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### Different Recommendations for Endoscopic Stent Insertion Depending on Tumor Location (Rt vs Lt)

#### 홍창원

국립암센터

외과에서 다루는 수술 가능한 폐쇄성 결장암을 암의 위치를 기준으로 우측과 좌측을 나누고 감압 없이 수술 전 감압을 위한 SEMS(Self Expanding Metallic Stent)를 한 군을 실험군, 수술 전 감압없이 응급수술을 한 군을 대조군으로 한 논문들을 리뷰하였다.

#### 1) 수술 가능한 폐쇄성 우측 결장암

논문 검색을 시행한 결과 총 8개의 연구가 확인되었으며 모두가 후향적 코호트 비교 연구였다. 연구들은 네덜란드에서 3개, 한국에서 2개, 일본에서 3개, 중국에서 1개가 이루어졌으며 실험군 대상자수도 한 연구에서는 1,500명이었으나 대부분의 연구가 50명 이내의 소규모 연구였다. 또한 해당 연구 중에 무작위 대조 연구(RCT)는 질병의 특성 상 이루어지기 어려워 후향적 코호트 비교 연구만을 분석하였으므로 해석과 적용에 있어서는 개별 기관의 특성과 환자 내원 당시의 조건 등을 고려하여야 할 것이다.

결론은 실험군은 대조군에 비해 stoma formation을 적게 하고, 30days mortality가 낮고 3yr DFS은 조금 높게 나왔으나 SEMS insertion 과정에서 매우 적지만 bowel perforation이라는 심각한 합병증의 가능성이 있고 우측 결장암의 위치적 특성 상 수술 전 감압을 하지 않아도 대부분의 경우에 stoma를 만들지 않고 primary anastomosis를 할 수 있어 stoma formation을 적게 할 수 있다는 이점이 적용되는 경우가 극히 적으며 환자의 내원 시간이나 응급의 정도, 해당 기관의 인적, 물적 조건에 따라 SEMS insertion은 제한적이다. 따라서 수술적 치료가 가능한 폐쇄성 우측 결장암의 경우에 수술 전 감압을 위한 SEMS insertion은 시행 여부에 따른 이익, 위해의 차이가 유의미하게 크지 않으므로 반드시 권고되지는 않는다.

#### 2) 수술 가능한 폐쇄성 좌측 결장암

총 18개의 연구가 확인되었으며 11개의 RCT, 7개의 후향적 코호트 비교 연구였다. 연구들은 네덜란드에서 3개, 스페인에서 3개, 이탈리아에서 3개, 영국에서 2개, 홍콩, 이집트, 영국, 싱가포르, 프랑스, 한국, 일본, 포루투갈에서 각 1개씩 이루어졌으며 실험군 대상자수도 한 연구에서는 196명이었으나 대부분의 연구가 50명 이내의 소규모 연구였다.

실험군은 대조군에 비해 stoma formation을 적게 하고, OC이 낮은 결과를 보였다. 30days mortality도 유의하지 않지만 낮은 경향을 보였다. 또한 primary anastomosis도 유의하지는 않지만 실험군에서 조금 더 높게 보고되었다. 그러나 물론 유의한 결과는 아니었지만 recurrence가 실험군에서 높게 나왔고 3yr, 5yr DFS과 3yr, 5yr OS이 실험군에서 약간 높았으나 유의하지 않다는 점은 폐쇄성 좌측 결장암에 있어서 SEMS insertion이 종양학적 측면에서는 별로 도움이 되지 않는다고 할 수 있겠다. 그러나 수술적 치료가 가능한 폐쇄성 좌측 결장암의 경우 SEMS insertion을 통해 적절한 수술 전 감압이 이루어지면 stoma를 만들지 않고 primary anastomosis의 비율이 올라간다는 점에서 종양학적 측면에서 큰 차이가 없다면 환자의 내원 시간이나 응급의 정도, 해당 기관의 인적, 물적 조건에 따라 SEMS insertion을 고려해 볼 수 있을 것이다.



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# 3 vs 6 Months Adjuvant FOLFOX or CAPOX in Colon Cancer Patients

배정훈

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# Efficacy of Immunotherapy for Colon Cancer Patients with MSI-H/dMMR

#### 박병수

부산의대

핵심질문: MSI-H/dMMR 인 전이성 결장암 환자에서 기존 항암요법에 비해 면역항암치료는 반응률이 더 우수한가?

	포함 및 배제 기준
대상 환자(P)	MSI-H/dMMR인 전이성 결장암 환자
중재(I)	면역항암치료 (pembrolizumab, nivolumab+/-ipilimumab)
비교군(C)	기존 항암요법 (FOLFOX or FOLFIRI ± bevacizumab or cetuximab)
결과(O)	primary endpoint: OS, PFS / secondary: ORR, DCR, QoL, Safety
연구설계(SD)	Phase III RCT, phase II clinical trial, 후향적 연구를 포함한 연구

#### 권고문과 권고 등급

### MSI-H/dMMR 인 전이성 결장암 환자에서 면역항암치료를 시행할 것을 권고한다 (근거수준, Low; 권고등급: Do, Conditional)

- 하나의 2군 병행 무작위 대조 시험(RCT) → 근거수준은 Low
- MSI-H/dMMR 환자군이 MSS/pMMR환자군에 비해 수가 적기 때문에 대규모 3상 임상시험을 계획하기 힘들다는 점을 고려 & 암 치료 표적으로서의 유전자 변이와 그에 대한 약물의 actionability를 고려 → 면역항암치료를 시행할 것을 권고
- 현재, 면역항암치료제의 높은 비용으로 인한 건강 불평등 증가로 권고등급을 conditional로 결정, 향후 국내 의료보험에서 면역항 암치료제가 보험 적용이 되어 비용 문제가 감소하게 되면 strong으로 권고하는 것을 고려.



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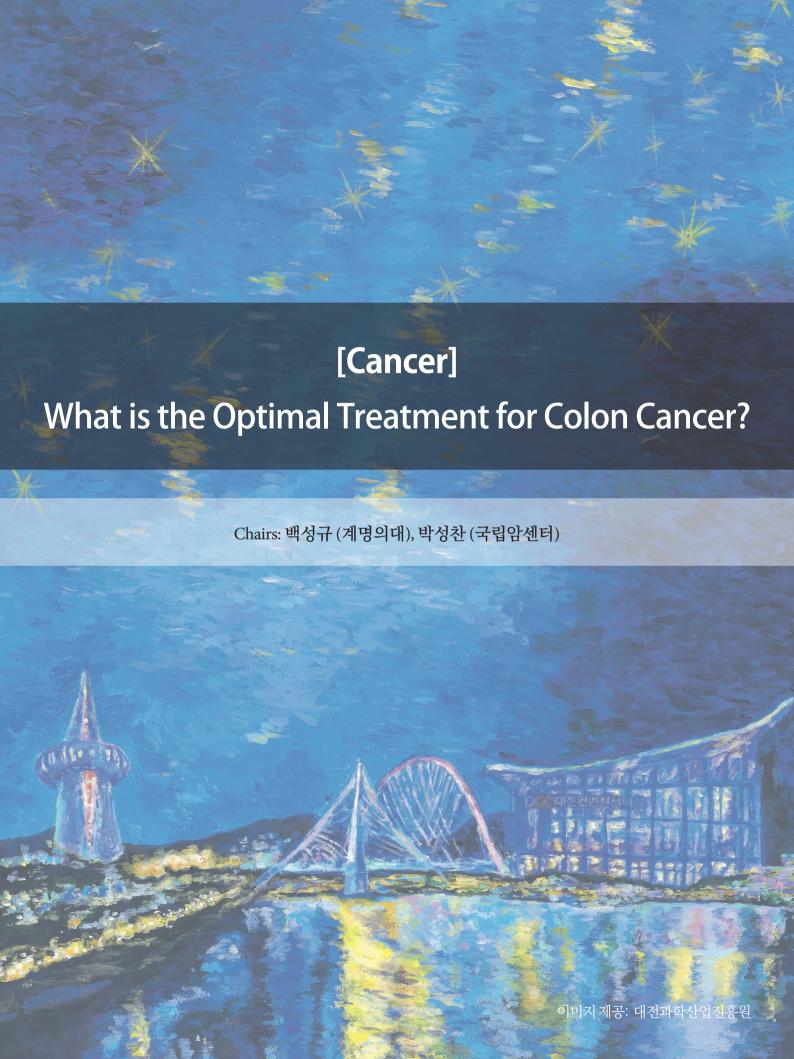
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## Optimal Treatment for Resectable Colorectal Liver Metastases

윤영철

가톨릭의대

Liver metastases are found in approximately 50% of patients diagnosed with colorectal cancer. For patients with colorectal cancer liver metastases, if the liver metastases cannot be resected, the prognosis is poor with a 5-year survival rate of less than 10%. For complete cure, surgical resection of liver metastases is necessary, and resection is possible in less than 50% of patients with liver metastases. With the advancement of liver surgery, most tumors that exist only within the liver can be treated, but there are some things to consider. First, the treatment results of RFA(radiofrequency ablation) or MWA(microwave ablation for liver metastases are gradually improving recently. Can these treatments replace liver resection? Second, is it possible to treat primary lesions of colon cancer and liver resection simultaneously or sequentially? Third, which treatment is more effective: chemotherapy before liver resection or upfront surgery. In addition, ongoing research is being conducted on the results of liver transplantation, which has recently been performed for colorecal cancer liver metastases, and in what cases it is best performed. Accordingly, we would like to present the results of the research done so far and discuss what further research should be done in the future.





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# Prevention of Colon Cancer: Modulation of Specific Species of Microbiome

#### 김영일

울산의대

Recent advancements in microbiome research have aroused significant interest in its role in colorectal cancer. The microbiome, comprising diverse microbial communities residing within the gut plays a pivotal role in human health. This lecture aims to explore the potential of modulating specific species within the human gut microbiome for the prevention of colorectal cancer.

The gut microbiome is a complex ecosystem of microorganisms. Mechanistically, dysbiosis of gut microbiome can lead to inflammation, genomic instability, and alterations in the host response, all contributing to carcinogenesis.

Various strategies for modulating the gut microbiome included dietary interventions, lifestyle change, and probiotic supplementation. Much has been enlightened over the last decade in the composition of gut microbiome and its role. However, clear benefits of clinical application are yet to be proven. Despite in vitro and in vivo experimental data, evidence on modulating gut microbiome to prevent colorectal cancer is still preliminary. Future research directions are in need for more clinical trials.

Modulating specific species of gut microbiome holds significant promise for the prevention of colorectal cancer. By implementing dietary, lifestyle, and medical interventions targeted at restoring microbial balance, we may potentially reduce the incidence and burden of colorectal cancer. Continued research efforts are crucial for advancing this field and improving colorectal cancer prevention strategies.



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# Colon Cancer Obstruction: SEMS with Interval Operation vs Emergency Operation

#### 김종완

한림의대

Common emergency presentations include large bowel obstruction, perforation, and hemorrhage. Obstruction is a common symptom of colorectal cancer, with an incidence range of 15% to 29%. The left colon is more prone to obstruction, most commonly in the sigmoid. Reasons for this include a tendency toward morphologically more annular lesions, a relatively narrow colonic luminal diameter, and a thicker stool consistency.

Cancers resected emergently are typically of a more advanced T stage, higher histologic grade, and more likely to exhibit lymphovascular invasion and liver metastases. Rates of morbidity, mortality, and stoma formation are higher for patients requiring emergent surgery (ES) compared with those managed electively.

Self-expandable metal stents (SEMS) were first developed in the 1990s for palliation of obstructions from unresectable tumors. SEMS have been used for curative decompression as a bridge to elective surgery and for palliative treatment of unresectable colorectal cancer obstruction.

SEMS was associated with lower rates of stoma formation and postoperative complications, shorter hospital stay, and higher rates of primary anastomosis in previous studies. When used as a bridge to elective surgery, SEMS could also permit bowel decompression and preparation and provide sufficient time for preoperative assessment for tumor staging and stabilization of comorbidities. Moreover, minimal invasive surgery is possible after decompression with a metallic stent.

One of the major concerns of stent insertion is the risk of dissemination of tumor cells as a consequence of bowel perforation. SEMS-related perforations occurred in 4-12%. Migration and restenosis are potential complications associated with stent insertion.

Several studies and meta-analyses have compared the long-term oncologic outcomes, including overall survival, disease-free-survival, relapse-free survival, and disease recurrence between stent placement and ES. The overall results did not indicate the superiority of either strategy.

SEMS insertion as a bridge to surgery was associated with faster recovery, a lower rate of stoma formation, and a higher rate of minimally invasive surgery, combined with similar oncologic outcomes to those of ES. SEMS insertion as a bridge to surgery could be considered as an alternative to ES for the management of patients with obstructive colon cancer.



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# Detection of Minimal Residual Disease with ctDNA after Curative Resection

유승범

서울의대

Circulating-tumor DNA (ctDNA), which is found in blood stream as a fragmented cell-free DNA (cfDNA) is originated from the circulating tumor cells or directly from the tumor itself, and can be released from the apoptosis or necrosis of tumor cells or even the viable tumor cells. It can be detected highly in the metastatic colorectal cancer (CRC) and also even the non-metastatic CRC. The detection of ctDNA after surgery for CRC can indicate the presence of remaining cancer cells and is associated with a very high risk of recurrence. Recently, it has been considered as an indicator for treatment response or novel prognostic marker for recurrences after surgery. The ctDNA could be detected in about 20% in stage III CRC after surgery and also 7-8% in stage II CRC. The risk factors of recurrence after curative resection for CRC has been revealed in numerous studies, and recently the ctDNA has been suggested to be the most important factor for better oncologic outcomes. Detection of ctDNA after surgery has also been introduced as a reasonable indication for adjuvant chemotherapy. Intensive adjuvant chemotherapy for 6 month could be beneficial for the ctDNA positive patients in stage III CRC. In stage II CRC, there are still controversies in the detection of the patients who can take advantages from the adjuvant chemotherapy, and the ctDNA might become a game-changer. Prospective randomized-controlled trials are ongoing for answering those questions for the utility of ctDNA for selection of adjuvant chemotherapy after curative surgery in non-metastatic CRC. The ctDNA can be detected also in stage I CRC even though the concentration was lower than advanced diseases. Although there has been no evidence of additional adjuvant chemotherapy in stage I CRC, recurrences can develop in 2-5% and they should receive the additional treatment for better oncologic outcomes. The serial checking the ctDNA after surgery can be the useful biomarker for monitoring the recurrences in the early CRC. However, the time for getting the first blood sample after surgery and interval for routine check for postoperative follow-up surveillance of recurrence are still investigated and technical improvement of detection rate in early CRC is also necessary. Curative resection for CRC should aim to achieve no residual disease or try to minimize the remaining tumor as much as possible. Radical resection with adequate margin is a principle for complete removal of the tumor without leaving microscopic residual disease. Extensive lymph node dissection can remove whole regional lymph nodes potentially existing tumor cells in surgical field, and complete mesorectal excision (CME) or D3 lymph node dissection have presented better oncologic outcomes. Preventions of tumor cell spillage or spread into blood circulation during the surgery are also important for prevention of recurrence. Total mesorectal excision (TME) without the tearing proper rectal fascia is the standard procedure of en-bloc resection for rectal cancer. No-touch isolation technique with lymphovascular ligation first before the mobilization of the cancer-bearing colon segment and minimal manipulation of the tumor was one of the surgeon's efforts to minimize the minimal residual disease (MRS), which will not be detected after surgery. Even in the recent era of minimally invasive surgery with laparoscopic or robotic system, these surgical principles are still critical for cure of the CRC with diminishing the possibility of postoperative detection of ctDNA from the MRS. Further researches are necessary for the relations between the surgical procedures and detection of ctDNA after surgery. The goal of cancer treatment is cure. It might be possible that the ctDNA can provide the chance to take one more step closer to conquer the cancer in the near future. In the CRC, it has been reported to be helpful to applying the additional treatment after surgery as individual precision medicine and monitoring the early detection of recurrences. Technical advancement for increasing detection rate in early CRC is essential to achieve better outcomes.



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# **High PCI Index Peritoneal Metastasis: CRS + HIPEC or Systemic Chemotherapy?**

이성철

단국의대

Peritoneal metastases (PM) are observed in approximately 8% of patients diagnosed with colorectal cancer, either synchronously or metachronously during follow-up. Peritoneal metastasis present unique challenge as this metastatic site was historically associated with short survival, severe symptoms, limited extension of survival, and a response rate not exceeding 30% after systemic chemotherapy. However, controversy over the treatment of peritoneal metastases is still ongoing. Since it is a systemic disease, research is still ongoing on whether chemotherapy should be given priority or whether it should be considered a local metastasis and proceed with local treatment. Traditionally, peritoneal metastases are considered terminal cancer, and palliative chemotherapy is the standard.

Therefore, patient selection is very important to perform CRS HIPEC surgery. Additionally, various imaging tests are suggested for patient selection. Computed tomography (CT) serves as the primary imaging modality was sensitivity (60% to 94%). Peritoneal extension is evaluated by different scores, the most common of which is that established by Sugarbaker: the peritoneal cancer index (PCI) ranging from 0 to 39. Noninvasive preoperative modality with high sensitivity, specificity, and accuracy in detecting PM is crucial for the selection of eligible patients for CRS-HIPEC. Despite careful patient selection, most patients with CRC-PM will eventually develop recurrent disease. Known prognostic factors other than the PCI score and CC score with a negative impact on overall survival are locoregional lymph node metastases, a low differentiation grade, and the presence of a signet ring cell histology. The peritoneal surface disease severity score (PSDSS) and the colorectal peritoneal metastases prognostic surgical score (COMPASS) are validated prognostic nomograms used as a clinical score for the prediction of patient survival after CRS-HIPEC.

Randomized studies examining the effect of CRS and HIPEC for colorectal peritoneal metastasis (CRPM) remain scarce, with retrospective studies dominating the available literature. Dutch study conducted between 1998 and 2001, 105patients were randomized. Systemic chemotherapy with 5-FU and leucovorin (n=51) VS CRS and HIPEC involving MMC (n=54). Significantly longer Disease-specific survival of 22.2 months (p=0.028) (vs chemo. 12.6mo). Complete cytoreduction had significantly improved survival.

The Korean Society of Peritoneal surface Malignancies conducted research to establish peritoneal cancer treatment guidelines. Among them, there was a question that was highly relevant to this lecture: "At what level is the degree of peritoneal metastasis (PCI score) of colon cancer an indication for cytoreductive surgery & HIPEC?" Based on analysis based on several studies, "For patients with peritoneal metastasis of colorectal cancer, tumor reduction surgery and intraperitoneal hyperthermic chemotherapy are recommended when the PCI score is 17 points or less." proposed recommendations, although they are very weak. The recommendation was written based on the following comparative study by Diane Goere et al. (Ann Surg Oncol (2015) 22:2958–2964), and there was a lack of other randomized studies or comparative studies that could be used as evidence.

CRS HIPEC surgery is a complex surgery with a morbidity of close to 30% and a considerable mortality, so preoperative preparation and consent are important. Because long-time surgery and the resection of various organs are required, it is advantageous to take a multidisciplinary approach and maintain sufficient manpower. And the CRS HIPEC training and mentoring system is needed for the future. This study aimed to determine a threshold value above which CCRS plus IPC may not offer survival benefit compared with systemic chemotherapy. And this study confirmed the major prognostic impact of PC extent. When the PCI exceeds 17 in PC of colorectal origin, CCRS plus IPC does not seem to offer any survival benefit.

CCRS followed by HIPEC or IPC achieves pro longed survival, but only for selected patients. When PCI is higher, Both the colorectal surgeon and the patient should be fully aware of the sparse expected benefits and the significant risks incurred. We need more information and should wait the results of ongoing RCT & pre-clinical study.



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### **Lung Oligometastasis: VATS or SABR**

양승윤

연세의대

The management of lung oligometastasis from colon cancer has experienced significant evolution, marked by the refinement of surgical techniques and the advent of stereotactic ablative radiotherapy (SABR). This evolution necessitates a comprehensive examination of the outcomes and toxicities associated with these therapeutic modalities. This overview aims to compare the outcomes and toxicities of stereotactic radiotherapy (SRT) versus surgical resection for the treatment of lung metastases originating from colon cancer, drawing upon the experiences of the Yonsei Cancer Center.





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## **Microbiome: Emerging Dimension of Information**

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Surface of human body, such as skin, oral cavity, gut, and reproductive tracts, accommodate trillions of microorganisms, and growing evidences support that the microbial community provides previously unappreciated layer of information for diagnosis, treatment, and stratification of many disorders.

Through 16S rRNA gene sequencing and survival analysis, we revealed that the gut microbiota harbors non-redundant information that improves prediction of medical outcomes for colorectal cancer (CRC) treatment. A total of 333 primary CRC patients were recruited and provide fecal samples within two weeks before a surgical resection. As a result, we identified *Prevotella*, one of two representative genera of human gut microbiota, as a potent biomarker for better prognosis of CRC, while suggesting three bacterial species as novel biomarkers for detrimental outcomes (progression or decease). The microbiota-based hazard score outperformed widely used prognostic biomarker, such as carcinoembryonic antigen and fibrinogen, and it non-redundantly enhanced the performance of prediction model with the other indicators. At last, metagenome inference proposed certain microbial pathways pertaining to the improved or detrimental outcomes, which motivate further experimental validation.

This study is the first successful case of exploiting non-invasive fecal microbiota as potent and independent biomarker for CRC, which should provide a novel and complementary dimension of information to regulate many microbiota-associated human diseases.



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## Satellite-based Regenerative Medical Research in Space

#### 박찬흠

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Astrobiology and regenerative medical research in space are primarily focused on the unique environment of microgravity and radiation experienced in space. These studies go beyond understanding the impact of body changes and disease occurrence in astronauts to include regenerative medicine applications for terrestrial use, manufacturing of anticancer drugs, and advancements in artificial intelligence. The goal is to unravel the underlying causes of long-term degenerative brain diseases, explore lifespan extension, develop innovative drug delivery methods, and pioneer new treatments. Research conducted on the space station has its limitations, ranging from the challenges of training astronauts for research purposes to complex mission requirements and ensuring astronaut safety when studying high-risk pathogens and cancer cells. However, there has been a growing interest in leveraging small satellites as an alternative research platform due to their relatively lower costs, although they present higher technical demands compared to the space station. In 2022, independent astrobiology and regenerative medical research took a significant leap forward with the development of the Korean space launch vehicle, Nuriho, utilizing indigenous technology. As a result, the launch of BioCabinet, a cutting-edge system comprising a bio 3D printer and 3D cell culture capabilities, is scheduled for 2025. Subsequently, BioRexs, a Returned Biomodule, will be launched in 2027. These groundbreaking studies will not only shed light on the physiological changes and diseases experienced in the space environment but also pave the way for the development of revolutionary treatments and medical technologies.



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## 인공지능 연구 기초

#### 최은경

서울의대

컴퓨터 과학의 한 분야인 인공지능은 일반적으로 인간이 수행하는 추론 작업을 모방하는 알고리즘을 말한다. Recognition과 prediction 과 같은 작업에서 기계가 학습하고 개선할 수 있게 하는 기술을 기계 학습이라고 하며, 이는 인공지능의 하위 분야이다. 최근의 컴퓨팅 기술의 발전과 인공지능 기술에 대한 접근성의 향상으로 인공지능 및 기계학습 관련 연구가 의학에서도 급속도로 증가되고 있다. 하지만 의료인과 데이터과학 공학자들 간의 전문 지식 분야의 차이로 인해 인공지능 솔루션의 임상적 관련성, 설명가능성, Workflow 호환성, 인공지능서비스의 질적 향상에 제한을 가지게 된다. 의료인과 인공지능 개발자 간의 언어 장벽이 생기게 된다. 또한, 여러 저널의 편집자와 리뷰어들이 이러한 기술 뒤에 있는 기본적인 아이디어에 익숙하지 않을 수 있어, 의학적 기여도가 높을 가능성이 있는 인공지능연구를 출판하지 못하거나, 도리어 공학적으로 질적인 문제가 있는 연구를 출판하게 되는 경우가 있다. 본 발표에서는 의료인으로서의학연구에 인공지능을 적용하기 위해 알아야 할 기본 지식과 연구를 진행함에 있어 고려해야 할 상황들을 검토해 보고자 한다. 이를통해 의료인이 인공지능을 의학연구에 보다 효율적으로 적용할 수 있고, 인공지능 문해력과 사고방식을 향상시키는 것을 목표로 한다.



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## Current Trends in Patient-Reported Outcome (PRO) Studies for Patients and Survivors with Colorectal Cancer

심진아

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This session explores the latest trends and applications in patient-reported outcome (PRO) studies focusing on patients or survivors of colorectal cancer (CRC). Evaluating PROs, which encompass self-reported health status, including symptoms, functional status, and quality of life, is invaluable in oncology as it provides unique insights into individuals grappling with cancer and its aftermath on their health. Moreover, PRO evaluation assists healthcare professionals in identifying the unmet physical, emotional, and social needs of cancer patients and survivors, paving the way for personalized clinical or psychosocial interventions. By analyzing recent data, this research sheds light on how patients perceive and report their symptoms, emotional well-being, and daily functioning. Additionally, it investigates emerging patterns in PRO assessments, considering advancements in technology, and patient-centered care. Understanding these contemporary trends is crucial for optimizing treatment strategies and enhancing patient care in the ever-evolving landscape of CRC management. Furthermore, this study introduces research aimed at identifying patterns of concurrent multi-symptoms among CRC survivors using network analysis or clustering methods. Specifically, it identifies cluster membership for subgroups of survivors based on a symptom inventory relevant to advanced stages of colorectal cancer. It evaluates detailed treatment and sociodemographic factors associated with individual symptom clusters and tests associations of symptom clusters with self-reported health-related quality of life (HRQOL) and mortality.



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## Chat GPT를 이용한 연구 기초

#### 김종엽

건양의대 이비인후과

이 강의에서는 데이터 기반 연구 방법론에 있어 ChatGPT와 같은 인공지능 도구의 활용을 중심으로 탐색합니다. 전통적인 연구 방법론에 비해 데이터 처리와 분석, 아이디어 발굴 과정에서 ChatGPT가 어떻게 연구자들의 작업을 간소화하고, 효율성을 높이며, 연구의질을 개선할 수 있는지를 심층적으로 살펴볼 예정입니다.

강의에서는 먼저 데이터 전처리와 분석 단계에 대해 집중적으로 다룹니다. 연구 데이터를 처리하는 과정에서 발생할 수 있는 다양한 문제들, 예를 들어 데이터의 형식화, 누락 데이터 처리, 이상치 탐지 등을 ChatGPT가 어떻게 해결할 수 있는지에 대한 사례를 통해 설명합니다. 또한, ChatGPT를 활용한 통계적 분석, 시각화 기법, 그리고 복잡한 데이터셋에서 의미 있는 결과를 도출하는 전략에 대해서도 논의합니다.

또한 연구 결과의 해석과 논문 작성 과정에서 ChatGPT의 역할을 탐구합니다. 어떻게 인공지능 도구가 연구 결과의 해석을 돕고, 해당 과정을 지원할 수 있는지 알아봅니다. 이 과정에서 연구자들이 고려해야 할 ChatGPT의 한계와 주의 사항에 대해서도 상세히 논의합니다.

마지막으로, 강연은 연구 방법론에서의 인공지능 도구 활용에 대한 미래 전망을 제시합니다. ChatGPT와 같은 도구들이 연구 환경에 가져올 장기적인 변화와 연구자들이 이러한 변화에 어떻게 적응해야 할지에 대한 전략을 모색합니다. 특히, 인공지능 기술의 발전이 연구 윤리, 데이터 보안, 그리고 학문적 진실성에 어떤 영향을 미칠지에 대해 심도 있는 논의를 통해 참석자들에게 깊은 통찰을 제공하고자 합니다.





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# 한국사회에서의 의료윤리

박형욱

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### **Professional Experience**

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# 의료사고에 대한 이해와 의료분쟁의 개괄 및 의료소송의 절차

### 김서형

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# 판사 입장에서 바라본 의료소송과 의료 감정

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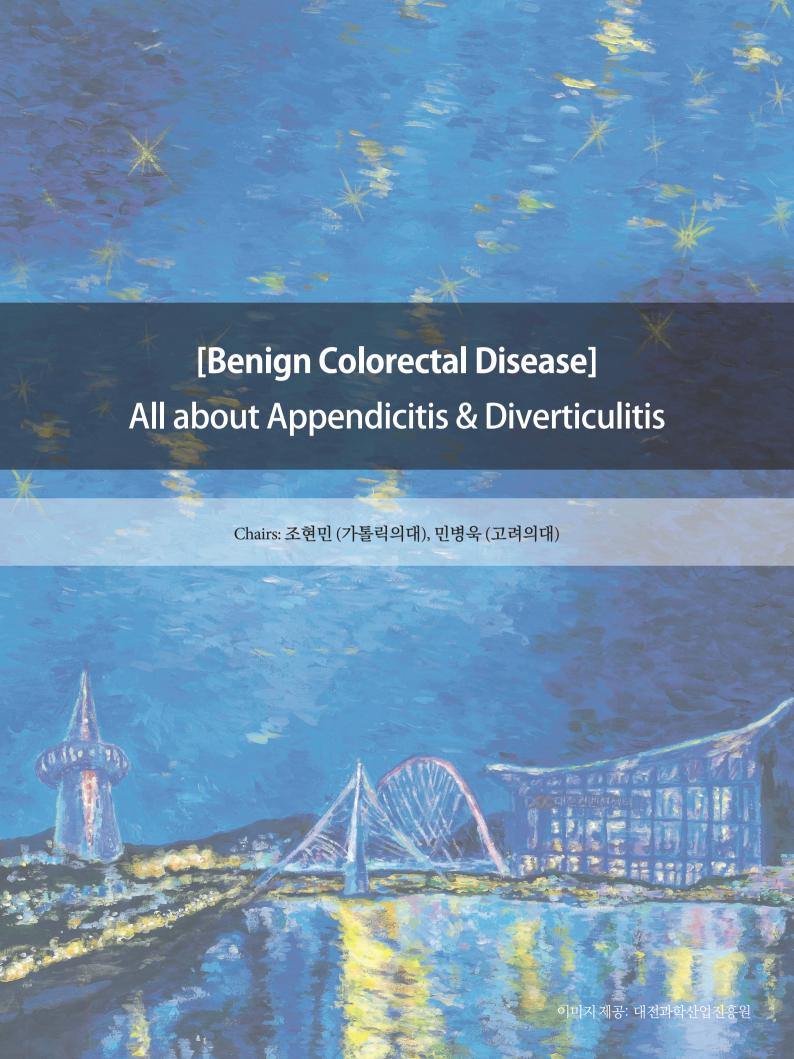
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# 의료감정의 원칙과 오류

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# Surgical Procedure for acute appendicitis: Is there a Room for Further Improvement?

### 이길용

가톨릭의대

급성 충수염은 외과에서 흔히 접할 수 있는 응급 상황 중 하나로, 염증 상태에 따른 적절한 치료 및 이에 따른 효과는 환자의 결과에 큰 영향을 미칩니다. 합병증이 동반되지 않은 선택적인 상황에서 수술적 치료 없이 보존적 치료 만으로 급성 충수염을 치료할 수 있지만, 그 외에는 수술적 치료가 표준 치료로 자리 잡고 있다. 현재까지 급성 충수염 수술에 대한 다양한 방법이 제안되어 왔으나, 여전히 개선의 여지가 있는지에 대한 의문이 남아있습니다.

급성 맹장염의 수술적 치료에서는 환자 개개인의 상태와 특성을 고려한 맞춤형 접근이 필수적입니다. 최소침습수술이 보편화된 현실속에, 최신 의료 기술과 수술 기법을 통합하여 환자 중심의 최상의 결과를 도출하기 위한 방안을 고민해 봐야 할 때 입니다. 특히, 누구나 쉽게 배울 수 있는 수술 기법 개발, 수술 후 합병증 발생률을 줄여서 빠른 회복을 꾀하고, 환자의 삶의 질을 높이는 방안은 현대 의료인이 가장 고려해야 되는 대상입니다.

이에, 본 발표에서는 급성 충수염 수술에 사용되는 수술방법의 발전 과정 및 각 수술 방법에 대한 장단점을 살펴보고, 최신 연구에 대한 고찰을 통해 치료 결과를 향상시킬 수 있는 새로운 방법이 있는지 확인하고자 합니다. 무엇보다도, 더 나은 결과를 위해 수술 절차 등에 대한 혁신적인 시각을 제시함으로써, 급성 충수염의 치료에 대한 미래적인 방향을 모색하고자 합니다.



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# Acute Appendicitis in High Risk Patients: Surgery vs Antibiotics

신정경

성균관의대



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# Medical Treatment and Prevention of Diverticulitis: Diet, Medications, etc

박윤영

경희의대

Diverticulum is the most common non-tumorous anatomical condition found in the colonoscopy screening. Prevalence of diverticulosis increases as aging. Among patients with diverticulosis, approximately 4-15% of lifetime chance of developing diverticulitis, and about 15-36% of patients with episode of diverticulitis will experience recurrent episodes.

The lecture will address the etiology of diverticulitis, highlighting the influence of diet on diverticulitis. We will also examine the impact of lifestyle choices, including diet patterns, smoking, and BMI, on diverticulitis incidence, underlined by evidence linking unprocessed red meat consumption and diet-related inflammatory markers to increased risk. Additionally, this talk will explore genetic factors contributing to diverticulitis, referencing studies that identify specific genetic mutations associated with the condition. Management strategies for uncomplicated diverticulitis, including the debated need for antibiotics and dietary restrictions during flares, will be discussed. Strategies for preventing recurrence, such as the use of rifaximin, mesalamine, and probiotics, will be evaluated based on recent research findings.



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# What Should We Think in Emergency Surgery for Sigmoid Diverticulitis?

장제호

을지의대

The prevalence of left colonic diverticular disease has been rising in Korea as a result of westernization and aging populations [1]. Acute complicated diverticulitis including abscess, fistula formation, stricture, and perforation of the colon that may require surgery. Emergency surgery is typically recommended for patients with generalized peritonitis rather than localized peritonitis. Experts agree that when treating patients with severe sepsis or septic shock, the emergency surgical strategy should be determined by the patient's hemodynamic response after the first fluid resuscitation [2]. The optimal surgical treatment in emergency situation for acute complicated diverticulitis is a matter of debate and has undergone significant changes. Primary resection and diversion (Hartmann's procedure) followed by delayed colostomy closure is the current standard of emergency surgical care. Due to the development of interventional and minimally invasive measures, differentiated concepts are now used to treat acute complicated sigmoid diverticulitis. Primary resection and anastomosis with or without proximal diversion and laparoscopic lavage are alternatives to Hartmann's procedure that may provide an improved outcome in properly selected patients [3-5].

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# What Should We Think in Elective Surgery for Colonic Diverticulitis?

#### 안태성

순천향의대

Colon diverticulitis는 흔한 질병이고, 다양한 임상양상으로 나타난다. 흔히 사용되는 Hinchey grade도 임상증상에 따라서 평가하며 이에 대한 객관적인 지표를 잡기도 어렵다. diverticular abscess나 panperitonitis가 형성되면 적극적인 수술을 요한다. 하지만, 최근 diverticulitis 발생 보존적 치료가 효과를 보고, 이후 경과 관찰도 좋은 효과를 보기에 치료의 계획을 세우는데 고려할 요건들이 많아졌다. 이에 안정적인 diverticulosis 환자에서 언제, 어떤 상황에서 수술을 고려해야할지 논의가 필요할 듯하다.

Diverticulosis 의 수술에 대한 indication은 standard가 없다. 2000년 초반에는 여러가지 경험적 접근이 권해지기도 하였다. 이에 대표적으로 1) Uncomplicated diverticulitis가 1년에 2회 이상 발생, 2) 60세 이하의 환자 등이었다. 이는 60세 이하의 환자는 적극적인 경제활동에 영향을 받을 수 있으며, 여생동안 또 attack의 가능성이 높다고 판단하였기 때문이며, 2회 이상 attack이 발생한 경우 추후 또 발생할 가능성이 높고, 다음 발생시엔 severe complication 의 가능성이 높다고 생각되었기 때문이다.

물론 재발의 가능성이 높긴 하지만, 2차 발생 후 3차 발생의 비율이 1년 20%이내이며, 이 또한 severity와는 관련성이 높지 않았다.

이렇기 때문에 Raffertyl 등은 "the number of attacks of uncomplicated diverticulitis is not necessarily an overriding factor in defining the appropriateness of surgery" 라고 하였다.

Colonic diverticulitis의 elective surgery를 하는 것은 환자의 상태에 따라서 고려해야한다. 그외에 elective surgery가 필요한 상황은 아래와 같을 것이다.

QoL의 영향을 주는 경우 2) Complicated diverticulum, 3) immunocompromised, 4) Age, 5) Cancer risk

특히 cancer risk는 명확한 상관관계를 보이지 않지만, 일부 연구에서 1.9~7.9% 의 발생율이 있고, 유전적인 관련성을 보이기에 주의가 필요하다.

그 외에 합병증 중에서 수술적 치료로 호전되지 않을 것으로 보이는 경우는 surgeon의 판단에 의존할 필요가 있다.

대표적으로 stenosis(obstruction), fistula, persistent abscess등은 환자와 충분한 상의 후 stoma를 피하는 방향으로 수술을 계획해야 할 것이다.





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# Method 심사 방법

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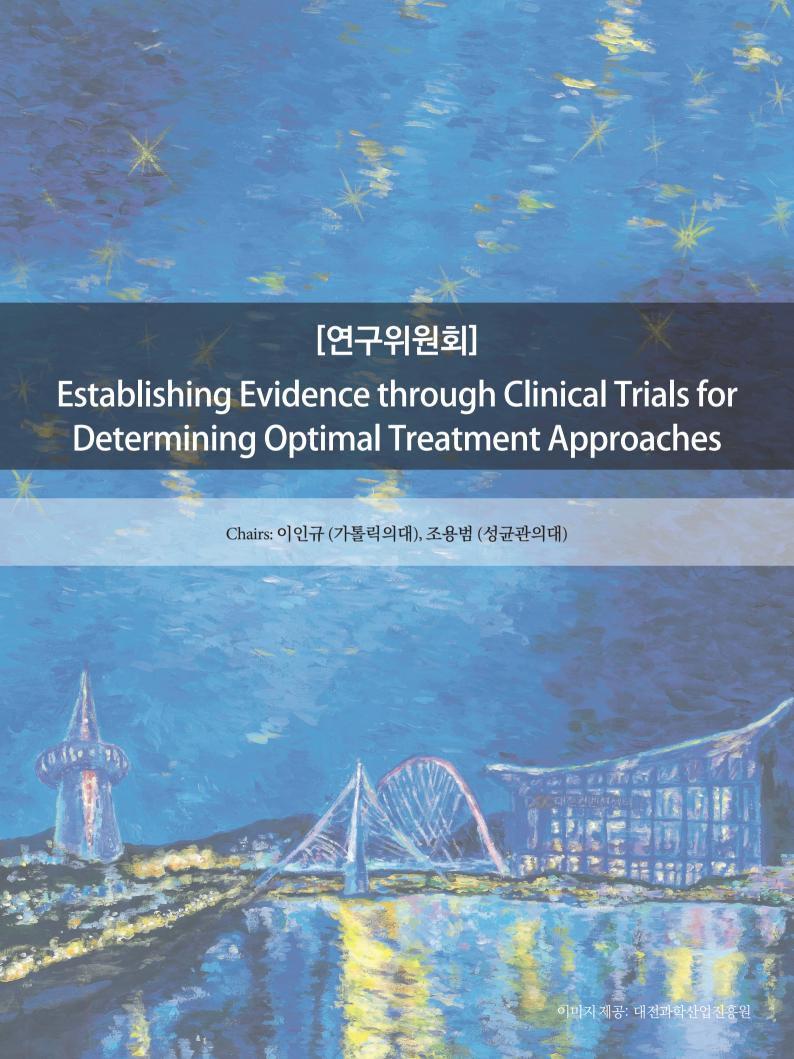
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## 투고 논문의 Table, Figure 심사를 위한 Tip

#### 이수영

전남의대

본 강의는 논문 심사자로서 Table과 Figure 부분에 집중하여 논문을 어떻게 평가할지에 대한 방법을 제시하고자 한다. 효과적인 시각 자료 작성의 중요성과 함께, 평가 기준과 주의사항에 대한 유용한 팁들을 다룰 것이다. 이는 더 나은 시각적 표현과 해석을 통해 논문 의 질 향상으로 이어지는 길이 될 것이다.





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# Making the Objective Guidelines from the Researches in National Cancer Center

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# The Journey of Minimally Invasive Surgery for Rectal Cancer with Seoul Colorectal Research Group (SECOG)

정승용

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# Efforts Towards Establishing Substantiation for Robotic Surgery in the Management of Rectal Cancer: The COLRAR Randomized Controlled Trial

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# Consolidation Chemotherapy: Evidence and Challenges in Korea

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경희의대

The new paradigm is already widely open for rectal cancer management, including total neoadjuvant therapy (TNT) and immunotherapy for MSI-H rectal cancer. Unfortunately, the Korean national insurance did not approve the TNT for rectal cancer.

To prove the efficacy of consolidation chemotherapy in advanced rectal cancer in Korea, The KONCLUDE trail started in 2017. The result of the KONCLUDE trail suggested the higher pCR rate compared to conventional treatment group. However, 3-cycle of consolidation is not enough to achieve more pCR. Furthermore, the primary aim of the rectal cancer treatment would be changed to sphincter preservation or TME or pCR, it would be revised to cCR and organ preservation rate for the best benefit of the patients.

A further trial aiming the cCR and Watch and Wait strategy is needed.



**신루미** 서울의대

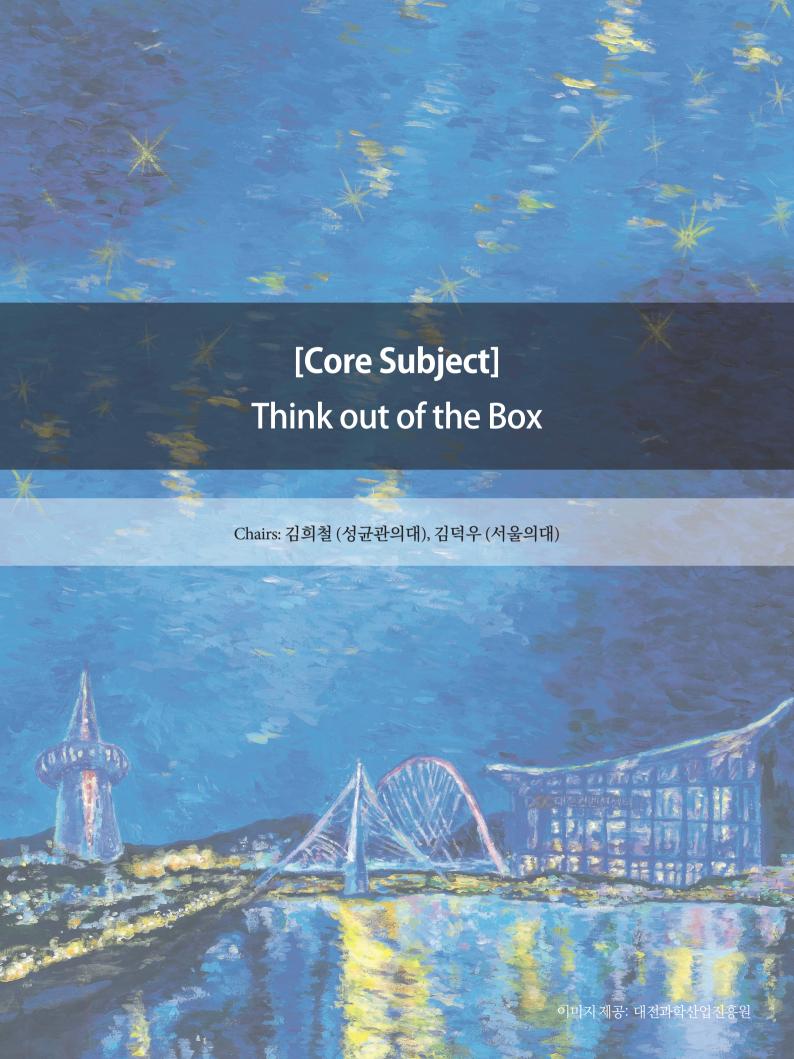
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# **Current and Future Perspectives on Multicenter Research at KSCP**

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## **Active Surveillance for Family Member of HNPCC**

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### **Organ Preserving Treatment for Rectal GIST**

#### 박병관

중앙의대

Gastrointestinal stromal tumors (GISTs) are the most common mesenchymal tumors of the gastrointestinal tract, commonly arising in the stomach (50%) and the proximal small intestine (35%) but rarely in the rectum (5%). Surgery is the mainstay of therapy for GISTs, and the main goals of surgical treatment of rectal GISTs are to achieve negative resection margins and to preserve the anal sphincter.

Imatinib has proven effective in the management of metastatic GIST, including as adjuvant therapy after complete tumor resection. Imatinib also showed clinical efficacy in converting unresectable GISTs. Surgical management of rectal GISTs requires consideration of several specific factors. Tumor rupture or failed tumor resection are well known to be highly aggressive prognostic factors and risk factors for local recurrence in the management of GIST. Due to anatomic limitations such as a narrow pelvis, tumor rupture or positive margins are more common in the perioperative management of rectal GISTs than in other surgeries.

Studies about organ preservation of neoadjuvant imatinib for rectal cancer are not conclusive for now, because they are heterogenous, small numbers, and retrospective. Based on limited results, we are going to review what is the benefit of neoadjuvant imatinib. Further multicenter prospective study might be needed for solid evidence.



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#### Various Anastomosis in IBD

#### 윤용식

울산의대

#### 1. 서론

크론병은 대개 젊은 나이에 발병하여 평생 지속되고, 내과적인 약물치료로 완치가 되지 않으므로 평생 관리가 필요하다. 또한 만성적으로 악화와 호전을 반복하면서 염증은 진행하므로 유병 기간이 길어질수록 합병증의 발생 가능성은 증가하고 내과적인 치료로 호전이 어려운 합병증의 경우에는 수술이 필요하다. 크론병의 복부수술은 거의 대부분 장절제와 장문합을 시행하므로 여러가지 상황에 따른 문합방법의 차이와 장단점을 아는 것이 필요하다.

#### 2. Anastomotic configuration

- 고려사항: 연결하는 장의 위치와 종류 (소장/대장), 문합부 주변의 염증 유무, 장의 직경, 장벽 비후 여부, 항문협착, 보험적용가능 여부 최근 다기관 연구에 의하면 문합방법에 따른 합병증의 차이는 없는 것으로 보고 된다.
- 1) End to end (EE): 주로 수기문합(hand-sewn)으로 시행되고, 장벽 비후가 동반된 장문합에서 시행된다. 최근 일부 연구에 의하면 SS에 비해 자연스러운 문합 방법으로 장기 추적관찰 시 복통이나 합병증이 적다는 연구가 있다. 문합부 주변에 염증이 없고, 연결하는 장의 직경 차이가 없다면 고려해볼 수 있다.<sup>2</sup>
- 2) Side to side (SS): 가장 많이 시행되는 문합법이고, 전통적으로 추천되는 표준 문합 방법으로 2020년 ECCO guideline에서도 내용은 바뀌지 않았다.<sup>3</sup> 문합부 주변에 염증이 있거나 소-대장 문합 등과 같이 직경 차이가 있는 경우 비교적 안전하고 쉽게 시행할 수 있다. 최근 Kono-S 문합이 재발률 감소에 도움이 된다는 보고들이 있어 사용이 늘고 있는 추세다.<sup>4</sup>
- 3) End to side (ES): Circular staple과 linear staple을 이용하여 직경의 차이가 있는 소대장 문합에서 시행할 수 있다. SS에 비해서 pouch 형태의 공간이 적게 생기므로 보다 자연스러운 형태의 문합이 가능할 수 있다.
- 4) Side to end (SE): 장협착이 심하여 근위부는 장비후와 직경이 크고, 원위부는 정상 장벽인 경우, SS가 시행하기 어려운 경우 고려할 수 있다. 또한 대장/직장 문합시 항문협착으로 circular staple이 항문으로 넣을 수 없는 경우에도 고려한다.

#### 3. 결론

다양한 문합 방법을 숙지하여 상황에 맞게 이용하면 합병증과 재발의 위험을 줄일 수 있다.

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### Fecal Incontinence: Medical or Surgical?

#### 홍광대

고려의대

The answer to fecal incontinence (FI) treatment doesn't seem to be medical or surgical treatment.

The options for treatment vary according to the cause, type, and severity of the FI.

Hence, the following therapeutic approach seems to be appropriate.

Firstly, we need to identify risk factors with a careful history. It includes central nervous system disorders, neuropathies, inflammatory bowel disease, obstetrical trauma, anorectal surgery, advancing age, diarrhea, and wide range of medications.

Secondly, we can further characterize the type and severity of FI adding a detailed physical examination. A visual inspection and careful digital rectal exam can help to inform a decision on further testing.

In this process, we can select the patients with underlying organic pathology such as colorectal cancer, inflammatory bowel disease, or rectal prolapse. If predominant symptom is diarrhea or constipation, we can treat accordingly with medication. Besides these cases, first line treatment can be performed with conservative manner including behavioral change, dietary adjustment, pelvic floor muscle exercise, and medical therapy (stool bulking and anti-diarrheal agents)

Thirdly, in patients whose symptoms are severe, do not improve with conservative (medical) therapy, further diagnostic testing is required. It includes anorectal manometry, endoanal ultrasound, defecography, or pelvic MRI.

We can try second line treatment with non-surgical interventions; it includes biofeedback, percutaneous tibial nerve stimulation, anal irrigation, and anal inserts. Or we can step up second line treatment with surgical interventions; It includes sacral neuromodulation, bulking injection, sphincteroplasty, and stoma.

Lastly, there have not been enough studies to provide evidence-based guidelines for FI. Hence, if available, a multidisciplinary approach is preferred. It is important to keep in mind that any treatment should be based on validated questionnaires based on the symptoms the patient complains of, and in the direction of pursuing the best quality of life.



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### **Update of Anorectal Physiology Test**

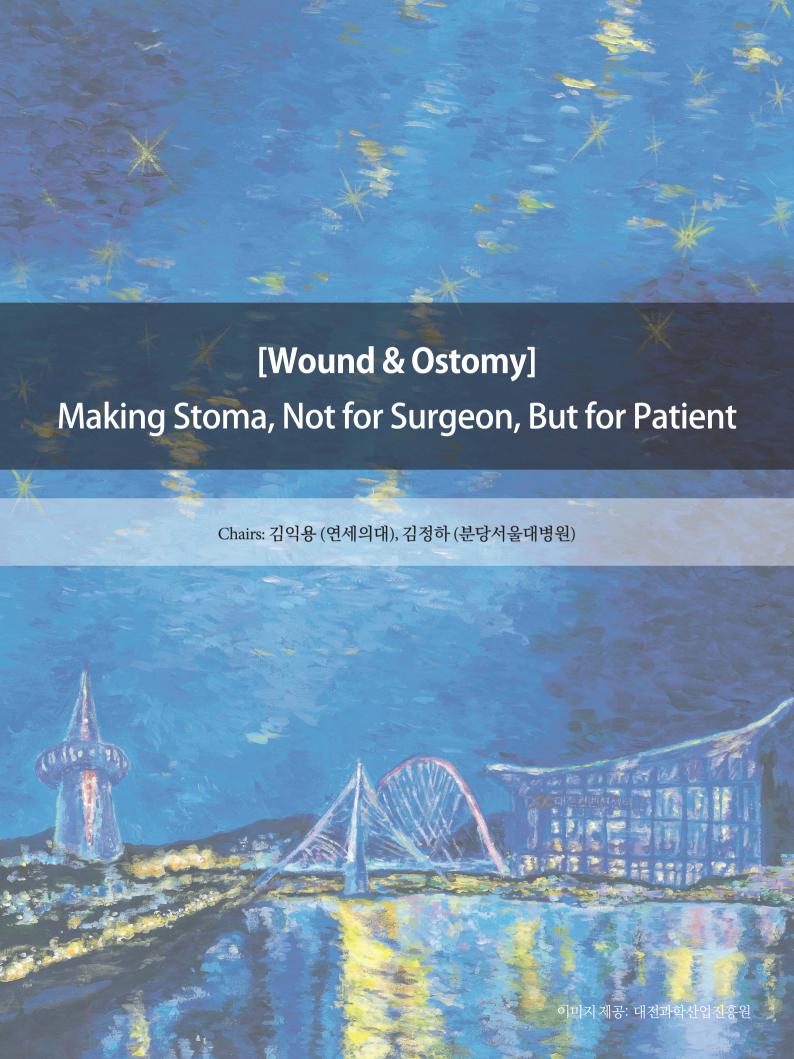
#### 곽하덕

전남의대

To measure anorectal physiology, physical examination of the patient is the most basic and important examination method. The focused physical exam consists of inspection and palpation of the perianal area for scars or absence of the perineal body from previous surgery, obstetric injury or other trauma; perianal disease such as prolapsed hemorrhoids, fistula, or anal warts; and signs of perineal irritant contact dermatitis due to fecal leakage (redness, skin loss, or rash). Inspection should also include assessment of underclothing for soiling and staining by feces. A digital rectal exam is performed to assess rectal contents, any masses, and the function, quality, and possible defects of the internal and external rectal sphincters and puborectalis muscle including voluntary and involuntary (e.g., during cough or Valsalva maneuver) squeeze pressure.

However, a more accurate diagnosis can be made through the additional tests below, which can help determine the better treatment. Specialized diagnostic testing utilizes anorectal function tests, endoanal ultrasonography, defecography, or magnetic resonance imaging.

- 1. Anorectal function tests include anorectal manometry, the rectal sensory test and the balloon expulsion test. These tests are typically used to evaluate anorectal sensorimotor function, functional anorectal pain, preoperative anorectal function in patients with incontinence or pain related to evacuation. These tests should be performed as a group of complimentary investigations.
- 2. Endoanal ultrasound (EAUS) or three-dimensional EAUS is used during the evaluation of anal sphincter injury, anal fistula, and rectal prolapse and at times following their surgical treatments and in use of intersphincteric bulking agents or implants. EAUS is the gold standard investigation to identify anal sphincter injury. EAUS can differentiate between intact anal sphincters and sphincter lesions (defects, scarring, thinning, thickening, and atrophy) due to vaginal delivery or anal surgery (e.g., fistula surgery, hemorrhoidectomy, or sphincterotomy). 3D-EAUS enables measurement of length, thickness, and the area of sphincter defect in the sagittal and coronal planes in addition to the volume of sphincter damage.
- 3. Defecography under fluoroscopy is the radiological assessment of the voluntary rectal evacuation of semi-solid contrast material, providing information on static and dynamic anorectal structure and function. Defecography can be useful in the diagnosis and management of FI by measuring perineal descent and the anorectal angle, and leakage of contrast material and diagnosing rectal intussusception and rectocele.
- 4. Magnetic resonance defecography (MRD), also termed dynamic MRI, is a non-ionizing radiation technique that can also provide information about anorectal structure and function. Its advantages over conventional fluoroscopic defecography are avoidance of radiation exposure and ability to evaluate other pelvic organs (e.g., vagina, uterus, bladder). Its disadvantages are that it is usually performed in the supine position and its expense. Anal (or static) MRI provides also detailed information of the anal sphincters and pelvic floor anatomy. It can be used to detect injuries of internal and external anal sphincters.





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### **Stoma Formation and Complication Management**

#### 양인준

충남의대

Due to the recent increase in colorectal cancer patients and surgeries, there has been growing interest in stomy. An stomy is an artificially created opening in the abdomen for the discharge of body wastes, necessitated by diseases, cancer, perforation due to accidents, or abnormalities in the intestine. There are various types of stomies, including ileostomy and colostomy, which can be temporary or permanent.

The ideal location for a stomy depends on surgical methods and the patient's physical condition. Typically, ileostomies are preferred to be placed on the right side of the abdomen near the ileum, whereas colostomies are located on the left. These placements maximize stomy management and comfort while helping to maintain the health of the skin surrounding the stomy. The optimal location may vary based on each patient's specific situation and needs.

Post-surgery, patients may experience several complications, including skin issues, inflammation, infection, blockage, or prolapse of the stoma. Managing these complications is crucial for improving the patient's quality of life. The main complications and their management include:

Skin complications: Persistent moisture and contact with feces can irritate and damage the skin around the stomy. Proper stomy care techniques and keeping the skin dry and clean are essential.

Stomy ischemia: A probe may be inserted into the stomy to check for ischemia or necrosis by shining a light through it. Temporary ischemia requires monitoring, while progressing necrosis needs surgical intervention.

Hernia: The abdominal wall may weaken through the stomy, leading to a hernia. Small hernias can be managed with support devices, but large hernias might require surgical repair.

Stenosis: Narrowing at the stomy opening can make waste passage difficult, treatable through surgical or non-surgical methods.

Peristomal fistulas: Abnormal passages can form between the stomy and skin or other internal organs. Treatment varies by location and size and may sometimes necessitate additional surgery.

For effective management and treatment of these complications, the active involvement of surgeons and proper education and support services by stomy care nurses are essential to empower patients and their families in ostomy care.



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### **Diet and Nutritional Support for Stoma Patient**

#### 계봉현

가톨릭의대

The stoma interrupts the absorptive process at the point where it is created, affecting the nature of output and the individual's ability to absorb nutrients from food. It is necessary to evaluate the patient's eating behavior because the stoma can bring specific changes depending on the intestinal region where it is formed (ileum or colon). An ileostomy is placed in the small intestine where nutrients are absorbed, resulting in liquid to semi-liquid stools with abundant digestive enzymes that continuously exit the body. According to an intervention study, a literature review, and a nutrition guide, persons with an ileostomy may incur nutritional losses of calcium; magnesium; iron; vitamins B12, A,D, E, and K; folic acid; water; protein; fat; and bile salts.

A colostomy is placed in the colon region (sigmoid colon, ascending, descending, or transverse), and fecal formation is intermittent, with near normal defecation ranging from semi-liquid or hard stools with little or no nutritional loss.

There are no recommendations for the nutrition assessment tool considering the nutritional status in both the ileostomy and the colostomy groups. Usually, universal questionnaires such as MUST are used. Overall, an in-depth assessment of the patient's condition is performed by a nutritional interview, anthropometric measurements, and biochemical and immunological tests.

There is no scientific data on the validity of increasing or not increasing energy supply in patients with an ostomy. Such data could be helpful, especially in patients who are malnourished or at risk of malnutrition, as well as in those who suffer from peristomal complications related to nutrition.

The average usual energy consumption in the group of patients with an ileostomy was lower than in patients with a colostomy. In addition, patients with an ileostomy also lost weight and body fat percentage during this period.

Clinicians recommended vast restrictions on fat intake to reduce the fatty diarrhea that often-accompanied patients, especially those with an ileostomy. No strict guidelines have been found regarding the percentage of this macronutrient in the diet of a patient with a stoma. Each afflicted should be treated individually, and the fat supply should be appropriately matched to their current condition and the condition of the digestive tract.

The total amount of carbohydrates is generally not restricted, with a recommendation to ingest 40–50% of calories as carbohydrates. The basic products recommended for patients with a stoma are starch products such as potatoes, white rice, refined flour pasta or white bread. Ingestion of a low-FODMAP (fermentable oligo-, di-, monosaccharides and polyols) diet may improve gastrointestinal symptoms and hydration in patients with high-output stoma. Among patients with colostomy whose gastrointestinal passage is less altered, the preventive use of foods with higher fiber content, such as brown rice or whole wheat bread, may be helpful. This may help to avoid constipation problems that accompany a significant percentage of patients with this type of stoma.

The usual supply of protein among patients with ostomies is recommended at the level of 20%, unless there are indications to increase its amount, such as convalescence or malnutrition. Due to the limitation of the supply of saturated fat, lean meat, e.g., poultry, fish, eggs or lean dairy products are considered the preferred sources of protein.

The general guidelines for ostomy patients emphasize the importance of regular meals, consuming plenty of fluids, and thoroughly chewing food to avoid stagnation in the gastrointestinal tract. Patients with a stoma are also recommended to consult a stoma nurse and a dietitian at every stage of nutritional management or in case of doubts.



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# Ostomy Management for Improving Stoma Patient's QOL

이혜란

건양대병원

Recently, the incidence of colorectal cancer is increasing due to changes in dietary habits and decreased physical activity. Considering that the risk factors for colorectal cancer include being over 50 years old, and the proportion of the population aged 65 and over in South Korea increased from less than 7% in 1997 to 14.3% in 2018, it is expected that the incidence of colorectal cancer will continue to rise in the future. Colorectal cancer can be classified into various surgical methods, including low anterior resection, ultra-low anterior resection, Hartmann's procedure with or without stoma, total colectomy, and palliative surgery. Permanent stoma formation may occur with procedures like stoma, and in some cases, even with Hartmann's procedure or total colectomy. Additionally, in cases of bowel obstruction due to tumor types, permanent stoma can be formed through palliative surgery, and temporary stoma procedures may be performed to prevent anastomotic leakage, such as low anterior resection or ultra-low anterior resection.

Patients with colorectal cancer who undergo stoma formation for treatment and palliative purposes inevitably experience various discomforts associated with stoma. Ostomates experience physical problems such as mucocutaneous junction separation, stoma bleeding, stoma necrosis, stoma retraction, peristomal hernia, prolapsed stoma, irritant contact dermatitis others. Furthermore, Ostomates may experience a decrease in mood and self-esteem due to physical changes, ultimately leading to pessimism about themselves. The physical, psychological, and social problems of stoma sufferers not only narrow their range of activities by refraining from meeting others and going out but also make it difficult for them to maintain their jobs, leading to economic crises. As a result, a decrease in quality of life due to the physical, psychological, and social problems of stoma sufferers has been reported.

To improve the quality of life of Ostomates, prioritized attention and management of stoma nursing are necessary, and it is reasoned that regular visits and continuous management through the activities of WOCN are essential. Furthermore, there is a need for more attention to the post-stoma surgery life of Ostomates, and long-term management accordingly.



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### 암환자 장루 재택의료 시범사업 현황 및 추진방향

#### 박현숙

세브란스병원

암환자 재택의료 시범사업은 암치료 후 퇴원한 환자가 자택에서 암치료에 따른 장애 극복, 합병증 예방 등의 관리가 지속될 수 있도록 환자 중심 재택의료 서비스 제공하고 암환자의 상태를 점검하고 피드백을 제공하여 관리의 효율성을 높일 수 있도록 보건복지부 및 건 강보험심사평가원은 교육상담료 및 관리료의 건강보험 수가 시범사업 추진하였다. 이 시범사업은 2021년 12월 20일 시작하였으며 2 차년도에는 요루환자를 포함하여 대상자를 넓혀 확대 시행되고 있다.

현재 사업은 제한된 수의 암 종류와 지정된 의료기관을 중심으로 진행되고 있으며, 주요 서비스로는 정기적인 전문 의료진에 의한 진료, 약물 관리, 심리 상담 및 영양 관리 등이 포함된다. 참여 환자 수 및 서비스 제공 범위는 점차 확대되고 있으나, 여전히 초기 단계에 머물러 있다.

향후 암환자 재택의료 시범사업은 다음과 같은 방향으로 발전해야 한다고 제안한다:

- 1. 확장 및 다양화: 재택 치료 가능한 암환자 외 확대 및 다양한 의료기관과의 협력을 통해 서비스 접근성을 개선한다.
- 2. 기술적 발전: 원격 의료 시스템과 모바일 애플리케이션의 개발을 통해 환자 모니터링과 데이터 관리의 효율성을 증대한다.
- 3. 정책 및 금융 지원: 정부의 정책적, 금융적 지원을 확대하여 보험 혜택과 재정 지원을 통해 화자의 경제적 부담을 줄인다.
- 4. 교육 및 인식 개선: 의료진과 환자를 대상으로 한 교육 프로그램을 확대하고, 재택 치료에 대한 사회적 인식을 개선한다.
- 5. 품질 관리 및 평가: 서비스의 질적 관리와 지속적인 평가 체계를 마련하고, 환자 만족도 조사를 통해 서비스를 개선한다.
- 6. 협력 및 네트워크 구축: 다양한 의료기관 및 전문가와의 협력 네트워크를 구축하고, 경험과 정보를 공유한다.
- 이러한 방향으로 암환자 재택의료 시범사업이 발전하면, 암 환자들에게 보다 나은 치료 환경을 제공하고, 전반적인 의료 시스템의 질을 향상시킬 수 있을 것이다.



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# **Necessity of Improving the Health Insurance System for Ostomy Patients**

#### 전정란

가톨릭관동대 국제성모병원

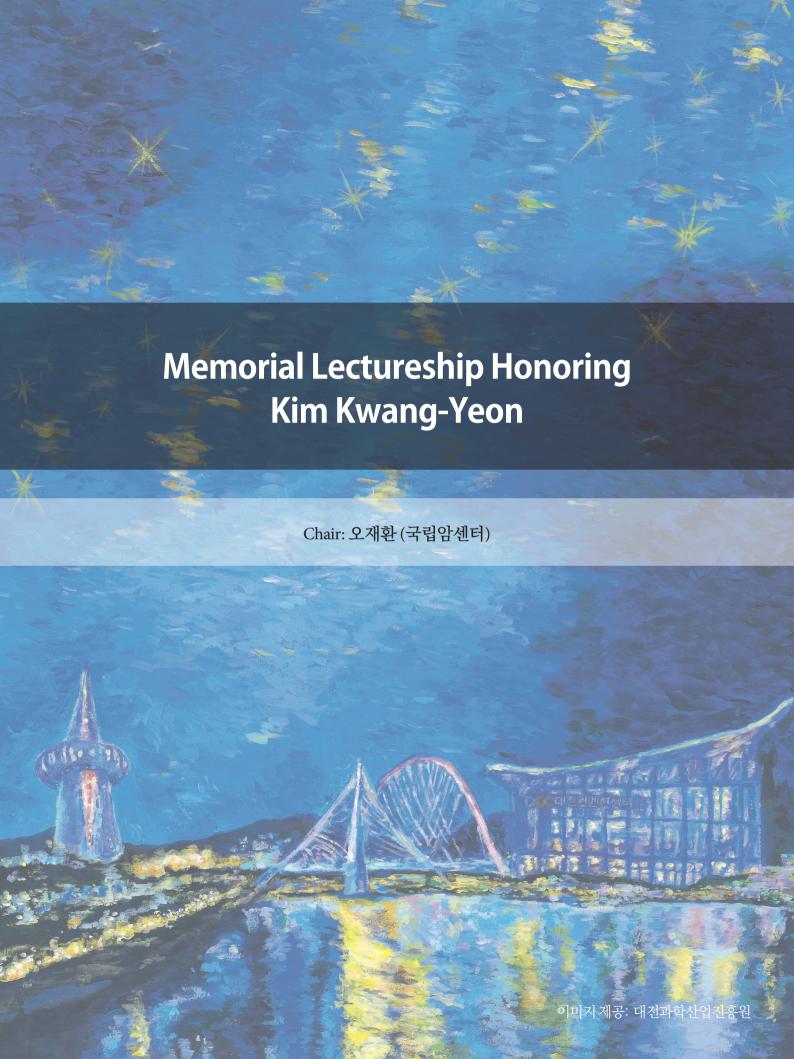
In South Korea, colorectal cancer ranks third among all cancers, with a 5-year survival rate of 74.3% ('16-'20), showing a gradual increase compared to the past. Colostomy procedures are part of colorectal cancer treatment. According to Ministry of Health and Welfare data, the nationwide registration of individuals with colostomies and urostomies reached 16,779 in 2022, steadily increasing.

Patients who have undergone colostomy procedures apply colostomy management products to prevent leakage of excreta, protect the skin, and facilitate odorless containment, discharge, and maintenance. Depending on the characteristics, shape, and stoma location of the colostomy, appropriate products are selected, and education on colostomy exchange methods and precautions is provided by skilled nurses to ensure timely and proper exchanges.

Currently, the counseling fees for education targeting patients who have undergone colostomy procedures in South Korea are very limited, with one session after surgery and one session after reoperation. Recently, through the trial implementation of home medical care for cancer patients, those who have undergone colostomy procedures due to cancer are eligible for up to 6 counseling sessions for colostomy education, with additional patient management fees for post-discharge counseling. However, for patients who have undergone colostomy procedures not related to cancer, the existing counseling fees remain unchanged.

Furthermore, the reimbursement criteria for colostomy supplies used to prevent leakage and protect the skin include allowing up to 4 units per week for flanges and pouches during outpatient periods. However, for skin barrier products that fill gaps between the flange and stoma to minimize skin irritation, ring-type skin barriers are allowed up to 2 units per week, and flat-type skin barriers are allowed up to 1 unit per week. While these products are typically used together during flange replacement, the insufficient number of reimbursed units hinders patients from using them effectively during colostomy care, contributing to their discomfort. In contrast, certain European countries have no restrictions on the quantity of colostomy supplies used, and countries like Germany, Austria, and Italy limit flange and pouch usage, allowing up to 30 units per month for a daily replacement.

South Korea is currently entering an ultra-aging society, which implies an anticipated increase in the number of patients with colostomies and urostomies. Ensuring that current and future patients with colostomies and urostomies can maintain their quality of life, free from issues such as fecal leakage and skin complications, and lead lives comparable to their pre-surgery state, requires a realistic adjustment of insurance reimbursement rates, similar to the example set by European countries.





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러시아 대장 항문외과 학회 명예 펠로우

# **Challenging Issues in the Treatment of Low-lying Rectal Cancer**

#### Nam Kyu Kim

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The management landscape of lower rectal cancer has undergone significant evolution, primarily characterized by the integration of Total Neoadjuvant Therapy (TNT) and advancements in imaging technologies. These developments have revolutionized preoperative planning by enhancing the visualization of the rectum and related structures, enabling more precise assessments of circumferential resection margin involvement. Consequently, alternative treatment strategies have been explored, with efforts toward standardizing the treatment of low-lying rectal cancer, aiming for exceptionally high tumor control while minimizing surgical interventions or adopting non-operative management. Preoperative chemoradiation is considered for organ preservation, particularly in cases where a clinical complete response (cCR) is expected, notably in cT2 N0 rectal cancer. Clinical trials have shown that preoperative chemoradiation followed by local excision can yield oncologic outcomes comparable to those of Total Mesorectal Excision (TME), although most guidelines recommend TME. Upfront surgery is crucial for cT2 and certain localized low-lying rectal cancers, where the surgeon's proficiency in deep pelvic dissection is imperative to ensure that oncologic and functional outcomes are not compromised. This lecture will emphasize technical insights regarding safe deep pelvic dissection in terms of oncologic and functional outcomes.

The deep pelvis is a concave, curved tunnel with a narrow bony space, surrounded by urogenital structures and a neurovascular bundle. Achieving a complete cylindrical-shaped TME specimen while preserving the pelvic autonomic nerve system is challenging due to the narrow deep pelvis, surrounding organ structures, and limited view. Space-making procedures and the sequence of operative steps are important technical tips. Analogous to maritime navigation, which evolved from astronomical observations to the use of GPS, we aim to refine surgical navigation methods for optimal rectal cancer surgery. Despite evolving paradigms of TNT, advanced imaging, and individualized treatment strategies reshaping rectal cancer surgery, concepts such as customized Denonvilliers' fascia (DVF) excision, navigating the complexities of the lower rectum, and employing techniques like the Gate approach enable surgeons to optimize the surgical approach for low-lying rectal cancer with an understanding of important anatomical landmarks.





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1987-1994 군의관, 국립의료원 외과수련 1994-1999 국립의료원 외과 의무사무관 1997-1998 미국 미네소타대학 연수 1999-현재 서울송도병원 원장

2017-2021 서울송도병원 병원장

### The Role of a Surgeon in a Colorectal Specialist Hospital-A Personal Experience

윤서구

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2001 계명대학교 의과대학 졸업(학사)

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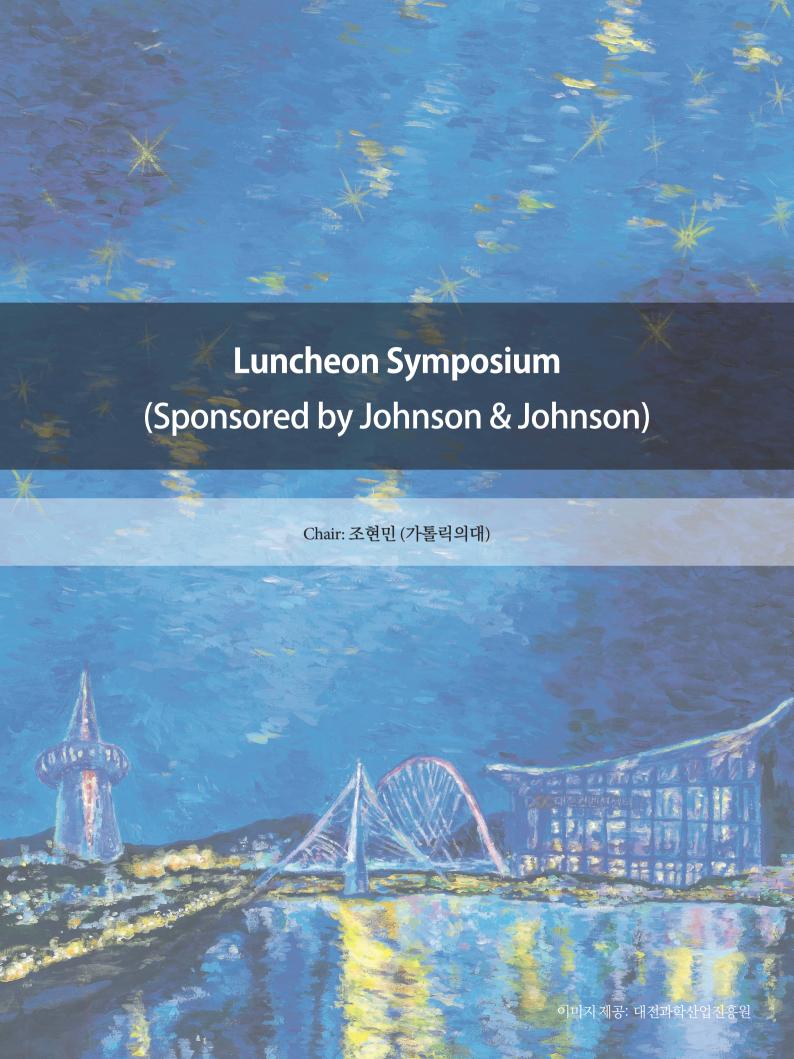
2006-2009 국립암센터 전임의

2012-현재 계명대학교 동산병원 대장항문외과 근무 (현) 부교수

# Advanced bipolar energy device와 ICG imaging system 을 활용한 대장암 수술

정운경

계명의대





#### 박윤아

#### 성균관의대

#### Education

1993.3-1999.2	M.D., Yonsei University College of Medicine, Seoul, Korea
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1999.3-2000.2	Internship, Severance Hospital, Yonsei University
2000.3-2004.2	Residency, Department of Surgery, Severance Hospital, Yonsei University
2004.3-2007.2	Fellowship, Division of Colorectal Surgery, Department of Surgery, Yonsei University College of Medicine
2007.3-2009.2	Instructor, Division of Colorectal Surgery, Department of Surgery, Yonsei University College of Medicine
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2011.9-2015.2	Clinical Assistant Professor, Division of Colorectal Surgery, Department of Surgery Sungkyunkwan University School of Medicine, Samsung Medical Center
2015.3-2020.2	Clinical Associate Professor, Division of Colorectal Surgery, Department of Surgery Sungkyunkwan University School of Medicine, Samsung Medical Center
2019.9-2020-8	Clinical researcher (Sabbatical period), Welch center, Johns Hopkins Hospital, Baltimore, Maryland, USA
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### **Successful Stapled Anastomosis for Rectal Cancer**

박윤아

성균관의대





**김혜진** 경북의대

2001-2005	경북의대 학사
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2005-2006	가톨릭중앙의료원 인턴
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2010-2014	경북대병원 대장항문외과 전임의
2014-2019	칠곡경북대병원 대장암센터 조교수
2019-현재	칠곡경북대병원 대장암센터 부교수
2022-2023	Visiting Scholar, University of California, San Diego, CA, USA

# The Usefulness of ArtiSential in Colorectal Surgery

김혜진

경북의대





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1993-1999	순천향대학교 의과대학
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2010-2013	순천향대학교 의과대학 박사
2013-2014	프랑스 스트라스부르 IRCAD/IHU 복강경 연구소 연수(Research Fellowship)

2007-2009	순천향대학교 서울병원 외과 전임의
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2010-2011	국립암센터 대장내시경아카데미
2016-2019	순천향대학교 부천병원 외과 임상조교수
2020-2023	연세대학교 용인세브란스병원 임상부교수
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2008-2012	Harvard Medical School/Mass. General Hospital, Research Fellow/Instructor
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### **Multimodal Optical Endomicroscopy**

유홍기

**KAIST** 

Optical imaging technologies enable us to obtain structural and biochemical information, allowing for high-resolution and precise observations of biological samples that were previously unobservable. Especially, with recent advancements in optical technologies, such as, lasers and optical fibers, novel optical imaging techniques have been developed and have found widespread use in the biological and medical fields. For instance, optical coherence tomography (OCT), an interferometric method for acquiring three-dimensional cross-sections of biological tissue, has successfully been translated into clinical diagnostics. It provides microscopic views of biological structures in fields such as ophthalmology and cardiology. Additionally, fluorescence lifetime imaging (FLIm), which measures nanosecond-scale fluorescence decay time, has also emerged as a label-free diagnostic modality leveraging endogenous autofluorescence within biological samples. The synergistic integration of OCT and FLIm offers a comprehensive perspective on pathological lesions, thereby positioning their combined application as a highly promising method in medical imaging. In this talk, I will discuss the technological evolution and combination of OCT and FLIm, their applications in diagnostic devices for cardiovascular disease, and advancements in image analysis and image quality improvement through machine learning.



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### **AI Application in Surgery**

#### 형우진

연세의대

Recent advances in imaging technology have led to changes in surgery in various ways. Interest in imaging technology is leading to research on how to use imaging information in imaging studies for surgery, such as CT, MRI, and US of the surgical patient. There is much other information in imaging studies and disease diagnostic information, although they have yet to be well explored. Most of this information is not readily utilizable for clinical application.

Moreover, it is impossible to identify what to use. However, with the recent advancement of AI technology, such as computer vision, imaging studies can be transformed into a form that can be used practically or discover previously unavailable information. Various technologies are being developed for better surgery with preoperative planning and intraoperative guidance using information extracted from imaging studies. New imaging information is mainly used in the form of a virtual model.

The developments of AI imaging reconstruction technologies in the surgical field are primarily stimulated by an increase in laparoscopic or robotic surgery, which is an image-based surgery. As gastric cancer surgery gradually shifts from open to laparoscopic or robotic surgery, new attempts are being made by applying the technology above. In this presentation, I would like to introduce preoperative planning and intraoperative vascular navigation technologies by reconstructing preoperative diagnostic images into a three-dimensional model using AI in robotic gastric cancer surgery.



**김철홍** 포항공대 기계공학과

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### **Photo Acoustic US Image**

#### 김철홍

포항공대 기계공학과

Trans-energy imaging modalities have been significantly explored to overcome existing problems in conventional imaging modalities with respect to spatial/temporal resolutions, penetration depth, signal-to-noise ratio, contrast, and so on. Among them, photoacoustic imaging, an emerging hybrid modality that can provide strong endogenous and exogenous optical absorption contrasts with high ultrasonic spatial resolution, has overcome the fundamental depth limitation while keeping the spatial resolution. The image resolution, as well as the maximum imaging depth, is scalable with ultrasonic frequency within the reach of diffuse photons. In this presentation, the following topics will be discussed; (1) multiscale and multiparametric trans-energy imaging systems, (2) novel deep-learning powered image processing, (3) recent clinical study results in pathology, endocrinology, oncology, cardiology, dermatology, and radiology, (4) label-free ultrafast ultrasound Doppler imaging, and (5) efforts to commercialization.



**이치원** 메디인테크

2011 서울대학교 기계항공공학부 학사

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2017-2020한국전기연구원 선임연구원2020-현재(주)메디인테크 대표이사

### **AI Based Colonoscopy**

#### 이치워

(주)메디인테크

소화기 질병의 진단과 치료에 필수적인 의료기기인 연성 내시경은, 국내에서만 2,000만건 이상 시행되지만, 일본계 3사인 올림푸스, 후지필름, 펜탁스가 독과점하고 있는 상황입니다. 재사용이 가능한 연성 소화기 내시경은 국내 제조업체가 전무하여 100% 외산에 의존하고 있고, 그 중 일본계 3사의 시장점유율은 90%에 육박합니다. 국가간 수출규제 상황이 악화일로로 치닫게 되면, 국민의 건강과 국가보건산업에도 치명적일 수 있습니다. 국내 의료진의 내시경 술기는 세계 최상위인데, 국산 내시경이 없어 내시경 국산화를 통해 자생적 경쟁력을 확보 해야 한다는 것에 여러 국내 학회가 한 목소리를 내고 있는 상황입니다.

이에 따라 범부처전주기의료기기연구개발사업단에서 '소화기관용 고성능 스마트 연성 내시경 시스템 개발'을 주제로 국책과제가 편성되었고, (주)메디인테크에서 수행중에 있습니다. 내시경용 광원장치, 영상처리장치, 위장 내시경, 대장내시경, 의료영상보조소프트웨어까지 2등급 의료기기가 개발이 되었고, 국내 인허가가 완료되었습니다. 해당 내시경 의료기기는 우수한 기동성과 직관적 조작이가능한 전동식 스코프, FHD급 영상 ISP, 편리한 원터치 커넥터, 멀티 밴드 광원 장치, 그 이외에도 임상에 쓰이기 위해 필요한 적정 화각, 심도, Distal End Diameter, Water jet 노즐, Working 채널을 모두 구비하도록 개발이 되었습니다.

특히나, 병변을 탐지할 수 있는 인공지능 알고리즘 개발 준비를 위한 데이터 큐레이션, 의료 영상 빅데이터 기반 병변 탐지 알고리즘 개발이 이루어졌고, 정확도는 95%이상으로 구현되었습니다.

기존 기계식 스코프에서는 불가능한 병변 길이 측정, 병변시야고정 알고리즘, Air/water/suction 자동화 알고리즘 등이 인공지능 기반으로 개발되어 사용자인 의사의 편의성을 확보하게 되었습니다.

AI 기반 병변탐지 알고리즘, 병변 길이 측정, 병변시야고정 알고리즘, Air/water/suction 자동화 알고리즘의 구현을 통해 시술 시간의 단축, 피험자 불편감 해소 등이 기대되며, 2024년부터 계획된 임상시험을 통해 성능 검증과 편의성 평가 등이 수행될 예정입니다.



**박준석** 경북의대

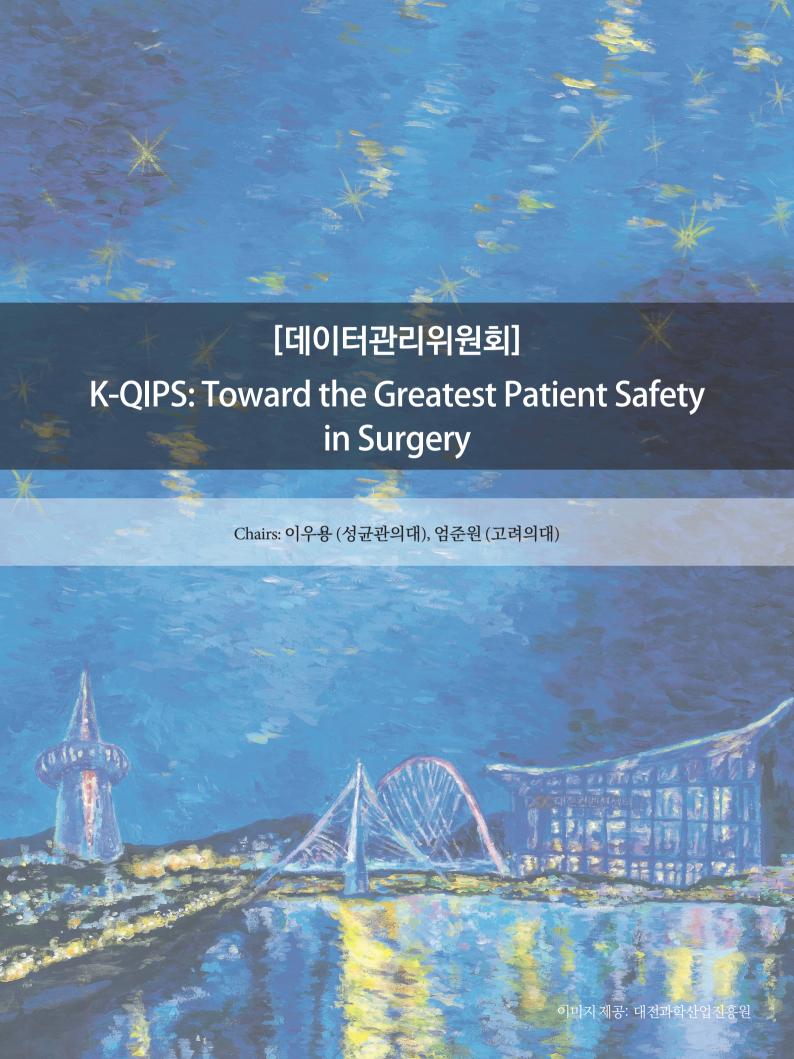
1995-2001 Chung-Ang University, School of Medicine

2001-2002	Rotation Internship, Chung-Ang University Hospital
2002-2006	General Surgery Residency, Chung-Ang University Hospital
2006-2007	Clinical Fellow, Seoul National University Bundang Hospital
2007-2009	Clinical Fellow, Chung-Ang University Hospital
2009-2010	Clinical Assistant Professor, Kyungpook National University Hospital
2010-2013	Assistant Professor, School of Medicine, Kyungpook National University
2015-2017	Visiting Professor, Center for System Biology, Harvard Medical School
2014-Present	Professor, School of Medicine, Kyungpook National University

### **Surgeon's Driven Development of Laparoscopy Cooperative Robot System**

박준석

경북의대





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1996-2002	서울대학교 의과대학 의학과 학사
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# K-QIPS: The First Step of Korean Quality Improvement Platform in Surgery

한인웅

성균관의대

Postoperative complications are the most important patient safety index in the OECD medical quality evaluation area, and the prevention and management of postoperative complications is directly linked to the improvement of medical quality. In addition, postoperative complications are a serious problem that threatens the safety, life and health of the people, adding to national losses such as increased hospitalization and increased medical expenses due to early death and loss of the working population. However, in the case of Korea, aside from the postoperative complication management system, the minimum national level database, statistical data, and evaluation criteria for management have not been established.

On the other hand, the US established ACS NSQIP 28 years ago and Japan established NCD 11 years ago to develop a postoperative complication occurrence status and prediction system for quality management of surgery, a key field of clinical practice, and apply it to the clinical field. Therefore, the Korean Surgical Society (KSS) of and the Korea Surgical Research Foundation (KSRF), in collaboration with the Ministry of Health and Welfare and the Korea Health Industry Development Institute, established a postoperative complication big data platform aimed at improving medical quality in the surgical field, developed an AI complication prediction system, and developed an optimal surgical technique CDSS. Through this, we want to build a Korean NSQIP system.

Target surgeries include gastric cancer surgery, colorectal and rectal surgery, liver resection and liver transplantation, pancreatectomy, and kidney transplantation, considering the annual number of patients among the top 10 major cancers and severe diseases in Korea, the 5-year survival rate of cancer patients, and the characteristics of surgery. It was designated as a major surgery group. We will design the standard E-CRF necessary to build complication integrated big data, establish a system, input data for each surgery, and promote the development of a postoperative complication integrated big data platform, AI prediction system for each surgery, and CDSS based on the data. scheduled In the meantime, there have been attempts to build complication data that occurs in the clinical field through various preceding studies. However, systematic analysis through risk factor-corrected surgical complication data is essential to construct accurate big data, but it could lead to direct evaluation of medical staff skills, so nationwide real-world data could not be collected. In order to improve these problems, the KSS-KSR will lead the research, and SCR (Surgical Clinical Reviewer), a highly trained research nurse, will be dispatched to each hospital to accumulate Real-World Data. These SCRs plan to input data from each hospital based on carefully crafted complication guidelines to increase the level of confidence in postoperative complication data and monitor them regularly.

In order to maintain the big data thus constructed for a long period of time, it is essential to prepare a plan to link the constructed K-NSQIP big data with public data in the health and medical field. Therefore, in this project, through the health and medical big data platform, the National Statistical Office-cause of death, National Health Insurance Corporation-health checkup, central registration headquarters-cancer registration, health insurance review and evaluation agency-combination of postoperative complications integrated DB and public data in the health care field Through this, we plan to devise a method for combining data to enable expanded research topics. Also, it is possible to develop complication prediction AI, which is the primary use of the postoperative complication DB, and to support data to be used for additional research on complications in addition to CDSS development, so that it can be continuously used as basic data for medical policy development.



**송정호** 아주의대

2011충남대 학사2021연세대 석사2021-연세대 박사과정

#### **Professional Experience**

2012-2016세브란스병원 외과전공의2019-2022세브란스병원 상부위장관외과 전임의2022-2024아주대병원 임상조교수2024-현재아주대학교 조교수

# **K-QIPS in Upper GI Surgery**

송정호

아주의대



박선진 경희의대

1998 경희대 의대 졸업

 2008
 경희대 의대 대학원 석사

 2010
 경희대 의대 대학원 박사

#### **Professional Experience**

2010-2020 경희대 의대 외과학교실 조교수, 부교수

2017-2018 MSKCC, NY, USA 연수

2020-현재 경희대 의대 외과학교실 교수

### **K-QIPS in Colon and Rectal Surgery**

#### 박선진

경희의대

한국형 의료 질 향상 프로젝트의 대장직장 수술 분야 프로그램의 목표는 대장 직장 수술의 질 향상을 통한 합병증 및 사망률 감소, 의료 비용 감소로 국민 건강과 대한민국 보건의료산업 발전에 기여하는 것이다.후향적 데이터와 전향적 데이터를 수집하여 국내 대장암수술 데이터 베이스를 구축하고자 한다. 먼저 전국 각 지역을 대표하는 2, 3차 의료기관의 10년치 후향적 데이터 분석을 통해 국내 대장암수술 후 합병증 형태와 발생률을 분석하여 각 기관별 수술 후 합병증을 줄이기 위한 피드백 자료로 사용하고자 한다. 또한 구축된 데이터를 통해 Clinical Decision Supporting System(CDSS)을 개발하여 환자의 합병증을 줄이고 치료의 질 향상을 도모하고자 한다. 후 향적 데이터의 결과를 바탕으로 중요 항목들을 전향적으로 수집하여 합병증에 영향을 주는 자료의 근거를 강화하고 AI시스템 구축 및 CDSS개발의 신뢰성과 효용성을 증대 시키고자 한다.



이길연 GI VITA

1992	경희대학교 의과대학 학사
1995	경희대학교 대학원 의학석사
2001	경희대학교 대학원 의학박사

### **Professional Experience**

2003-2006	경희대학교 조교수
2007-2012	경희대학교 부교수
2013-현재	경희대학교 교수

## Artificial Intelligence in Developing Clinical Decision Support System for Surgical Quality Improvement

이길연

GI VITA



권오철 MDB Inc.

2012 동국대학교 의학과 졸업

#### **Professional Experience**

2017 동국대학교 일산병원 외과 전공의 수료 및 외과전문의 취득

2020 (스타트업 근무) 포티파이 주식회사 CTO

2021 (창업) 엠디비 주식회사 대표

# Role of Comprehensive Database System and Artificial Intelligence

#### 권오철

MDB Inc.

#### 1. Importance of Big Data in Medicine

We live in the information age where data has become a critical resource in all fields, especially in healthcare. Today, each patient interaction, diagnosis, and treatment contributes to an expanding reservoir of medical data. Understanding this data is key to improving healthcare outcomes.

We live in the information age where data has become a critical resource in all fields, especially in healthcare. Today, each patient interaction, diagnosis, and treatment contributes to an expanding reservoir of medical data. Understanding this data is key to improving healthcare outcomes

Big Data can transform healthcare in numerous ways. It can enable predictive modeling for early disease detection, improve patient care by personalizing treatments, optimize operational efficiency in healthcare facilities, and significantly advance medical research.

#### 2. The DIKW Pyramid and Insight

- DIKW is a model that represents Data, Information, Knowledge, and Wisdom.
- Data is at the bottom of the pyramid. it is raw facts, text or numbers with no context.
- When this data is organized and given context, it becomes Information.
- As we start to understand the relationships between different pieces of information, we call it Knowledge.
- Finally, when knowledge is applied or used for decision-making, it becomes Wisdom.

This course explains how to turn raw medical data into meaningful insights for better patient outcomes.

#### 3. Evolution of Database System

• Advent of Electronic Databases (1970s-1980s)

With the rise of computer technology, some medical information began to be stored in electronic databases.

• Emergence of Electronic Health Record (EHR) Systems (1990s-2000s)

The medical field underwent significant change during this period. Thanks to more powerful and accessible computer technology, Electronic Health Record (EHR) systems were born.

• Cloud-based Systems and Big Data (2010s-Present)

The advent of cloud computing revolutionized the way medical data is stored and processed.

• Integration with AI and Machine Learning (Present and Future)

In the present and future, medical database systems are becoming more tightly integrated with AI and Machine Learning technologies.

#### 4. Artificial intelligence

Analysis methods have evolved from traditional statistical methods, machine learning methods, and deep learning.

All of these methods have their own uses, and later analysis methods are not always superior to earlier ones.

Deep learning is attracting attention because it has been able to handle data in a form that could not be handled well before, and that it has made it possible to model more complex natural phenomena together with big data.

It is important to select a model suitable for the purpose of the study and the complexity formed by the type and amount of data.

#### 5. Remarkable features of K-QIPS system

The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) has exemplified success in advancing postoperative quality management by enabling systematic data collection and utilization in the US. Achieving its objectives through an efficient platform, which encompasses a eCRF, CDSS and data management system. The purpose of data collection is not only to enhance surgical quality itself but also to establish a dataset for related research. To satisfy the diverse requirements of each subdomain and facilitate efficient future expansions, we designed a structure that integrates external eCRF systems with a central eCRF system.





**김인경** 가톨릭의대

2016-2021 경상국립대학교 의학석사

#### **Professional Experience**

2021-2022 창원경상국립대병원 대장항문외과 전임의

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2024-현재 서울성모병원 대장항문외과 임상진료조교수

## 전임의: 나를 힘들게 하는 것들, 이상과 현실의 괴리

김인경

가톨릭의대



**강정현** 연세의대

2001	연세대학교 의과대학 졸업
2008	연세대학교 의과대학 대학원 석사
2018	연세대학교 의과대학 대학원 박사

### **Professional Experience**

2018-2020	미국 클리블랜드 클리닉, Dept. of Quantitative Health Sciences 연수
2015-2019	연세대학교 의과대학 외과학교실 강남세브란스병원 대장항문외과 조교수
2019-2022	연세대학교 의과대학 외과학교실 강남세브란스병원 대장항문외과 부교수
2023-현재	연세대학교 의과대학 외과학교실 강남세브란스병원 대장항문외과 교수

### 대학교수: 어둠속의 희망, 대장항문외과의 과거, 현재, 그리고 미래

#### 강정현

연세의대

한국에서 대학에서 외과교수로 일하는 것은 매우 존경받는 직업 중 하나입니다. 이는 의학 분야에서 전문적인 지식과 높은 전문성을 요구하는 분야이며, 특히 대장암이 호발하는 암중의 하나인 상황에서는 대장항문외과 의사는 이러한 질환을 치료하는데 있어 매우 중요한 역할을 하는 직종중의 하나입니다.

일반적으로 대장항문외과 교수로 일을 하고자 하는 분들의 경우 다음과 같은 점들이 매력적일 가능성이 높습니다.

- 1)전문성 인정: 대장항문외과 교수로 일하면 자신의 분야에서 높은 전문성을 증명할 수 있습니다. 교수로서 교육, 연구 및 임상 경험을 통해 인정받을 기회가 많습니다.
- 2) 연구 및 개발 기회: 대학의 교수로서 연구 및 학문적 개발에 참여할 수 있습니다. 새로운 치료법이나 수술 기술 등을 개발하거나 개선하는데 기여할 수 있습니다.
- 3) 교육에 참여: 학생들과 전공의 혹은 전임의들을 교육하는 기회가 있습니다. 자신의 경험과 지식을 다음 세대의 의료 전문가들에게 전달하는 역할에 대해 만족도가 올라갈 수 있습니다.
- 4) 인정과 보상: 교수로서의 업적은 보통 학술적 성과나 교육적 업적에 따라 평가됩니다. 이에 따라 적절한 인정과 보상을 받을 수 있습니다.

그럼에도 불구하고 대학에서 대장항문외과 교수로 일하는 것이 예전만큼 선호되는 직업이 아닌 것 같다는 느낌이 들기도 합니다. 연구와 교육에 투자할 시간과 노력이 많이 필요하며, 학문적 경쟁이 치열할 수 있습니다. 또한 환자의 치료와 관련된 윤리적인 문제에 대한 책임도 큽니다. 무엇보다도 각 병원에서 대장항문외과 의사가 담당해야 하는 응급환자 치료에 대한 부담감이 상당한 것으로 여겨지고 있고, 이러한 모습은 후학들이 이 분야를 꺼리는 하나의 원인이 되는 것 같습니다. 마지막으로 대장항문외과 교수직에만 해당하는 이 야기는 아닐 수도 있겠지만, 전반적으로 급여수준의 차이가 일반적으로 대학에서 근무하는 경우와 다른 형태로 근무하는 경우와 비교 해서 점점 더 커지는 느낌을 갖는 것도 하나의 원인일 것 같습니다.

대학에서 대장항문외과 교수로 일하는 것의 중요한 역할은 이 분야에 관심이 있는 후학들에게 적절한 교육의 기회를 주는 것일 것 같습니다. 이를 위해서 현재 대학에서 교육을 하는 시스템을 좀더 개선하고 이와 함께 외과 전공의들이 대장항문외과에 관심을 갖을 수 있는 방안에 대해서 우리 모두 고민을 해야 할 것입니다.



**정평안** 구병원

2007 영남대학교 의과대학 졸업

 2008
 영남대학교 의과대학 부속 병원 인턴

 2012
 성균관대학교 삼성서울병원 외과 전공의

#### **Professional Experience**

2015 국제협력의사(KOICA)

2017 삼성서울병원, 대장항문외과 전임의

2017-현재 구병원 외과 과장

### 봉직의: 의료 분쟁과의 싸움, 그리고 소진

#### 정평안

구병원

병원 혹은 종합 병원에서 근무하는 봉직의는 1차, 2차, 3차로 이어지는 의료 전달 체계의 허리 역할을 맡고 있다. 특히 병원/종합 병원에 근무하는 대장 항문 외과 봉직의는 일반 외과 진료뿐 아니라 내시경, 항문 질환, 탈장, 양성/악성 질환에 대한 다양한 복부 수술, 복막염, 혈복강, 외상 등에 대한 응급 수술을 담당하고 있는 경우가 많다. 이 때문에, 2차 병원의 봉직의는 1차 의료기관의 의사보다 중환자를 진료하게 되고, 3차 의료 기관의 의사보다 다양한 환자군을 진료하게 되며 이로 인해 의료 분쟁에 휩싸일 여지가 높다고 할수 있다. 하지만 대다수의 2차 의료 기관에서는 이에 대비한 법적 조력 혹은 의료 배상 공제 조합에의 가입이 미비한 경우가 많아 진료의 안정성이 떨어진다고 할수 있다. 이를 해결하기 위해서는 의료 분쟁 발생을 최소화하기 위한 개인적인 노력 외, 학회와 의사 협회, 의료 배상 공제 조합 등의 법적 조력이 필요하며 아울러 적절한 시기에 상급 의료 기관으로 원활히 전원할수 있는 시스템이 필요하다.



**Professional Experience** 

# 개원의: 병원 유지, 지속 가능한가?

유홍열

신일병원



**이관철** 한솔병원

1996-2003 고신의과대학 졸업

#### **Professional Experience**

2007-2011 삼성서울병원 외과 전공의

2011-2012삼성서울병원 대장항문외과 전임의2012-현재한솔병원 대장항문외과 진료부장

### 전공의/전임의 교육에 있어서 1, 2차 의료기관의 역할: 현실과 가능성

이관철

한솔병원

의료정책과 의료전달체계의 붕괴로 인해 필수 의료에 위기가 도래한 현재, 외과 전공의의 지원 감소와 함께 외과 분과 중에서도 필수의료를 담당하는 대장항문외과 전임의의 지원이 부족한 상황이 나타나고 있습니다. 대장항문학회 일차의료기획위원회는 이러한 문제의 원인과 해결책에 대해 논의하였으며, 그 중 한가지 방향으로 일차의료에 필요한 대장항문질환 교육에 초점을 맞추었습니다. 현재 진행 중인 의학 교육은 주로 상급종합병원에서 이루어지는데, 이는 현재의 의료전달체계에서 일차 의료에서 다루는 양성항문질 환에 대한 교육이 제한되어 있다는 한계가 있습니다. 또한, 개원에 관련된 교육은 거의 이루어지지 않아, 일차 의료의 기반이 되는 개원 가를 준비하는 것이 현실적으로 어렵고, 개원을 희망하는 외과 의사들은 개원에 필요한 교육을 개인적인 관계에 의존하고 있습니다. 또한, 1차 또는 2차 병원에서 봉직을 원하는 사람들도 봉직의 상황에 필요한 술기에 대하여 현 교육환경으로는 충분한 임상 경험을 얻기 어려워졌습니다. 이는 봉직을 희망하는 사람들 뿐만 아니라 채용을 원하는 개원가에서도 아쉬운 점입니다.

이러한 문제에 대응하기 위해, 일차의료에 필요한 대장항문질환 교육은 반드시 강화되어야 합니다. 이를 위해서는 현재 수련 중인 대학병원에서만 해결하기 어려우며 이 문제를 우리 모두 방관할 수는 없습니다. 따라서, 대장항문학회 차원에서 전공의 및 전임의들과 교육을 제공할 수 있는 일차의료기관 사이의 연결을 도모하고, 지역별, 질환별, 술기별로 교육수련 모델을 제안하고자 합니다.





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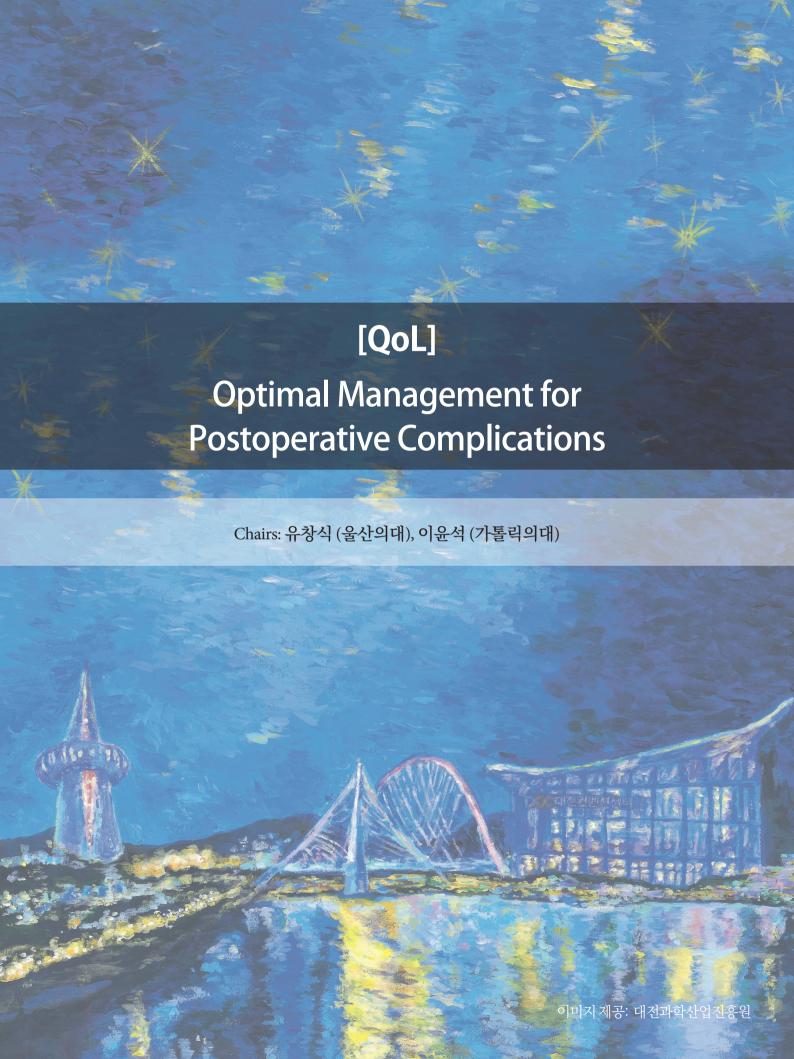


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# Prevention and Treatment of Wound Complications and Fecal Discharge

김명조

충북의대

Colorectal surgery represents a significant surgical intervention often associated with the risk of wound complications and fecal discharge, posing challenges to postoperative management and patient recovery. This abstract outlines key strategies for the prevention and treatment of these complications in colorectal surgery.

Preventive measures encompass a comprehensive approach aimed at minimizing risk factors and optimizing wound healing processes. Surgical techniques have evolved, with minimally invasive procedures such as laparoscopy and robotic-assisted surgery demonstrating benefits in reducing tissue trauma and postoperative complications. Perioperative care optimization plays a crucial role, including preoperative nutritional optimization and meticulous glycemic control to mitigate risk factors. Intraoperative measures, such as meticulous hemostasis and proper tissue handling, contribute to reducing the risk of wound contamination and subsequent infection.

Enhanced recovery protocols (ERPs) have revolutionized perioperative management in colorectal surgery, emphasizing multimodal strategies to expedite recovery and reduce complications. Components of ERPs, including early mobilization and optimized pain management, not only facilitate wound healing but also minimize the risk of postoperative ileus and fecal discharge.

Utilization of advanced wound care products is integral to prevention and treatment strategies. Negative pressure wound therapy (NPWT) promotes wound healing by enhancing tissue perfusion and reducing bacterial burden, thereby mitigating the risk of wound dehiscence and fecal discharge. Antimicrobial dressings offer additional support in preventing wound-related infections and complications.

Pharmacological interventions play a significant role in preventing wound complications. Prophylactic antibiotic administration reduces the incidence of surgical site infections and associated complications. Topical agents such as fibrin sealants or cyanoacrylate tissue adhesives provide adjunctive support in wound closure, particularly in cases of minor dehiscence or mucosal defects.

Despite preventive measures, wound complications may still occur, necessitating prompt and effective treatment. Surgical revision may be required in cases of severe complications such as fistula formation, providing definitive management to prevent further morbidity. Tailored wound care approaches, including specialized dressings and irrigation techniques, are essential in promoting wound healing and minimizing the risk of secondary complications.

In conclusion, the prevention and treatment of wound complications and fecal discharge following colorectal surgery require a multifaceted approach. Integration of innovative surgical techniques, perioperative care optimization, utilization of advanced wound care products, and judicious pharmacological interventions are essential to mitigate complications and enhance patient outcomes. Further research and advancements in these areas are crucial to continually improve the management of colorectal surgery complications.



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# Prevention and Treatment of Incisional and Parastomal Hernia

강상희

고려의대

This talk is about the important parts of preventing and treating incisional and parastomal hernias (PSH), with a focus on the newest research and guidelines to help patients have the best possible results. Incisional hernias and PSH, which happen next to a stoma, are common complications after abdominal surgery. They have a big effect on the patient's quality of life and are hard to treat surgically.

Key tactics for prevention include careful surgery, the possible use of prophylactic mesh in high-risk patients, and steps taken after surgery, such as teaching patients about risk factors and taking extra care of wounds. It is emphasized that stoma care nurses play a key part in choosing the best stoma site before surgery, teaching patients how to make changes to their lifestyle, and helping patients use supportive clothing to help prevent PSH development.

Imaging techniques, like CT scans or ultrasound, are used along with a clinical exam to help diagnose these types of hernias. These help doctors figure out the hernia's size, position, and contents, which are very important for planning the right way to treat it.

In terms of treatment, there is more proof that mesh repair is better than suture repair at lowering the rate of recurrence for both incisional and PSH repairs. Different surgical methods and mesh placements (on-lay, in-lay, sub-lay, and intraperitoneal) are talked about, with a focus on customizing ways based on the patient and hernia's features. The talk also looks at new information about laparoscopic versus open repair methods, highlighting how important it is for the surgeon's skill and the patient's needs to choose the best method.

Overall, this presentation shows how important it is for surgeons, stoma care nurses, and other medical professionals to work together to effectively prevent, diagnose, and treat incisional and parastomal hernias. It also encourages more research to fill in the gaps in our knowledge and make patient care better.



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# Prevention and Treatment of Recurrent Postoperative Ileus

하기원

전북의대

Small bowel obstruction (SBO) is defined as abdominal pain or distension, vomiting, and the appearance of a dilated small bowel loop on abdominal radiography or computed tomography. Postoperative adhesions, defined as abnormal fibrous bands between organs and/or tissues in the abdominal cavity that are normally separated, are the most common complications of abdominal and pelvic surgery. About 65% to 75% of acute intestinal obstructions are caused by adhesions, predominantly involving the small bowel.[1] With the disease progression, intraluminal pressure increases, and the small bowel becomes severely dilated. This pressure can cause mucosal ischemia, necrosis, and finally perforation. Of all types of abdominal surgery, open colorectal surgery was found to result in the highest rate of adhesion-related readmissions. Colorectal surgeries are associated with approximately 30% risk of adhesion-related complications over 4 years. Moreover, approximately 10% of the patients who undergo colorectal surgery are at risk for readmission directly related to adhesions.[2-4]

The initial goal of evaluating a patient with SBO is to identify hemodynamic instability, the presence of strangulation or bowel ischemia. Through this, surgeons should make a decision the need for operative intervention. Patients with SBO should be provided symptomatic control with and bowel rest. Intravenous fluid resuscitation with electrolyte replacement is also required. After initial management, treatment for SBO can be divided into conservative and surgical interventions. Surgery is required for strangulation and those who fail conservative treatment. Recently, the laparoscopic approach has demonstrated benefits in adhesive SBO.[5,6] In selected patients with simple band adhesions, laparoscopic surgery may be associated with better postoperative outcomes.

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# Prevention and Treatment of Anastomosis Leakage and Chronic Sinus

노경태

이화의대

The safety of colorectal surgery for oncological disease is gradually improving, yet anastomotic leakage (AL) remains a significant concern due to its adverse impact on surgical outcomes and patient prognosis. AL prolongs hospitalization, escalates costs, and heightens the risk of short- and long-term complications, ranging from radiological findings to severe peritonitis and multi-organ failure. While most AL cases care detected shortly after surgery, subclinical leaks may only become overt by endoscopy or imaging of the anastomosis in preparation for diverting stoma closure. Late leaks or chronic presacral sinuses can present years post-surgery, exhibiting diverse symptoms such as pain, anemia, fistulae, or sepsis. To prevent AL, gaining a better knowledge of the risk factors that influence the AL rates may help identify highrisk surgical patients requiring more intensive perioperative surveillance. Early diagnosis and evaluation of the severity of this complication may offer a significant opportunity to guide clinical judgement and decision-making. Treatment strategies vary based on patient factors and AL severity. Non-operative management is usually preferred in patients who underwent proximal fecal diversion at the initial operation. Reoperation for sepsis control is rarely necessary in those patients who already have a diverting stoma at the time of the leak. In patients without a stoma who do not require abdominal reoperation for a contained pelvic leak, there are several treatment options, including laparoscopic diverting ileostomy combined with trans-anal anastomotic tube drainage, percutaneous drainage or recently developed endoscopic procedures, such as stent or clip placement or endoluminal vacuum-assisted therapy. Despite the expanding range of nonoperative interventions, surgical management remains pivotal in addressing AL, particularly in cases presenting with sepsis and peritonitis, necessitating immediate surgical intervention to achieve source control. Moreover, for patients unresponsive to nonoperative measures, surgical re-intervention becomes imperative. The primary objectives of surgical re-intervention for AL encompass source control through strategies such as washout, effective drainage, and the establishment of fecal diversion, if not previously implemented during the index surgery.



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## Prevention and Treatment of Venous Thromboembolism (VTE) and Postoperative Bleeding

양성수

울산의대

Venous thromboembolism (VTE) and postoperative bleeding present significant challenges in colorectal surgery, necessitating a comprehensive approach to prevention and management. This examines the current strategies aimed at mitigating the risks of DVT occurrence and its associated postoperative bleeding in colorectal surgical settings.

Effective prevention of VTE involves a multifaceted approach, integrating pharmacological prophylaxis, mechanical measures, and patient-specific risk assessment. Pharmacological agents, such as low-molecular-weight heparin and fondaparinux, are commonly utilized to inhibit thrombus formation, particularly in high-risk patients. Mechanical prophylaxis, including intermittent pneumatic compression devices and graduated compression stockings, complements pharmacological interventions by enhancing venous blood flow and reducing stasis. Moreover, individualized risk assessment tools, incorporating patient-specific factors like age, comorbidities, and surgical complexity, aid in tailoring preventive strategies to optimize outcomes.

In the context of postoperative bleeding associated with VTE prophylaxis, a delicate balance between thromboprophylaxis and hemostasis must be maintained. Surgical techniques emphasizing meticulous hemostasis, judicious use of anticoagulants, and close postoperative monitoring are crucial. Advanced hemostatic agents, such as topical sealants and fibrin glues, offer additional adjuncts to traditional hemostatic measures, reducing the risk of bleeding complications while preserving thromboprophylaxis efficacy.

In conclusion, the prevention and treatment of DVT and associated postoperative bleeding risk in colorectal surgery demand a comprehensive and individualized approach. Surgeons can effectively mitigate thrombotic and bleeding risks while optimizing patient outcomes by integrating pharmacological, mechanical, and surgical interventions within a tailored perioperative care framework.

KEYWORDS Venous thromboembolism, Colorectal surgery, Postoperative bleeding, Prevention, Treatment





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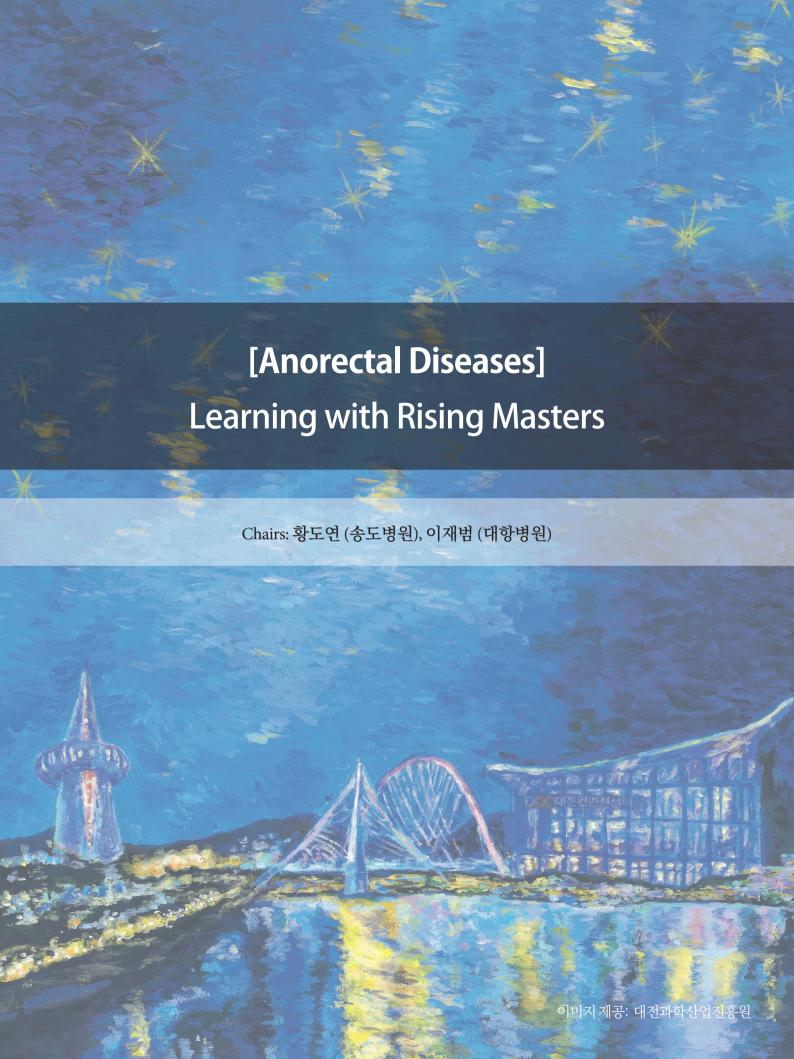
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# **Strangulated Hemorrhoids: Emergency or Delayed Surgery?**

#### 곽동민

구병원

An internal hemorrhoid prolapses and becomes trapped outside the anal sphincter. The blood supply to the hemorrhoid is cut off, resulting in a painful and potentially serious condition like tissue necrosis and sepsis.

#### **Symptoms**

Pain and discomfort in the anus or rectal area
Swelling and inflammation around the anus
Difficulty passing stool
Bright red blood in the stool or on the toilet paper after wiping
Itching, irritation and discomfort around the anus
A lump or bulge protruding from the anus
A feeling of fullness or pressure in the rectum

#### **Treatment**

Surgical intervention to remove hemorrhoids and alleviate the pressure on the affected area. In some cases, medication may be prescribed to manage pain and reduce inflammation.

#### Conclusion

Hemorrhoidectomy is one of the safest and most effective methods to treat strangulated piles.



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## **High Type Anal Fistula: Sphincter Cut or Save?**

이정은

한솔병원

치루는 항문관이나 직장에 내공이 있고, 항문 주위 피부에 외공을 가지는 섬유성 관을 형성한 것으로 가장 흔한 원인은 치상선에 위치하는 항문 분비샘에서 비특이성 염증이 발생하는 것입니다. 고위치루는 치루를 간단하게 저위치루와 고위치루로 나누어 분류했을 때 치루관의 경로가 항문괄약근의 중상부 2/3 이상을 침범하는 경우로 분류할 수 있습니다.

항문은 내괄약근과 외괄약근의 이중 근육으로 이루어져 있으며 외괄약근이 상방으로 주행하여 치골직장근과 항문거근으로 합쳐지게됩니다. 내괄약근은 지속적인 수축작용에 의해 항문이 닫혀 있을 때 휴식기 항문압에서 주요한 기능을 담당하고 있으며 외괄약근은 수의적인 수축작용을 담당하고 있습니다. 항문의 주요 기능인 변자제 능력에는 변의 굳기, 직장용적, 정상채취반사, 정상휴식기압, 외괄약근과 치골직장근의 정상적인 기능, 항문 열림에 대한 반응 등 여러가지 요소가 복합적으로 관여하고 있으며 항문괄약근이 중요한 요소를 담당하고 있습니다. 내괄약근은 휴식기 항문압의 70-85%를 차지하고 있으며 외괄약근은 휴식기 항문압의 일부와 대부분의 수축기 압력에 관여하고 있어서 내괄약근이 손상되면 항문 닫힘 기능이 약화되고 채취반사 기능이 손상을 받게 되며 외괄약근의 절개는 휴식기, 수축기 항문압에 모두 영향을 주게되며 주로 절박성 또는 설사 관련 변실금을 유발하는 것으로 알려져 있습니다. 그 외에 치골 직장근이 항문 후방에서 직장을 고정시켜서 항문직장각을 유지하여 변자제에 관여하고 있으며 항문전방에는 치골직장근이 없기 때문에 전방에서 항문괄약근을 보존하는 것이 더 중요하게 여겨지고 있습니다.

치루는 수술적 치료를 원칙으로 하며 괄약근을 절개하는 수술 방법과 보존하는 수술 방법이 있습니다. 원발병소와 치루관을 모두 제거하여 완전치유를 이루기 위해서는 어느 정도의 괄약근이 손상될 수 밖에 없으며 괄약근의 기능이 저하되어 변실금의 발생위험이 증가하게 됩니다. 특히 괄약근의 상부 2/3이상을 침범하고 있는 고위치루의 경우 수술 후 괄약근의 손상이 더 많이 발생 할 수 있어 재발과 변실금의 합병증 발생 위험을 모두 감소시킬 수 있는 치료방법을 찾고자 하는 노력이 계속되고 있습니다

괄약근을 보존하는 수술방법으로 전진피판법, fibrin glue 주사법. 항문 등이 있으며 최근에는 LIFT 수술법이 소개되어 활발히 연구가이루어지고 있으며 laser 를 이용한 치료와 stem cell을 이용한 치료방법도 시행되고 있습니다. 연구마다 치료결과가 다양하게 보고되고 있는데 수술 후 재발률은 점막전진 피판법에서 25-33%, LIFT 에서 18-50% 로 보고 되었으며 변실금은 0-15% 로 보고되었습니다. Fibrin glue나 anal plug 를 사용한 치료에서는 재발률이 26-46%로 보고되었고 변실금은 0-26%로 보고되었습니다. 아직까지는 어느 수술방법이 가장 효과적인지에 대한 결론은 이루어지지 않고 있습니다. 고전적으로 많이 사용되는 세톤법의 경우 절단 세톤법은 재발률은 1-4%로 낮게 보고되었으나 변실금의 발생이 39-63%로 높게 보고 되어 괄약근을 보존하고자 하는 여러가지 변형된 세톤법이 시행되고 있으며 재발률이 0.8-19.5%, 변실금은 0-3.8%로 보고되었습니다.

항문수술 후 괄약근 압력을 측정한 연구에서 대부분 휴식기 압력이 감소된 결과를 보였으나 그 중 일부에서만 변실금 증상이 나타났으며 전체 내괄약근이나 대부분의 외괄약근을 절개해도 변실금이 나타나지 않는다는 연구결과도 보고되었습니다. 여성, 고령, 이전에 항문수술의 과거력이 있는 경우에 수술 후 변실금 발생이 많았고 치골직장근이 없는 전방치루에서는 괄약근 손상이 크지 않더라도 수술 후 변실금의 발생이 높게 나타나서 치료방법뿐 아니라 환자의 괄약근 기능에 따라 수술 후 변실금의 발생빈도가 영향을 받을수 있는 것을 알수 있습니다.

정리해보면 고위 치루는 괄약근의 2/3이상을 침범하고 있어서 수술적치료를 시행할 때에 괄약근의 손상에 의한 변실금의 발생 위험이 높게 나타나기 때문에 괄약근을 보존하는 치료방법을 선택하는 것이 이상적이나 괄약근을 온전히 보존하는 치료방법은 재발률이 높게 보고되고 있으며 괄약근의 일부가 손상되더라고 변실금 증상이 모두 나타나는 것은 아니기 때문에 환자의 수술 전 괄약근 상태를 잘 파악하고 고령, 여성, 전방 치루와 같은 위험요소가 있는 경우에는 좀 더 적극적으로 괄약근을 보존하는 치료방법을 사용하는 것이 좋을 것으로 생각됩니다.



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2013-현재 대항병원 과장

## **Chronic Anal Fissure: Surgical or Conservative?**

#### 신재원

대항병원

치열은 항문연에서 치상선 사이에 생기는 항문관부위의 열상으로 정의된다. 급성기는 단순한 열상이지만 만성화되면서 궤양이 형성된다. 보통 치열의 증상이 6주 이상 지속되면 만성 치열이라 정의하는데, 특징적인 소견은 궤양 저부에 내괄약근의 섬유가 노출되거나 궤양주의 조직의 부종과 섬유화로 인해 궤양 상하로 비후유두와 전초퇴, 췌피가 생길 수 있다. 만성 치열이 되면 보존적인 치료에 잘 낫지 않고 좋아지더라도 곧 재발하게 되므로 수술의 적응이 된다.

치열은 처음에는 대부분 딱딱한 변으로 인하여 항문관이 직접 손상을 받아서 생긴다. 일단 항문에 상처가 생기고 단단한 변으로 인해 자극이 지속적으로 반복되면 만성화로 진행되게 된다.

치열치료는 주로 내괄약근의 휴지기 항문 압력을 낮추는데 목적이 있다. 증상 발현이 3주 이내인 단순한 열상인 경우 보존적인 치료로 효과를 보는 경우가 많다. 변비를 방지해주는 것이 가장 중요하며 대개 2~3주일 내에 낮는 경우가 많다. 급성기 치열치료의 목적은 변비와 딱딱한 변에 의한 항문 손상 및 통증, 또 그 자극과 통증에 의한 항문경련, 항문경련에 의한 항문 통증과 변비유발이라는 일련의 악성고리를 차단하는데 있다. 외과적 치료의 목적은 내괄약근의 기능 이상, 즉 내괄약근 경축이 생기지 않고 항문관의 직경이 넓어져 배변에 의한 항문 손상이 일어나지 않도록 하는데 있다. 주로 측방 내괄약근 절개술이 치열 수술치료의 기본술기로 정착되었지만전진피판 수술법등도 상황에 따라 시행될 수 있다. 화학적 괄약근절개술로는 칼슘채널차단제를 도포하는 방법이나 보툴리눔톡소주사요법도 시행될 수 있다.



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## Rectovaginal Fistula: Transanal or Transvaginal?

#### 전영민

서울송도병원

Anovaginal fistulas (AVFs) and rectovaginal fistulas (RVFs) most frequently result from obstetric trauma, especially in undeveloped countries where prolonged obstructed labor can lead to pressure necrosis of the rectovaginal septum. These fistulas can also occur following a failed repair of a third- or fourth-degree laceration of the perineum, from unrecognized injury at the time of vaginal delivery, and from episiotomy infection. Radiation damage and Crohn disease are two other important causes of RVFs.

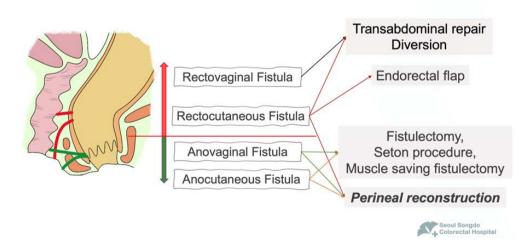
RVFs may also occur following difficult hysterectomies, especially those performed for severe endometriosis with involvement or obliteration of the posterior cul-de-sac (pouch of Douglas); from extension or rupture of perirectal, perianal, and, rarely, Bartholin's abscesses; and from any surgical procedures involving the posterior vaginal wall, perineum, anus, or rectum.

In older women, RVFs can occur as a result of diverticulitis, colon cancer, or fecal impaction. In addition, treatment options for pelvic organ prolapse such as pessaries and various mesh repair procedures have been associated with RVFs.

The key aspect in determining the treatment method for RVF is accurately identifying the location of the lesion(Fig1). Based on the dentate line, rectovaginal fistulas and rectocutaneous fistulas are located on the proximal side. Anovaginal fistulas and Anocutaneous fistulas are found near the dentate line. In fact, there are many obstetric causes for these two sites, but cryptoglandular infection is also often the cause. So, the surgical methods are classified by location as follows: Rectovaginal fistulas close to the peritoneum may be approached through a transabdominal approach. Rectocutaneous fistulas can be addressed via a transabdominal approach, flap surgery, or perineal reconstruction. In the case of anovaginal and anocutaneous fistulas heavily affected by the pelvic floor, fistula surgery alone or perineal reconstruction can be performed, depending on sphincter injury and pelvic laceration.

In our hospital RVFs associated childbirth trauma are treated with fistula operation with perineal reconstruction. Because of the complex structure and physiology of the anal canal, the rate of recurrence increases without the perineal reconstruction.

In conclusion, the treatment method for RVF varies depending on the cause. When considering surgical treatment, a decision should be made after accurately defining the anatomical nature of the lesion. If there is weakness in the perineum, reconstruction should be performed concurrently to reduce the risk of recurrence and fecal incontinence.





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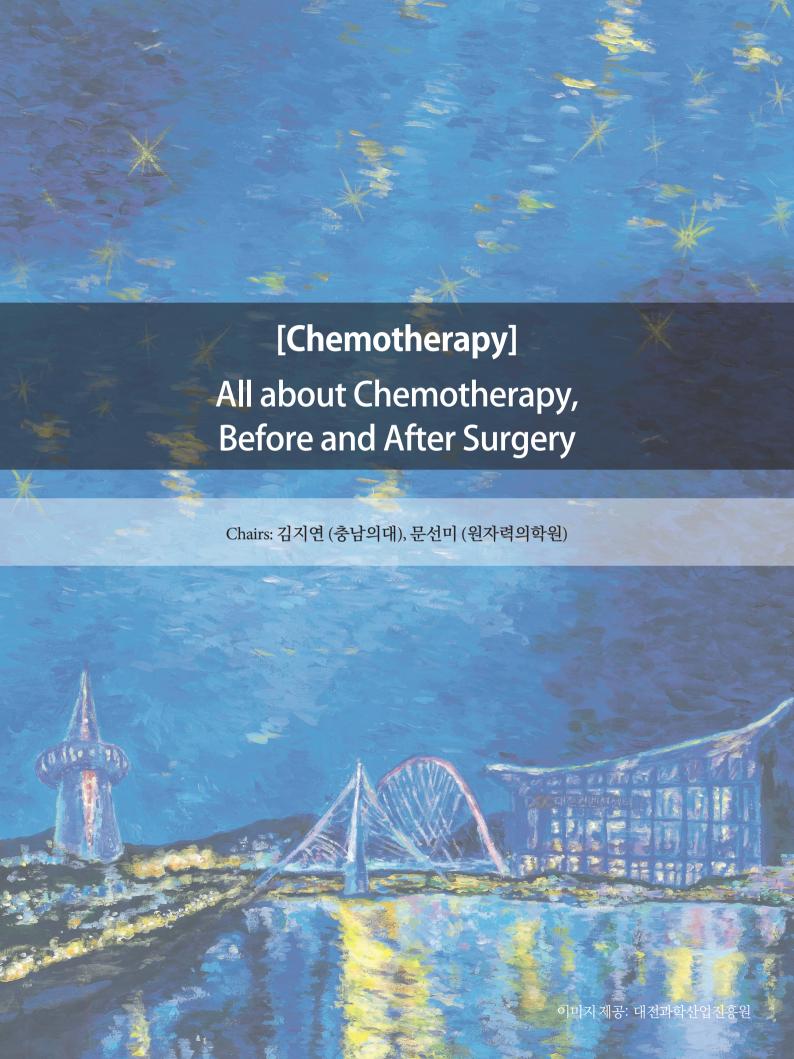
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### Rectourethral Fistula: Perineal or Abdominal?

노승재

건양의대

Rectourethral fistula (RUF) is an uncommon congenital or acquired entity in which an abnormal connection forms between the rectum and the urethra. Numerous repair strategies have been described in the colorectal, urologic and pediatric surgical methods can be simplified as working from above, requiring an anterior or transabdominal approach, or from below, meaning the transanal, transperineal, and posterior techniques. Many operations exist for the surgical correction of RUF, which speaks to the complexity of the problem and the affected patients. Due to the rarity of the disease process and the lack of robust high-quality evidence, no generalizations can be made as to the ideal repair technique. Preoperative evaluation is of critical importance, as is patient counseling regarding complications and options in the face of possible recurrence.





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## From the Basics to the Recent Updates of Adjuvant Chemotherapy in Colorectal Cancer

지웅배

고려의대

Thanks to recent advancements in surgery, the survival rate for colon cancer has been improving. However, it's not just surgery that plays a role; postoperative adjuvant chemotherapy also contributes to enhancing survival rates and reducing the risk of recurrence. Unless there are special circumstances, undergoing adjuvant chemotherapy after surgery is considered a crucial factor in improving oncological outcomes for patients. The current cancer treatment protocols are the result of numerous clinical trials focusing on the regimen, method of administration, and duration of adjuvant chemotherapy. Recently, there have been many updates regarding the duration of cancer treatment, attempts at new treatments based on MSI status, and the sequence of treatments. This lecture aims to explore the basic evidence behind adjuvant chemotherapy as well as discuss the recent changes in this field.



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# The Role of Neoadjuvant Chemotherapy in Locally Advanced Colon Cancer

박수연

경북의대



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# Chemotherapy Related Toxicities and How to Prevent and Manage Them

성낙송

건양의대

Chemotherapy and immunotherapy have crucial roles in treatment of colorectal cancer. However, chemotherapy-induced side effects often pose challenges and can lead to treatment interruptions or discontinuations, compromising patient outcomes. We need strategies to effectively manage chemotherapy-related toxicities in colorectal cancer patients, including chemotherapy-induced neutropenia (CIN), chemotherapy-induced nausea and vomiting (CINV), chemotherapy-induced peripheral neuropathy (CIPN), and immunotherapy-related toxicity, with the aim of increasing treatment completion rates.

Chemotherapy-Induced Neutropenia (CIN): CIN is a common and potentially serious side effect of colorectal cancer treatment. To prevent severe complications, the use of granulocyte colony-stimulating factors (G-CSFs), dose modification strategies, and prophylactic antibiotics are recommended. Additionally, patient education and close monitoring in early detection and management of CIN to minimize treatment disruptions are essential.

Chemotherapy-Induced Nausea and Vomiting (CINV): CINV significantly impact patients' quality of life and treatment adherence. 5-HT3 receptor antagonists, NK1 receptor antagonists, and corticosteroids are mainly used to prevent and minimize CINV. It is essential to personalize antiemetic regimens based on the emetogenicity of chemotherapy agents and patient-specific risk factors.

Chemotherapy-Induced Peripheral Neuropathy (CIPN): CIPN presents challenges in colorectal cancer management, often causing sensory and motor disturbances. Dose modification strategies, neuroprotective agents such as duloxetine, and physical therapy modalities are recommended to prevent CIPN

Immunotherapy-Related Toxicity: Immunotherapy has emerged as a promising treatment modality in colorectal cancer, but it can also lead to immune-related adverse events (irAEs) such as immune-mediated colitis, dermatitis, and hepatitis. We recommend the use of corticosteroids, immunosuppressive agents, and immune checkpoint inhibitor discontinuation or dose modification to complete immunotherapy. By implementing tailored management approaches, healthcare providers can minimize treatment-related toxicity, optimize patients' quality of life, and ultimately improve treatment adherence and completion rates in colorectal cancer therapy.



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2001 계명대학교 의과대학 졸업(학사)

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### Treatment Strategy of Palliative Chemotherapy for Unresectable mCRC in the Era of Precision Medication

정운경

계명의대

Around 20% of patients diagnosed with Colorectal Cancer (CRC) have metastases.

Additionally, up to 50% of patients with initially localized disease will develop metastases.

Unfortunately, the prognosis for metastatic CRC is poor, with a survival rate of less than 20% after 5 years. To achieve personalized cancer medicine, the first step is to define different treatment options and sequences based on tumor molecular stratification.

RAS and BRAF gene alterations, as well as microsatellite status, are considered the gold standard for molecular characterization of metastatic colorectal cancer (mCRC) and are necessary for selecting the most appropriate treatments.

In addition, screening for HER2 gene amplification is becoming a standard.

Bevacizumab, a humanized anti-VEGF-A monoclonal antibody, is the first anti-angiogenic drug successfully added to the mCRC treatment armamentarium and can be used in either first or second line therapy.

Cetuximab and panitumumab, anti-EGFR monoclonal antibodies, are used to treat RAS/BRAF WT tumors as first-line therapy with chemotherapy and as second-line therapy after chemotherapy plus bevacizumab. An anti-EGFR monoclonal antibody plus chemotherapy is the most effective treatment in patients with mCRC whose primary tumors are located in the left colon or rectum.

For patients with chemorefractory mCRC, the goal is to use molecularly selected treatments based on the presence of targeted tumor gene alterations for anti-BRAF V600E, anti-HER2, anti-KRAS G12C, anti-NTRK, or anti-RET therapies.

After second-line therapy, the current treatment options are limited to regorafenib or trifluridine-tipiracil. These drugs are typically used as third- or fourth-line therapies for unselected patients with mCRC.



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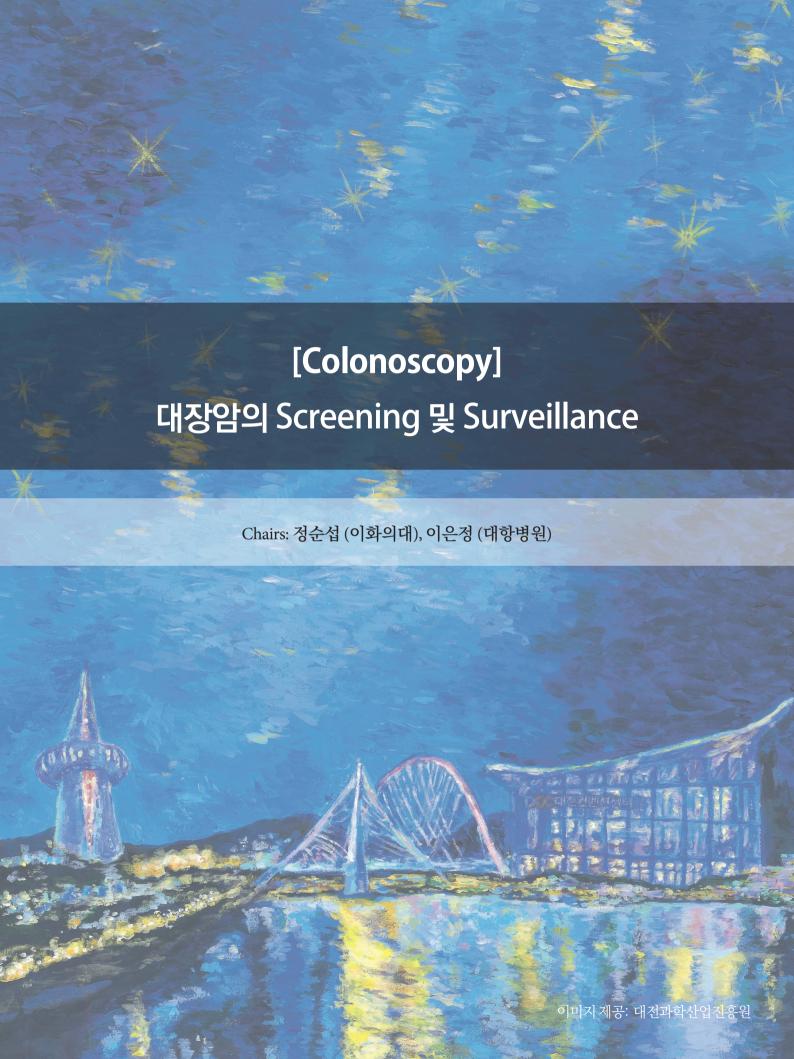
 2024-현재
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# **Immunotherapy for Colorectal Cancer**

#### 표대희

가톨릭의대

Immune checkpoint inhibitors (ICIs), including anti-programmed cell death-1, programmed cell death ligand-1, and cytotoxic T-lymphocyte antigen-4 monoclonal antibodies, have exhibited significant therapeutic efficacy in various types of cancers. The presence of mismatch repair deficiency (dMMR) and/or high microsatellite instability (MSI-H) within tumors has been identified as critical biomarkers predictive of a favorable response to such ICIs. These markers are indicative of a high mutational burden, the presence of cancer-specific neoantigens, and robust infiltration of immune cells, leading to a potent immune-mediated response. In the context of metastatic colorectal cancer (mCRC), pembrolizumab and nivolumab, optionally in combination with ipilimumab, are advocated for use in patients unresponsive to traditional chemotherapy. Moreover, pembrolizumab is advised for first-line treatment in patients with dMMR and MSI-H tumors. Conversely, the clinical efficacy of ICI monotherapy in patients with mismatch repair-proficient (pMMR) and microsatellite-stable (MSS) mCRC has not been demonstrated. Present research efforts are focused on evaluating combination therapies that pair anti-PD-1/PD-L1 and CTLA-4 monoclonal antibodies or combine ICIs with targeted molecular agents or radiotherapy. This approach aims to modulate immune cell activity and increase treatment efficacy in pMMR and MSS mCRC. Additionally, the exploration of ICIs in neoadjuvant and adjuvant therapeutic settings continues to advance. This lecture will summarize several landmark trials regarding immunotherapy and discuss future perspectives with a focus on ICI-based treatments for CRC.





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# 각국가의 대장암 Screening 방법의 비교

박성실

한양의대



**서민아** 국립암센터

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# 대장내시경 시범사업의 추진현황 및 예측

#### 서민아

국립암센터

Colorectal cancer is a relatively prevalent cancer worldwide and in Korea. Screening is very useful to reduce the burden of disease of colorectal cancer. The government of the Republic of Korea has been providing annual fecal immunochemical test (FIT) for free to adults aged 50 years and older as the primary modality for detecting colorectal cancer (CRC) of the National Cancer Screening Program (NCSP) since 2004. In the NCSP, individuals with a positive FIT result are referred for either colonoscopy.

As an alternative method for NCSP, colonoscopy screening has emerged. Colonoscopy screening not only improves colorectal cancer early detection rates, but it has preventive effects by removing adenomatous polyps. However, colonoscopy is an invasive procedure as it can cause hemorrhage, bowel perforation, or even death during insertion of the scope or tissue biopsy. Since 2019, the Korean Colonoscopy Screening Pilot Study (K-cospi) was developed to evaluate the effectiveness of colonoscopy screening for CRC incidence and mortality, screening-related complications, and acceptability of colonoscopy as a primary modality for the national CRC screening program.

The target subject is males and females aged 50–74 years living within the pilot sites. However, subjects who have been diagnosed with CRC, who are undergoing treatment for CRC, or who have undergone colonoscopy screening within the past 5 years are not allowed to participate. Participating endoscopists at each cancer screening institution perform colonoscopy. We conduct a telephone survey after 7 days and 4 weeks post-colonoscopy to assess for procedure-related complications and satisfaction of the participants. In case of abnormal findings from colonoscopy screening, we track the results from follow-up diagnostic tests. Data from this pilot study will be linked to the diagnostic workup results, the Korean Cancer Registry, and death certificate data, and will be analyzed the performance, long-term effects, and cost-effectiveness of colonoscopy. The results will provide critical information to determine whether the introduction of colonoscopy as the primary modality of the Korean NCSP would be acceptable and feasible.



봉준우 고려의대

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# Surveillance Protocol after Colonoscopic Polypectomy

#### 봉준우

고려의대

A surveillance colonoscopy is a medical procedure to identify metachronous polyps or residual abnormalities. Nevertheless, given the invasive nature of colonoscopy, it is essential that we only perform it for specified purposes and acquaint ourselves with the recommendations for surveillance colonoscopy.

The guidelines classify the time intervals for surveillance colonoscopy according to three high-risk factors: size, number, and pathological characteristics. If one or more risk factors have been identified, the surveillance period should be reduced to less than 5 years. For tubular adenomas larger than 10 mm, a colonoscopy every 3 years is advised for surveillance. Several extensive studies have confirmed a close relationship between the size of an adenoma and the probability of discovering advanced adenomas (AA) during the follow-up. AA is characterized by a size of 10mm or larger or high-grade dysplasia or villous type. It was shown that a cut-off value of 10mm showed a significant association with the occurrence of colon cancer for follow-up. Therefore, if the size of the tubular adenoma exceeds 10mm, the surveillance interval should be reduced to 3 years. Furthermore, as the number of adenomas increases, the suggested interval for surveillance colonoscopy decreases. A thorough meta-analysis has shown an obvious positive relationship between the number of non-advanced adenomas (NAA) and the occurrence of AA during the follow-up period. Furthermore, it was observed that the incidence of colon cancer exhibited a significant increase when the number of NAA detected exceeded 5. The surveillance interval is recommended as 5-10 years for 1-2 adenomas, 3-5 years for 3-4 adenomas, and 3 years for more than 5 adenomas. Additionally, 3 years of surveillance is recommended after villous morphology. Studies have shown that the presence of villous adenoma significantly increases the possibility of developing AA and cancer. Furthermore, three-year surveillance is recommended in cases where the pathology has been confirmed as serrated adenoma with a risk factor, such as having more than 5 polyps, dysplasia, or a size larger than 10 mm. This is because it increases the likelihood of developing AA. It is recommended to shorten the surveillance interval to 6 months for a piecemeal resection of a polyp larger than 20 mm, as this increases the recurrence. Five to 10 years of surveillance is advised in cases of without any risk factors.

Finally, to determine the optimal monitoring interval, we also consider factors such as the completeness of the index colonoscopy, the state of the resection margins, and any underlying disease.



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# **Decision Making: Polypectomy, EMR, ESD**

#### 정형중

대항병원

대장 내시경을 통한 대장암의 선별 검사는 대장암의 조기 발견과 함께 그 전암성 병변인 선<del>종을</del> 발견하고 적절한 방법으로 제거함으로써 대장암으로 인한 사망률을 낮추다.

지료 내시경의 영역에서는 병변을 발견하고 그 조직 진단을 예측하는 능력과 더불어 다양한 용종 절제 방법에 대한 이해와 술기 능력, 그리고 시술 후 발생할 수 있는 합병증에 대처할 수 있는 능력 등이 요구된다. 용종 절제 방법을 선택할 때는 합병증의 가능성이 적고 완전절제가 가능한 방법을 선택해야 할 것이며, 용종의 크기, 모양, 위치, 시술자의 숙련도 등을 고려하여 선택하게 된다.

Cold snare polypectomy는 전류를 통전하지 않고 올가미를 조이는 기계적인 힘에 의해 용종을 절제하는 방법이다. 주로 미세용종이나 10mm 미만의 작은 용종에서 적용할 수 있는 방법으로 지연 출혈의 빈도가 적고 천공의 가능성이 거의 없기 때문에 안전한 방법으로 알려져 있다. 미세용종에서도 겸자를 통해 여러 조각으로 절제하는 방법에 비해 완전 절제율이 높은 방법이라 할 수 있다.

10-20mm 크기의 측발육형용종(Lataerally Spreading Tumor)에서는 conventional EMR법을 적용하거나 상황에 따라 precutting EMR, underwater EMR 등의 modified EMR 법을 적용해볼 수 있다. 20mm 이상의 큰 용종에서 분할절제(piecemeal resection)가 된 경우 en bloc resection된 경우에 비해 재발율이 높다. 용종 절제 후 장기간 추적관찰한 여러 연구에 의하면 분할절제 후 재발율은 10-23%, ESD 후 재발율은 0-3%를 보이고 있다. 따라서 악성 혹은 악성화 가능성이 있는 용종에서는 en bloc resection이 될 수 있는 ESD를 시행하는 것이 바람직하다. ESD의 장점은 용종의 완전절제율이 높다는 것과 조직학적 진단이 용이하다는 점이다. 반면 술기가 어렵고 천공 등의 합병증의 위험이 있으며, 시술시간이 긴 것이 단점이다. 또한 악성 용종이 의심되는 경우 육안적인 모양이나 내시경 소견, pit pattern, NBI 소견 등을 종합하여 내시경으로 절제를 시도할 지 판단하는 능력도 요구된다.

이번 시간에는 다양한 용종 절제 방법을 살펴보고 절제 방법 선택 시 고려해야 할 요소들에 대해 기존에 발표된 가이드라인과 근거 문 헌을 바탕으로 논의해보고자 한다.

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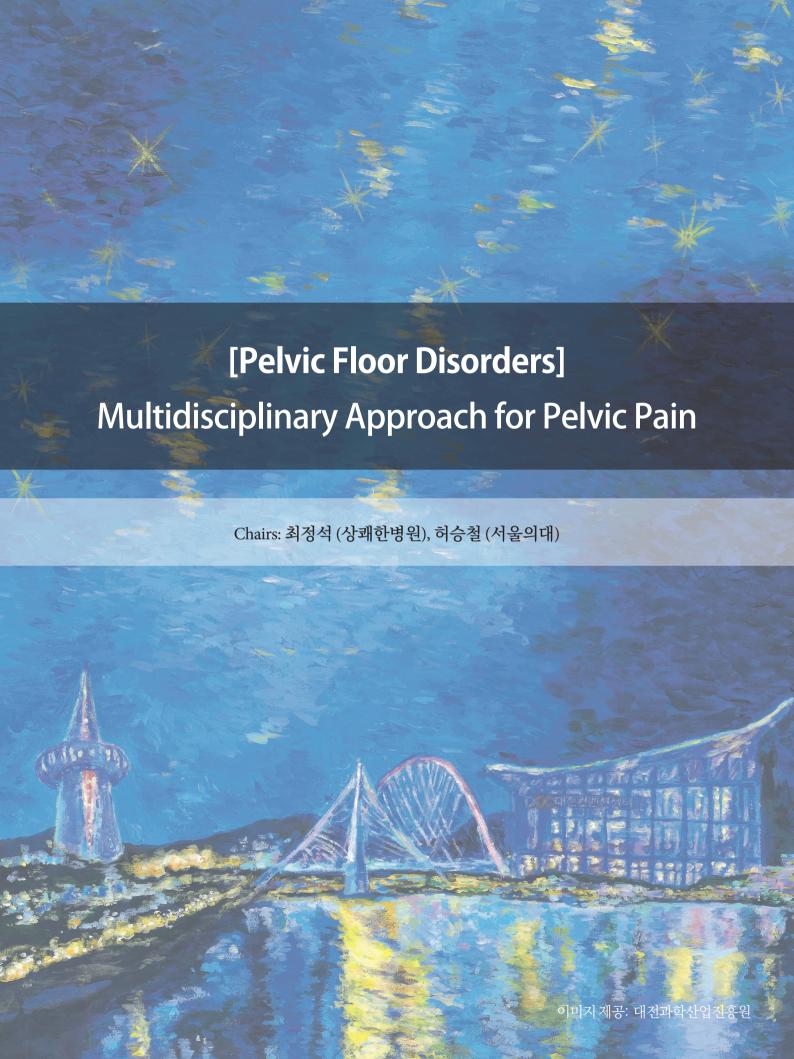
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# Clinical Feature and Oncologic Outcome of Interval Cancer

임대로

순천향의대

세계 암 통계에 따르면 2018년 대장암은 전 세계에서 세번째로 흔한 악성 종양이며 한국에서는 2021년 통계에서 대장암의 남녀 전체에 서 두번째로 흔한 악성종양의 보고되었습니다. 대장암의 진단과 예방에 있어 대장내시경은 표준적인 검사로 자리잡았습니다. 중간대 장암 (interval colorectal cancer, interval cancer)은 대장내시경 검사 후 일정기간 이내에 발생한 대장암이라고 할 수 있으며 대장내시경 후 대장암 (post-colonoscopy colorectal cancer, PCCRC) 이라고도 불리우는 경우도 흔합니다. 선별 혹은 추적 검사에서 암이 발견되지 않고 권고되는 다음 검사 이전에 진단되는 대장암을 중간암의 정의로 얘기할 수 있으며 연구에 따라 보통 대장내시경 후 36-60개월 이 내의 기간에 발견되거나 생긴 암을 얘기합니다. 중간암의 발병률은 연구에 따라 차이가 있지만 여러 연구의 보고내용을 종합해보면 약 1.8%~9.0%으로 보고 되고 있습니다. 중간암의 원인으로 크게 세가지로 (간과된 병변missed lesions, 불완전한 절제incomplete resection, 새로운 병변new lesions) 분류하여 설명하고 있습니다. 간과된 병변은 대장내시경 시행 이후 3년 이내 대장암이 진단되고, 진단된 대장 암이 크기가 작고 병기가 낮은 경우, 절제한 선종의 위치가 암의 위치와 다른 경우를 간과된 병변에 의한 중간암이라고 추정할 수 있고 면평한 모양의 선종(flat sphaped adenoma), 불완전한 장청소, 경험 적은 시술자, 6분 이하 회수시간, 우측대장에 위치한 선종이 관련 인 자로 알려져 있고 선종간과율은 9~25%까지 보고 되었습니다. 불완전한 절제는 폴립의 size 가 클수록, 편평한 모양, 편평 톱니 선종 (flat serrated adenoma), 분할 절제가 관련 인자로 보고 있으며 불완전 절제에 의한 중간암은 약 20% 이내로 추정하고 있습니다. 중간암은 미소위성체 불안정성 (microsatellite instability, MSI) 가 비중간암에 비해 유의하게 높았고 CpG island methylator phenotype (CIMP) 이 나 BRAF 변이 또한 중간암이 비중간암에 비해 유의하게 높았습니다. KRAS 변이는 중간암이 비중간암 보다 유의하게 적은 것으로 보 고 되었습니다. 중간암의 예방으로는 대장내시경의 질 향상, 적절한 장청소, 맹장삽입률 90% 이상, 6분 이상의 충분한 회수 시간, 적절 한 폴립 절제술, 조영증강 내시경등과 같은 새로운 기술을 이용한 선종 발견율 향상이 있다고 볼 수 있다.





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## **Mechanisms and Control of Pelvic Pain**

#### 유용재

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Chronic pelvic pain (CPP) is defined as the presence of pain in the pelvic girdle region for over a 6-month period and can arise from the gynecologic, urologic, gastrointestinal, and musculoskeletal systems. The challenge of accurately diagnosing chronic pelvic pain resides in the degree of peripheral and central sensitization of the nervous system associated with the chronicity of the symptoms, as well as the potential influence of the affective and biopsychosocial factors on symptom development as persistence. Once the musculoskeletal or visceral origin of the symptoms is identified, a clinical examination schema that is based on the location of primary onset of symptoms can be followed to establish a basis for managing the specific pain generator(s) and manage tissue dysfunction.

Both patients and clinicians are often frustrated by a perceived lack of treatments. CPP conditions often overlap with nonpelvic pain disorders (eg, fibromyalgia, migraines) and nonpain comorbidities (eg, sleep, mood, cognitive impairment) to contribute to pain severity and disability. Recommended treatments are usually multimodal and require an interdisciplinary team of clinicians. Patient involvement, shared decision-making, functional goal setting, and a discussion of expectations for long-term care are important parts of the evaluation process. Chronic pelvic pain is like other chronic pain syndromes in that biopsychosocial factors interact to contribute and influence pain. To manage this type of pain, clinicians must consider centrally mediated pain factors as well as pelvic and nonpelvic visceral and somatic structures that can generate or contribute to pain.



**박미옥** 구병원 영상의학과

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# Radiologic Workup for Pelvic Pain

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# **Treatment for Pelvic Pain in Outpatient Clinic**

### 현기훈

서울송도병원

Anal pelvic pain is the most common clinical presentation encountered by colorectal surgeons, but treating anal pelvic pain when there is no organic cause can be very troublesome. This lecture aims to cover the basic concepts, diagnosis, and treatment fundamentals when managing such patients in the outpatient clinic.



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# Rehabilitation for pelvic pain

#### 흥미진

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Pelvic floor dysfunction can include "bladder and bowel dysfunction, pelvic organ prolapses, sexual dysfunction, and pelvic pain. Pain syndromes

- 1. Chronic pelvic pain syndrome (CPPS)
- 2. Chronic PFM pain syndrome

Pelvic pain is defined as a painful condition located pelvis, lumbosacral region, pelvic floor, and the anterior abdominal wall at or below the umbilicus. Chronic pelvic pain (CPP) is a syndrome of pain originating from a specific site of the body region for at least six months, resulting in functional disability or severe condition requiring treatment. It is reported that 25% of women and 2 to 10% of men are affected by CPP.

The treatment and rehabilitation program can be planned to address specific causes and/or general pain treatment. Treatment should include a trial of conservative therapies (e.g. patient education, pharmacotherapy, psychotherapy, exercise, or physical therapy) that can often provide significant symptom relief and improved quality of life.

- \*Exercise and physical therapy
- Transcutaneous electrical nerve stimulation, superficial heat, therapeutic ultrasound, biofeedback, manual therapy
- extracorporeal shockwave therapy
- Posterior tibial nerve stimulation
- $\bullet \ \ Kegel\ exercises, core\ stabilization,\ stretching,\ strengthening,\ water-based\ exercises\ etc.$
- Pilates and yoga



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대한 골반신경 수술연구회 사무총장

# Approach for pelvic pain in OBGY

#### 변승원

유성선병원 부인과

지난 50여년간 한국은 엄청난 경제 발전을 해왔고, 임신과 출산은 더 이상 위험한 상황도 아니고, 의무도 아닌 개인선호의 선택지가 되었다. 이제 몇몇 부인암 질환을 제외하고는 죽고 사는 문제로 부인과를 찾지 않는다. 배고픔보다는 비만이 문제가 되고, 죽고사는 문제보다 삶의 질이 더 중요한 시대를 살고 있다.

100여년전부터 시작된 현대의학의 발전은 미국, 유럽등의 기조를 따랐으며, 각과로 세분화되면서 부인과 영역에서 수술적 치료의 역할은 덩어리의 제거로 인한 막연한 구조적 문제 해결에 집중하게 된다. 더군다나 복강경이 발전하기 전 육안으로 깊은 골반안을 봐야하는 상황에서는 골반 기저( 거의 골반뼈 바로 위에 있는)위를 주행하는 골반신경(lumbosacral plexus, sup. & inf. Hypogastric nerve plexus, pudendal nerve, sciatic nerve, sup. & inf. Gluteal nerve, sympathetic trunk)와 복벽 및 psoas muscle 위를 지나는 iliohypogastric nerve, ilioinguinal nerve, genitofemoral nerve 에 대한 관심은 없었다.

2014년부터 Mark possover 라는 부인과 의사에 의해 Neuropelveology( 골반 신경학) 이라는 학문이 발전하면서 우리는 이유 없는 극심한 생리통, 설명할 수 없는 만성골반통은 이제 우리가 모르는 것이지 틀린 것은 아니라는 것을 알게 된다. 여성에게서 가장 많은 만성골반통증의 원인은 무엇보다 자궁내막증( endometriosis), 특히 심부자궁내막증(deep infiltraiting endometriosis) 이다. 부인과 영역에서도 이것이 통증을 유발할 수 있다는 것을 알게 된 것도 그리 오래되지 않았다.

만성골반통증은 크게 visceral pain과 somatic pain으로 구분한다. 골반통증이 반드시 부인과 영역이 아닐 수 있지만, 통증이 생기는 기전은 동일하다. 거의 대부분의 골반통증 중 visceral pain은 inf. And sup. Hypogastric nerve plexus 에 의한 교감, 부교감 신경총을 통해서 전달된 통증신호가 척수에서 viscerosomatic convergency라는 기전을 통해 refered pain 의 형식으로 통증이 전달된다. Somatic pain 은 각각의 신경을 물리적, 화학적 자극을 통해 각각의 신경의 dermatome에 해당하는 부위에 통증이 발생한다. 따라서 통증이 유발된 부위를 찾아 거꾸로 통증부위를 찾아가는 Neuropelveologic examination 을 시행하는 것이 가장 진단의 기초가 된다.

만성 골반통증 중 부인과 영역에서 접근하고 치료가능한 분야는 다음과 같다.

첫째, Inf. Hypogastric nerve plexus, rectum, bladder, lumbosacral plexus를 침범한 심부자궁내막증

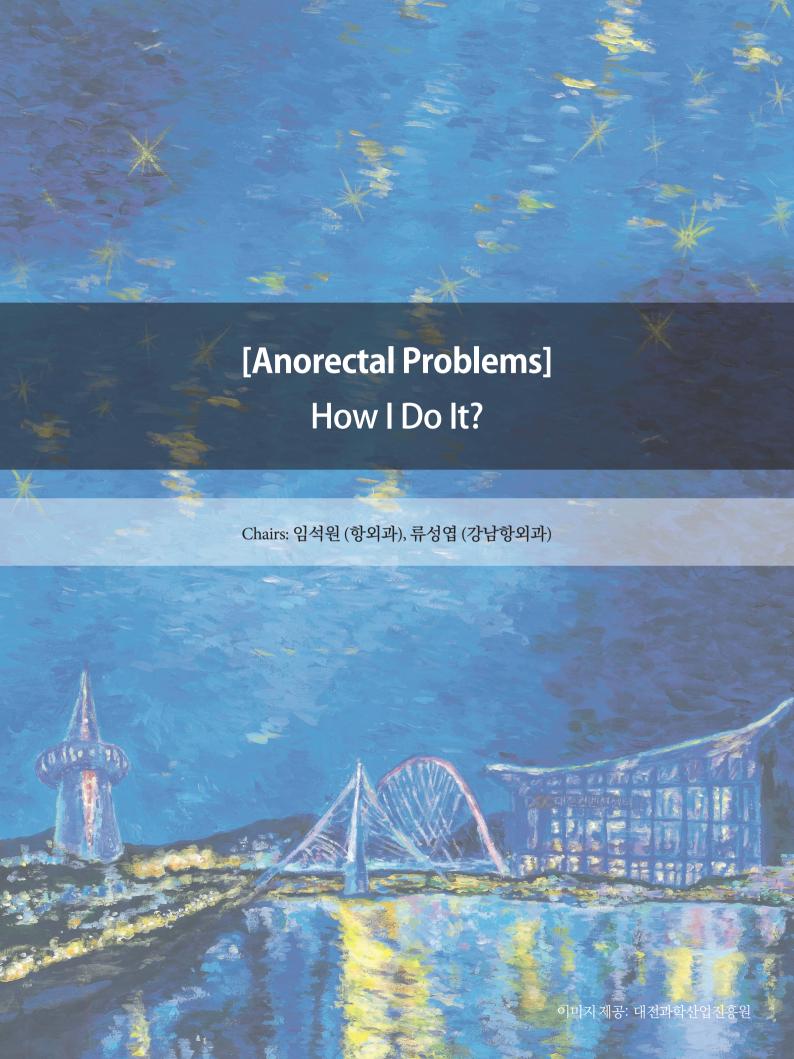
둘째, 골반신경 ( 주로 Sciatic nerve, pudendal nerve )을 주변 neurovascular entrapment

셋째, vulvodynia를 유발시키는 pudenda nerve entrapment (Alcock's canal syndrome)

넷째, pelvic congestion syndrome( Mainly, Lt. ovarian vein engorgement)

상기질환은 부인과 영역이 아닌 환자로 오인되기 쉽지만, Neuropelveology의 관점에서는 골반신경의 문제로 갈음할 수 있다. 금일 이질환에 대한 수술적 처치를 해야하는 경우와 그 방법, 예후에 대해서 설명드리겠습니다.

또한 Neurolysis 이후에도 지속되는 통증 및 기능 이상, 하지마비에 대한 신경자극치료 개념과 그 연구상황도 알려드리겠습니다. 감사합니다.





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# **Conventional and Stapled Hemorrhoidectomy**

남수민

대항병원



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# **Surgery for Hemorrhoids**

조동호

송도병원

#### Introduction

Hemorrhoids are one of the oldest and most common conditions in anorectal disease, a description of which can be found even in the Code of Hammurabi of Babylon in 2250 BC, experiencing symptoms in 5% of the total population. In addition, there are differences between individuals over the age of 50, but 50% of them are treated with hemorrhoids, and 10-20% of them require surgery.

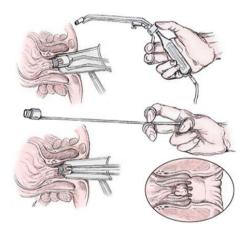
The surgical treatment of hemorrhoids aims to resolve symptoms of hemorrhoids and minimize recurrence, and in principle, to minimize postoperative pain and complications. Therefore, various surgical and non-surgical treatment methods are implemented alone or in combination to prevent bleeding, sphincter damage, and stenosis that may occur after surgery and to achieve the goal.

#### Main subject

#### 1. Outpatient procedure

- Rubber band ligation(RBL)

RBL was first attempted by Blaisdel in 1954 and is widely known by Baron, and used as an early hemorrhoids treatment because it is relatively easy to manipulate and apply repeatedly. In some cases, septic conditions have been reported after the procedure, but they are extremely rare, and if fever and systemic symptoms appear after the procedure, it can be prevented in advance by releasing rubber ligaments. The most common complication is pain that occurs within 24 hours of the procedure, which is controlled by the administration of painkillers, but long-term follow-up results show that recurrence is more than surgery. In the case of RBL, if you keep in mind that pain in the anus may occur after the procedure, you can achieve a good treatment effect with Office-based therapy.



Above: McGown Suction ligator Below: McGivney type ligator.

#### 2. Surgical treatment

- Conventional hemorrhoidectomy

The ligation and excision of the hemorrhoids by Milligan-Morgan and closed method by Ferguson have long been used in the grade III-IV hemorrhoids but are mainly performed by semi-open and submucosal dissection by utilizing the advantages of the two methods. To date, it is the most widely used treatment of hemorrhoids and is accepted as a "Gold standard" among various treatments of hemorrhoids. New energy sources such as Ligasure have been developed and used to accurately and minimize damage to surrounding tissues when performing the hemorrhoidectomy and this system has a superior local hemostatic effect compared to conventional electrical cautery, with only 2mm of thermal injury to the surrounding tissue. In addition, it is reported that excision by Harmonic scalpel or Ligasure is less likely to use pain management and painkillers after surgery, and the return to social life is reported quickly, but more research is needed in the future.

- Stapled hemorrhoidopexy / PSH
SH could be used in patients with Grade II–III hemorrhoids and/or in patients who are refractory to outpatient procedures

#### Conclusion

Physicians who treat hemorrhoids should be familiar with the indications and complications of each treatment method and choose a method that can be customized for each patient. In conclusion, it is necessary to choose a quick way to minimize pain and bleeding that commonly occurs after hemorrhoids, minimize recurrence, and return to social life.

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# Video-assisted Anal Fistula Treatment (VAAFT)

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# HAL & LAL

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# **Perianal Crohn Disease**

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# **Reduced-port Laparoscopic Ventral Rectopexy**

최병조

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# Total Surgical Stapling Solution for Colorectal Surgery with Tri-Staple Technology

오흥권

서울의대

Colorectal surgery, while common, presents various complications such as surgical site infections, anastomotic leak, and sepsis. The innovative Medtronic Tri-Staple Technology has emerged as a promising tool in mitigating these risks, revolutionizing surgical procedures with its unique features. This lecture delves into the nuances of Tri-Staple Technology, highlighting its stepped cartridge face designed to minimize tissue stress and enhance stapling precision across varying tissue thicknesses.

We will explore the technology's groundbreaking color-coding system and the integration of SIGNIA Tissue Sensing Technology, underscoring how these features collectively improve clinical outcomes. Comparative analyses with existing technologies will be presented, showcasing Tri-Staple's superiority in terms of consistent performance and reduced complication rates.

Further, the discussion will encompass the clinical benefits of Tri-Staple Technology, emphasizing its role in achieving better perfusion, ensuring secure staple lines, and its impact on the overall success of colorectal surgeries. We will also navigate the practicalities and recommendations for transitioning to this technology, particularly in complex surgical scenarios.

Conclusively, this lecture aims to offer a comprehensive insight into the Medtronic Tri-Staple Technology, illuminating its transformative potential in enhancing surgical efficiency and patient outcomes in colorectal surgeries. Participants will gain an enriched understanding of this technology's advantages, positioning them to make informed decisions in their surgical practices.





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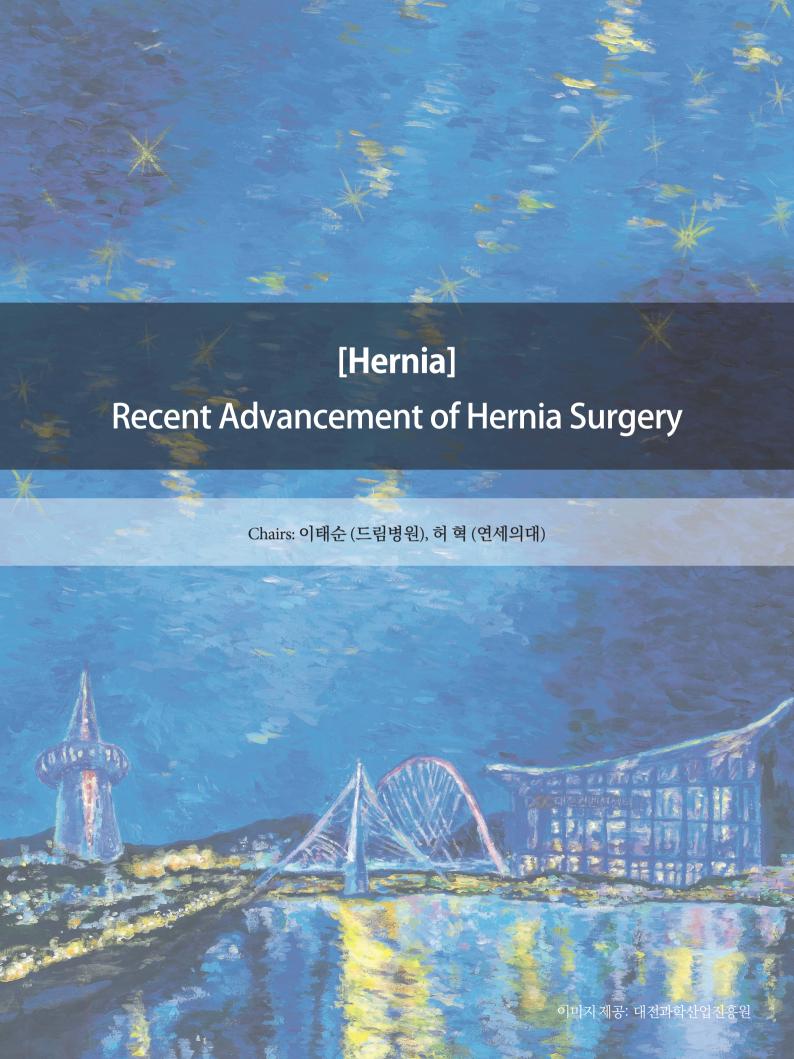
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# **Move Ahead to New Generation of TPN**

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# Robotic Inguinal Hernia Repair

### 백세진

고려의대

서혜부 탈장은 가장 흔하게 시행되는 외과 수술로 전방 접근법인 절개 방식부터 후방 접근법인 복강경 방식, 그리고 최근에는 로봇 서혜부 탈장 수술까지 이용되고 있다. 로봇 서혜부 탈장 수술은 처음에 비뇨기과 분야에서 주로 보고 되었는데 2007년 처음 보고를 시작으로 2015년에 외과 분야 연구에서 처음 발표되었다. 2020년대에 이르러 로봇 서혜부 탈장 수술이 급격하게 증가하였고 한국에서도 최근 많이 보고 되고 있다. 로봇 서혜부 탈장 수술 결과를 절개 및 복강경 방식과 비교하였을 때 공통적으로 더 긴 수술 시간과 높은 비용을 보였으나, 양측성 탈장의 경우에서는 수술 시간의 차이를 보이지 않았고 재발률도 비슷하였다. 특히 로봇 시스템이 가지는 장점 때문에 양측성 탈장이나 이전에 비뇨기과 수술을 받은 적이 있는 난치성 탈장, 재발성 탈장에 적용하기에 용이하다. 로봇 서혜부 탈장 수술은 적절한 적응증의 환자에게서 좋은 수술적 결과를 얻을 수 있는 대안적 최소 침습 수술의 하나로 자리잡고 있으며 향후에도 지속적인 성장세가 기대되는 수술 분야이다.



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# **Single Port Inguinal Hernia Surgery**

### 김지훈

가톨릭의대

The surgery for Inguinal hernia began in the Middle Ages and has made many progress so far. The most important of many procedures is that Lichtenstein's tension-free repair. And Lichtenstein's tension-free repair became the gold standard for open hernia surgery.

The second innovation in inguinal hernia surgery is the introduction of minimally invasive surgery.

Through the posterior approach using laparoscopic equipment, we were able to completely cover myopectoral orifice.

Among the minimally invasive surgeries, single port or single incision surgery have an excellent advantage in the process of 'space making'. For this reason, we need to understand and apply the single port TEP.

The detailed surgical method of single port TEP will be described in detail through a surgical video in this presentation.



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# Extended Totally Extraperitoneal Repair (E-TEP) for ventral Hernia

### 한승림

아인병원

복벽 탈장은 외과의사들이 만나는 흔한 질환이지만 복벽 탈장을 교정하는 수술법은 복강경과 로봇 수술과 같은 minimal invasive surgery가 시작되면서 수술법은 굉장히 다양해졌다. 가장 전통적으로 시행하는 open onlay mesh placement는 쉽고 빠르게 수술 할 수 있지만 mesh를 고정하기 위한 과도한 subcutaneous flapping으로 많은 seroma와 통증이라는 단점을 갖고 있다. 그 이후 복강경을 통한 복막내로 접근하여 hernia defect를 닫거나 있는 상태로 mesh를 복막에 붙여서 수술하는 IPOM (Intraperitoneal onlay mesh) 방법이 많이 시행되어졌다. 그러나 이 방법도 mesh가 직접 장에 닿음으로 인한 mesh complication이 보고되고, mesh를 복벽에 고정하는 tacker로 인한 chronic pain이 주된 단점으로 지적되어왔다. 이러한 단점을 보완하기위한 방법으로 mesh를 sublay로 넣는 방법들이 공안되었고, 대표적인 방법인 TAPP (transabdominal preperitoneal repair)와 e TEP (extended or enhanced-view totally extraperitoneal repair)가 소개되었다.

오늘 주제인 eTEP은 Jorge Daes, Ignore Belyansky라는 두 선구자에 의해 vental hernia를 eTEP으로 수술하는 방법이 대중화되게 되었다. 미국의 빅데이타 연구에 따르면 현재 미국에서도 로봇 수술의 비율은 점차 증가하는 추세이며, 이중 ventral hernia의 로봇 수술 비율이 가장 현저히 늘어나는 추세를 보이며, 이중 MIS ventral hernia의 비율도 IPOM이 가장 선호되던 2010초반에 비해 점차 TAPP와 eTEP과 같은 sublay mesh placement가 늘어나고 있다.

보고된 laparoscopic IPOM과 비교한 연구에서 통증감소와 재원일수 감소의 임상결과도 보고되고 있다. eTEP의 장점 중 또 한가지는 큰 탈장의 경우, posterior component separation 즉, TAR (transverse abdominis release)를 통해 fascia closure rate을 증가시킬 수 있다는 점이다. eTEP를 보고한 9개의 연구를 review한 연구에서도 7cm 이상 size의 탈장은 eTEP with TAR을 시행하였고 낮은 합병증률, 짧은 재원일수, 그리고 fascia closure rate이 높은 점을 장점으로 결론짓고 있다. 그러나 수술 시간이 길다는 점의 단점이 보고되고 있고, 최근 시행된 7cm 이하의 복벽탈장 환자의 무작위 배정 연구에서는 robotic IPOM과 robotic eTEP에서 수술 후 통증의 차이가 없다는 점과 eTEP의 workload가 더 많고, 수술시간이 길다는 점을 소개하였다.

복벽탈장을 수술하는 방법은 다양하다. 이중 한가지인 eTEP의 수술법에대한 개념은 소개하고 임상적으로 좋은결과들을 아는 것이 중요하며, 복벽탈장의 크기와 수술자의 선호도에 따른 수술법을 선정하는 것이 중요하다.



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# Day Surgery under Regional Anesthesia for Inguinal Hernia

### 주현호

주외과의원

### 1) Advantages of Regional or Local Anesthesia

- Safer anesthesia for patients with cardiopulmonary disease (in comparison to general and spinal anesthesia)
- Suitable for people with spinal diseases (in comparison to spinal anesthesia)
- Quick recovery from anesthesia (in comparison to general and spinal anesthesia)
- Less pain on the operation day (in comparison to spinal anesthesia)
- No urinary retention
- => suitable for Day surgery

#### 2) Conveniences of Regional Anesthesia with Tumescent Solution in Comparison to Local Anesthesia

- Includes the advantages of local anesthesia
- Requires fewer injections than local anesthesia
- Reduces tissue swelling at the operation field
- Regardless of the injection dosage
- \* Tumescent solution used in my clinic
  - 1. Normal saline 500ml
  - 2. Lidocaine 2%, 1 vial (20ml)
  - 3. Epinephrine 1A
  - 4. Sodium bicarbonate 1A

### 3) Limitations of Regional Anesthesia

- Inguinal hernia with adhesion of internal organs to the scrotum.
- Obesity (due to a very thick subcutaneous fat layer).



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## Parastomal Hernia Repair

### 정성우

#### 국민건강보험 일산병원

Parastomal hernia (PSH) is a common complication after ostomy creation. It is defined as an abnormal protrusion of the contents of the abdominal cavity through the abdominal wall defect created during placement of a colostomy, ileostomy or ileal conduit stoma. The hernia sac, lined by parietal peritoneum, may contain only the stomal limb and its mesentery, or any other abdominal viscera, commonly including greater omentum, colon, or small intestine.

The incidence of PSH varies widely, ranging between 30 and 59%. The incidence is dependent on duration of follow-up, type of stoma, patient characteristics, and the definition of hernia occurrence. End colostomy has a higher incidence of PSH than loop colostomy, loop ileostomy, and ileal conduit.

Risk factors demonstrated to increase the risk of PSH include higher BMI, older age, female sex, larger aperture size, and larger waist circumference. Techniques used during stoma creation that may reduce the likelihood of PSH formation should be considered at primary operation.

Surgery is the most definitive treatment for PSH, and involves repairing the hernia defect. Non-surgical methods for treating PSH include: weight loss, smoking cessation, diabetic control, use of immunosuppression, stoma appliance modification, stoma relocation

Stoma relocation is a surgical procedure that involves moving the stoma to a new location on the abdomen. This can be a good option for patients with small PSHs that are not amenable to repair with surgery.

The recurrence rate after PSH repair is high, ranging from 20 to 50%. This is due to the fact that the stoma and the fascial defect are still present after repair.

In the elective setting, numerous methods are described to repair PSH. Correctable risk factors should be addressed before surgery, including BMI reduction, smoking cessation, diabetic control or use of immunosuppression.

The choice of surgical approach depends on a number of factors, including the size and location of the hernia, the patient's health status, and the surgeon's experience.

The following are some of the most common surgical approaches to PSH repair:

- Simple fascial repair: This is the simplest technique, and involves direct suture repair by musculofascial approximation. However, it is associated with a very high recurrence rate of 46-100%.
- Stoma relocation: This involves moving the stoma to a new position on the abdominal wall and repairing the hernia at the previous site. This exposes the patient to the morbidity associated with a new laparotomy, the risk of developing an incisional hernia at the old stoma site (30-50%), and the inevitable development of a parastomal hernia at the new stoma site (60%).
- Mesh repair: This is associated with lower recurrence rates than simple fascial repair and stoma relocation. There is a lack of comparative
  evidence regarding the vast array of meshes available for use in PSH repair. Materials used include synthetic, biological, and biosynthetic
  meshes. Use of synthetic, uncoated mesh should not be considered for intraperitoneal application owing to an increased risk of adhesions
  and bowel erosion with formation of enterocutaneous fistula.

Onlay mesh repair: This method involves a suture repair of the fascial defect and placing the mesh subcutaneously (keyhole), with fixation to the anterior rectus sheath and external oblique aponeurosis.

- Intraperitoneal mesh repair: This involves placement of the mesh intra-abdominally and fixed posterior to the peritoneum. This technique can be performed in an open procedure, laparoscopically or robotically.
- Retromuscular mesh repair: This is the most effective technique for PSH repair, with the lowest recurrence rate. The mesh is placed posterior to the rectus muscle and above the posterior sheath and peritoneum. There is the opportunity to cover multiple defects, and this approach is a good option for multiple recurrent parastomal hernias.

The choice of surgical approach should be individualized based on the patient's specific needs and circumstances.





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# **TNT in Advanced Rectal Cancer**

### 박지원

서울의대

Total Neoadjuvant Therapy (TNT) for advanced rectal cancer is a treatment approach that administers a combination of chemotherapy and chemoradiotherapy before surgery, aiming to improve patient outcomes by tackling micrometastatic disease early. This strategy seeks to enhance the effectiveness of treatment, increase the rates of pathological complete response (pCR), and potentially allow for organ preservation. TNT has shown promise in increasing treatment completion rates, improving patient tolerance, and potentially leading to better survival rates compared to traditional treatment sequences. The approach is becoming increasingly recognized for its benefits in managing locally advanced rectal cancer, with ongoing research focusing on optimizing treatment regimens to maximize its effectiveness.



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## **Organ Preservation for Early Rectal Cancer**

유니나

가톨릭의대

The implementation of total mesorectal excision (TME) has standardized the surgical treatment of rectal cancer and greatly enhanced oncological outcomes. In locally advanced diseases, neoadjuvant chemoradiotherapy (nCRT) has further improved oncological benefit. However, significant morbidity, including long-term bowel, urinary, and sexual dysfunction, has driven the development of alternative treatment
strategies to avoid or minimize the morbidity associated with oncological resection without compromising oncological outcomes. Achieving
a complete clinical response (cCR) after nCRT for rectal cancer may offer a chance to maintain functional outcomes without sacrificing
oncological outcomes, preserving the quality of life. Along with the emergence of cancer-targeted therapy and immunotherapy coupled
with better radiological assessment, recent publications about rectal cancer treatment strategies have shown the potential to further improve
oncological outcomes, which allows organ preservation in rectal cancer. Optimal patient selection would be the key to achieving treatment
success. A selective approach is based on a diagnosis of early rectal cancer to achieve a cCR to avoid the consequences of surgery. Moreover,
patient adherence to nCRT with induction or consolidation chemotherapy regimens and acceptance of the need for frequent surveillance
are crucial for an organ preservation strategy to be successful. To be a viable treatment option in managing rectal cancer, a patient should be
part of the decision-making process regarding organ preservation strategies.



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# Salvage Surgery after W&W for cCR

### 허정욱

성균관의대

Treating locally advanced rectal cancer poses a challenge in balancing effective oncologic control with minimizing morbidity. Standard treatment involves neoadjuvant chemoradiotherapy (CRT) followed by total mesorectal excision, but this approach has a potential of post-operative morbidities. Alternatives like transanal local excision and the watch-and-wait (W&W) strategy for clinical complete response (cCR) after CRT are gaining attention recently. Here I briefly review the role and evidence of salvage surgery after W&W for cCR in patients with rectal cancer.



김진고려의대

1995 학사, 고려대학교 의과대학

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### **Professional Experience**

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2006-현재 교수, 고려대학교 의과대학 외과학교실

## **Cure for Recurrent Rectal Cancer**

### 김 진

고려의대

The management of locally recurrent rectal cancer (LRRC) poses significant challenges despite radical surgery, with up to 33% of patients experiencing locoregional relapse. Multimodality therapy, including radical surgery and intraoperative radiotherapy, has shown promising 5-year survival rates of up to 31% and local control rates of 50-71%. R0 resection is crucial for long-term local control and survival, with extended surgeries like abdomino-sacral resection showing lower survival rates and higher postoperative morbidity. Surgeon-related factors play a critical role in the success of surgical treatments for local recurrence, emphasizing the need for a staging system based on prognostic factors to guide appropriate treatment modalities. Research suggests that approximately 40% of patients with LRRC are candidates for intentionally curative treatment, with R0 resection rates around 56% and postoperative mortality at 2.2%. The use of external beam radiotherapy preoperatively, along with concurrent chemotherapy, has shown benefits in achieving R0 resection, a key predictor for survival in LRRC treatment. However, the optimal treatment strategy remains unclear due to disease heterogeneity and the lack of conclusive evidence on the most effective approaches. Innovative strategies are emerging, such as total neoadjuvant treatment protocols and individualized therapies based on molecular alterations, aiming to maximize local tumor response and prevent recurrences. Pooled analyses of patient data from trials are proving instrumental in understanding outcomes over time and guiding future treatment approaches for rectal cancer. In summary, the evolving landscape of LRRC treatment underscores the importance of tailored multimodal approaches, emphasizing the role of surgery, radiotherapy, chemotherapy, and emerging targeted therapies in improving outcomes for patients with recurrent rectal cancer.



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# **Neoadjuvant Immunotherapy for Rectal Cancer**

김혜진

경북의대





**송승호** 경북의대

#### Education

2011 M.D. Kyungpook National University2023 Ph.D. Kyungpook National University

#### **Professional Experience**

2019-2022 Fellow, Kyungpook National University Chilgok Hospital

2022-Present Assistant Professor, Department of Surgery, Kyungpook National University

## Surgical Strategies in Multidisciplinary Management of Crohn's Disease

송승호

경북의대

The management of Crohn's disease (CD) requires a comprehensive and multidisciplinary approach due to its complex nature, characterized by a chronic, unpredictable course, and potential for both intestinal and extraintestinal manifestations. This presentation aims to elucidate the pivotal role of surgical strategies within the context of multidisciplinary management of CD, highlighting the importance of a collaborative approach among gastroenterologists, surgeons, radiologists, and nutritionists to optimize patient outcomes.

We will begin by outlining the current understanding of Crohn's disease pathophysiology and its implications for surgical management. The presentation will then delve into the indications for surgery in CD patients, which include failure of medical therapy, complications such as strictures, fistulas, and abscesses, and the management of emergent conditions like bowel obstruction and perforation.

A significant focus will be placed on the evolution of surgical techniques, from traditional open surgeries to minimally invasive approaches, including laparoscopic and robotic-assisted surgeries. The benefits of these minimally invasive techniques, such as reduced postoperative pain, shorter hospital stays, and quicker return to normal activities, will be discussed in the context of CD.

Moreover, the presentation will address the concept of bowel preservation and the importance of a meticulous surgical technique to minimize short and long-term complications, thereby improving the quality of life for patients with CD. Strategies for postoperative management, including the prevention of disease recurrence and the role of biologic therapies, will also be explored.

In conclusion, the presentation will emphasize that surgical intervention, when integrated into a multidisciplinary management plan, plays a crucial role in the comprehensive care of patients with Crohn's disease. By fostering collaboration among specialists, we can achieve a personalized treatment plan that addresses the unique needs of each patient, ultimately leading to improved disease control and enhanced quality of life.



**정준성** 전남의대

#### Education

2011-2015	전남대학교 의학전문대학원 의학 석사
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#### **Optimal Timing for Refractory Crohn's Disease**

#### 정준성

전남의대

Crohn's disease is one of the representative inflammatory bowel diseases along with Ulcerative colitis and is a common and a refractory disease whose prevalence is rapidly increasing worldwide. Crohn's disease is caused by a combination of genetic, environmental, dietary, immune, and gut microbiota factors. The main approach for managing Crohn's disease is medical treatment, but surgical intervention is often necessary when medical treatment is ineffective. Recent studies have shown that approximately 70% of patients with CD will require at least one surgery during their lifetime, and the timing of surgery can have a significant impact on clinical outcomes, especially for early abdominal surgery. Surgical intervention is a key part of the comprehensive treatment of Crohn's disease. Inappropriate timing of surgery may lead to catastrophic postoperative complications, increasing the risk of surgery and prolonging hospital stays. Therefore, clinicians need to evaluate the severity and type of Crohn's disease as well as the effectiveness of medical therapy and choose the timing of surgical intervention based on individual circumstances to ensure the maximum benefit for Crohn's disease patients.

In this presentation, I will look at how to make the most appropriate decision through an overall view of the clinical condition along with an analysis of each of these factors to accurately evaluate the optimal timing for refractory Crohn's disease.



**조민수** 연세의대

#### Education

2005	연세대학교 의과대학교 졸업
2013	연세대학교 의과대학교 대학원 석사
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# Malignancies from IBD: Incidence, Treatment, and Prognosis

조민수

연세의대

Inflammatory bowel disease (IBD) with its 2 subtypes, Crohn's disease (CD) and ulcerative colitis (UC), is characterized by a chronic inflammation of the intestine. Patients with IBD are at increased risk of colorectal cancer (CRC), but the risk varies between different studies and seems to be decreasing. The cumulative risk of CRC has been reported to be 1%, 2%, and 5% after 10, 20, and over 20 years of disease duration, respectively, in recent meta-analysis. Disease duration and grade of inflammation are the main driving forces of dysplasia and CRC development. However, Recent studies consistently show a decline in rates of IBD associated CRC over the past 20 years potentially as a result of improved therapies. However, there is still a greater than 2-fold relative risk (RR) of CRC in patients with UC or with colonic CD than in the background population. Also, the risk of extraintestinal cancers is increased in IBD, where the degree of immunosuppression and its duration are the most important risk factors. Most important extraintestinal malignancies are lymphomas, cholangiocarcinoma, and non-melanoma skin cancers. This lecture aims to summarize the current literature on IBD, the risk of developing gastrointestinal malignancies, and the risk of malignancies associated with available biologic and immunomodulatory therapies and to discuss the overall treatment strategy and prognosis for a patient with a history of malignancy.



**김소현** 영남의대

#### Education

2006	영남대학교 의과대학 졸업
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#### **Professional Experience**

2015	영남대학교 의과대학 외과학교실 조교수

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#### Short Bowel Syndrome in Patients with Crohn's Disease

#### 김소현

영남의대

Short bowel syndrome (SBS) is a rare disorder caused by shorter bowel than normal. SBS impacts on bowel function, especially water and nutrition absorption. Intestinal failure (IF) is diagnosed when nutritional support is needed, but not necessarily parenteral nutrition. Patients with SBS with chronic intestinal failure (SBS-IF) required intravenous supplements to maintain their lives, because of insufficient absorption of water and nutrition by oral intake. Crohn's disease (CD) is chronically recurrent, require repeated resection, and results in SBS-IF. Oral fluid restriction is a key challenge in the management of patients with SBS. Short bowel patients are unable to absorb enough proximal secretions distally, which means that dehydration causes thirst, but drinking water further exacerbates fluid loss. Food is encouraged in the patients with SBS-IF. This should be ordinary food, but do not recommend formula feeds or elemental feeds. A little and often approach is helpful.

Patients with SBS-IF are prescribed anti-secretory regimens. The medication included proton pump inhibitors, loperamide, codeine phosphate, somatostatine or glucagon-like peptide-2 (GLP-2). Tedglutide(Gattax $\phi$ c) is an analogue of GLP-2. GLP-2 is a hormone secreted by L cell. GLP-2 effect to absorb water and nutrition. The group with tedglutide showed sustained reduction of demand of parenteral nutrition compared with controlled group.

Studies with SBS-IF are limited by small enrolled patients and heterogeneous methods. The main practice areas need more definitive guidelines and strategies to improve absorption of medications, nutrients, and fluids.



**김민현** 울산의대

#### Education

2001-2005	서울대학교 응용화학부/생물공학 연합전공
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# Prevention of Anastomotic Leakage in iBD Surgery: ICG, Bowel Preparation, and Oversewing

김민현

울산의대



#### Development of the National Health Insurance Big Data-Based Clinical Support Platform (NHI BD-CSP) by Ministry of Trade, Industry, and Energy

#### Ik Yong Kim<sup>1</sup>, Sung Woo Kim<sup>2</sup>

<sup>1</sup>Yonsei University, Wonju Severance Hospital, <sup>2</sup>Yonsei University, Wonju Yonsei Health System

BACKGROUND: This R& D project focuses on the imperative need to integrate patient medical information to elevate the standard of patient care within a comprehensive digital healthcare ecosystem. I'd like to introduce this R&D project at KSCP society,Bio-Nano Industry Open Innovation Ecosystem Promotion Project (2021~2924,) supported by Ministry of Trade, Industry, and Energy, Korea.

**PURPOSE:** The primary goal is to develop a universal clinical support platform that consolidates medical treatment and prescription details, health checkup records, and life log data collected by the National Health Insurance System (NHIS). It can also help improve clinical decision making, quality of care, and patient outcomes.

MATERIALS AND METHODS: Research Project 1: Integrating Patient Medical Information for Enhanced Care The platform, operated through the 'Healthcare Institution Information Center,' provides a unified interface for medical staff across all institutions. This empowers them to deliver precise and tailored treatment to patients, with the crucial aspect of obtaining patient consent for personal information use secured only once. The NHIS big-data based medical information includes such a history of medication, treatment, and diagnosis with a personal health record. The research methodology Research Project 2: Optimizing Medical Support Platform Utilization involves construction of a medical support platform as shown in Figure 1. This initiative revolves around a medical support platform that integrates OCS/EMR\*, aiming to enhance its utilization within medical institutions. Strategies include interlinking screens, adjusting configurations, and incorporating additional data into the OCS/EMR connection.

**RESULTS**: Initially implemented as a pilot program in five local medical institutions, the platform has expanded to 127 institutions by December 2023, with 19,904 patients consenting to share personal information. Plans for 2024 involve selective expansion across Gangwon Special Self-Governing Province and specific regions.

The project's inception includes connecting OCS/EMR to primary care provider platforms, enhancing functionality for clinicians. Specialized linkages for departments, especially in surgical and colonic diseases, are underway. Active collaboration with healthcare experts aims to refine the platform, emphasizing privacy features and simplifying the certificate login process.

CONCLUSION: In summary, this Clinical Support Platform(N-HI BD-CSP)goal is to optimize the platform for healthcare providers, providing a comprehensive overview of patients with secured consent. Future efforts involve seeking insights from colorectal specialists for ongoing development, emphasizing continuous improvement in functionality and accessibility. \* OCS/EMR is a term that refers to the integration of order communication system (OCS) and electronic medical record (EMR) in a hospital system; OCS is a system that delivers the prescriptions from doctors to the relevant departments using computer technology. EMR is a system that records and stores all the medical information of patients in electronic format. OCS/EMR can help improve the efficiency, accuracy, and quality of medical services.



Figure. Flow of Development of the National Health Insurance Big Data-Based Clinical Support Platform(NHI BD-CSP).

#### Effect of Chitosan-Based Biomaterials Containing Hyaluronic Acid and Ca2+ on Accelerated Wound Healing

Sujin Kang, Jun Seok Park

Department of Surgery, Kyungpook National University

BACKGROUND: Reduced oxygen, wound infections, and systemic factors such as age impede wound healing, leading to chronic wounds. This places a significant burden on global healthcare systems, impacting millions of patients and straining the workforce. Chitosan, a naturally-derived polymer, fosters positive interactions crucial for wound healing due to its bacteriostatic properties that actively promote tissue regeneration. Its versatile biological and physicochemical characteristics enhance the healing process, making it a promising material for advanced wound care products.

**PURPOSE**: To assess the efficacy of Chi-G/HA/Ca2+ in evaluating the benefits of chitosan in wound healing.

MATERIALS AND METHODS: Chitosan-gallic acid (CHI-G) was synthesized through standard 1-ethyl-3-(3- dimethylamino-propyl)-carbodiimide hydrochloride (EDC) chemistry, where an amide bond was formed between the amine group of chitosan and the carboxylic acid group of gallic acid (GA). The resulting complex was prepared in fixed ratios with hyaluronic acid (HA) and calcium ions (Ca2+). After inducing wounds using a skin punch on rats, we evaluated wound healing at 0, 7, and 10 days based on the presence or absence of chitosan patches.

RESULTS: The wound size(%) of the complex performed better than 15% of the control. We visually confirmed a faster healing rate, with a noticeable reduction in the wound size of the chitosan group compared to the control group from day 0 to day 14. The evaluation of the excision wound involved assessing the percentage of wound size relative to the initial wound size. On day 7 and day 14, fresh epidermal and granulation tissues were analyzed through H&E staining to assess the microscopic changes in wound recovery for both the control and chitosan groups. The cross- sectional analysis of H&E staining clearly demonstrated a reduced wound width in the chitosan group compared to the control group. Additionally, a significant increase in epidermal thickness was observed in the chitosan group.

CONCLUSION: The optimized concentrations for preparing the Chi-G/HA/Ca2+ patch as a wound healing agent were determined to be 1 wt% for hyaluronic acid (HA) and 2 wt% for Chitosan-Glycerophosphate (Chi-G). The results demonstrated the efficacy of the Chi-G/HA/Ca2+ patch in promoting rapid wound healing in the rat model.

#### Dual Labeling Color-Coded Fluorescence-Guided Surgery Has the Potential in Tailored Lymphadenectomy in Colorectal Cancer in the Orthotopic Mouse Model

<u>Hye-Jin Kim</u><sup>1</sup>, Gyu-Seog Choi<sup>1</sup>, Michael Bouvet<sup>2</sup>, Paul Yazaki<sup>3</sup>, Kristin Cox<sup>2</sup>, Robert Hoffman<sup>4</sup>, Siamak Amirfakhri<sup>2</sup>

BACKGROUND: Lymph node (LN) status is one of the most important prognostic factors in patients with colorectal cancer. However, the intraoperative detection of metastatic LNs has struggled with low accuracy. Tumor-specific antibodies conjugated with near-infrared fluorophores have shown the potential to visualize colorectal cancer in preclinical studies and clinical trials.

**PURPOSE**: This study investigated the effectiveness of tumor-specific antibodies to discriminate metastatic LNs in the orthotopic rectal cancer mouse model.

MATERIALS AND METHODS: Humanized anti-CEA antibody (M5A) was used to detect the tumor-bearing LNs. M5A- IR800CW was used to assess the sensitivity of M5A for metastatic lymph nodes in colorectal cancer. For dual-labeling color-coded images, M5A-IR700CW and indocyanine green (ICG) were introduced 48 hours and 3 hours before fluorescence imaging, respectively. Maximal tumor-background ratio (TmaxBR) was used to evaluate the

effectiveness of the intra-molecular imaging. The Pearl Small Imaging System was used for these studies.

RESULTS: A total of six mice were injected with M5A-IR800CW. The median TmaxBR was significantly higher in metastatic lymph nodes than benign lymph nodes [4.46 (range, 2.90-5.15) vs. 1.83 (1.01-3.00); p < 0.001]. Under dual-labeled mode, 700 and 800nm lights, a total of 15 lymph nodes were identified. Although all lymph nodes had green- colored ICG signals, only six lymph nodes simultaneously had red-colored signals, which were finally identified as malignant lymph nodes. The metastatic lymph nodes had higher median TmaxBR of M5A-IR700 than the benign lymph nodes [4.00 (range, 2.71-6.42) vs. 1.63 (1.16-1.92); P < 0.001].

**CONCLUSION**: All lymph nodes are detected under dual color-coded fluorescence, but the metastatic lymph nodes were well discriminated with different colors.

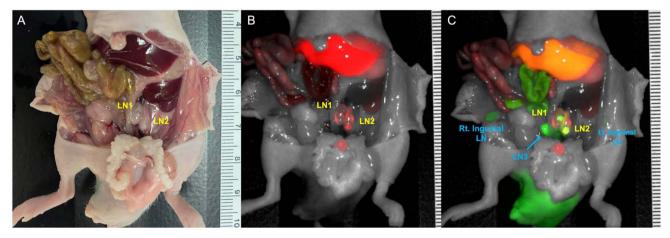


Figure 1. Dual labeling color-coded images of para-aortic and inguinal lymph nodes. M5A-IR700CW and indocyanine green (ICG) were injected 48 hours and 3 hours before fluorescence imaging. A. Under white light mode B. Under 700nm mode: two lymph nodes (LN1 and LN2) had the signal. C. Under dual-labeled mode, 700nm and 800nm: five lymph nodes had a green-colored signal. Among them, two lymph nodes (LN1 and LN2) only had mixed signals.

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# A Novel Approach for Simple and Fast Extracellular Vesicle Isolation in Colorectal Cancer for Early and Accurate Detection

Young Il Kim, Seok-Byung Lim

Asan Medical Center

BACKGROUND: Colorectal cancer (CRC) is a prevalent global malignancy. Early detection is challenging, but crucial for effective intervention, as the 5-year survival rate declines sharply from stages 1 to 4. While biopsy through colonoscopy is the gold standard, it has limitations like invasiveness and accessibility issues. Small extracellular vesicles (EVs) have gained significance in CRC diagnosis, especially those containing circRNAs and miRNAs.

**PURPOSE**: Efficient EV isolation is vital, with ultracentrifugation being the current standard, despite drawbacks. Our study introduces a novel, simple, and fast EV isolation system, SF-ZAHVIS, using zeolite-amine and hydrazides.

MATERIALS AND METHODS: A total of 80 blood plasma samples were obtained from the Biological Resource Center (BRC) of Asan Medical Center in Seoul, Korea. The cohort included individuals with histologically confirmed stage 0 & 1 (n = 20), stage 2 (n = 20), stage 3 (n = 20), and stage 4 colorectal cancer (n = 20) with healthy controls (n = 20). The SF-ZAHVIS system (integrated tool for EV isolation, EV-derived protein and EV- derived nucleic acid (NA) extraction with EV enrichment) was used to isolate EV from samples. EV-derived miRNAs and circRNAs extracted using real-time PCR (qRT- PCR) and were compared between healthy control and according to each cancer stage. Eight candidate miR-

NA markers were selected by analyzing colorectal cancer cell line and colon normal cell line. The efficacy of the SF-ZAHVIS system was assessed through a comparison with commonly employed EV isolation techniques, specifically the ultracentrifugation (UC) and total exosome isolation (TEI) methods.

**RESULTS**: The SF-ZAHVIS system demonstrated an effective approach for EV isolation, yielding purity and concentration comparable to the established UC and TEI techniques. EV's particle size distribution, based on signal intensity and number, was determined through nanoparticle tracking analysis (NTA), presenting SF-ZAHVIS for  $187.1 \pm 27.5$ , UC for  $202.4 \pm 36.7$ , and TEI for  $222.5 \pm 65.3$ , nm. The SF-ZAHVIS system successfully extracted EV-derived non-coding RNAs and detected potential CRC miRNA markers (miR-23a-3p, miR-92a-3p, miR-125a-3p, miR-150-5p). The relative expression level of miR-23a-3p, miR-92a-3p, and miR-125a-3p was significantly higher in the CRC samples compared to healthy control (p = 0.042, 0.013, and 0.042, respectively). expression level of miR-150-5p was significantly lower in the CRC group compared to healthy control (p < 0.001).

**CONCLUSION**: The SF-ZAHVIS system is capable of isolating EVs efficiently. By using this novel system, miRNAs could be assessed from patient blood to detect CRC.

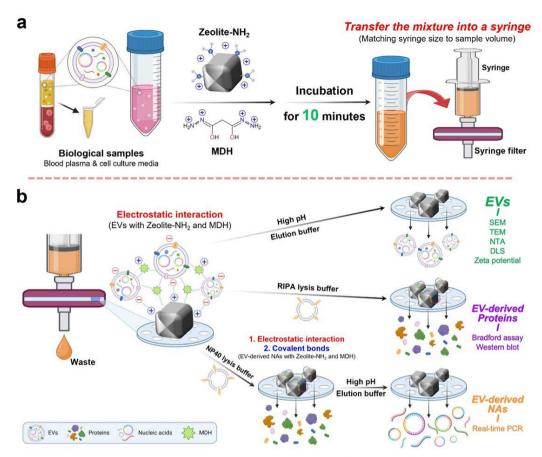


Figure. Schematic illustration of application of the SF-ZAHVIS system. (a) Preparation of materials such as zeolite-NH2, MDH, and syringe filter and workflow for enrichment of EVs using biological samples (b) Workflow and mechanism of EV isolation, EV-derived proteins and nucleic acids extraction.

#### The Anticancer Effect of 'Sustained-Release, Oxaliplatin-Loaded, Multi-Vesicular Liposomal Depot' for Intraperitoneal Chemotherapy in a Syngeneic Mouse Model of Colon Cancer with Peritoneal Metastas

Eun Jung Park<sup>1</sup>, Juseung Lee<sup>2</sup>, Hyun-Ji Park<sup>3</sup>, Chul-Kyu Lee<sup>3</sup>, Seung Hyuk Baik<sup>4</sup>, Sung-Joo Hwang<sup>2</sup>

BACKGROUND: The ideal drug for intraperitoneal (IP) chemotherapy should have prolonged peritoneal activity and slow blood vessel absorption. However, oxaliplatin is limited by its short half-life and rapid peritoneal clearance. To overcome these limitations, we have developed a sustained-release, oxaliplatin-loaded multive-sicular liposomal (MVL) depots. However, it is necessary to assess its anticancer efficacy and toxicity in a peritoneal metastasis colon cancer model.

**PURPOSE**: This study aimed to evaluate the anticancer effect of IP chemotherapy using oxaliplatin-MVL in the CT-26 colon cancer syngeneic mouse model with peritoneal metastasis.

MATERIALS AND METHODS: The dose-escalation test was conducted to determine the optimal concentration of oxaliplatin for IP administration. To compare the anticancer effects between oxaliplatin and oxaliplatin-loaded MVL IP injections, we divided BALB/c mice into four groups: G1 (control), G2 (oxaliplatin 18 mg/kg IP injection), G3 (oxaliplatin-MVL 18 mg/kg IP injection), and G4 (oxaliplatin 36 mg/kg IP injection). The IP injection volume was 20 mL/kg, based on the recent body weight of the mice. Each group consisted of 12 BALB/c mice, each injected with 2x10^6 cells/0.2mL of the CT-26 colon cancer cell line into the abdominal cavity to induce peritoneal metastasis. We evaluated body weight changes, clinical signs, and survival rates. Tumor growth was assessed in each group on day 7 and 14 using IVIS imaging.

**RESULTS**: From the dose-escalation test, we determined that 18

mg/kg of oxaliplatin is a safe and effective dosage for IP injection, considering the LD50 dose of oxaliplatin in the mouse model. The body weight of the G2 group showed a significant decrease compared to the control group (G1). The G4 group exhibited a significant decrease in body weight on days 5 and 12. However, the G3 group showed no effect on body weight change. The mean survival of the G2 group was 13.08±1.37 days, which was not significantly different from the G1 group of 17.08±0.29 days (P=0.4461). However, the mean survival for the G3 and G4 groups were 18.33±0.59 and 18.92±0.57 days, respectively, both showing a significant increase in survival compared to the G1 group (P=0.0348 and P=0.0029, respectively). Notably, the survival of G3 at the same concentration as oxaliplatin exhibited a significant increase compared to G2 (P=0.0422). In the IVIS imaging, both G3 and G4 demonstrated a significant decrease in radiant efficiency on day 14 compared to the negative control group.

CONCLUSION: Oxaliplatin-MVL demonstrated increased survival and reduced toxicity compared to the same dose of oxaliplatin IP injection in the colon cancer mouse model. Even high concentrations of oxaliplatin, typically lethal, were found to be tolerable and effective when administered in the MVL formulation. Consequently, the oxaliplatin-MVL formulation has the potential to exceed the effectiveness of oxaliplatin IP injections and improve oncologic outcomes in IP chemotherapy.

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<sup>&</sup>lt;sup>4</sup>Busan Mirae IFC Medical Center

#### Perceptions and Attitudes of Korean Colorectal Surgeons on Climate Crisis and Sustainability of Surgery

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BACKGROUND: The climate crisis necessitates a global response, including in healthcare. The integration of sustainable practices in operating rooms (ORs) is gaining attention, yet remains unfamiliar. PURPOSE: This study explores surgeons' perceptions of the relationship between the climate crisis and clinical practice, and assesses their willingness to transition towards sustainable OR practices. MATERIALS AND METHODS: This study analyzed responses from a survey sent to 2443 members of the Korean Society of Coloproctology (KSCP) through two rounds of email invitations. Responses from participants who agreed to participate and completed the questionnaire were included in the analysis. The questionnaire, aligned with the guidelines of the Royal College of Surgeons of England and prior research on sustainable ORs, comprised approximately 23 questions categorized into knowledge, perceptions, concerns, and willingness to change regarding the climate crisis and sustainable ORs.

**RESULTS**: Out of 2443 members, 103 (4.2%) completed the survey. A significant majority recognized the severity of climate change (94.2%) and its potential impact on human health (93.2%). Howev-

er, 81.6% were unaware that 5-8% of global greenhouse gas emissions originate from the healthcare sector. In terms of sustainable OR practices, 15.7% perceived a risk to patient safety. Thirty-five percent thought it did reduce efficiency in the operating room. The lack of institutional arrangements, guidelines, and knowledge was the most identified barrier (44.7%) to improving OR sustainability. Notably, respondents from community hospitals exhibited greater receptivity to the use of reusable gowns (75.0% vs. 48.5%, P=0.018) and surgical instruments (82.1% vs. 53.0%, P=0.008) compared to those from tertiary care institutions.

CONCLUSION: Most respondents are aware of the climate crisis, there was a lack of knowledge about the operating room's contribution to climate change through waste and carbon dioxide emissions. Most were willing to implement changes, especially Surgeons at community hospitals. However, the lack of guidelines and the absence of a leading institution are seen as the main barriers. These findings emphasize the need for educational initiatives and the establishment of guiding bodies to promote and guide sustainable OR practices.



Figure. What respondents say are the biggest barriers to increasing sustainability in the OR

# Prospective Randomized Control Study for Exclusion of Appendicitis; Deep Learning Model, Information of Appendix (IA) versus Non-Radiologists: Preliminary Report

Minsung Kim<sup>1</sup>, <u>II Tae Son</u><sup>1</sup>, Bo-Young Oh<sup>1</sup>, Eui Myung Kim<sup>2</sup>, Jong Wan Kim<sup>3</sup>, Geunhyung Gye<sup>1</sup>, Taeyong Park<sup>4</sup>, Min-Jeong Kim<sup>1</sup>, Sang-ook Ha<sup>1</sup>, Won Seok Yang<sup>1</sup>, Bum-Joo Cho<sup>4</sup>, Duck-Woo Kim<sup>5</sup>

**BACKGROUND**: Currently, it should be mandatory to ensure deep learning model meets ethical requirements and is safe with comparable performance to human corresponding demand for a requisite of clinical use approval.

**PURPOSE**: To hypothesis that information appendix (IA) model shows comparable an exclusion rate of appendicitis of less 10% non-inferior margin than non-radiologist with a shorter interpretation time in prospectively randomized multicenter dataset.

MATERIALS AND METHODS: CT image data collected from patients who visited the emergency room with right low quadrant abdominal pain prospectively, were used for test dataset with labeled as non-, simple, and complicated appendicitis. The minimal risk to human subjects and the ethical and legal aspects of artificial intelligence, imposed study design to include only patients whose treatment was clinically finished. Parallel randomized assignment of same anonymized CT image was applied for non-radiologists and IA model employing two-stage binary algorithm-connected transfer learning utilizing DenseNet169. Participants were given CT slices masked with blinded truth labeling and size of average width of 204, height of 225, and depth of 28 slices, identical to the range of the volume of interest for appendicitis generated automatically through the extraction pipeline. The primary endpoint as exclusion rate of appendicitis was defined as specificity. To evaluate

the diagnostic performance of humans, four test items were set up as follows: (1) visualization of the appendix; (2) exclusion of appendicitis; (3) complications; and (4) diagnosis of CT images. Sample size of 263 patients per institution with a follow-up loss of 10% was assumed. The study is registered on ClinicalTrials.gov [ClinicalTrials.gov ID: NCT06175169].

**RESULTS**: True class dataset labelled as non- (n = 40), simple (n = 40), complicated (n = 20) appendicitis was randomly assigned to non-radiologist (n = 4) and IA. The performances of human and IA in stage of classification of non-appendicitis and appendicitis represented by specificity (0.81 vs. 0.70, p = 0.514), accuracy (0.78 vs. 0.79, p = 0.074), and sensitivity (0.76 vs. 0.85, p = 0.032). The AUROC for human and IA were 0.784 and 0.775, respectively (p = 0.743). In stage II to differentiate between simple and complicated appendicitis, human and IA exhibited a specificity of 0.79 vs. 0.71 (p = 0.001), accuracy of 0.74 vs. 0.67 (p<0.001), and sensitivity of 0.63 vs. 0.59 (p = 0.001). The AUROC of stage II classification of complicated appendicitis for human and IA were 0.667 and 0.675, respectively (p = 0.802).

**CONCLUSION**: This ongoing pilot study showed that IA model can yield comparable performance of identifying non-appendicitis, acute appendicitis, and complicated appendicitis in CT scans to human.

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#### Predictive Value of Inflammatory Markers in Enhanced Recovery After Surgery (ERAS) Failure after Minimally Invasive Surgery for Rectal Neoplasms

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BACKGROUND: Enhanced Recovery After Surgery (ERAS) program comprises evidence-based guidelines providing contemporary recommendations for optimal perioperative care. Despite the widespread adoption of ERAS programs in colorectal surgery, certain patients do not recover as expected. Identifying predictive factors for ERAS failure is crucial for tailored patient management. PURPOSE: This study aimed to explore the predictive potential of inflammatory markers in identifying patients at risk of ERAS failure after minimally invasive surgery (MIS) for rectal neoplasms. Understanding these factors may enable early recognition and targeted interventions.

MATERIALS AND METHODS: We conducted a retrospective review of 128 patients who underwent MIS for rectal neoplasms and were subjected to the ERAS program between September 2020 and February 2023. Demographic, perioperative, and laboratory data were collected. ERAS failure was defined by specific criteria, including intolerance of a soft diet on postoperative day (POD) 2, postoperative length of stay exceeding 7 days, or readmission within 30 days after surgery.

**RESULTS**: ERAS failure occurred in 51 patients, associated with male sex (p = 0.024), low-lying tumors (p < 0.001), neoadjuvant chemoradiotherapy (p < 0.001), abdominoperineal resection (p = 0.002), diverting stoma (p < 0.001), and longer operative time (p = 0.006). In the failure group, inflammatory markers such as neutrophil-lymphocyte ratio (NLR; p = 0.024), platelet-lymphocyte ratio (PLR; p = 0.042), and C-reactive protein-albumin ratio (CAR; p < 0.001) were elevated on POD 3. Additionally, NLR (p = 0.012) and CAR (p = 0.017) were significantly higher on POD 1. CAR on POD 3 demonstrated the highest predictive capacity (area under the curve = 0.769). Postoperative ileus was the most common cause of ERAS failure.

CONCLUSION: All inflammatory markers analyzed in this study serve as early predictors for ERAS failure following MIS for rectal neoplasms. Understanding these factors allows for early identification of at-risk patients and tailored interventions, contributing to improved patient care and surgical outcomes within the ERAS paradigm.

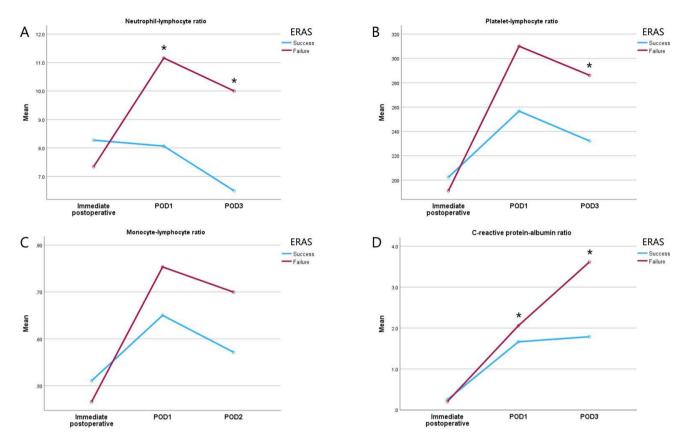
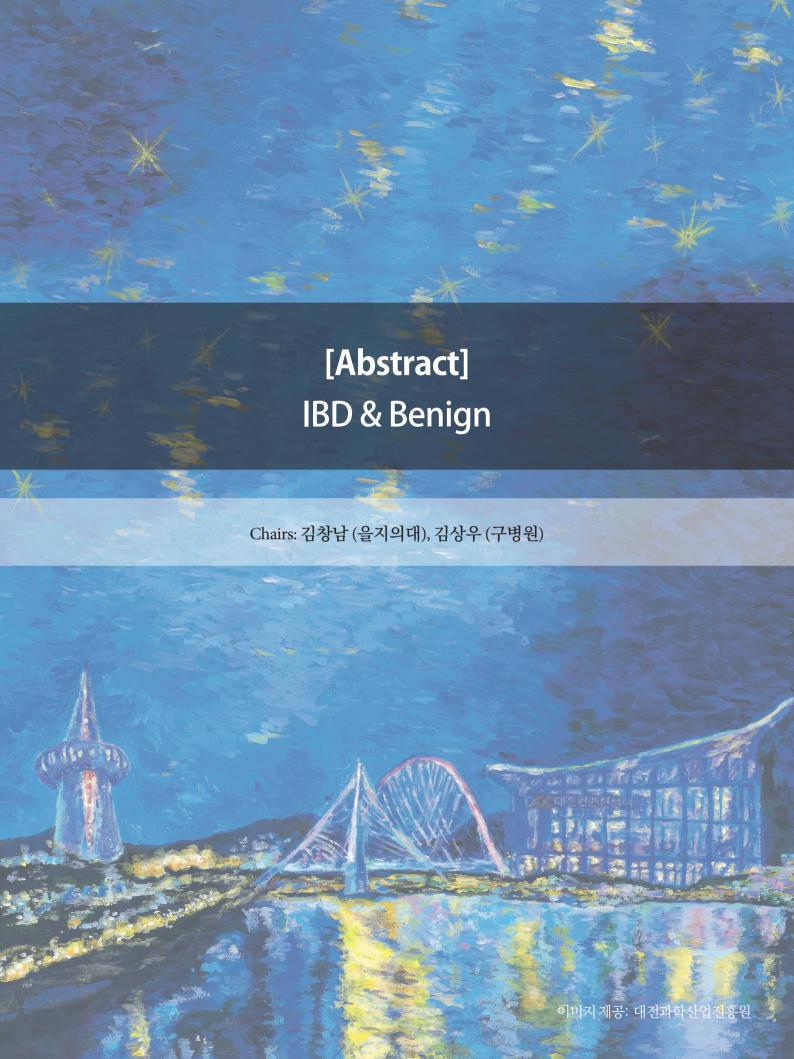


Figure. The differences in mean values of inflammatory markers between the success and failure groups on immediate postoperatively, on postoperative day (POD) 1, and on POD 3. In the failure group, neutrophil-lymphocyte ratio (NLR) and C-reactive albumin ratio (CAR) were significantly higher on POD 1 and 3. Platelet-lymphocyte ratio (PLR) was significantly higher on POD 3. (A) NLR; (B) PLR; (C) MLR; (D) CAR. \* p < 0.05



#### Clinical Impact of Artificial Intelligence-Assisted System (CADe) in the Practice of Colonoscopy

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BACKGROUND: The adenoma detection rate (ADR) is inversely associated with colorectal cancer mortality. However, previous meta-analyses showed that 22% to 26% of adenomas were overlooked by colonoscopy. Furthermore, approximately 60% of postcolonoscopy colorectal cancer cases are believed to arise from such overlooked lesions. To reduce the number of overlooked neoplasms and maximize the ADR, the use of Artificial Intelligence–Assisted System (CADe) to help endoscopists identify polyps is now being eagerly investigated. Recent studies have investigated the impact of computer-aided detection (CADe) on adenoma detection rates (ADR) in colonoscopies.

**PURPOSE**: The aim of this study is to assess the effectiveness of AI-assisted colonoscopy by comparing periods before and after its implementation, determining if there are differences in adenoma detection rates during each period.

MATERIALS AND METHODS: A single-center retrospective study that took place at Daehang hospital in seoul Korea, between 15 June 2023 and 15 December 2023. We recruited patients aged>20 years who were scheduled for colonoscopy. Exclusion criteria were patients with polyposis, inflammatory bowel disease, incomplete total colonoscopy because of stricture or obstructed cancer, prior colorectal surgery, contraindication for biopsy, and current lower gastrointestinal bleeding (diverticular bleeding) were excluded. We compare the Adenoma Detection Rate (ADR) as the primary out-

come between patients examined with and without Computer-Aided Detection (CADe).

**RESULTS**: During the study period, 17,948 patients underwent colonoscopy. Of these, 7,863 patients were excluded in accordance with the exclusion criteria. There were no significant differences in baseline patient age, gender, indication for the procedure, or bowel preparation scores. Fifteen endoscopists, including one nonexpert and fourteen experts, participated in the study. While the ADR showed a trend toward an increase in the CADe group compared to the control group (36.02% vs. 34.69%, respectively,p=0.481), the difference did not reach statistical significance. The Polyp Detection Rate (PDR) also showed a non-significant increase in the CADe group (59.39% vs. 57.09%, respectively,p=0.519). Sessile Serrated Adenoma Detection Rate (SSLDR) also did not exhibit a significant increase (10.0% vs. 8.65%, p = 0.488) in the CADe group compared to the control group. However, the withdrawal time was significantly longer in the CADe group compared to control group (772.5  $\pm$  $369.5 \text{ vs. } 804.7 \pm 385.0 \text{ seconds}, p < 0.001$ ).

CONCLUSION: The use of the CADe system for colonoscopy did not significantly improve ADR in our study. Despite this, the study highlights a trend towards increased detection rates for polyps, adenomas, and SSLs, even though statistical significance was not achieved. Further research is required to understand its utility and impact on long-term clinical outcomes.

# Endoanal Ultrasonography before Incision and Drainage Can Predict the Development of Anal Fistula for the Patients with Anorectal Abscess

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BACKGROUND: Anorectal Abscess is thought to begin as an infection in the intersphincteric anal glands spreading into adjacent spaces and resulting in fistulas in 40% of cases. The treatment of an anorectal abscess is early, adequate, dependent drainage. EAUS has been increasingly utilized in the evaluation of anorectal abscess and is relatively simple, painless, and associated with minimal morbidity.

**PURPOSE**: We investigated the clinical characteristics and surgical outcomes of anorectal abscess patients including pre-operative EAUS findings and post-operative follow-up results.

MATERIALS AND METHODS: Patients with anorectal abscess who underwent I&D at the Seoul Song-do hospital in 2020, were retrospectively reviewed. Patients with inflammatory bowel disease, tuberculosis, hydradenitis suppurativa, pilonidal disease, anal surgery history within 90 days, loss of follow up, gluteal abscess, malignancy, and didn't have preoperative EAUS data were excluded.

RESULTS: Total 309 patients were included. Mean age at surgery was 46 years (± 13.7), and mean BMI was 26 (± 4.2). 267 patients (86.1%) were male, 28 patients (9.1%) had DM history, 99 patients (32%) were active smoker, and 246 patients (79.6%) had anal pain less than 7 days. 83 patients (26.9%) had previous anal operation history. There were 68 patients (22%) who had fever up to 38.0°C post-operatively. There were 13 patients (4.2%) who had post-operative complications, 8 patients for bleeding and 5 patients for recurrence. 12 patients got a re-operation, but no patients were died. By the pre-operative EAUS, we can classify the type of anorectal abscess and find the presence of internal opening which was the key finding of cryptoglandular fistula. 156 patients (50.5%) were intersphincteric abscess, 85 patients (27.5%) were ischiorectal abscess, 35 patients (11.3%) were supralevator abscess, 17 patients were perianal abscess (5.5%), and 16 patients had no evidence of abscess. 161 pa-

tients (54.9%) were posterior, 63 patients (21.5%) were anterior, 31 patients (10.6%) were left, and 38 patients (13%) were right abscess. Among the all patients who received I&D, 278 patients (90%) had developed anal fistula and 268 patients (86.7%) had fistula surgery. Among the patients who developed anal fistula, 241 patients was detected internal opening by pre-operative EAUS. The sensitivity was 86.7% (241/278) and specificity was 87.1% (27/31). Among the patients who was found internal opening, 241 patients developed anal fistula. The positive predictive value was 98.4% (241/245) and negative predictive value was 42.2% (27/64).

CONCLUSION: The occurrence of the anal fistula after I&D for the patients with acute anorectal inflammation was 90% after excluding any secondary causes. Pre-operative EAUS can predict the development of the anal fistula after I&D, the sensitivity was 86.7%, specificity was 87.1%, PPV was 98.4% and NPV was 42.2%.

Table. Relationship between presence of internal opening detected by pre-operative 3D EAUS and development of anal fistula after I&D

	Pre-operative 3D EAUS	Pre-operative 3D EAUS	
Total I&D patients: N=309	Internal opening (+):	Internal opening (-):	
	N=245	N=64	
Anal fistula (+): N=278	241	37	(Sensitivity: 241/278=86.7%)
Anal fistula (-): N=31	4	27	(Specificity: 27/31=87.1%)
(Fistula rate: 278/309=90%)	(PPV: 241/245= <b>98.4</b> %)	(NPV: 27/64=42.2%)	
Type of abscess by 3D EAUS :			
-No evidence of abscess : N=16	0	16	
Anal fistula (+): n=5	0	5	
Anal Fistula (-): n=11	0	11	
-Perianal abscess : N=17	4	13	
Anal fistula (+): n=6	4	2	
Anal Fistula (-): n=11	0	11	
-Intersphincteric abscess : N=156	134	22	
Anal fistula (+): n=150	132	18	
Anal Fistula (-): n=6	2	4	
-Ischiorectal abscess : N=85	77	8	
Anal fistula (+): n=83	76	7	
Anal Fistula (-) : n=2	1	1	
-Supralevator abscess : N=35	30	5	
Anal fistula (+): n=34	29	5	
Anal Fistula (-): n=1	1	0	

Abbreviation : PPV positive predictive value, NPV negative predictive value

# The Role of Laparoscopic Surgery in Colonic Crohn's Disease, Compared to the Open Surgery

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BACKGROUND: Colonic Crohn's disease (CD) has a low rate of 5-10% within CD and surgical treatment of colonic CD is still controversial and can be challenging in view of the high risk of postoperative septic complications and the impaired functional outcomes. With the development of minimally-invasive surgery (MIS) in colorectal surgery over the past 20 years, it is widely used in CD surgery despite CD complications including structuring resulting from obstruction, abscess, or colonic fistula.

**PURPOSE**: This study aims to compare postoperative outcomes and recurrence rate of patients undergoing laparoscopic surgery for colonic CD, compared to open surgery.

MATERIALS AND METHODS: This retrospective study was conducted for a total of 102 patients with CD who underwent colorectal surgery between January 2006 and December 2018. Patients were excluded if they had undergone just closure of colostomy and combined multiple small bowel surgery. The 2 cases that attempted laparoscopy but were converted to open surgery were included in the analysis as open surgery.

**RESULTS**: Of the 102 patients included, 31 patients underwent laparoscopic colorectal surgery (LS group) and 71 patients underwent opens colorectal surgery (OS group). The OS group has more history of previous abdominal surgery than the LS group (38.0% vs. 16.1%, respectively, P = 0.037). In the disease characteristics, the LS

group has more stricturing behavior than the OS group (58.1% vs. 29.6%, respectively, P = 0.008). There was no significant differences in operative indication, emergency operation, anastomosis configuration, and operative names. In the postoperative outcomes, the LS group showed shorter hospital stay after surgery, compared to the OS group (9.00  $\pm$  6.46 days vs. 13.77  $\pm$  10.44 days, respectively, P = 0.006). Although there was no significant difference in overall postoperative complication between the two groups, the LS group has lower rate of infectious complication than the OS (28.2% vs. 9.7%, respectively, P = 0.043). There was no significant difference in operative time (LS group, 161.42  $\pm$  39.23 minutes vs. OS group, 174.17  $\pm$  62.14 minutes, respectively, P = 0.043) and surgical recurrence (LS group, 14.1% vs. OS group, 14.1%, respectively, P = 0.043) between the two groups.

CONCLUSION: Adoption of laparoscopic surgery for colonic CD has the advantage of reducing infectious postoperative complication and length of hospital stay. Although the rate of application in penetrating disease of CD is still low, it is advisable to consider performing laparoscopic surgery depending on CD characteristics and patients' condition. Further large-scale research will be needed for the application of laparoscopic surgery in the colonic CD in the MIS era.

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## Optimal Timing for Surgical Drain Removal in ERAS after Low Anterior Resection for Rectal Cancer

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BACKGROUND: In low anterior resection (LAR) surgery, the risk of fluid collection or anastomosis leakage in the deep pelvic cavity is notably high. The maintenance of a drain may clinically lead to evacuate or identify early, or obviating the need for additional drain. However, various research results have failed to prove benefit and the necessity and role of surgical drains remain controversial. In our previous study on predictive factors of a high comprehensive complication index (≥26.2), we identified that a serum C-reactive protein(CRP) below 6.47mg/dL on postoperative day (POD) 3 or 4 serves as a safety net for predicting fewer complications. Consequently, we have implemented a strategy to monitor serum CRP levels for POD 4 days, and if the value is below 6, the surgical drain is removed.

**PURPOSE**: We aimed to investigate whether there is a difference in the timing of surgical drain removal based on CRP values and the occurrence of deepSSI in patients who underwent LAR.

MATERIALS AND METHODS: From January 1, 2017 to December 31, 2022, a total of 361 consecutive patients who underwent elective low anterior resection for rectal cancer were collected. Definition of deep SSI was fluid collection in presacral space or anastomosis leakage which identified by abdomen CT. 'Strategy' group was surgical removal on POD 4 if the serum CRP value was less than 6.47 on the POD 3or 4th day. 'Non-strategy' was a group except included 'strategy.' 'Early removal' was surgical removal on POD1,2,3 days regardless of serum CRP.

**RESULTS**: In a total of 361 patients, deepSSI were confirmed in 27 individuals. Upon analyzing the incidence of deepSSI, there was no significant difference between the strategy and non-strategy groups (8 (7.1%) vs. 19 (7.7%), p=0.846). No significant differences were found in the early subgroup as well. Although the average length of hospital stay (LOS) tended to be longer in the strategy group, the

hospital stay for patients with deepSSI was longer in the non-strategy group, a trend consistent with the early subgroup. When categorizing patients based on serum CRP levels ( $\geq$ 6 and <6) on POD 4, there was no significant difference in the incidence of deepSSI between the strategy and early groups. However, the strategy group required fewer additional interventions. The average LOS in the early group was significantly shorter when CRP was <6. For patients with CRP  $\geq$ 6 and no deepSSI, there was no significant difference between the two groups, but the early group tended to have a shorter hospital stay.

CONCLUSION: The removal of surgical drains on POD 4 based on CRP values did not demonstrate a significant difference in the incidence of deep SSI. On the contrary, it was observed that patients who did not develop deepSSI had a longer hospital stay when surgical drains were removed early. Therefore, in LAR surgery, the timing of surgical drain removal does not show a difference in the occurrence of deepSSI, and in cases where there is no apparent risk, early removal may be considered.

Table. Postoperative outcomes between 'Strategy' and 'Early' group according to serum CRP level

	CRP≥6 mg dL (N=118)		p-value	CRP<6 mg/dL (N=201)		p-value
	Strategy (+) (N=28)	Early (N=70)	8 8	Strategy (+) (N=85)	Early (N=102)	
Deep SSI (+)	7 (25.0)	17 (24.3)	0.941	1(1.2)	1 (1.0)	1.000
Only antibiotics	5 (71.4)	10 (58.8)				
Intervention	0 (0.0)	4 (23.5)		1(100.0)	1(100.0)	
Reoperation	2 (28.6)	3 (17.6)				
Mean POD	9.86±5.97	8.54±7.21	0.359	5.21±0.69	4.64±2.25	0.025
DeepSSI+POD(day)	15.00±7.72	18.24±8.99	0.391			
DeepSSI- POD(day)	8.14±4.23	5.43±1.91	< 0.001			

 $Deep \ SSI, \ Deep \ space \ site \ infection; \ POD, \ postoperative \ day; \ p, \ CRP, \ serum \ c\text{-reactive} \ protein \ (mg/\underline{dL});$ 

#### Risk of Incisional Hernia in Laparoscopic Colon Cancer Surgery: A Multicenter Randomized Controlled Trial Comparing Periumbilical Transverse Incision with Midline Incision

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BACKGROUND: Despite advances in minimally invasive surgery, incisional hernia (IH) remains a concern. We previously proposed a non-muscle-cutting periumbilical transverse incision to reduce IH in laparoscopic colon cancer surgery. Our retrospective analysis revealed that the non-muscle-cutting periumbilical transverse incision showed lower rate of IH (2.4%) compared to periumbilical midline incision (14.9%). However, higher level of evidence was needed.

**PURPOSE**: This study aimed to assess the efficacy of the non-muscle-cutting periumbilical transverse incision in reducing the incidence of IH compared to the periumbilical midline incision during laparoscopic colon cancer surgery.

MATERIALS AND METHODS: This study was designed as an open-label, parallel, superiority, multicenter randomized trial. Between April 2021 and February 2023, 174 patients with primary colon cancer were enrolled and randomly assigned (1:1) to the non-muscle-cutting periumbilical transverse incision or the periumbilical midline incision group, stratified by tumor location (right

or left). The primary endpoint was the incidence of IH (both symptomatic and radiologic hernias) at 12 months after surgery. The secondary endpoints were operative outcomes, 30-day postoperative complications, pathological results, and patient-reported questionnaires on health and body image.

RESULTS: The patient enrolment (130 in CNUHH, 30 in KNUCH, 7 in JNUH, and 7 in PNUYH) has been completed, awaiting the 1-year follow-up for the final analysis. While a few patients in the midline incision group experienced IH, statistical analysis is pending completion of data collection, as specified in the protocol. The primary outcome will be analyzed in mid-March and presented and discussed at the 57th Annual Meeting of KSCP 2024.

**CONCLUSION**: This study suggested the use of a non-muscle-cutting periumbilical transverse incision to reduce IH in laparoscopic colon cancer surgery. The results are anticipated to provide robust evidence for determining the optimal mini-laparotomy site in minimally invasive colon cancer surgery.

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#### Night Matter to Nightmare: The Significance of Emergency Colorectal Surgery at Night

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BACKGROUND: Emergency surgery may result in a less favorable prognosis for patients due to various variables compared to elective surgery. In particular, emergency surgeries performed in the field of general surgery often have a direct impact on the patient's life, necessitating a focus on emergency surgery. One common area of emergency surgery in the field of general surgery is colorectal surgery, where postoperative complications and mortality rates are known to be high. However, amidst current medical system challenges, there is a decreasing number of surgeons specializing in emergency procedures, leading to increased fatigue for those performing emergency colorectal surgeries, especially during nighttime.

**PURPOSE**: This study examines the differences in postoperative mortality and complications between patients admitted during daytime and nighttime for emergency colorectal surgeries conducted over approximately 20 years at a regional emergency medical center.

MATERIALS AND METHODS: The study included patients who underwent emergency colorectal surgeries requiring colon or rectal resection under general anesthesia through the emergency room at the Catholic University of Korea Uijeongbu St. Mary's Hospital from June 2009 to February 2023. We categorized patients into two groups: those who visited the emergency room and underwent emergency surgery during the day (8 am to 6 pm) (DT) and those who presented to the emergency room and underwent emergency surgery during the night (6 pm to 8 am) (NT). The primary outcome was the incidence of 30-day mortality.

**RESULTS**: A total of 288 patients were analyzed in our study. No significant differences were observed between the two groups in terms of age (p=0.793), sex (p=0.517), surgery type (p=0.798), and surgery time (p=0.501). However, the DT group exhibited a higher frequency of chronic renal disease as an underlying disease (23.4% vs. 12.8%, p<0.001) and a higher frequency of preoperative inotro-

pes use (23.4% vs. 12.8%, p=0.019). The incidence of 30-day mortality as the primary outcome was higher in the NT group (22.6% vs. 8.5%, p=0.001). Univariate analysis for 30- day mortality identified age (p=0.001), time of emergency room admission (p=0.001), preoperative inotropes use(p<0.001), and stoma formation (p=0.017) as influencing factors. In multivariate analysis, nighttime admission to the emergency room (OR 2.67, 95% CI 1.28-5.56, p=0.009), age (Odds ratio 1.04, 95% CI 1.02–1.07), and preoperative inotropes use (OR 4.95, 95% CI 2.32-10.59, p<0.001) were statistically significant factors.

**CONCLUSION**: Considering the higher severity and increased postoperative mortality in emergency patients admitted at night, there is a need for greater attention and focus on emergency surgeries performed during the day compared to those conducted at night.

Table. Uni- and Multi-variate analysis for factors affecting 30-day mortality

		Univariate analysis			Multivariate analysis	
	Survival (n=246)	30-days mortality (n=42)	p-value	Odds ratio	95% confidence interval	p-value
Age (years)	$64.6 \pm 16.6$	$74.1 \pm 15.0$	0.001	1.04	1.02 - 1.07	0.002
Sex			0.636			
Male	125 (84.5%)	23 (15.5%)				
Female	121 (86.4%)	19 (13.6%)				
The time of emergency room visit			0.001			
Day (8am - 6pm)	150 (91.5%)	14 (8.5%)		Reference		
Night (6pm - 8am)	96 (77.4%)	28 (22.6%)		2.67	1.28 - 5.56	0.009
The time of surgery			0.448			
Day (8am - 6pm)	125 (83.9%)	24 (16.1%)				
Night (6pm - 8am)	121 (87.1%)	18 (12.9%)				
Past medical history						
Hypertension	117 (82.4%)	25 (17.6%)	0.152			
Diabetes	51 (85.0%)	9 (21.4%)	0.918			
Chronic renal disease	6 (66.7%)	3 (33.3%)	0.129			
Heart disease	23 (74.2%)	8 (25.8%)	0.1			
Pulmonary disease	4 (80.0%)	1 (20.0%)	0.548			
Cerebral vascular accident	12 (70.6%)	5 (29.4%)	0.083			
Preoperative inotropes use	31 (62.0%)	19 (38.0%)	< 0.001	4.95	2.32 - 10.59	< 0.001
Time from Emergency Room	7.7 ± 5.4	6.5 ± 5.1	0.213			
Admission to Surgery (hours)	7.7 = 5.4	0.5 = 5.1	0.213			
Operator			0.899			
Colorectal surgeon	209 (85.3%)	36 (14.7%)				
Non-colorectal surgeon	37 (86.0%)	6 (14.0%)				
Surgery type			0.44			
Right hemicolectomy	72 (83.7%)	14 (16.3%)				
Left hemicolectomy	7 (100%)	0				
Anterior resection	104 (85.2%)	18 (14.8%)				
Primary repair	16 (100%)	0				
Segmental resection	35 (87.5%)	5 (12.5%)				
Subtotal total colectomy	8 (61.5%)	5 (38.5%)				
Others	4 (100%)	0				
Stomy formation			0.017			
No	131 (90.3%)	14 (9.7%)				
Yest	115 (80.4%)	28 (19.6%)				
Surgery time(hours)	$2.6 \pm 1.0$	2.9 ± 1.6	0.118			

#### Comparison of Short-term Outcomes Related to Emergency Hartmann Surgery between Colorectal Surgeons and Non-Colorectal Surgeons

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BACKGROUND: Hartmann's operation is required due to perforation or obstruction in the left colon or rectum, commonly resulting from diverticulitis, cancer-induced obstruction, or traumatic injury. Often accompanied by hemodynamic instability and generalized peritonitis, it has reported mortality rates of 10–30% and morbidity rates of 30–50%.

PURPOSE: The purpose of this study is to compare the short-term treatment outcomes of Hartmann's operation performed emergently between colorectal surgeons and non-colorectal surgeons. An analysis and comparison are conducted on the multitude of variables that emerge throughout the course of the surgical procedure MATERIALS AND METHODS: Patients who underwent an emergency Hartmann's operation from January 2010 to December 2021 at Dankook University Hospital were collected. Data were retrospectively compiled, and medical records were reviewed for the study. Patients who underwent elective Hartmann's operation and those with missing medical records were excluded.

RESULTS: In total, 141 patients were recruited. Among them, colorectal surgeons performed 52 operations (36.9%), and non-colorectal surgeons performed 89 operations (63.1%). The average age was 68.6 years, with 67 males (47.5%). Although the non- CR surgeon patient group had a higher incidence of HTN and DM, only HTN was statistically significant (P = 0.039). Emergency surgeries conducted by CR surgeons had a higher proportion of malignancy, which was statistically significant (25.5% vs. 19.1%, P<0.001). The surgery duration for non-CR surgeons was shorter at 177.0 minutes, which was statistically significant (177.0 min vs. 243.9 min, P<0.001). Patients operated on by CR surgeons had significantly lower proportions of ICU admissions (24.1% vs. 58.2%, P<0.001), mortality (1.4% vs. 16.3%, P=0.001), and post-op complications (13.5% vs. 43.3%, P<0.001). Although not statistically significant, Hartmann reversals were more often performed by non-CR surgeons (29.2% vs. 14.9%, P = 0.512). Logistic regression analysis was conducted to identify risk factors for postoperative mortality, and while the surgeon's specialty was identified as a risk factor in univariate analysis (P<0.001), it was not statistically significant in multivariate analysis (P = 0.700).

CONCLUSION: In conclusion, while the surgeon's specialization in emergency Hartmann's operation was not identified as a direct risk factor for mortality, there were significant statistical differences observed in overall post-op complications, mortality, and ICU admission rates between colorectal and non-colorectal surgeons. In the training of surgeons, education and practice in Hartmann's operation are essential, ensuring that every physician is equipped with the necessary surgical skills for emergency situations. Focusing on educational aspects and enhancing techniques is crucial for reducing mortality and morbidity rates.

Demographics	non-CR (0)	CR (1)	P-value
Age, mean	70.1	66.08	0.1
Sex	89(63.1%)	52(36.9%)	0.064
Male	37(26.2%)	30(21.3%)	
female	52(36.9)	22(15.6)	
BMI	22.39	21.92	0.434
HTN	52(36.9%)	21(14.9%)	0.039
DM	22(15.6%)	12(8.5)	0.826
Indication			
Cancer	27(19.1%)	36(25.5%)	< 0.001
Benign	62(44.0%)	16(11.3%)	
Prev. abdomen OP Hx	25(17.7%)	9(6.4%)	0.149
ASA score			0.047
	0(0.0%)	1(0.7%)	
2	21(14.9%)	21(14.9%)	
3	56(39.7%)	28(19.9%)	
4	11(7.8%)	1(0.7%)	
5	1(0.7%)	1(0.7%)	
ICU care(+)	82(58.2%)	34(24.1%)	<0.001
ICU Duration (days)	7.45	4.37	0.77
Stoma reversal (+)	41(29.2%)	21(14.9%)	0.512
Stoma revesal Duration (days)	62.06	65.65	0.868
EBL (cc)	465.8	422.7	0.733
OP time (min)	177.08	243.92	< 0.001
Mortality	23(16.3%)	2(1.4%)	0.001
Post op Complication	61(43.3%)	19(13.5%)	< 0.001

#### Risk Analysis of Recurrence After Ventral Hernia Repair

#### Eunhae Cho, Jeong Min Choo, Hyo Seon Ryu, Ji-Seon Kim, Se-Jin Baek, Jung-Myun Kwak, Jin Kim

Korea University College of Medicine

**BACKGROUND**: Ventral hernia, particularly incisional hernia, emerges as a frequent complication following abdominal surgery. Despite undergoing ventral hernia repair, concerns persist regarding recurrence and prolonged complications, and surgical methods are fragmented.

**PURPOSE**: This study aims to identify the risk factors associated with ventral hernia recurrence and to determine the optimal surgical method.

MATERIALS AND METHODS: Patients who underwent ventral hernia repair at the Division of Colon and Rectal Surgery, Korea University Anam Hospital from April 2015 to November 2022 were selected. Parastomal hernia repair was excluded. Data collection encompassed patient demographics, ventral hernia lesion characteristics, details of previous surgeries, and surgical details of ventral hernia repair procedures. Short- and long- term postoperative outcomes and information for recurrence were also collected. Statistical analysis was conducted to identify the risk factors contributing to ventral hernia recurrence, evaluating the significance of the relationship between the surgical method, which is an important controllable variable, and other factors.

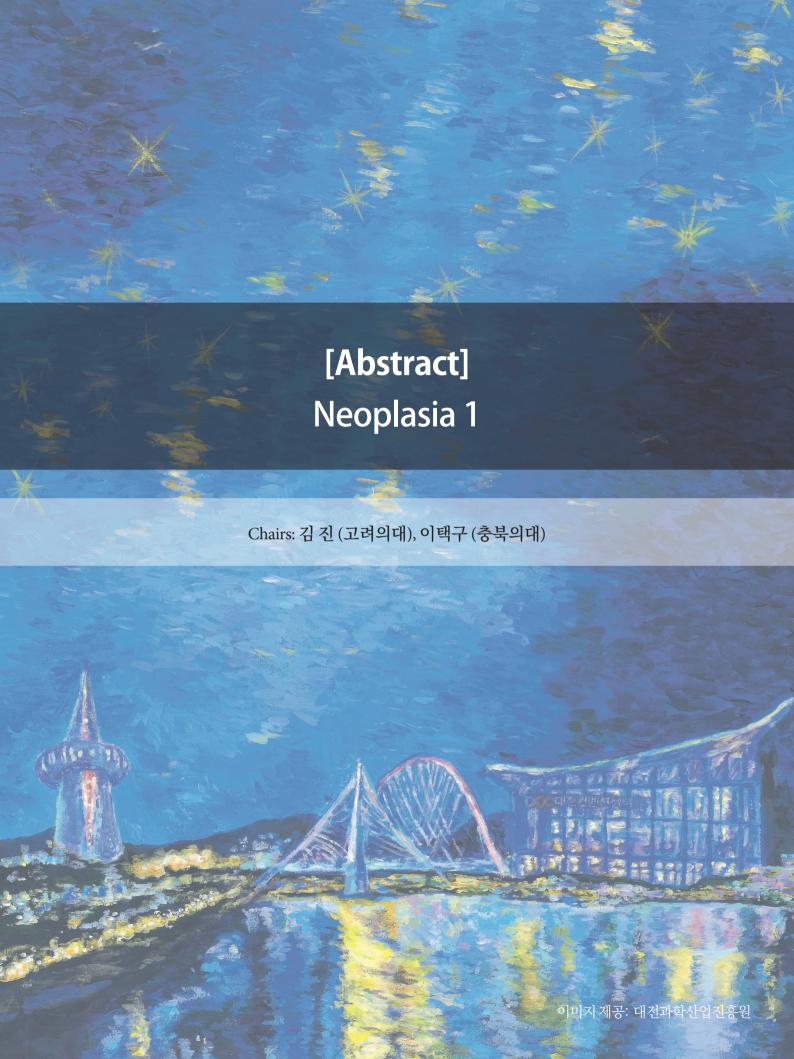
RESULTS: The study included 145 ventral hernia repairs, marked by a predominant female cohort (62.0%) and a mean age of 64.6 years. The majority of hernias were situated in the midline (73.1%), manifested as single lesions (96.6%), with an average size of 5.3 cm, and predominantly of incisional hernia (91.7%). Surgery was performed using open (35.9%), totally laparoscopic (30.3%), hybrid (26.9%), and robotic approaches (6.9%), with the majority involving abdominal wall reconstruction (79.3%). Mesh placement was conducted in the majority of cases (84.8%), predominantly using the intraperitoneal onlay (IPOM) technique (66.7%). The mean

operation time was 125.1 minutes. Postoperative complications occurred in 12.4% and delayed complications in 5.5%, and 10.3% of incisional hernias recurred during a mean follow-up of 22.3 months. The average time to recurrence was 11.1 months, and half of the cases underwent reoperation. Current smoking (p=0.031), multiple hernias (p=0.002), open surgery (vs totally laparoscopic, p=0.040; vs hybrid, p=0.021), and no mesh placement (p=0.040) were identified as risk factors for ventral hernia recurrence. In the analysis of surgical approach, hernia size (p=0.008) and location (p=0.033), previous cancer surgery (p=0.007), and surgeon (p<0.001) were identified as significant preceding factors. Abdominal wall reconstruction (p<0.001), mesh placement (p<0.001) and location (p<0.001), and operation time (p<0.001) showed significant differences depending on the surgical approach.

**CONCLUSION**: To reduce the risk of ventral hernia recurrence, smoking cessation is recommended, and mesh should be applied as possible. Additionally, the appropriate surgical approach should be selected considering hernia size and location.

Table. Risk analysis for hernia recurrence

			Univariate		Multivariate	
	(Reference)	_	OR	p	OR	p
Smoking	(No)			0.001		0.096
		Yes	12.598	< 0.001	9.533	0.031
		Ex	2.186	0.182	1.483	0.538
Hernia number	***		10.578	0.004	130.530	0.002
Recurrent lesion	(No)		3.581	0.030	3.182	0.124
Operative type	(Open)			0.012		0.090
		Totally laparoscopy	0.127	0.007	0.041	0.040
		Hybrid	0.103	0.029	0.052	0.021
		Robot	< 0.001	0.982	< 0.001	0.989
Mesh application	(No)		0.109	< 0.001	0.254	0.040



#### Enhancing AI Chatbot Efficacy in Metastatic Colorectal Cancer Decision-Making through Surgeon-Led Prompt Engineering

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BACKGROUND: Metastatic colorectal cancer (CRC) poses significant decision-making challenges. Current AI chatbots like ChatGPT (openAI) and Bard (Google) show promise but falter in complex clinical scenarios. Prompt engineering techniques that could be easily adopted by non-AI experts have been known to improve AI chatbot efficacy dramatically.

**PURPOSE**: This study examines surgeon-led prompt engineering to bolster AI efficacy, aiming to align chatbot recommendations more closely with expert clinical decisions of multidisciplinary tumor boards in metastatic CRC management.

MATERIALS AND METHODS: In this cross-sectional study, we included 200 real-world clinical scenarios reviewed on a multidisciplinary tumor board at Samsung Medical Center from January 2021 to October 2023. We made queries for each case including baseline demographic information (age, sex, and body mass index), overall health status, comorbidities, current medication, details of previous treatment relating to colorectal cancer, TNM staging at initial diagnosis, current TNM staging, and recent image findings. We asked for the best treatment options for the chatbot as a zero-shot query. In prompt engineering, chain-of-thought and few-shot techniques were conducted. Prompt engineering was performed by a surgeon who was not an expert in AI. The primary outcomes were the concordance rate of the chatbot's recommendations with real-world decisions by a multidisciplinary tumor board. The secondary outcomes were the quality of consumer health information based on the validated DISCERN instrument.

**RESULTS :** The overall concordance rates for AI chatbots were 65.1% and 90.5% before and after prompt engineering (P < 0.001).

In a subgroup of patients with metachronous metastasis who were diagnosed with metastatic lesions at least 6 months from the initial diagnosis regardless of the type of treatment, the concordance rates before engineering were 50.0% but significantly improved to 91.2% after engineering (P < 0.001). The quality of text responses generated was 'good' in the DISCERN instrument.

CONCLUSION: Prompt engineering techniques can be readily and simply employed by individuals who are not experts in AI. When AI chatbots undergo fine-tuning, they have the potential to offer clinical recommendations with a notably high concordance rate, even in complex cases like heavily pre-treated metachronous metastasis patients, aligning closely with the decisions made by a colorectal multidisciplinary tumor board.

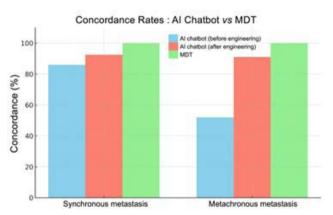


Figure. Comparison of concordance rates of AI chatbot before and after prompt engineering and multidisciplinary team for patients with synchronous and metachronous metastasis

#### Combination of Preoperative Oral Antibiotics with Mechanical Bowel Preparation in Patients Undergoing Elective Minimally Invasive Colorectal Surgery Reduces Surgical Site Infections

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BACKGROUND: Among elective abdominal surgeries, colon and rectal surgery has the highest rates of SSIs reported, with rates up to 23.2%, and mean of 11.4%. Evidence supporting for a single protocol to reduce the risk of such postoperative morbidity is still lacking, and the biggest debate as of now is that regarding mechanical bowel preparations (MBP) and use of oral antibiotics (POA) preoperatively. Recent studies have reported that combining POA to MBP in elective colorectal surgery may result in lower surgical site infections (SSI).

PURPOSE: A retrospective analysis of a prospectively maintained database of patients who underwent elective resections of primary colon or rectal cancer using minimally invasive operative methods between January 2020 and December 2023 was conducted. Those who had inflammatory bowel disease, combined surgery for another condition, preoperative infectious status requiring systemic antibiotics treatment, and creation of stoma were excluded.

MATERIALS AND METHODS: Primary aim was comparing the rate of SSIs between two groups using MBP only versus MBP and POA together. For MBP+POA group, oral intake of 400mg of rifaximin every 12 hours one day before surgery was used. Secondary aim was exploring other short-term outcomes such as postoperative complications, anastomotic leakage, and operative outcomes. RESULTS: Out of total 1506 patients that were enrolled, 695 patients used MBP combined with POA, while 811 patients used MBP only preoperatively. More male patients (54.4%), at median age of 64 (IQR 55-72), and mostly ASA class of 2-3 (94.6%) with primary cancer located in more frequently in colon (68.5%) than rectum and undergoing laparoscopic surgery (89.4%) were found. Baseline characteristics between the two groups did not differ sig-

nificantly. However, for operative outcomes, there were significantly more SSIs reported for those who did not use POA with MBP (19.5% vs 14.4%, p=0.009), and more minor complications (16.7% vs. 11.9%, p=0.009). Operations were longer (181.9 $\pm$ SD 60.9 minutes vs. 164.7 $\pm$ SD 54.7 minutes, p=0.001), and had larger EBLs (20ml, IQR 0-50 vs. 10, IQR 0-30, p=0.025). In univariate analysis, not using POA was shown to be a significant risk for SSI (HR1.51, 95% CI 1.09-2.08, p=0.014), along with male gender (HR 1.47, 95%CI 1.06-2.03, p=0.02), and having higher ASA grade (HR 1.86, 95%CI 1.35-2.56, p=<0.001). Not using POA was an independent risk factor for SSI after multivariate analysis (HR 1.57, 95% CI 1.13-2.18, p=0.007).

**CONCLUSION**: In minimally invasive elective colorectal cancer surgery, use of preoperative oral antibiotics significantly reduced the rate of SSI compared to those only undergoing MBP.

Table. Operative outcomes

	Total (N=1506)	MBP+POA group (N=695)	MBP only group (N=811)	Р
OP time (min)	173.9 ± 58.7	164.7 ± 54.7	181.9 ± 60.9	0.001*
EBL (mL)	20 (IQR 0-30)	10 (IQR 0-30)	20 (IQR 0-50)	0.025*
POD (days)	5 (IQR 5-7)	5 (IQR 5-6)	6 (IQR 5-7)	0.58
SSI (all)	174 (11.6%)	65 (9.4%)	109 (13.4%)	0.015*
Grade 1-2	112 (7.4%)	38 (5.5%)	74 (9.1%)	0.008*
Grade 3	67 (4.4%)	30 (4.3%)	37 (4.6%)	0.90
Complication	258 (17.1%)	100 (14.4%)	158 (19.5%)	0.009*
CD Gr1-2	211 (14.5%)	80 (11.9%)	131 (16.7%)	0.009*
CD Gr3-4	48 (3.7%)	21 (3.4%)	27 (4.0%)	0.66
Anastomosis leakage	41 (2.7%)	23 (3.3%)	18 (2.2%)	0.21

OP time: operative time, EBL: estimated blood loss, POD: postoperative days, SSI (surgical site infections), CD Gr: clavien-dindo classification grade

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## Oncologic Outcomes Based on Initial Treatment in Clinical T2N0 Low Rectal Cancer

#### Hyeungmin Park, Soo Young Lee, Chang Hyun Kim, Hyeong-Rok Kim

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**BACKGROUND**: The optimal treatment for T2N0 low rectal cancer is still controversial.

**PURPOSE**: This study aimed to identify the most appropriate treatment approach by analyzing oncological outcomes associated with various treatments for T2N0 low rectal cancer.

MATERIALS AND METHODS: We retrospective analyzed data from patients with rectal cancer who underwent magnetic resonance imaging at our hospital prior to receiving treatment between January 1, 2010, and May 31, 2023. Inclusion criteria involved patients with rectal cancer located within 6cm of the anal verge and classified as MR stage T2N0. Patients were categorized based on their initial treatment into chemoradiotherapy (CRT) group, local excision (LE) group, and total mesorectal excision (TME) group. Disease- free survival (DFS) was calculated as the time from initial treatment to the date of recurrence or death.

RESULTS: Among 119 patients, 77 were in the CRT group, 16 in LE, and 26 in TME. In the CRT group, seven patients were placed under observation without additional treatment following CRT, while 39 patients underwent additional LE, and 31 patients underwent TME after CRT. Within the LE group, nine patients were observed after LE, while six patients underwent postoperative CRT, and one patient underwent additional TME. In the TME group, 19 patients were managed with observation after TME, one received

adjuvant chemotherapy, three underwent postoperative CRT, and three underwent a combination of postoperative CRT and adjuvant chemotherapy. The 3-year DFS rates were 75.2% in the CRT group, 84.4% in LE, and 86.9% in TME, with no statistically significant difference between groups (P = 0.477).

**CONCLUSION**: The oncological outcomes based on the initial treatment approach in clinical T2N0 low rectal cancer did not exhibit significant differences. Larger, multi-center studies are needed to establish a standard treatment for T2N0 low rectal cancer.

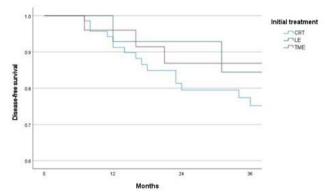


Figure. Disease-free survival based on the initial treatment

#### Clostridium Difficile Infection after Surgery for Rectal Cancer

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**BACKGROUND**: Clostridium difficile infection (CDI) is known to occur after gastrointestinal surgery, which can increase perioperative morbidity and mortality. Several studies have been conducted on the risk factors for the occurrence of CDI, with recent research indicating a higher prevalence in patients who have undergone ileostomy reversal surgery and its association with postoperative anastomotic leakage.

**PURPOSE**: This study aims to investigate the patterns of CDI occurrence in patients who receive rectal cancer surgery.

MATERIALS AND METHODS: This retrospective study reviewed the medical records of rectal cancer patients who underwent low anterior resection and ultra-low anterior resection with or without ileostomy between January 2017 and December 2019. To ensure a robust comparison between the two distinct patient cohorts, we employed propensity score matching to address significant disparities in baseline characteristics and demographics. Data regarding clinical characteristics and CDI incidences before and after propensity score matching were collected. Direct real-time PCR and enzyme-linked fluorescent assays for detecting toxin A and B were used to detect CDI positivity.

**RESULTS**: In our study of 1600 rectal cancer patients, including 848 without and 752 with ileostomies, propensity score matching reduced each group to 232, totaling 464 patients. The incidence of CDI was significantly lower at 1.1 percent (9 patients) in the non-ileostomy group versus 5.3 percent (40 patients) in the ileostomy group (p < 0.001), and this trend continued post-matching, with 0.43 percent (1 patient) versus 5.2 percent (12 patients), respectively (p = 0.001). CDI positivity was found to be associated with ileostomy formation in either non-matched or matched groups (P < 0.001 and P = 0.001, respectively).

**CONCLUSION**: The study reveals that rectal cancer patients without ileostomies face a significantly lower risk of CDI. This finding highlights that ileostomy, regardless of surgical method or other factors, is a key contributor to increased CDI risk.

Table. Statistical analysis of non-matched and propensity score matched group (n(%))

	Non-	Non-matched (N=1600)			y score matched	(N=464)
	CDI (-)	CDI (+)	Р	CDI (-)	CDI (+)	Р
	(N=1511)	(N=49)		(N=452)	(N=12)	
Sex			0.081			0.357
Male	965 (62.2)	37 (75.5)		300 (66.4%)	10 (83.3%)	
Female	586 (37.8)	12 (24.5)		152 (33.6%)	2 (16.7%)	
Age	60.9 ± 11.3	60.3 ± 11.8	0.680	60.9 ± 11.2	59.6 ± 10.6	0.682
BMI	23.9 ± 3.3	23.5 ± 3.2	0.416	23.8 ± 3.4	24.8 ± 4.1	0.353
Alcohol	737 (47.5)	24 (49.0)	0.955	243 (53.8)	9 (75.0)	0.244
Smoking	771 (49.7)	24 (49.0)	1.000	247 (54.6)	8 (66.7)	0.595
DM	278 (17.9)	5 (10.2)	0.228	85 (18.8)	0 (0.0)	0.199
HTN	528 (34.0)	11 (22.4)	0.124	176 (38.9)	1 (8.3)	0.064
PCRT	403 (26.0)	19 (38.8)	0.066	25 (5.5)	0 (0.0)	0.849
AdjCTx	811 (52.3)	34 (69.4)	0.027	241 (53.3)	9 (75.0)	0.233
Operation			0.013			0.380
LAR	955 (61.6)	21 (42.9)		303 (67.0)	10 (83.3)	
uLAR	596 (38.4)	28 (57.1)		149 (33.0)	2 (16.7)	
Prophylactic			0.636			0.979
antibiotics			0.030			0.575
Cefoxitin	1520 (98.0)	49 (100.0)		445 (98.5)	12 (100.0)	
Others	31 (2.0)	0 (0.0)		7 (1.5)	0 (0)	
C.difficile examination	169 (10.9)	49 (100.0)	< 0.001	51 (11.3)	12 (100.0)	< 0.001
lleostomy formation	712 (45.9)	40 (81.6)	< 0.001	220 (48.7)	12 (100.0)	0.001

CDI, Clostridium difficile infection; BMI, body mass index; DM, diabetes mellitus; HTN, hypertension; PCRT, preoperative chemoradiotherapy; AdjCTx, adjuvant chemotherapy; LAR, low anterior resection; uLAR, ultra-low anterior resection; C.difficile examination, Clostridium difficile toxin A and B assay, direct real time PCR

Statistical analysis of the non-matched and propensity score matched groups. CDI positivity was found to be associated with ileostomy formation in either non-matched or matched groups (P < 0.001 and P = 0.001, respectively).

#### Perioperative and Oncologic Outcomes after Colorectal Cancer Surgery with Psychiatric Disorders: A Propensity Score Matched Analysis

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<sup>1</sup>Ajou University Hospital,

**BACKGROUND**: Patients with psychiatric disorders are known to have worse perioperative and oncologic outcomes of colorectal cancer (CRC) surgeries in western countries, either due to delayed diagnosis or poor perioperative compliance.

**PURPOSE**: We aimed to discover the perioperative outcomes in CRC patients and compare them in patients with or without psychiatric disorders.

MATERIALS AND METHODS: Patients who underwent primary colorectal surgery under the diagnosis of CRC from January 2005 to February 2023 were collected. Inclusion criteria was age ≥ 19 years and radical CRC surgery. Patients with familial, metastatic, synchronous or metachronous CRC, inflammatory bowel disease, and active other malignancy diagnosed within 5 years were excluded. Psychiatric disorders included depressive disorders, anxiety disorders, post-traumatic stress disorder, bipolar disorder, psychotic disorders, personality disorders, substance use disorders, and cognitive disorders, as categorized by International Classification of Diseases, 9th Revision codes. A 1:1 propensity score matching was performed with variables of age, sex, American Society of Anesthesiologists physical status classification, hypertension, diabetes, body mass index, tumor location (right colon vs. left colon vs. rectum), insurance system (national insurance vs. medical aid vs. international), preoperative tumor complication (tumor obstruction, fistula, perforation, bleeding vs. none), preoperative chemotherapy or chemoradiation.

RESULTS: Among 12,576 patients who underwent primary surgery for CRC, 2,587 patients were excluded, and 761 patients were assigned to each group after the match, for a total of 1,522 patients analyzed. Median age was 68 years; right colon, left colon, and rectal cancers were 27.1%, 36.5%, and 36.3%, respectively. 22.1% of patients received neoadjuvant therapy. There were no significant differences between the two groups in perioperative findings (operative method, surgical radicality, emergency operation, combined organ resection, operative time and intraoperative blood loss) and pathologic outcomes (pT, pN, tumor stage, histology, harvested lymph nodes, lymphovascular invasion, perineural invasion, margin status). However, patients with psychiatric disorders had longer hospital stay (11.0±10.5 vs. 9.4±9.8 days, P=0.015), higher rates of 30-day complications (14.8% vs. 11%, P=0.028), 90-day complications (24% vs. 17%, P<0.001), 90-day reoperation rates (7.1% vs. 3.9%, P=0.009), and 90-day readmission rates (8.5% vs. 5.3%, P=0.015). The median follow-up duration was 52.6 months. Fiveyear disease-free survival was not significantly different (88.5% vs. 88.1%, P=0.971), but 5-year overall survival was lower in patients with psychiatric disorders (86.1% vs. 90.7%, P=0.029).

**CONCLUSION**: Presence of diagnosis of psychiatric disorder may influence postoperative complications. Also, by investigating national database, further research on the overall Korean CRC patients may be helpful to find the influence of psychologic disorder in CRC.

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Table 2. Pathologic and perioperative outcomes

		Overall	Psy group N=762	No Psy group N=9228	P-value			Overall	Psy group N=762	No Psy group N=9228	P-value
Operative	Open	276 (18.1%)	132 (17.3%)	144 (18.9%)	0.809						0.804
method	Lapa Robot	1049 (68.9%) 197 (12.9%)	531 (69.8%) 98 (12.9%)	518 (68.1%) 99 (13%)			pT0 pT1	5 (0.3%) 215 (14.1%)	3 (0.4%) 102 (13.4%)	2 (0.3%) 113 (14.8%)	
Operative	APR	37 (2.4%)	24 (3.2%)	13 (1.7%)	0.113	pT	pT2	253 (16.6%)	133 (17.5%)	120 (15.8%)	
name	AR	444 (29.2%)	215 (28.3%)	229 (30.1%)	0.220		pT3	789 (51.8%)	397 (52.2%)	392 (51.5%)	
	Hartmann	8 (0.5%)	3 (0.4%)	5 (0.7%)			pT4	155 (10.2%)	72 (9.5%)	83 (10.9%)	
	LAR	476 (31.3%)	230 (30.2%)	246 (32.3%)			pTx	105 (6.9%)	54 (7.1%)	51 (6.7%)	
	LHC	70 (4.6%)	42 (5.5%)	28 (3.7%)			P				0.153
	RHC	460 (30.2%)	232 (30,5%)	228 (30.0%)			pN0	985 (64.7%)	504 (66.2%)	481 (63.2%)	
	STC	4 (0.3%)	4 (0.5%)	0 (0%)		pN	pN1	387 (25.4%)	193 (25.4%)	194 (25.5%)	
	TC	23 (1.5%)	11 (1.4%)	12 (1.6%)			pN2	150 (9.9%)	64 (8.4%)	86 (11.3%)	
Radicality	R1/R2	13 (0.9%)	7 (0.9%)	6 (0.8%)	>0.999					(	0.799
	ersion	39 (2.6%)	24 (3.2%)	15 (2%)	0.194		0	5 (0.3%)	3 (0.4%)	2 (0.3%)	0.799
Emer	gency	35 (2.3%)	18 (2.4%)	17 (2.2%)	>0.999		1	392 (25.8%)	201 (26.4%)	191 (25.1%)	
Combined resection		126 (8.3%)	67 (8.8%)	59 (7.8%)	0.515	Stage	2	503 (33.0%)	256 (33.6%)		
Intraabdominal adhesions		134 (8.8%)	74 (9.7%)	60 (7.9%)	0.240		3	537 (35.3%)	257 (33.8%)	280 (36.8%)	
Operative	time (min)	207 (116)	205 (117)	208 (116)	0.395		x	85 (5.6%)	44 (5.8)	41 (5.4%)	
	blood loss	20 (50)	20 (100)	20 (50)	0.529	Harvest LNs		$1.0 \pm 2.7$	1.0 ± 2.5	$1.2 \pm 2.9$	0.126
	erative fusion	68 (4.5%)	35 (4.6%)	33 (4.3%)	0.901	Metastatic LNs		$19.6 \pm 11.5$	$19.6 \pm 10.9$	$19.8 \pm 12.1$	0.852
Hospital s	stay (days)	10.2 ± 10.2	$11.0 \pm 10.5$	$9.4 \pm 9.8$	0.015						0.068
Time to sof	t diet (days)	$5.0 \pm 3.7$	$5.1 \pm 4.3$	$4.8 \pm 3.0$	0.320		AWD	212 (13.9%)	88 (11.6%)	124 (16.3%)	
Complicat	ions (≤30d)	197 (12.9%)	113 (14.8%)	84 (11%)	0.028	Histology	AMD	1192 (78.3%)	612 (80.4%)	580 (76.2%)	
≥ gra	de III	92 (6.0%)	70 (9.2%)	22 (2.9%)	< 0.001		APD	62 (4.1%)	32 (4.2%)	30 (3.9%)	
	ions (≤90d)	321 (21.1%)	18 (24%)	13 (17%)	< 0.001		Others	56 (3.7%)	29 (3.8%)	27 (3.5%)	
	de III	114 (7.5%)	82 (10.8%)	32 (4.2%)	< 0.001	LVI	3	304 (20%)	146 (19.2%)	158 (20.8%)	0.441
	ion (≤30d)	62 (4.1%)	43 (5.7%)	19 (2.5%)	0.003	PNI		158 (10.4%)	89 (11.7%)	69 (9.1%)	0.110
	ion (≤90d)	84 (5.5%)	54 (7.1%)	30 (3.9%)	0.009	1111		130 (10.470)	05 (11.770)	33 (3.170)	0.110
	ion (≤30d)	57 (3.7%)	34 (4.5%)	23 (3%)	0.177						
	ion (<90d)	105 (6.9%)	65 (8.5%)	40 (5.3%)	0.015						

Readmission (<90d) 105 (6.9%) 65 (8.5%) 40 (5.3%) 0.015

\* Psy; psychiatric, LNs; lymph nodes, AWD; adenocarcinoma well differentiated, AMD; adenocarcinoma moderately differentiated, APD; adenocarcinoma poorly differentiated, LVI; lymphovascular invasion, PNI; perineural invasion

## Laparoscopic Colorectal Cancer Surgery for Cirrhotic Patients and Open Conversion Rate: A Propensity Score Matching Study

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BACKGROUND: Liver cirrhosis (LC) refers the end stage of damage to hepatocytes. Patients with LC may present signs of portal hypertension, such as varices and ascites, coagulopathy, infections or renal impairment, which can cause higher morbidity and mortality following surgery. While laparoscopic surgery has become a standard procedure for colorectal cancer, the safety and efficacy in cirrhotic patients remain unconfirmed.

**PURPOSE**: Our study aims to assess the feasibility and safety of laparoscopic colorectal cancer surgery in patients with LC and examine the rate of conversion to open surgery.

MATERIALS AND METHODS: This is a retrospective study for prospectively collected data of patients who underwent curative laparoscopic colorectal cancer surgery from January 2004 to November 2022 at a tertiary hospital in Korea. Palliative or emergent surgeries, major organ combined resections were excluded. We utilized propensity score matching (PSM) to compare operative outcomes and open conversion rates between patients with cirrhosis and those without.

**RESULTS**: During the study periods, a total of 2585 patients underwent laparoscopic colorectal cancer surgery, with 57 classified as cirrhotic and 2528 as non-cirrhotic. After PSM, 57 cirrhotic patients were successfully matched with 114 non-cirrhotic patients. In general characteristics, the two groups showed no differences, except for the American Society of Anesthesiologists (ASA) classification (P<0.001). The cirrhotic group experienced a longer operation time (150 vs. 140 minutes, P=0.047) and higher estimated blood loss (EBL) (IQR, 50~230 vs. 50~150 ml, P=0.004) compared to the non-cirrhotic group. While the overall number of postoperative complications was not significantly different between the two groups, major complications (Clavien-Dindo grade  $\geq$  3) were more

prevalent in the cirrhotic group than in the non-cirrhotic group (8.8% vs. 1.8%, P=0.042). Pathologically, the cirrhotic group exhibited smaller tumors and a lower pT class compared to the non-cirrhotic group (tumor size, 3.3 vs. 4.0 cm, P=0.005; pT0-2, 47.4% vs. 31.6%, P=0.044). No significant differences were observed in 5-year overall survival and 5- year relapse-free survivals between the two groups. Open conversion rates were 8.8% in the cirrhotic group and 1.8% in the non-cirrhotic group (P=0.042). Within the cirrhotic group, the conversion rates were 42.9% in class B and 4.0% in class A (P=0.011).

**CONCLUSION**: Performing laparoscopic colorectal cancer surgery in patients with LC involves a significant risk of increased bleeding and major postoperative complications. Furthermore, the probability of open conversion is particularly high in LC patients, especially those in higher LC classes, emphasizing the necessity for careful patient selection for laparoscopic colorectal cancer surgery.

#### **OPEN CONVERSION RATE**



Figure. Open conversion rates were 8.8% in the cirrhotic group and 1.8% in the non-cirrhotic group (P=0.042).

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## Recurrence After Radical Resection in T1 Colorectal Cancer: Clinical Implications and Characterization

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**BACKGROUND**: The detection of early-stage cancer has increased with enhanced screening methods, and its management, whether through local or radical resection, has evolved accordingly. Despite the high success rates of curative resections, a small but significant percentage of T1 colorectal cancer cases recur even after radical resection, with a current lack of understanding due to low incidence.

**PURPOSE**: This study aims to identify the clinical characteristics of patients with T1 colorectal cancer who experienced recurrence after radical resection and to present a comprehensive understanding of its clinical outcomes.

MATERIALS AND METHODS: Medical records of patients who underwent radical resection for T1 colorectal cancer between January 2010 and December 2015 at Asan Medical Center were retrospectively reviewed. Patients with radical resection were included, while those who had local resection were excluded from the study. A comprehensive analysis was conducted on the associations between recurrence and various clinicopathological features in patients who experienced recurrence.

RESULTS: A total of 548 patients were diagnosed with pT1 colorectal cancer, with a mean age of 58.8 years. The rate of lymph node metastasis in patients with T1 colorectal cancer was 8.4% (46/548), and 2 patients presented with distant metastasis initially. Recurrence developed in 13 (2.3%) patients during a median follow-up of 4.6 years. The majority of recurrences (8/13, 61.5%) were

observed within the first two years of follow-up, with the lungs being the most common site of metastasis (8/13, 61.5%). The 5-year overall survival (OS) rate for patients with recurrence was 61.5%, compared to 83.5% in patients without recurrence (p = 0.009). Lymph node metastasis (p = 0.013), high preoperative CEA level (p = 0.005), and tumor in rectum (p = 0.025) were significantly associated with higher risk of recurrence.

CONCLUSION: Although rare, lymph node metastasis was significantly associated with recurrence of T1 colorectal cancer and exhibited survival rates similar to those of stage III colorectal cancers. Patients with rectal cancer who have high CEA levels should also be considered for higher-risk groups for recurrence. These findings provide additional information for selecting patients for radical resection and post-surgical surveillance in T1 colorectal cancer.

Table. Details of the characteristics of patients with recurrence in T1 colorectal cancer

	Age	Sex	Preop CEA	Tumor Location	DIFF	LN metastasis	Stage	Adjuvant Tx	Time (year) to recurrence	Recurred site	Recur Tx
1	60	м	1.4	RA	WD	1/18	ША	Post op CRT	7.5	Long	Bevacizumab/FOLFOX
2	34	F	1.1	RB	MD	0/27	1		7	Anastomosis	Bevacizumab FOLFIRI
ì	43	F	1.4	SC	WD	0/10	IV	XELOX	0.7	Lung	WR of lung
ı	67	M	4.4	RA	MD	0/30	1		0.7	Long	RT+ XELOX/FOLFIRI
5	55	F	1.7	RB	MD	0/23	1		5.8	Pelvis	Bevacirumab FOLFOX
6	52	м	2.9	RA	WD	0/16	1		1.1	Liver	Bevaciranab FOLFIRI
7	51	F	11.8	RA	MD	7/39	IV	XELOX	0.5	Liver	RT
8	54	M	4	RA	MD	0/15	1		2.4	Lung	S-FOLFIRI
9	66	M	3.1	RA	WD	0/3	1		1.7	IILN	IILND(Surgery), post CRT
10	76	F	1.5	AC	WD	0/2	1		0.6	Long	Observation due to old age
11	56	F	1.3	SC	MD	1/29	IIIA	XELOX	2	Long	WR of lung, post Capecitabin
12	54	F	1.6	sc	WD	0/33	1		3.2	Long	WR of long, post XELOX
13	75	м	7.2	CE	MD	1/26	IIIA	Capecitabine	1.7	Long	f'u loss

#### 동시성 대장암 복막전이로 종양감축술 및 복강 내 온열항암화학요법을 받은 환자의 재발 패턴의 차이와 전체 생존율에 영향을 미치는 인자에 관한 연구: 다기관 후향적 연구 (KOPEM Study Group)

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BACKGROUND: 대장암 복막전이로 종양감축술과 복강 내 온열항암화학요법을 받은 환자의 수술 후 재발은 매우 흔하다. 대개 9-15개월 사이에 80-85%의 환자가 재발을 하며, 재발의 패턴역시 매우 다양하여 복막재발, 복막 및 전신 재발, 전신 재발의 빈도가 각각의 연구마다 서로 상이하다. 이러한 배경 때문에 현재 대장암 복막전이 환자를 대상으로 종양감축술과 복강 내 온열항암화학요법 전후 항암요법에 관한 전향적 연구(CAIRO6)가 진행 중이다.

PURPOSE: 본 연구는 후향적 다기관 연구로 동시성 대장암 복막전이 환자의 재발 패턴의 차이 및 전체 생존율에 영향을 미치는 인자를 분석하여 향후 종양감축술과 복강 내 온열항암화학요법의 적절한 대상자를 선정하고 수술 전후 항암치료에 관한 가이드라인을 제시하기 위해 제안되었다.

MATERIALS AND METHODS: 2014년 1월 1일에서 2020년 12월 31일 기간 동안 동시성 대장암 복막전이로 종양감축술과 복강 내 온열항암화학요법을 받은 환자의 5개 국내기관의 후향적데이터를 COX 회귀분석을 통해 생존율과 재발에 관한 위험요인을 분석함.

RESULTS: 연구기간동안 총 84명의 환자가 동시성 대장암 복막 전이로 종양감축술과 복강 내 온열항암화학요법을 받았다. 중앙 추적기간은 24.5개월(2-79)이었고, 수술 전 항암치료를 받은 환 자가 46명(54.8%), 수술 후 항암치료를 받은 화자가 72명(85.7%) 이었다. PCI값은 20미만이 71명(84.5%), 20이상이 13명(15.5%)였 고, CCR0-1은 67명(79.8%), CCR2는 17명(20.2%) 이었다. 추적 관 찰기간 중 총 60명(71.4%)의 환자가 재발이 되었고, 이중 복막 단 독은 26명 (31%), 복막외 재발은 34명(40.5%)이었다. 재발까지 의 중앙값은 9개월(2-53)이었고, 1년, 2년, 3년 무병생존율은 각 각 30%, 8.3%, 5%였다. 수술 후 중앙생존기간은 34개월(2-79)이 었고, 1년, 2년, 5년 전체생존율은 각각 88.5%, 64.4%, 44.8%였다. 전체 환자를 복막단독재발군, 복막외재발군, 복막과 복막외 모 두 재발한 군으로 나누어 분석해 보았을 때, 중앙생존기간이 각 각 30.6개월, 34.4개월, 15.8개월 (P=0.013) 로 복막과 복막외 모 두 재발한 군이 통계학적으로 안 좋은 예후를 보였다. 전체생존 율에 영향을 미치는 요인으로는 복막과 복막외 모두 재발 (HR 3.521 [1.380-8.984], P=0.045), 높은 PCI (HR 2.117 [1.049-4.2710, P=0.036]였고, 수술 전후 전신항암치료의 여부는 통계학적의로 유의미한 요인으로 분석이 되지 않았다. 재발에 영향을 미치는 요인으로는 수술전 항암치료 (HR 2.081[1.203-3.601], P=0.009), 수술 후 합병증 (HR 2.184 [1.190-4.006], P=0.012)이 재발의 가능성을 높이는 것으로 분석되었다. 복막과 복막외 모두 재발하는 데 영향을 미치는 요인으로는 비만 (HR 4.518 [1.441-14.166], P=0.010), 수술후 항암치료 (HR 0.284 [0.092-0.877], P=0.029), 높은 PCI (HR 7.391 [1.780-30.691], P=0.006)가 통계학적인 유의성이 있었다. 하지만 수술전 항암치료 여부는 통계학적으로 유의미한 요인으로 분석되지 않았다.

CONCLUSION: 동시성 대장암 복막전이로 종양감축술과 복강 내 온열항암화학요법을 받은 환자 중 복막과 복막외에 모두 재발이 된 환자의 예후가 복막단독재발이나 복막외에만 재발된 환자보다 좋지 않았고, 위험인자 분석에서 수술전 항암치료보다는 수술 후 항암치료가 이러한 재발을 낮추는데 도움이 되는 것으로 분석이 되었다. 따라서, 동시성 대장암 복막전이로 진단된 환자는 PCI가 높지 않다면 종양감축술과 복강 내 온열항암화학요법을 먼저 시행하고 이후 보조항암치료를 하는 것이 더 나은 치료전략으로 생각된다.

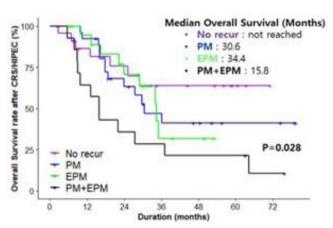


Figure. 종양감축술과 복강 내 온열항암화학치료를 받은 환자의 재발 패턴에 따른 생존율 분석 (Kaplan Meyer)

#### The Impact of Induction and Consolidation Total Neoadjuvant Therapies Compared to Conventional Chemoradiotherapy for Locally Advanced Rectal Cancer: A Systematic Review and Network Metaanalysis

Chinock Cheong<sup>1</sup>, Na Won Kim<sup>2</sup>, Sung Ryul Shim<sup>3</sup>, Jeonghyun Kang<sup>4</sup>

BACKGROUND: Although total neoadjuvant therapy (TNT) has been introduced to enhance oncological outcomes and minimize toxicity in locally advanced rectal cancer (LARC), the superiority between the induction and consolidation of TNT remains uncertain.

**PURPOSE**: This meta-analysis aimed to assess the oncological and postoperative outcomes in patients with LARC by comparing induction and consolidation TNT with conventional chemoradiotherapy (CRT).

MATERIALS AND METHODS: We searched the PubMed, Embase, and Cochrane databases from their inception to June 30, 2023 to identify studies that compared the outcomes among induction, consolidation TNT, and conventional CRT. We compared the rates of pathological or clinical complete response (pCR or cCR), postoperative results, CRT-related toxicity, and survival outcomes across these treatments.

**RESULTS**: In total, 793 articles were screened, 33 of which were eligible for analysis. These studies included 9,741 patients over the

period from 2012 to 2023. In NMA, a significantly increased odds ratio (OR) for attaining a pCR was observed in both the induction TNT group at 1·65 (95% credible interval [CrI], 1·18–2·30) and the consolidation TNT group at 1·87 (95% CrI, 1·40–2·47) compared to conventional CRT. However, no difference was observed in pCR rates between the induction and consolidation TNT. No significant distinctions concerning cCR rates, Clavien-Dindo grade  $\geq$  III, positive circumferential resection margins, or grade  $\geq$  3 toxicity related to CRT were observed among the groups. Pairwise meta-analysis revealed no significant differences in local recurrence, distant metastasis, disease-free survival, or overall survival.

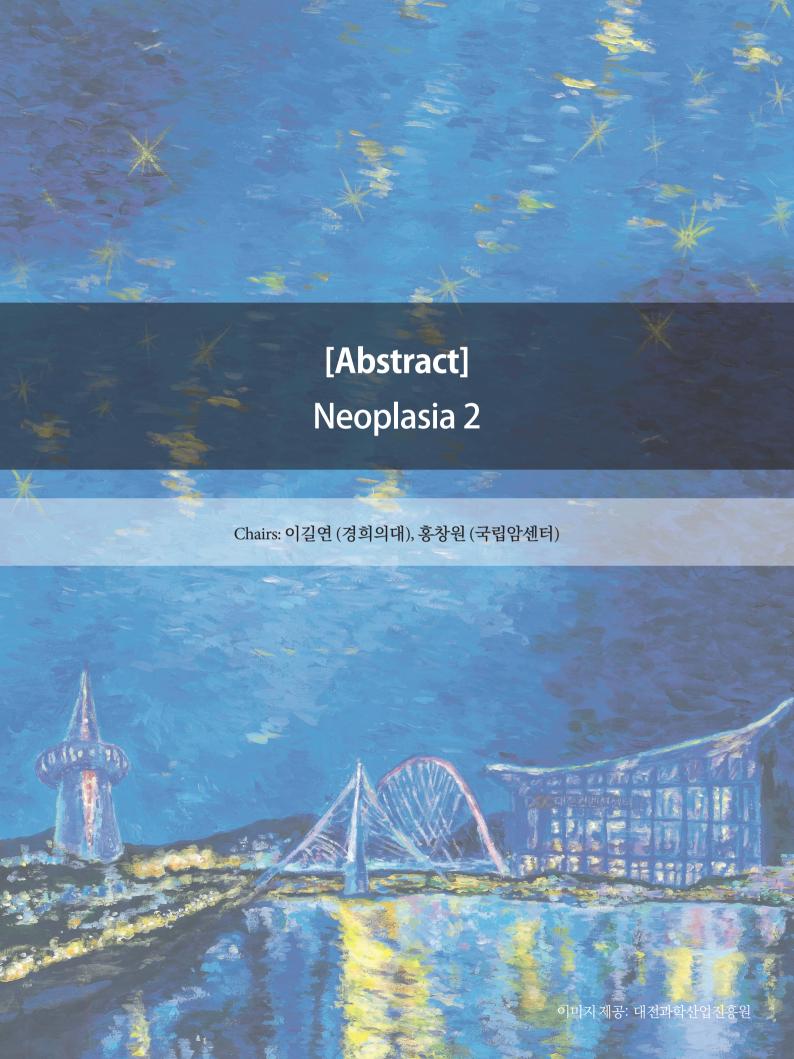
CONCLUSION: Both induction and consolidation TNT demonstrated an enhanced pCR rate compared with conventional CRT in patients with LARC. Both strategies demonstrated similar post-operative outcomes and CRT-related toxicities without decreasing survival outcomes. Despite these statistically similar outcomes, they represent safe and promising approaches for the management of LARC.

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## Prognostic Significance of Lymph Node Retrieval after Preoperative Chemoradiation for Rectal Cancer

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BACKGROUND: The evaluation of lymph nodes removed in colorectal cancer is a critical issue because it can influence the detection of metastatic lymph nodes and reflect the adequacy of oncologic surgery. The American Joint Committee on Cancer and the College of American Pathologists recommend that a minimum of 12 lymph nodes be examined to accurately stage colorectal cancer. Several studies have demonstrated that a reduced number of lymph nodes are retrieved from rectal cancers treated with preoperative chemoradiotherapy. However, the influence of low lymph node retrieval on prognosis is not clear.

**PURPOSE**: This study was designed to evaluate the effect of preoperative chemoradiation on the number of lymph nodes retrieved from rectal cancer specimens and to determine the prognostic impact of the number of lymph nodes retrieved when stratifying patients according to tumor regression grade (TRG).

MATERIALS AND METHODS: A total of 1,496 patients with rectal cancer who underwent curative surgery after preoperative chemoradiation therapy at the Asan medical center and Gang-

neung asan hospital between May 2010 and December 2018 were analyzed retrospectively.

**RESULTS**: Of the 1,496 patients, 15.3% (229/1,496) had < 12 lymph nodes retrieved. The patients with < 12 lymph nodes showed a higher rate of good responders (TRG 3-4) than patients with  $\geq$ 12 lymph nodes (45.6% vs.38.3%, p = 0.047). In multivariate analysis, retrieval of < 12 lymph nodes, poor responder (TRG 0-2), and presence of perineural invasion were an independent prognostic factors for overall survival. Among patients with a good tumor response, those with  $\geq$ 12 lymph nodes retrieved had a significantly better 5-year overall survival (P = 0.006) than those with <12 lymph nodes retrieved. However, patients with a poor response, retrieval of  $\geq$ 12 lymph nodes were not associated with overall survival and disease free survival.

**CONCLUSION**: In good responders, the number of retrieved lymph nodes may have decreased, however, the removal of 12 or more lymph nodes remains significant from an oncologic perspective.

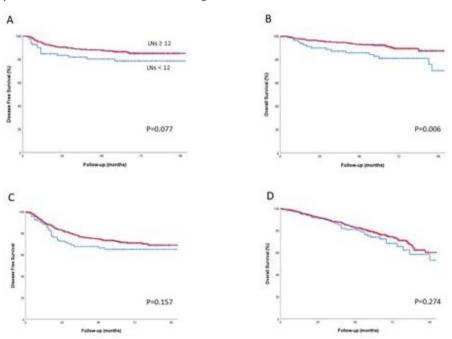


Figure. (A) 5-year disease free survival (DFS) and (B) overall survival (OS) in patients with a good response. (C) DFS and (D) OS in patients with a poor response.

# The Potential efficacy of Blood-Based Methylation profiling of Circulating Tumor DNA (ctDNA) for Treatment Plan Decisions in Rectal Cancer Patients Undergoing Preoperative Chemoradiotherapy (PCRT)

Hayoung Lee<sup>1</sup>, In Ja Park<sup>1</sup>, Na Young Min<sup>2</sup>, Younghui Kang<sup>2</sup>, Hyebin Bak<sup>2</sup>

**BACKGROUND**: The need for non-invasive, blood-based biomarkers for predicting colorectal cancer prognosis is increasing, as current tissue-derived markers are invasive and affected by tumor heterogeneity.

**PURPOSE**: This pilot study aims to explore efficacy of ColonAiQ® platform, which tests six ctDNA methylation markers, on setting treatment plan in rectal cancer patients treated with preoperative chemoradiotherapy.

MATERIALS AND METHODS: We initially selected 32 plasma samples from patients with rectal cancer who underwent preoperative chemoradiotherapy (PCRT) before radical surgery. Sample collection occurred on the surgery day just before the operation or pre-operation outpatient visits. Finally, 26 samples were eligible for ctDNA methylation test. Test- positivity was defined as exhibiting at least 1 methylation marker among 5 methylation markers (Septin9, IKZF1, BCAT1, Septin9-2 and, VAV3). The function of test in evaluating tumor response and predicting recurrence was evaluated.

**RESULTS**: In total cases, 20 (76.9%) were male and good responders were 11 (42.3%), including 5 with total regression and 6 with near-total regression. The final pathologic stage included 10 cases of stage 0 to I, 5 of stage II, and 9 of stage III. Two cases were classified as stage IV with pre-existing distant metastasis. When each marker was tested separately, all 6 markers did not show statistically significant results in PCRT response prediction. However, 5 markers (Septin9, IKZF1, BCAT1, Septin9-2 and, VAV3) each exhibited significant result in recurrence event, except BCAN. The ColonAiQ\* positivity did not assess primary tumor response, showing sensitivity of 45.5% and specificity of 46.7%. The recurrence ratio was significantly higher in the test-positive group (66.7% vs. 8.3%, p = 0.003), exhibiting sensitivity of 88.9% and specificity of 73.3%. Recurrences in the positive group occurred all within 2 years (mean 13.8  $\pm$  7 months), with one case showing pathologic total regres-

sion. The 2 false-positive patients exhibited pathologic total or near-total regression

CONCLUSION: This pilot study reveals the potential benefits of ctDNA methylation profile test in predicting recurrence among rectal cancer patients undergoing PCRT and radical surgery, despite of its limitations in predicting PCRT response. The test can be used to help setting patient-specific surveillance intervals and the indication of adjuvant treatments following radical surgery in PCRT patients, complementing the standard pathologic report. To validate the effectiveness of the ctDNA methylation test in predicting recurrence, prospective trials are essential.

Table Clinical characteristics and recurrence profile according to ColonAiQ test

ColonAiQ	Negative	Positive	p-value	
Colonialo	(n=13)	(n=13)	p value	
Sex			0.352	
Male	9 (69.2%)	11 (84.6%)		
Female	4 (30.8%)	2 (15.4%)		
Age, years	$54.3 \pm 11.9$	$59.2 \pm 9.0$	0.252	
ypStage*			0.853	
0	3 (25.0%)	4 (33.3%)		
I	2 (16.7%)	1 (8.3%)		
II	2 (16.7%)	3 (25.0%)		
III	5 (41.7%)	4 (33.3%)		
Lymphovascular	3 (27.3%)	3 (23.1%)	0.813	
invasion	3 (27.376)	3 (23.176)	0.813	
Perineural invasion	0 ( 0.0%)	5 (38.5%)	0.021	
Good response**			0.691	
Yes	6 (46.2%)	5 (38.5%)		
No	7 (53.8%)	8 (61.5%)		
Recurrence*			0.003	
Yes	1 (8.3%)	8 (66.7%)		
No	11 (91.7%)	4 (33.3%)		

<sup>\*</sup>ypStage and Recurrence were calculated for all cases except two initial stage IV patients. \*\*Good response includes pathologic total regression and near total regression. Values are presented as a number (%) or as a mean  $\pm$  standard devation unless otherwise indicated.

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#### Assessing the Communicative Competence of Generative Artificial Intelligence in Response to Query about Colorectal Cancer Surgery

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**BACKGROUND**: With the advancement of Generative Artificial Intelligence (GAI), numerous attempts have been made to integrate it into healthcare. However, it's applicability in the context of colorectal cancer has not been thoroughly evaluated.

**PURPOSE**: This study aimed to evaluate the ability of GAI to answer questions about colorectal cancer using several criteria.

MATERIALS AND METHODS: Ten clinically relevant questions about colorectal cancer were selected from top-rated hospitals' websites and patient surveys. These questions were presented to three GAI (GPT-4, Google Bard and CLOVA X), and their responses were compared to answers from the information book on colorectal cancer. Response evaluation was performed by two groups, each consisting of five healthcare professionals (HCP) and patients. Each question was scored on a 1-5 Likert scale based on four evaluation criteria, with a maximum of 20 points per question. The Evaluation criteria included accuracy, completeness, level of empathy, humanness, and patient satisfaction. ANOVA and Welch's t-test were used to compare the mean scores of the four respondents. Post-hoc analysis was conducted when significant differences were identified.

**RESULTS**: In an analysis that only included HCP, information book scored 11.8  $\pm$  1.2, GPT-4 scored 13.5  $\pm$  1.1, Google Bard scored 11.5  $\pm$  0.7, and CLOVA X scored 12.2  $\pm$  1.4 (P = 0.001). The score of GPT-4 was significantly higher than that of the information book (P=0.020) and Google Bard (P = 0.001). In an analysis that only included patients, the information book scored 14.1  $\pm$  1.4, GPT-4 scored 15.2  $\pm$  1.8, Google Bard scored 15.5  $\pm$  1.8, and CLOVA X scored 14.4  $\pm$  1.8, without significant differences (P = 0.234). When including both groups of evaluators, the information book

scored 13.0  $\pm$  0.9, GPT-4 scored 14.4  $\pm$  1.2, Google Bard scored 13.5  $\pm$  1.0, and CLOVA X scored 13.3  $\pm$  1.5 (P = 0.070).

CONCLUSION: The three GAIs (GPT-4, Google Bard and CLO-VA X) demonstrated similar or better communicative competence than the information book regarding questions in the Korean language related to colorectal cancer surgery. If the high quality medical information provided by GAI is well supervised by HCP and published as an information book, it could be helpful for patients to obtain accurate information and make informed decisions.

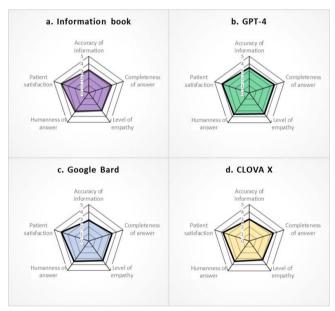


Figure. Average score per evaluation criterion for each responding entity

#### Challenge of Image Texture Analysis for Patient with Masquerading Appendicitis Harboring Risk of Hidden Carcinoma Using Deep Learning Model, Information of Appendix (IA)

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**BACKGROUND**: Until recently, masquerading appendicitis harboring hidden malignancies, rare but presents diagnostic challenge and can lead to worse outcomes.

**PURPOSE**: To evaluate clinical and CT image texture features between inflammation and tumor of appendiceal structure using pretrained deep learning model

MATERIALS AND METHODS: The archive of project MHo4 (Machinery Hierarchy of Four appendiceal structures) provided clinical data of patients presented as suspected masquerading appendicitis corresponding to their abdominal pelvic CT interpretation annotated with 'd/dx', or 'r/o' and text such as 'appendiceal tumor' or 'carcinoma' or 'cancer' or 'malignancy' from 2006 to 2023 at single institution. Inflammation of appendiceal structure was labelled as true class. Pathologic confirmed malignant appendiceal structure was labelled as non-inflammatory class regardless of combined secondary appendicitis. The study involved three radiologists specializing in the abdominal section. Misdiagnosis rates between radiologist and IA model were calculated in prediction of true class. In addition, we analyzed image features between inflammation and tumor of appendiceal structure through gradient-weighted class activation mappings (Grad-CAMs). Activation maps was generated by pretrained Densenet169 embedding tens of millions of parameters for appendiceal and extra-appendiceal structures in CT scan. RESULTS: Pathological review for whole dataset, thirty-eight patients revealed that there were patients with simple (n = 15), complicated appendicitis (n = 14) and, primary appendiceal cancer accompanying with secondary appendicitis (n = 8), except one case with surgical observation. Preoperative misdiagnosis rate for an exclusion of hidden malignancy in radiologist-based annotation was 78.9%. However, among them, four patients underwent unnecessary oncologic radical resection. Two patients underwent appendectomy only after intraoperative frozen biopsy. For patients with primary appendiceal cancer, in contrast, two patients underwent only appendectomy, and three patients underwent secondary curative resection with lymph node dissection. Extraction rate of IA model for inflammatory class was 89.4%. However, IA model could not yield a significant distinction between inflammatory and malignant class (radiologist vs. IA model = 78.9% vs. 23.7%, p<0.001). Gross review on Grad-CAMs revealed that distinct rearranged patterns for homogeneity, regularity, repetitive texels, edgeness per unit area, and local neighborhood intensity in field of inflammation might enable it easier to recognize true class rather than tumorous condition with ambiguous pattern.

**CONCLUSION**: This study was the first attempt to apply pretrained deep learning model for patients with a difficulty of preoperative diagnosis for hidden appendiceal malignancy with providing a clue of diagnostic parameters.

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#### 조기 발병 대장암 환자의 증상 및 동반 질환에 대한 네트워크 분석: 전향적 코호트 연구

박재현1, 유지원2, 박지원1, 심진아2, 송난3, 김민정1, 유승범1, 신애선4, 정승용1, 박규주1, 유영호1, 전현선1

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BACKGROUND: 대장암(CRC) 환자들은 다양한 증상과 동반 질환을 경험한다. 조기 발병 대장암 (EOCRC)은 일반적인 대장 암과 병리학적 특성, 분자 프로필 및 위험 요인 등 여러가지 면 에서 독특한 차이를 가진 특징을 보이며, 점차 발생율이 증가하 고 있다.

PURPOSE: 본 연구를 통해 조기 발병 대장암 환자들의 다양한 증상, 기능 및 동반 질환 간의 복잡한 상관 관계를 조사하고자 한다. 이로써 환자들이 치료 과정에서 경험할 수 있는 증상 및 동반 질환의 복잡한 네트워크를 더 잘 이해하고 조기 발병 대장암 인구에서 특이적으로 나타나는 차이를 강조하고자 한다.

MATERIALS AND METHODS: 서울대학교병원에서 2015년 부터 2021년 사이에 근치적 절제술을 받은 987명의 대장암 환자로 이루어진 코호트 데이터를 후향적으로 검토 및 분석하였다. 해당 환자들의 EORTC QLQ-C30 및 CR29 설문조사에서 유래된 33개 증상, 기능들과 14가지 동반 질환들 간의 상관 관계를 네트워크 분석을 통하여 분석하였다. 각각의 관계에 대한 상관 계수를 계산하였고 Fruchterman-Reingold 알고리즘을 사용하여 R의 qgraph 패키지로 도식화하였다. 중심 노드는 강도를 기반으로 한중심성 분석에 의해 식별하였다. 모든 분석은 R 통계 소프트웨어 4.3.1을 사용하여 분석하였다.

RESULTS: 증상 분석에서 EOCRC 환자는 감정 및 인지 기능 사이에서 가장 두드러진 상관 계수를 보여주었으며 중심 노드 는 엉덩이 통증이었다. LOCRC의 경우, 사회 기능과 피로가 관 련된 가장 두드러진 상관 계수를 보였으며 피로가 중심 노드였 다. EOCRC는 통증과 같은 증상과 강한 상관 관계를 보여주었으며 LOCRC는 각종 기능과 피로 사이의 상관 관계가 더 많았다. 동반 질환 분석에서 EOCRC 환자는 근골격계 질환과 정신 질환간에 강한 상관 관계를 보였으며 그 다음으로 고지질혈증과 혈관 질환이 높은 상관계수를 보였다. 고지혈증이 중심 노드였다. LOCRC는 고혈압, 당뇨병 및 고지질혈증이 서로 간에 강한 상관관계를 보였으며 중심 노드는 고혈압 이었다. 결합된 분석에서 LOCRC는 증상과 동반 질환 간의 상관 관계가 훨씬 적었으며, 반면 EOCRC는 훨씬 더 복잡하고 얽힌 네트워크를 보여주었다. 둘다피로가 중심 노드였다.

CONCLUSION: 조기 발병 대장암 (EOCRC)은 50세 이상에서 발병하는 대장암 (LOCRC)과는 다른 네트워크 분석 결과를 보였다. EOCRC는 증상과 동반 질환 간에 더 많은 상관 관계를 보였으며 중요한 요소는 통증, 고지질혈증 및 피로와 같은 증상이었다. 특히 근골격 질환과 정신질환은 피로와 강한 상관 관계가 있었으며 중심 노드로서 피로의 심리적 부담과 증상의 존재가 비교대상 인구보다 큰 것을 나타냈습니다. 특히나, LOCRC와 비교했을 때 비교적 더 증상, 기능 간의 상관관계가 복잡하게 얽혀있었으며 동반 질환들도 증상, 기능과 더 확연한 관계를 보였다. 이런 결과들을 바탕으로, 조기 발병 대장암 환자의 기능 제약을 줄이고 증상을 완화하며 삶의 질을 향상시키기 위해서는 다면적인 치료와 관리가 필요하며 동반 만성 질환을 적절하게 치료하는 것이 중요하다고 생각되다.

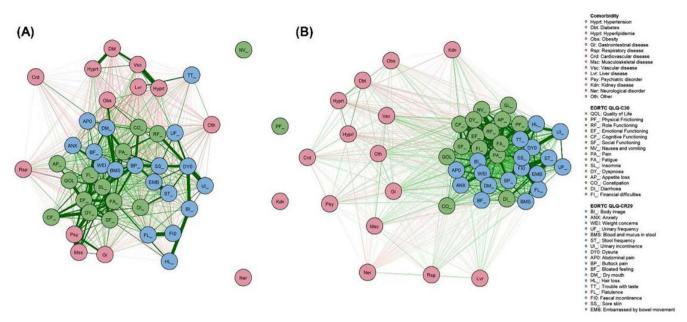


Figure. 조기 발병 대장암 (좌측)과 50세 이상에서 발병한 대장암 (우측)에서 33개의 증상, 기능 및 14개의 동반 질환 간의 상관 관계를 보여주는 네트워크 분석 도표.

#### Safety and Feasibility of Single-port Robotic Left-sided Lateral Pelvic Node Dissection for Locally Advanced Rectal Cancer: A Comparative Study of Multi-port Robotic Approach

<u>Jun Seok Park</u>, Min Hye Jeong, Hye Jin Kim, Gyu-Seog Choi, Soo Yeun Park, Seung Ho Song, Sung Min Lee, Su Jin Kang

Kyungpook National University Chilgok Hospital

**BACKGROUND**: The da Vinci Single-port (SP) system is designed to facilitate single-incision robotic surgery in a narrow space. We developed a new procedure of lateral pelvic node dissection (LPND) using the SP platform.

**PURPOSE**: This study was planned to evaluate the technical safety and feasibility of our procedure by comparing it to a multi-port (MP) robotic approach.

MATERIALS AND METHODS: We retrospectively reviewed rectal cancer patients who underwent robotic total mesorectal excision (TME) with left-sided LPND between January 2020 and May 2023. Patients' demographics, intra-operative outcomes, and post-operative morbidity were analyzed.

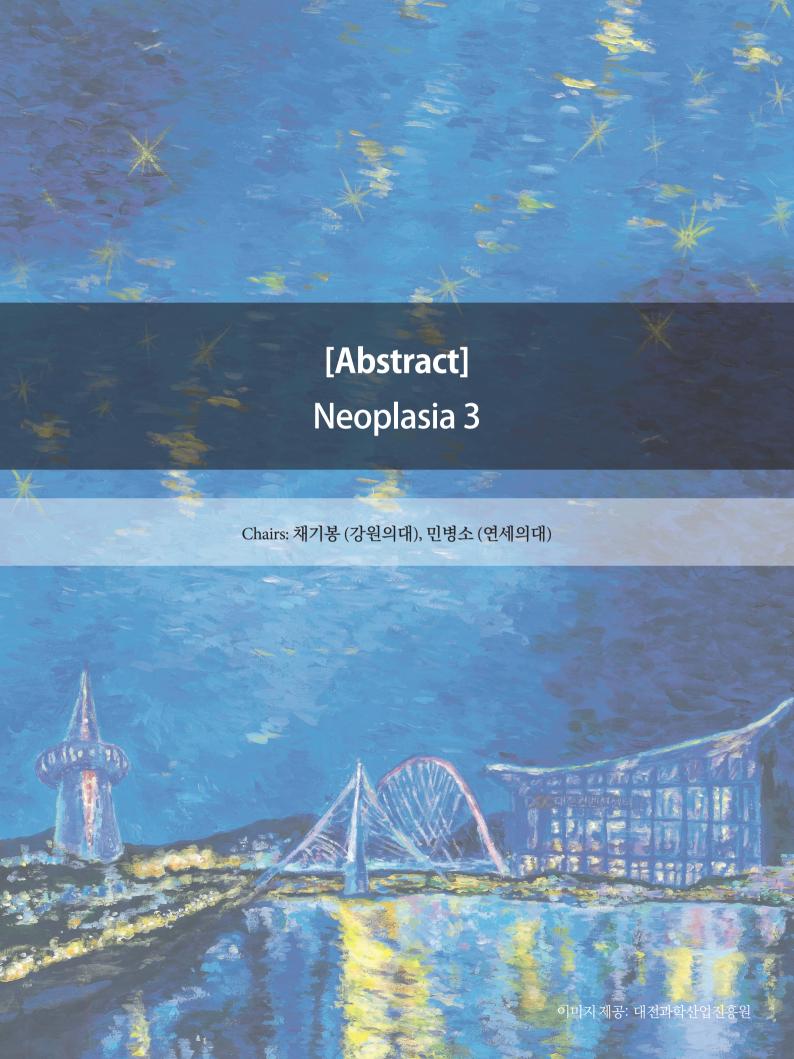
**RESULTS**: Thirty-one and 18 patients underwent MP and SP robotic TME with LPND, respectively. No significant differences in patient characteristics and intra-operative outcomes were observed between the two groups. The mean operative time did not differ significantly between the MP and SP groups (MP vs. SP, 254.5 $\pm$ 73.2 min vs. 268.9 $\pm$ 86.8 min; P = 0.608). The average number of harvested lateral pelvic lymph nodes (LPNs) was 10.8 $\pm$ 6.4 in the MP group and 9.3 $\pm$ 4.4 in the SP group (P = 0.058). Pathologic LPN metastatic rates were comparable between the two groups (MP vs. SP, 0.2 $\pm$ 0.5

vs.  $0.1\pm0.3$ ; P = 0.684). No complications related to urinary problems were observed in either group.

**CONCLUSION**: SP robotic TME with Lt. LPND showed its safety and comparative outcomes compared with MP robotic approach.

Table. Perioperative outcomes

	MP	SP	
	(n = 31)	(n = 18)	р
Type of operation			0.976
LAR	18 (58.1%)	11 (61.1%)	
ISR	11 (35.5%)	6 (33.3%)	
APR	2 (6.5%)	1 (5.6%)	
Duration of OP, min	254.5 ± 73.2	268.9 ± 86.8	0.608
Estimated blood loss, mL	85	42.8	0.194
Protective ileostomy, no	29 (93.5%)	17 (94.4%)	0.709
Pathologic tumor depth, no			
T0	2 (6.5%)	2 (11.1%)	0.653
T1	1 (3.2%)	1 (5.6%)	
T2	5 (16.1%)	1 (5.6%)	
Т3	20 (64.5%)	14 (77.8%)	
T4	2 (6.5%)	0 (0%)	
Pathologic nodal status, no			
N0	18 (58.1%)	12 (66.7%)	0.221
N1	12 (38.7%)	5 (33.4%)	
N2	1 (3.2%)	0 (0%)	
No. of retrieved LNs			
Total	27.3 ± 9.7	$33.2 \pm 8.0$	0.196
LPN	10.8 ± 6.4	9.3 ± 4.4	0.058
Rate of LPN metastasis	12.9%	11.1%	0.684



#### Clinical and Pathological Correlations of Recurrence after Conventional Follow-up Completion in Colorectal Cancer Patients

<u>Jesung Park</u><sup>1</sup>, Min Jung Kim<sup>2</sup>, Ji Won Park<sup>2</sup>, Seung-Bum Ryoo<sup>2</sup>, Seung-Yong Jeong<sup>2</sup>, Kyu Joo Park<sup>2</sup>

BACKGROUND: Typically, patients with colorectal cancer undergo a follow-up (f/u) period of 5 years post-surgery, after which additional follow-ups are often not conducted. However, in clinical practice, it's not uncommon to encounter patients who experience sudden recurrence even after 5 years. In light of this, it is necessary to identify the differences between patients who recur during the standard follow-up period and those who recur afterwards, and to determine what factors can predict recurrence after 5 years.

**PURPOSE**: This study was designed to evaluate the characteristics of recurrences that occur 5 or more years after curative resection for colorectal cancer.

MATERIALS AND METHODS: This research encompassed 782 individuals diagnosed with a recurrence following curative surgery for colorectal cancer between December 2007 and December 2015. Among these, 688 experienced intermediate recurrence (occurring within 5 years post-surgery), while 27 cases were classified as late recurrence (occurring more than 5 years after surgery). The study

specifically compared the clinical and pathological characteristics of patients with late recurrence against those in the intermediate recurrence groups, with a particular focus on the recurrence patterns. **RESULTS**: No significant patients characteristic differences were noted between the late recurrence group and the general recurrence group. In logistic regression analysis, when comparing the group that recurred after 5 years based on factors such as lymphatic invasion, venous invasion, and perineural invasion, as well as pretreatment and post-operative CEA levels, it was observed that the likelihood of recurrence after 5 years is higher in patients without perineural invasion (OR: 0.23, p=0.009) and in those with high pre-treatment CEA levels (OR: 1.013, p=0.046)

**CONCLUSION**: This study indicates that in patients with perineural invasion and relatively high pre- operative CEA levels, there is an increased likelihood of recurrence beyond the standard follow-up period, suggesting the need to consider an extended period of additional follow-up.

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## **Evaluation of Causes for R1 Resection Status in Rectal Cancer - International Collaborative Study**

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BACKGROUND: Microscopic involvement of the resection margin (R1 resections) following rectal cancer resections impacts on oncological outcomes and is often interpreted as surgical error. However, staging errors, as well as the failure of adequate pre-operative downsizing, or combinations of these errors can all contribute to unfavorable outcomes.

**PURPOSE**: As R1 resection status is rare, we combined data from four dedicated international units to investigate causes for R1 status. MATERIALS AND METHODS: Retrospective analysis of audit data from four international rectal cancer centers with a total of 199 patients with R1 status. Data from patients undergoing low anterior resections, intersphincteric resections or abdominoperineal resections (i.e. rectal cancers) were included. Resections for local recurrence after previous surgery were excluded. For Korea, data was available from 08/2011-04/2023, for the UK from 01/2015-06/2023 and Austria's centers 01/2015-12/2020. Causes for R1 resection were classified in four categories: incorrect preoperative staging or multidisciplinary team (MDT) meeting error (P=preoperative error); problems with/poor response to neoadjuvant therapy, intact TME specimen (D=downsizing error); problems with/poor response to neoadjuvant treatment, defective TME specimen (C=combined error); good response to neoadjuvant treatment, defective TME specimen (S=surgical error).

RESULTS: The overall rate of R1 resections was 7.8% (199/2562).

The majority of patients with R1 status had cancers within 0-6cm of the anorectal junction (125/199, 62.8%), with a T3 pre-operative tumor stage (109/199, 54.8%) and pre-operatively identified positive circumferential resection margin (CRM; 124/199, 62.3%). As expected, the majority (152/199, 76.4%) had undergone neoadjuvant treatment, with only a poor or intermediate response in 137/152 (90.2%) of patients who had neoadjuvant treatment. Most operations were performed minimally invasive (laparoscopic 88/199; robotic 74/199). Due to locally advanced disease, 71/199 (35.7%) had additional resections other than bowel resections. The most common site of R1 involvement was anterior (58/199; 29.2%) and posterior CRM (58/199; 29.2%), followed by lateral CRM (32/199, 16.1%). When analyzing causes for R1 resections in detail, category D errors were responsible for R1 resections in 120/199 (60.3%) of cases, category P errors in 58/199 (29.2%), C in 5/199 (2.5%) and category S in 13/199 patients (6.5%). In 3 cases, no error could be identified (R1 status at the site of tumor perforation in emergency operation, or no possibility of more extensive of resection).

**CONCLUSION**: The most common cause of R1 resection status are problems with/poor response to neoadjuvant therapy and intact TME specimen (downsizing error), followed by incorrect preoperative staging or MDT decision (preoperative error). Surgical errors as sole cause for R1 resections are rare.

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### Immunogenomic Intertumor Heterogeneity in Patients with Synchronous Colorectal Cancer

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**BACKGROUND**: Synchronous colorectal cancers (SCRC) are defined as having more than one primary colorectal cancer at the time of the initial diagnosis. The molecular characteristics of SCRC are not fully understood despite their importance in determining targeted therapy.

**PURPOSE**: The aim of this study was to compare molecular characteristics, including microsatellite instability (MSI) and somatic mutations between synchronous cancers.

MATERIALS AND METHODS: From 2012 to 2014, 100 patients with surgically resected SCRCs were retrospectively reviewed. Molecular characteristics, including MSI and tumor infiltrating lymphocytes (TILs), were analyzed for all tumor lesions in SCRC patients. Whole exome sequencing (WES) was performed on 18 cancers from 9 patients who had at least one MSI-H cancer to evaluate the intertumoral heterogeneity of SCRCs.

RESULTS: Among the 100 SCRC patients, 12 had at least one MSI-H cancer, and 5 showed discordant MSI status. Patients who had at least one MSI-H cancer had a higher proportion of mucinous adenocarcinoma and a higher density of TILs than those who had only MSS cancers. In WES analysis, most synchronous cancers shared only a few variants in the same patient (0.09–0.36%), except for one patient (6.5%). The concordance rates for BRAF, KRAS, NRAS, and PIK3CA of synchronous cancers from the same individual were 66.7%, 66.7%, 66.7%, and 55.6%, respectively. Even though synchronous cancers shared the same mutated gene, they had different mutant subtypes.

CONCLUSION: In this study, SCRC showed a discordance rate of 5% in MSI status and a high discordance rate in somatic variants. As intertumoral heterogeneity may affect the response to target therapy, molecular analysis of all cancers in a single patient is recom-

mended in determining the treatment strategies for SCRC.

Table. Comparison of clinicopathologic characteristics between the groups divided according to MSI status

Characteristics	All MSI-H (n = 7 patients, 14	All MSS (n = 88 patients, 176	p-value	MSI-H/MSS (n = 5 patients, 10	All MSS (n = 88 patients, 176	p-value	MSI-H/MSS (n = 5 patients, 10	All MSI-H (n = 7 patients, 14	p-value
	tumors)	tumors)	-	tumors)	tumors)		tumors)	tumors)	
Sex			0.083			0.613			0.417
Male	7 (100.0)	61 (69.3)		4 (80.0)	61 (69.3)		4 (80.0)	7 (100.0)	
Female	0 (0)	27 (30.7)		1 (20.0)	27 (30.7)		1 (20.0)	0 (0)	
Age (yr)	$49.3 \pm 9.0$	$63.3 \pm 12.8$	0.006	59.6 ± 20.0	$63.3 \pm 12.8$	0.536	59.6 ± 20.0	$49.3 \pm 9.0$	0.216
Location type			0.127			0.974			0.359
Both right colon	4 (57.1)	16 (18.2)		1 (20.0)	16 (18.2)		1 (20.0)	4 (57.1)	
Both left colon	0 (0)	22 (25.0)		1 (20.0)	22 (25.0)		1 (20.0)	0 (0)	
Different colon	2 (28.6)	22 (25.0)		1 (20.0)	22 (25.0)		1 (20.0)	2 (28.6)	
Colon & rectum	1 (14.3)	25 (28.4)		2 (40.0)	25 (28.4)		2 (40.0)	1 (14.3)	
Both rectum	0 (0)	3 (3.4)	0.72	0 (0)	3 (3.4)	0.215	0 (0)	0(0)	0.523
pT category T1	0 (0)	1(1.1)	0.72	0 (0)	1(1.1)	0.215	0 (0)	0(0)	0.323
T2									
T3	0 (0)	13 (14.8)		0 (0)	13 (14.8)		0 (0)	0 (0)	
T4	6 (85.7)	65 (73.9)		3 (60.0)	65 (73.9) 9 (10.2)		3 (60.0)	6 (85.7)	
	1 (14.3)	9 (10.2)	0.966	2 (40.0)	9 (10.2)	0.436	2 (40.0)	1 (14.3)	0.598
pN category No	4 (57.1)	46 (52.3)	0.900	4 (80.0)	46 (52.3)	0.436	4 (80.0)	4 (57.1)	0.598
NI NI	2 (28.6)	29 (33.0)			29 (33.0)		4 (80.0)	2 (28.6)	
N1 N2	1 (14.3)	13 (14.8)		1 (20.0) 0 (0)	13 (14.8)		0 (0)	1 (14.3)	
	1 (14.5)	13 (14.6)	0.216	0 (0)	13 (14.6)	0.583	0 (0)	1 (14.3)	1
cM/pM category M0	7 (100.0)	72 (81.8)	0.216	5 (100.0)	72 (81.8)	0.583	5 (100.0)	7 (100.0)	
MI		16 (18.2)		0 (0)	16 (18.2)		0 (0)	0(0)	
	0 (0)	16 (18.2)	0.413	0 (0)	16 (18.2)	0.299	0 (0)	0(0)	0.674
AJCC Stage	0.000	10/11/0	0.413	0.000		0.299		0.000	0.576
I II	0 (0)	10 (11.4) 34 (38.6)		0 (0) 4 (80.0)	10 (11.4) 34 (38.6)		0 (0)	0 (0)	
III	4 (57.1) 3 (42.9)						4 (80.0)	4 (57.1)	
IV		28 (31.8)		1 (20.0)	28 (31.8)		1 (20.0)	3 (42.9)	
	0 (0)	16 (18.2)	0.018	0 (0)	16 (18.2)	0.477	0 (0)	0(0)	0.504
Tumor location Right colon	10 (71.4)	59 (33.5)	0.018	5 (50.0)	59 (33.5)	0,477	5 (50.0)	10 (71.4)	0.504
				- 4					
Left colon Rectum	3 (21.4)	86 (48.9) 31 (17.6)		3 (30.0) 2 (20.0)	86 (48.9) 31 (17.6)		3 (30.0) 2 (20.0)	3 (21.4)	
Depth of invasion	1 (7.1)	31(17/0)	0.676	2 (20.0)	31 (17/0)	0.357	2 (20.0)	1 (7.1)	0.234
Tis	0 (0)	2(1.1)	0.070	0 (0)	2(1.1)	0.337	0 (0)	0 (0)	0.234
TI		31 (17.6)			31 (17.6)			1 (7.1)	
T2	5 (35.7)	37 (21.0)		3 (30.0) 1 (10.0)	37 (21.0)		3 (30.0) 1 (10.0)	5 (35.7)	
T3	7 (50.0)	95 (54.0)		4 (40.0)	95 (54.0)		4 (40.0)	7 (50.0)	
T4	1 (7.1)	11 (6.3)		2 (20.0)	11 (6.3)		2 (20.0)	1 (7.1)	
	1 (7.1)	11 (0.3)	< 0.001	2 (20.0)	11 (0.5)	< 0.001	2 (20.0)	1 (7.1)	0.47
Histologic type Adenocarcinoma	12 (95.7)	176 (100.0)	< 0.001	8 (80.0)	176 (100.0)	- 0.001	8 (80.0)	12 (85.7)	0,47
Mucinous	2 (14.3)	0(0)		1 (10.0)	0(0)		1 (10.0)	2 (14.3)	
Signet ring cell	0 (0)	0(0)		1 (10.0)	0(0)		1 (10.0)	0(0)	
Differentiation	0 (0)	0(0)	0.024	1 (10.0)	0(0)	0.617	1 (10.0)	0(0)	0.267
Well	2 (16.7)	39 (22.2)	0.024	1 (12.5)	39 (22.2)	0.017	1 (12.5)	2 (16.7)	0.207
Moderate	7 (58.3)	128 (72.7)		7 (87.5)	128 (72.7)		7 (87.5)	7 (58.3)	
Poor	3 (25.0)	9 (5.1)		0 (0)	9 (5.1)		0 (0)	3 (25.0)	
LVI	3 (23.0)	2 (2.1)	0.971	0 (0)	P (3.1)	0.736	0 (0)	2 (22.4)	0.77
Absent	9 (64.3)	114 (64.8)	0.371	7 (70.0)	114 (64.8)	0.730	7 (70.0)	9 (64.3)	0.77
Present	5 (35.7)	62 (35.2)		3 (30.0)	62 (35.2)		3 (30.0)	5 (35.7)	
PNI	3 (33.1)	04 (35.4)	0.848	3 (30.0)	02 (33.2)	0.124	3 (30.0)	3 (33.7)	0.239
Absent	11 (78.6)	142 (80.7)	U.ond	10 (100.0)	142 (80.7)	0.124	10 (100.0)	11 (78.6)	0.239
Present	3 (21.4)	34 (19.3)		0 (0)	34 (19.3)		0 (0)	3 (21.4)	
Tumor budding	2 (21/4)	34(133)	0.19	0 (0)	34(13.3)	0.39	0 (0)	2 (41.4)	0.803
Low	13 (92.9)	124 (70.5)	0.17	9 (90.0)	124 (70.5)	0.55	9 (90.0)	13 (92.9)	0.003
Intermediate	1 (7.1)	40 (22.7)		1 (10.0)	40 (22.7)		1 (10.0)	1 (7.1)	
High	0 (0)	12 (6.8)		0 (0)	12 (6.8)		0 (0)	0(0)	
TILs	0 (0)	16 (0.0)	< 0.001	0 (0)	14 (0.0)	< 0.001	0 (0)	0 (0)	0.504
Weak (0-10%)	6 (42.9)	150 (85.2)	~ 0.001	6 (60.0)	150 (85.2)	- 0.001	6 (60.0)	6 (42.9)	0.504
Moderate (20-40%)	2 (14.3)	24 (13.6)		2 (20.0)	24 (13.6)		2 (20.0)	2 (14.3)	
Strong (50-90%)	6 (42.9)	2(1.1)		2 (20.0)	2 (1.1)		2 (20.0)	6 (42.9)	

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#### Longitudinal Assessment of Quality of Life after Laparoscopic Colorectal Cancer Surgery using Korean Version of the Gastrointestinal Quality of Life Index (K-GIQLI) Questionnaire

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BACKGROUND: The Gastrointestinal Quality of Life Index (GIQ-LI) is an established tool for assessing gastrointestinal tract-related quality of life (QOL), with global validation in multiple languages. PURPOSE: This prospective multicenter study aimed to ascertain the reliability of its Korean adaptation (K-GIQLI) in patients undergoing laparoscopic colorectal cancer surgery and to elucidate midterm postoperative outcomes.

MATERIALS AND METHODS: This study, conducted between Nov 2021, and Feb 2023, involved 120 patients who underwent laparoscopic colorectal cancer surgery across four tertiary referral centers. Participants completed the K-GIQLI and EORTC-QLQ-CR29 questionnaires preoperatively, and at one week, three weeks, and six months post-surgery. The study evaluated K-GIQLI's reliability and analyzed risk factors contributing to substantial impairment in QOL one week postoperatively, with 'substantial impairment' defined as a K-GIQLI score reduction exceeding the average observed change.

RESULTS: From the initial cohort, 115 patients were analyzed following the exclusion of five. The K-GIQLI demonstrated high reliability, evidenced by a preoperative intraclass correlation coefficient of 0.930 (95% CI: 0.899-0.951) and consistently strong Cronbach's alpha values (>0.9) across all five assessment points. One week postsurgery, a marked decrease in total K-GIQLI score was observed (106.2±20.1 preoperatively to 92.7±20.2, p<0.001). Multivariable analysis identified early T- stage (T1-2; OR 2.82, 95% CI: 1.25-6.40, p=0.013) and intraabdominal drain (OR 3.95, 95% CI: 1.09-14.28, p=0.036) as significant risk factors for substantial QOL impairment. By three weeks post-surgery, scores remained lower than baseline (97.5±23.9, p=0.037), but notably, they approached baseline levels by six months (104.6±21.2, p=1.000). At the six-month assessment, patients who underwent rectal surgery demonstrated persistently

lower K-GIQLI scores compared to those who had colon surgery, indicating a more pronounced long-term impact on quality of life  $(94.2\pm23.2 \text{ vs. } 106.8\pm20.2, p=0.015)$ 

CONCLUSION: The K-GIQLI has been validated as a reproducible and reliable instrument for evaluating QOL shifts following laparoscopic colorectal cancer surgery. This study not only confirms the utility of the K-GIQLI in a clinical setting but also sheds light on the dynamic nature of postoperative QOL. Specifically, it highlights the substantial impact of intraabdominal drains on early postoperative QOL deterioration. Future research should focus on developing targeted strategies to optimize postoperative QOL for colorectal cancer patients.

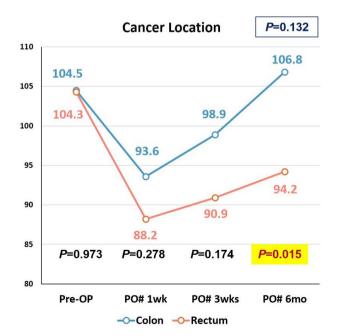


Figure. Change in KGIQLI scores over time for colon and rectum surgery groups

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## Prognostic Impact of Circumferential Resection Margin in Rectal Adenocarcinoma Treated with TME Following Preoperative Chemoradiation

Hyeon Seung Kim, Dong Woon Lee, Sung Chan Park, Kyung Su Han, Dae Kyung Son, Jae Hwan Oh

National Cancer Center

BACKGROUND: Recent literature on the circumferential resection margin (CRM) in rectal cancer patients treated with preoperative chemoradiation and total mesorectal excision (TME) has sparked debates regarding its impact on local recurrence (LR) and distant recurrence (DR). Emerging evidence suggests a contentious discussion surrounding the influence of CRM on these key outcomes. Understanding the current debate on CRM's role in LR and DR is crucial for refining prognostic assessments and informing treatment decisions in the evolving landscape of rectal cancer management.

**PURPOSE**: This study aimed to assess the prognostic implications of the circumferential resection margin on long-term outcomes in patients with rectal cancer undergoing total mesorectal excision (TME) following preoperative chemoradiation. The primary outcomes assessed were LR, DR, overall survival (OS), and disease-free survival (DFS).

MATERIALS AND METHODS: A retrospective, single-center study was conducted to compare the outcomes between patients with positive and negative circumferential resection margins. The study included patients who underwent TME with curative intent after preoperative chemoradiation for middle-to-low rectal cancer

between 2001 and 2018

**RESULTS**: The study cohort comprised 1287 patients, with 8.6% having a positive CRM. The median follow-up period was 61 (7-181) months. Patients with a positive CRM demonstrated a higher 5-year cumulative LR rate (2.2% vs. 9.3%, p < 0.0001) and a significantly increased DR rate (17.6% vs. 40%, p < 0.0001). Additionally, 5-year overall survival was markedly lower in patients with a positive CRM (87.5% vs. 59.4%, p < 0.0001), and disease-free survival was inferior (76.7% vs. 45.9%, p < 0.0001). Multivariable analysis revealed a higher risk of LR in the positive CRM group compared to the CRM negative group (HR 3.158, 95% CI 1.457-6.847; P = 0.036). Additionally, there was a higher risk of DR in the positive CRM group (HR 1.6659, 95% CI 1.177–2.339; P = 0.038) compared to the CRM negative group. In multivariable analysis, 5-year OS was lower in the positive CRM group (HR 2.312, 95% CI 1.618-3.303; P < 0.0001), and 5-year DFS was also lower in the positive CRM group (HR 1.804, 95% CI 1.3478-2.416; P < 0.0001).

**CONCLUSION**: A positive CRM was associated with elevated rates of LR and DR, as well as decreased OS and DFS. These findings emphasize the critical prognostic significance of the CRM, even in patients undergoing preoperative chemoradiation for rectal cancer.

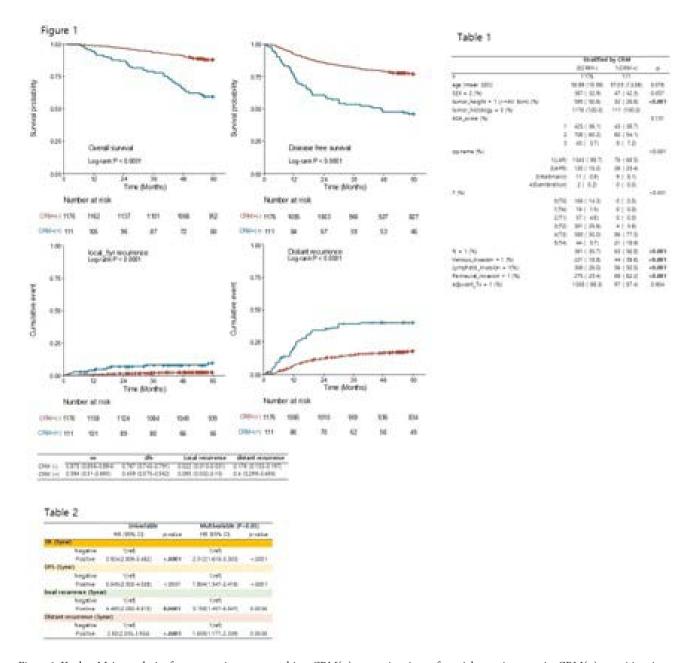


Figure 1. Kaplan-Meier analysis after propensity score matching. CRM(-) = negative circumferential resection margin; CRM(+) = positive circumferential resection margin; DFS = disease-free survival; OS = overall survival.

Table 1. Baseline patient characteristics

Table 2. Multivariate Cox regression analysis of CRM+ CRM+ = positive circumferential resection margin; DFS = disease-free survival; OS = overall survival;

#### Comparative Outcomes of Different Treatment Strategies in Rectal Cancer Patients with Complete Response to Neoadjuvant Chemoradiotherapy

Seijong Kim, Jung Wook Huh

Samsung Medical Center

BACKGROUND: Treating locally advanced rectal cancer poses a challenge in balancing effective oncologic control with minimizing morbidity. Standard treatment involves neoadjuvant chemoradiotherapy (CRT) followed by total mesorectal excision (TME), but this approach has drawbacks. Alternatives like transanal local excision (LE) and the watch-and-wait (WW) strategy are gaining attention.

PURPOSE: This study evaluates the oncologic outcomes of patients with a clinical complete response (cCR) to rectal cancer following neoadjuvant CRT, based on different treatment strategies. MATERIALS AND METHODS: A retrospective assessment was conducted on 186 cCR patients from 2007 to 2020. Various modalities were used for preoperative diagnoses. Patients received 5-fluorouracil-based chemotherapy alongside radiotherapy. Post-CRT, cCR was determined via endoscopy, MRI, and digital rectal examination (DRE). Based on shared decision-making, patients with cCR were offered LE, WW, or TME. The analysis focused on patients' characteristics, pathological results, and oncologic outcomes. **RESULTS**: Over a median follow-up period of 54 months, 51, 57, and 78 patients underwent WW, LE, and TME, respectively. Baseline characteristics were similar across the groups, except for the pre-CRT clinical N stage, which was notably higher in the TME group (p = 0.037). Age trends were observed but were not statistically significant. Disease-free survival (DFS) rates showed no significant differences across the WW, LE, and TME groups (88.2%, 87.7%, and 91.0%, respectively; p = 0.375). However, the TME group exhibited a significantly higher rate of local recurrence-free survival compared to the WW and LE groups (98.7% vs. 92.2% and 91.2%, respectively; p = 0.042). Among TME patients, six experienced distant metastasis and one had local recurrence. In the LE group, four patients had local recurrence, two had distant metastasis, and one had combined metastasis. In the WW group, four patients experienced local recurrence and two had distant metastasis. CONCLUSION: While TME showed a higher rate of local-recurrence free survival compared to WW and LE, both LE and WW demonstrated comparable DFS to TME in patients with locally advanced rectal cancer who underwent neoadjuvant CRT and were diagnosed with a clinical complete response. Identifying patients with cCR post-neoadjuvant CRT suggests that the WW strategy can offer favorable oncologic outcomes along with an improved quality of life.

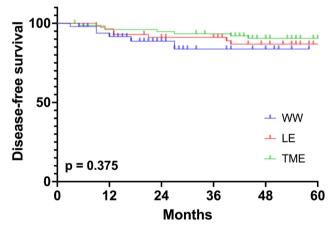
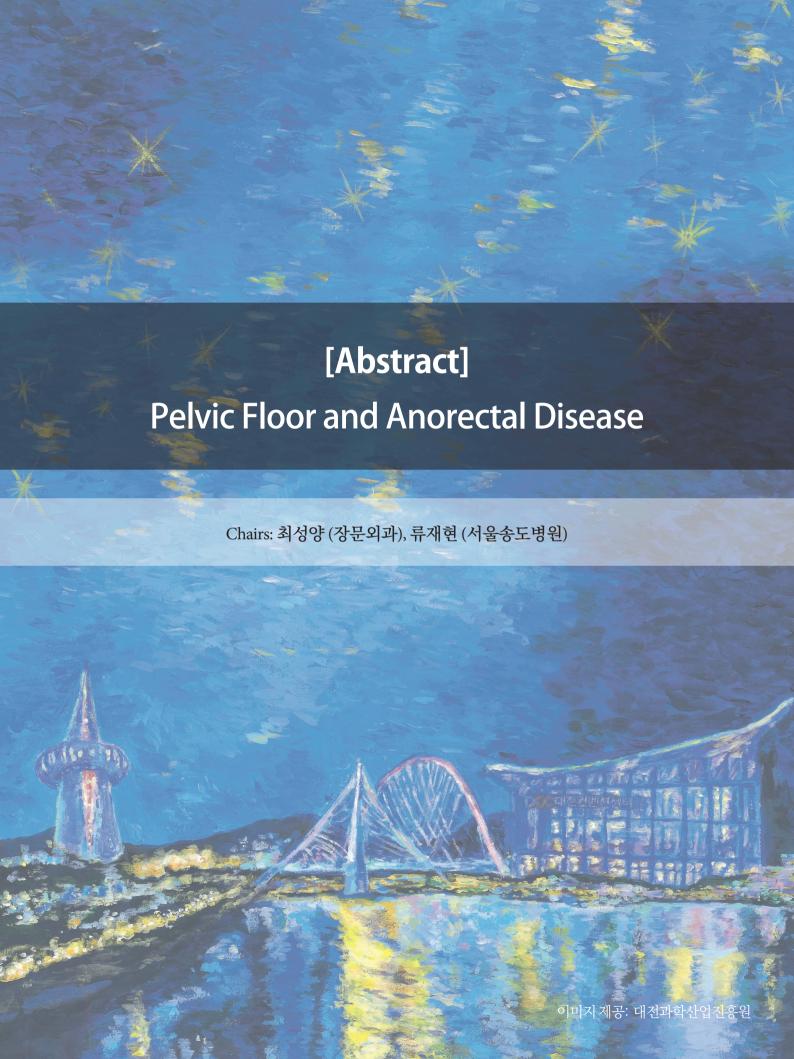


Figure 1. Disease-free survival of cCR patients according to treatment strategy



#### Characteristics of Anterior Anal Fistulas in Women: MRI Analysis

#### Young Min Jeon, Lee Jong Kyun

Seoul Songdo Hospital

BACKGROUND: Anal fistulas with anterior internal openings are mostly of the low type. It is predominantly caused by cryptoglandular infection, although there are also types that complicate with anal fissures. In women, the short length of the anal sphincter muscle in the anterior part of the anus can lead to significant complications such as fecal incontinence after surgery

**PURPOSE**: This study analyzed the anatomical characteristics of the anterior anal canal in women using MRI.

MATERIALS AND METHODS: This was a retrospective study. All patients, who underwent surgery for anterior anal fistula in women, received a preoperative MRI scan along with a physical examination, excluding those with inflammatory bowel diseases such as Crohn's disease and anovaginal fistulas. The study involved analyzing the directions of the internal and external openings. Additionally, the record included whether the fistula tract followed the superficial Bulbospongiosus muscle (BS) and transverse perineal

muscle (STP).

RESULTS: From January 2020 to June 2023, among 819 female patients who underwent anal fistula surgery at our institution, 56 patients had preoperative MRI scans. The occurrence of anal fistula tracts along the BS was noted in 13 cases (23.2%), those passing through the STP muscle were observed in 18 cases (32.1%), both BS and STP were traversed in 2 cases (3.6%), distally tracing towards the ischiorectal space occurred in 10 cases (17.6%), and penetration limited to the external anal sphincter was seen in 10 cases (17.6%) (Fig. 1).

**CONCLUSION**: Analyzing the direction of fistula tracts accurately through preoperative MRI scans in the treatment of female anal fistulas can facilitate the decision-making process for surgical approaches. This can contribute to reducing postoperative fecal incontinence and recurrence.



Figure. BS: Bulbospongiosus muscle, STP: transverse perineal muscle, EAS: external anal sphincter, IAS: internal anal sphincter.

## The Efficacy of Anal Duct Ligation and Muscle Closure: A Novel Sphincter-Preserving Surgical Technique for Fistula-In-Ano

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Seoul Song Do Hospital

BACKGROUND: The goal of surgery for fistula-in-ano is to eradicate the fistula tract and prevent recurrence while maintaining fecal continence. Although various sphincter-preserving techniques have been developed, none have demonstrated clear superiority over others in treating complex fistulas.

**PURPOSE**: This study aimed to introduce a novel sphincter-preserving technique for anal duct ligation and muscle closure (ALMC) and analyze its perioperative outcome.

MATERIALS AND METHODS: Patients who underwent ALMC for fistula-in-ano between 2009 and 2023 were enrolled in the study. Patient demographics, intraoperative information and post-operative outcomes were assessed. Recurrence was defined as the presence of a fistula tract or discharge after achieving complete healing for more than 12 weeks after the primary surgery. Fecal incontinence (FI) was also investigated clinically.

RESULTS: Overall, 556 patients (84.0% male; mean age 41.7 years)

underwent ALMC. Among these, 152 (27.3%) had a history of fistula surgery, 259 patients (46.4%) had suprasphincteric fistulas, and 287 patients (51.6%) had horseshoe fistulas. Fistula-in- ano recurred in 33 patients (5.9%), wound healing was delayed in 97 patients (17.4%), and FI was observed in 12 (2.2%). The proportions of suprasphincteric (57.6% vs. 45.9%, p=0.239) and horseshoe fistulas (51.5% vs. 51.6%, p=0.171) in the recurrence and non-recurrence groups were comparable. In addition, the proportions of suprasphincteric (56.7% vs. 44.4%, p=0.054) and horseshoe fistulas (61.9 vs. 49.4%, p=0.083) in the delayed wound healing group were slightly higher, although the differences were not statistically significant.

**CONCLUSION**: ALMC appears to be a safe and feasible option for treating complex anal fistulas when sphincter preservation is crucial.

#### Laparoscopic Ventral Mesh Rectopexy (LVMR) for Internal (IP) and External (EP) Rectal Prolapse: 10 Year Experience of 264 Consecutive Patients

Soomin Nam, Jae Won Shin, Doo-Seok Lee, Do Sun Kim

Daehang Hospital

**BACKGROUND**: Even though several reports have been published on the results of laparoscopic ventral mesh rectopexy (LVMR) in Asia, there are few mid-term or long-term results of LVMR.

**PURPOSE**: The authors aimed to evaluate the results of LVMR in patients with internal rectal prolapse (IRP) external rectal prolapse (ERP).

MATERIALS AND METHODS: From September 2013 to November 2023, 264 patients with IRP (n=103, 39.0%) or ERP (n=161, 61.0%) underwent LVMR. Constipation and fecal incontinence (FI) scores were evaluated using the Cleveland Clinic Florida score preoperatively and postoperatively. The questionnaire for the change of obstructed defecation or FI symptoms after surgery was also administered to grade the results as cured, improved, unchanged, or worsened for each survey.

**RESULTS**: The mean age of the patients was  $65.06\pm13.63$  years. Since 2013 until 2018, there were 48 patients (39.3%) with IRP and 74 patients (60.7%) with ERP. However, from 2019 onwards, the number of IRP patients increased to 55 (38.7%), while ERP patients rose to 87 (61.3%), indicating a higher proportion of IRP patients. The mean operation time was  $124.75\pm32.52$  minutes, and the mean hospital stay was  $5.48\pm1.74$  days. The mean follow-up was  $29.06\pm29.49$ months. There were no mesh-related complications. 14 pa-

tients (8.7%) among the ERP group required additional surgery for recurrent full-thickness prolapse. 13 patients (8.1%) who had mucosal prolapse within 2 cm underwent stapled hemorrhoidopexy after LVMR. In the postoperative 6-month period, the overall constipation score (7.01) significantly improved compared with the preoperative score (13.13) (P<0.001), whereas the FI score significantly improved after surgery (11.28 to 4.57; P<0.001).

CONCLUSION: The mean age of the patients was 65.06±13.63 years. Since 2013 until 2018, there were 48 patients (39.3%) with IRP and 74 patients (60.7%) with ERP. However, from 2019 onwards, the number of IRP patients increased to 55 (38.7%), while ERP patients rose to 87 (61.3%), indicating a higher proportion of IRP patients. The mean operation time was 124.75±32.52 minutes, and the mean hospital stay was 5.48±1.74 days. The mean follow-up was 29.06 ±29.49months. There were no mesh-related complications. 14 patients (8.7%) among the ERP group required additional surgery for recurrent full-thickness prolapse. 13 patients (8.1%) who had mucosal prolapse within 2 cm underwent stapled hemorrhoidopexy after LVMR. In the postoperative 6-month period, the overall constipation score (7.01) significantly improved compared with the preoperative score (13.13) (P<0.001), whereas the FI score significantly improved after surgery (11.28 to 4.57; P<0.001).

#### Outcome of Laparoscopic Suture vs Laparoscopic Mesh Ventral Rectopexy for Complete Rectal Prolapse

#### Kiduk Kim, Keehoon Hyun, Seo-Gue Yoon

Seoul Songdo Hospital

BACKGROUND: There are lots of surgical procedures for rectal prolapse patients, but nowheredays suture rectopexy and mesh ventral rectopexy is the main surgical procedures. Which surgical procedure is better has been debated for a long time.

**PURPOSE**: The aim of this study was to compare the outcome of laparoscopic suture rectopexy and laparoscopic mesh ventral rectopexy for the treatment of rectal prolapse patients.

MATERIALS AND METHODS: In this retrospective study, 244 male and female rectal prolapse patients who had surgery between October 2019 and April 2023 were included. Age was ranging between 29 years and 91 years (mean 70.04 years). 103 patients underwent laparoscopic suture rectopexy and 141 patients underwent laparoscopic mesh rectopexy. These patients were followed up 1month and 3month after operation and the mean period of follow up was 6 months. Operation time, hospital stay, pre-post Wexner constipation score, pre-post Cleveland clinic incontinence score(C-CIS), pre- post Fecal incontinence severity index(FISI), pre-post Fecal incontinence quality of life(FIQL), recurrence and complication rate, satisfaction score were assessed.

RESULTS: Operation time was 81.5 minutes in laparoscopic suture rectopexy and 106.6 min in laparoscopic mesh ventral rectopexy. Mean hospital stay was 7.5 (range: 4-24) days. Pre-operation Wexner constipation score was 8.51 in suture rectopexy group and post Wexner score was 7.20. Pre-operation Wexner constipation score was 9.05 in mesh ventral rectopexy group and post Wexner score was 7.25. Total 8 patients had new-onset constipation. 2 patients(1.94%) were suture rectopexy group and 6 patients(4.25%) were mesh ventral rectopexy group. Pre-operation CCIS, FISI, FIQL was 10.06, 33.30, 20.19 in suture rectopexy group and post CCIS, FISI, FIQL was 5.76, 20.19, 14.27. Pre-operation CCIS, FISI, FIQL was 9.25, 34.77, 11.63 in mesh ventral rectopexy group and

post CCIS, FISI, FIQL was 6.60, 21.45, 13.51. Recurrence rate was 3.8%(4) in suture rectopexy and 7%(10) in mesh rectopexy. Complication rate was 8%(8) in suture rectopexy(incisional hernia, ileus, UTI, SSI, colitis) and 6%(8) in mesh ventral rectopexy(incisional hernia, ileus, SSI, proctitis, APN, mesh infection). There was one significant postoperative complication who had mesh infection in mesh ventral rectopexy group and had laparoscopic abscess drainage, mesh removal, suture rectopexy and loop ileostomy formation. Satisfaction score was 93.7 in suture rectopexy group and 90.2 in mesh ventral rectopexy group.

CONCLUSION: There was no significant difference in both groups. But laparoscopic suture rectopexy may offer advantages in terms of operative efficiency, recurrence rate and constipation symptomatic improvement compared to laparoscopic mesh ventral rectopexy. Also, complication rate was slightly high in suture rectopexy but only minor complications were happened. As a result of this study, laparoscopic suture rectopexy could be another option for rectal prolapse as laparoscopic mesh ventral rectopexy.

Table 1. Result of Lap suture rectopexy and ventral rectopexy

Variable₽	Laparoscopic suture rectopexy (n=103)	Laparoscopic mesh ventral rectopexy (n=141)	P-value	
Pre-op Wexner constipation score←	8.51€	9.05←3	0.511↩	
Post-op Wexner constipation score←	7.20⊖	7.25€	0.953↩	
New onset ←	2(1.94%)←	6(4.25%)₽	0.090←	
Pre-op CCISe	10.06€	9.25€	0.412←	
Post-op CCIS€	5.76←	6.60€	0.366↔	
Pre-op FISI€	33.30€	34.77€	0.581€	
Post-op FISI€	20.19←	21.45€	0.637←	
Pre-op FIQL	12.03↩	11.63↩	0.528€	
Post-op FIQL	14.27←	13.51₽	0.244←	
Hospital stay€	7.64	7.55€	0.735↔	
Operative time←	81.5↩	106.67€	0.000€	
Mean follow up⊖	136.4	211.7€	0.009	
Recurrence⊖	4(3.8%)←	10(7%)↩	0.263←	
Complication	8(8%)	8(6%)⊢	0.526€	
Satisfaction score	93.79↩	90.21€	0.018←	

CCIS: Cleveland clining incontinence score FISI: Fecal incontinence severity index, FIQL: Fecal incontinence quality of life.

#### A Novel Approach to Reducing Stricture After Stapled Hemorrhoidopexy: The Efficacy and Safety of Low-Dose Triamcinolone Acetonide Injection

#### Sangmin Youn, Jieun Kim

Centum Surgical Clinic

BACKGROUND: Stapled hemorrhoidopexy (SH), being effective for severe internal hemorrhoids and rectal mucosal prolapse, is widely used due to its minimal pain and rapid return to daily life. Stapled hemorrhoidopexy site stricture (SHS) is one of the most common and long-term complications of SH, and it can cause defecation disorders, decrease in quality of life, and the need for additional procedures. Various methods like Tissue selecting therapy-(TST) have been devised to prevent this, but due to their limited effectiveness or their impact on reducing the therapeutic effects of SH, there is a need for more effective approaches.

**PURPOSE**: Triamcinolone acetate (TA) injections are widely used due to their effectiveness in reducing stricture by decreasing fibrosis. Currently, their efficacy and safety in reducing stricture following gastrointestinal surgeries, such as esophageal endoscopic submucosal dissection, have been demonstrated. We investigated the efficacy and safety of injecting low-dose TA at the SH site for preventing SHS.

MATERIALS AND METHODS: From 2020 to 2023, 1023 patients who underwent SH were included in the study. An average of 3.2 hemorrhoids were additionally excised through submucosal

hemorrhoidectomy. The fluid mixture for hemorrhoidectomy contained 40mg of TA per 100ml (0.4mg/ml), with 5ml(2mg of TA) injected at the SH site and 2ml(0.8mg of TA) per excisional hemorrhoidectomy(EH) site. The Triam group (n=554) received low-dose TA injections at the SH site just before firing the stapler, and at the EH site before performing EH. The Non-triam group (n = 469) did not receive a TA injection. The difference in the rate of SHS and re-surgery rate were tested using a two-sided test in a logistic regression model, adjusting for covariates including age, gender, concurrent operation, botox injection, and number of EH.

RESULTS: A significantly lower proportion of patients in the Triam group (14 [2.5%] of 554) had SHS than in the Non-triam group (74 [15.8%] of 469). The odds ratio was 0.15 [95% CI 0.078-0.28] and two-sided p-value was <0.001. A significantly lower proportion of patients in the Triam group (38 [6.9%] of 554) had re-surgery than in the Non-triam group (62 [13.2%] of 469). The odds ratio was 0.34 [95% CI 0.21-0.57] and two-sided p-value was <0.001.

**CONCLUSION**: This study showed that low dose TA injection can reduce SHS safely and, furthermore, it also has the potential to decrease the rate of re-surgery.

Table 2. Comparison of SH site stricture and Re-surgery Rates Based on TA Injection Status

		No Triam (n=469)	Triam (n=554)	All (n=1023)	OR (95% CI)	P
CH site Strictures	no	395 (84.2%)	540 (97.5%)	935 (91.4%)	0.15 (0.078-0.28)	7.40E-09
SH site Stricture*	yes	74 (15.8%)	14 (2.5%)	88 (8.6%)		
D	no	407 (86.8%)	516 (93.1%)	923 (90.2%)	0.34 (0.21-0.57)	3.70E-05
Re-surgery**	yes	62 (13.2%)	38 (6.9%)	100 (9.8%)		

<sup>\*</sup> SH Site Stricture: Defined as stenosis detected during a rectal examination 2 weeks after surgery, coupled with actual dilatation being conducted.

<sup>\*\*</sup> Re-surgery : bleeding control, Skin tag excision, fistulotomy or I&D for wound problem, anoplasty for sticture

#### **Painless Hemorrhoidectomy**

#### **Euiheum Jeong**

Dr. Jeong's Surgical Clinic

BACKGROUND: Hemorrhoidectomy has been known as one of the most painful surgical procedures. Numerous surgical techniques and medicine that have been developed to treat hemorrhoids over the years are often used based on surgeons' preference and choice. We have yet to develop a surgical technique that could cost-effectively minimize pain and side effects. One of the problems with hemorrhoid treatment is the intention of surgeons is not often reflected. What could be the solution to this problem?

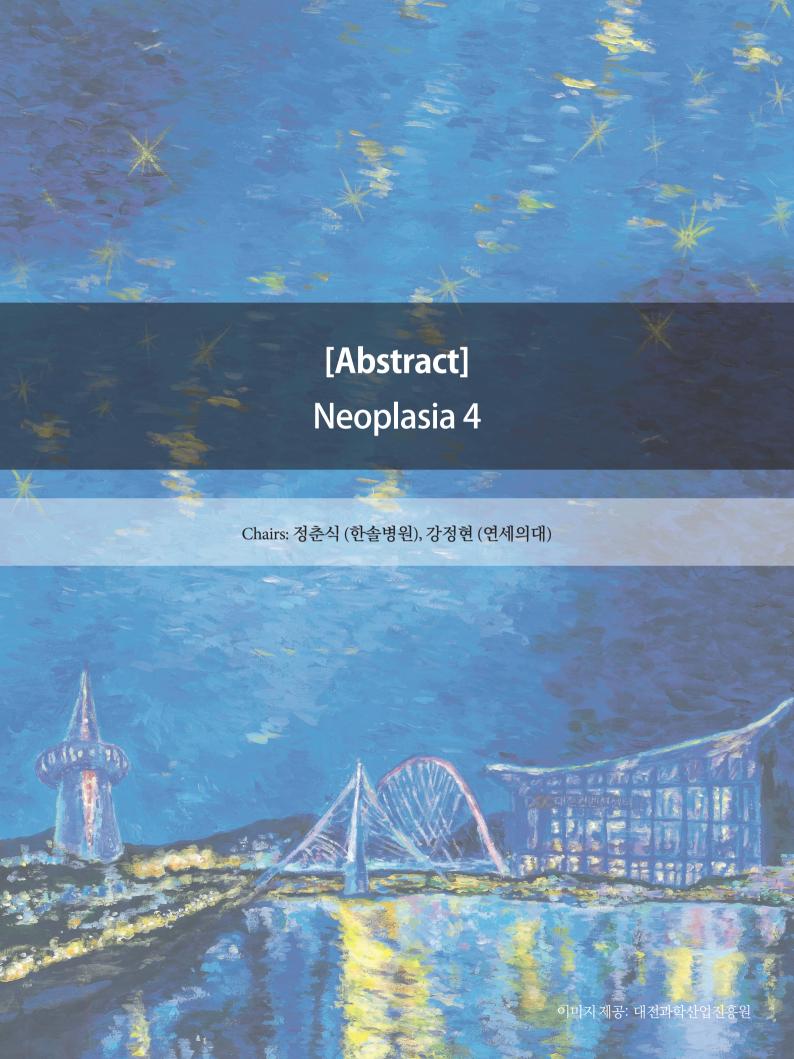
**PURPOSE:** The most detrimental factor that causes pain is the reflex spasm of the internal sphincter. To minimize this spasm, surgeons often rely on methods such as digital dilatation, partial internal sphincterotomy, and Ketorolac and Botox injection. However, those methods have yet to yield satisfactory results. Since 2000, I have been using Diclofenac injection into the internal sphincter following operations, which have led to successful results. I also saw satisfactory outcomes after switching from the semiclosed excision procedure to the closed technique. I would introduce this painless procedure as a new standard of hemorrhoidectomy.

MATERIALS AND METHODS: A total of 698 patients with internal hemorrhoids were treated with closed submucosal hemorrhoidctomy and Diclofenac (Diclofenac sodium 75mg) injection into the internal sphincter from January 2018 to December 2022: 553 patients (79%) had fourth degree, 143 patients had third

degree(20%) and 2 patients had second degree stages. The intersphincteric injections were done in six directions of anus(1, 3, 5, 7, 9 and 11 o'clock directions).

RESULTS: 1)All patients did not complain of pain on the first and second days after surgery. Except for the case of abscesses, they complained of minor pain bellow NRS 3(numeric pain rating scale) until seven to eight days after surgery. After that, they were more comfortable. 2)Postoperative bleeding occurred in three patients, one of whom was delayed bleeding required admission and observation. 3) 28 patients had urinary retention(4%) and only three among them needed Nelaton catheterization. 4)There were 13 cases of wound infection(2%), which were rare in conventional operations, including 9 intersphincteric abscesses and 4 external abscesses. Those were suspected to have occurred due to contaminated injection or infection in the process of wound healing. 5) Other complications needed surgical intervention were two fistulas and three recurrent prolapses. 6)None of the patients showed anal incontinence or stenosis.

**CONCLUSION**: Closed submucosal hemorrhoidectomy with internal sphincteric injection of Diclofenac shows excellent results and is expected to act as a standard method of hemorrhoidectomy because it has few complications and provide painless recovery.



## Favorable Factors for the Conversion of Unresectable or Oligometastatic Lesions

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The Catholic University of Korea, Medical College, St. Vincent Hospital

BACKGROUND: The decision to perform surgery in stage IV colorectal cancer (CRC) exhibits considerable variability, dependent on individual factors. One of the essential considerations is the resectability of metastatic lesions. Notably, in certain patients, a phenomenon known as "conversion" may arise, wherein initially unresectable lesions become amenable to surgical intervention following chemotherapy or local treatment. Once a patient achieves conversion, surgery becomes a viable treatment option in stage IV CRC patients. Furthermore, attaining R0 status by surgery results in a marked increase in the survival rate.

**PURPOSE**: Therfore, the primary aim of this study is to identify the key factors influencing the conversion of metastatic lesions from an unresectable or oligometastatic to a resectable state in individuals diagnosed with stage IV CRC.

MATERIALS AND METHODS: This is a retrospective, single-center study at a single institute. The study population included patients with synchronous metastatic CRC at the time of initial diagnosis from 2010 to 2020. We confined metastatic lesions to the liver, lung, and distant lymph nodes, which upon conversion, they became potential candidates for surgical intervention. The conversion was defined as the patients showing NED status at follow-up imaging study after surgery. The primary outcome of this study was to identify the primary factor determining the conversion of metastatic lesions from an unresectable or oligometastatic to a resectable state in this specific population.

RESULTS: A total of 97 patients were eligible in this study: stage IV CRC with oligometastasis was 14 patients, and unresectable was 83 patients. The overall conversion rate was 11.3%, with 11 cases undergoing conversion. Patients who achieved conversion showed better PFS than those who is not achieved (median OS 18 vs 50 month, p<0.001 / PFS 8 vs 14 month, p=0.009). Among variables, the number of metastatic lesions emerged as a statistically significant factor associated with conversion. Patients with fewer than 8 metastases exhibited a conversion rate of 26.2%, whereas none of the patients with 8 or more metastases showed conversion (P<0.001). Furthermore, every converted patient featured liver metastasis, although this did not reach statistical significance in univariate analysis (p=0.082). To further validate these findings, a

decision tree analysis was conducted, revealing that the total number of metastatic lesions held paramount importance in predicting conversion. Subsequently, liver metastasis emerged as the second most influential factor, while statistical confirmation for other variables remained inconclusive.

**CONCLUSION**: This study demonstrates favorable factors for the conversion of initially unresectable or oligometastatic lesion in stage IV CRC patients. Liver metastasis and the number of metastatic lesions were most crucial factors predicting the conversion, providing valuable insights for tailoring treatment strategies for individuals diagnosed with stage IV CRC.

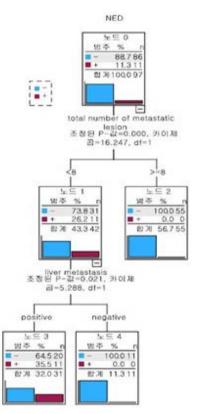


Figure. Decision tree for the conversion. Age, gender, ASA score, liver/lung/node metastasis status, the count of organs affected by metastasis, overall number of metastatic lesions, tumor differentiation, RAS mutation, and CEA level were examined as potential factors associated with conversion. The number of metastatic lesions was the most crucial factor, followed by the presence of liver metastasis.

## Nationwide Survey on Lynch Syndrome in Korea: The Status Quo of Diagnosis, Pathology, and Treatment

<u>Hong-min Ahn</u><sup>1</sup>, Duck-Woo Kim<sup>1</sup>, In Hee Lee<sup>2</sup>, Rumi Shin<sup>3</sup>, Ji Won Park<sup>4</sup>, Seok-Byung Lim<sup>5</sup>, Min Hyun Kim<sup>5</sup>, Gyung Mo Son<sup>6</sup>, Soo Young Lee<sup>7</sup>, Il Tae Son<sup>8</sup>, Minsung Kim<sup>8</sup>, Heung-Kwon Oh<sup>1</sup>, Sung-Bum Kang<sup>9</sup>

<sup>1</sup>Seoul National University, Bundang Hospital,

BACKGROUND: Lynch syndrome (LS) is a heritable genetic condition caused by mutation in DNA mismatch repair (MMR) genes; MLH1, MSH2, MSH6, and PMS2. Although the diagnosis methods have evolved from pedigree to genetic tests, the characteristics of LS in the Korean population have not been updated recently, and there are no nationwide studies on surveilling them.

**PURPOSE:** This study aims to demonstrate the clinicopathological features with diagnosis and treatment of current Korean LS with a nationwide multicenter cohort.

MATERIALS AND METHODS: Colorectal cancer (CRC) patients who underwent surgery from 2004 to 2023 at the eight tertiary hospitals in South Korea were reviewed. The LS cohort included either hereditary nonpolyposis colorectal cancer (HNPCC) by the Amsterdam II criteria, or LS by detecting MMR mutations from the germline genetic tests. The cohort also included highly suspected LS with MMR protein deficient from the tissue immunohistochemistry (IHC) such as deficiency of MSH2 and MSH6, only MSH6, or only PMS2. The other hereditary CRCs such as familial adenomatous polyposis, and loss of MLH1 in the IHC without the genetic tests were excluded.

RESULTS: In the highly suspicious Korean LS cohort (N=218), 52

(23.9%) fulfilled Amsterdam II criteria and 49 (22.5%) had been detected MMR gene mutation, and 24 of them were included in both. The mean diagnosed age for CRC was 54.5 years old with a standard deviation of 15.7, and 58.3% (n=127) were male. The right-sided colon cancer patients were more than half (n=127, 58.3%) of the cohort. Poorly differentiated adenocarcinoma was reported in 24 patients (11.0%), and 71.6% were relatively early stages (pathologic stage I and II, 25.7% and 45.9%, respectively). Extracolonic cancer was reported in 43 patients (19.7%), and the most common site was the stomach (19/43, 44.2%) followed by the endometrium (11/43, 25.6%). While 26 patients (11.9%) underwent extended resection (subtotal, total colectomy, and total proctocolectomy), most of the patients (n=186, 85.3%) were treated by segmental resection; right or left colectomy, (low/ultralow) anterior resection, and abdominoperineal resection. Deficiency in both MSH2 and MSH6 was reported in 106 patients (48.6%), and deficiency in only MSH6 or PMS2 was found in 22 (10.1%) and 19 (8.7%) patients, respectively. **CONCLUSION**: For the past two decades, the Korean LS could be characterized as more male patients who underwent segmental resection with relatively early staged right-sided colon cancer.

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#### Early versus Conventional Adjuvant Chemotherapy in Stage III Colon Cancer: A Multicenter, Randomized, Open-Label, Phase 3 Trial

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BACKGROUND: Evidence is lacking regarding the earliest timing of initiating adjuvant chemotherapy to maximize its efficacy safely. The postoperative recovery interval has been reduced due to minimally invasive surgery and Enhanced Recovery After Surgery protocols. Therefore, more patients are physiologically able to tolerate adjuvant chemotherapy earlier than in the past.

**PURPOSE**: This trial was designed and conducted to evaluate the safety and oncological efficacy of early adjuvant chemotherapy compared with conventional adjuvant chemotherapy. Data on short-term outcomes of toxicity, postoperative complications, and quality-of-life in this trial have been published previously. We present the primary endpoint here.

MATERIALS AND METHODS: A multicenter, randomized (1:1), open-label, phase III trial was conducted comparing early adjuvant chemotherapy with conventional adjuvant chemotherapy in patients with stage III colon cancer. Patients who underwent radical surgery who had stage III colon cancer confirmed by histopathological assessment were screened and randomized into the early adjuvant chemotherapy group (EAC group) or the conventional adjuvant chemotherapy group (CAC group). The adjuvant chemotherapy with FOLFOX was delivered between postoperative day 10 and 14 in the EAC, and between postoperative day 24 and 28 in the CAC group. The primary endpoint was 3-year disease-free survival, defined as the time from the date of the operation to the

earliest date of recurrence, assessed in the intention-to-treat population. The secondary endpoints were toxicity, postoperative complication, quality of life, and overall survival. (ClinicalTrials.gov, NCT01460589)

RESULTS: Between 9 September 2011 and 6 March 2020, 443 patients consented to randomization at eight sites. The intention-to-treat population included 423 patients (217 in the EAC group and 221 in the CAC group), and the per-protocol population included 380 patients (192 in the EAC group and 188 in the CAC group). There was no statistically significant difference in overall toxicity (28.1% in the EAC group and 28.2% in the CAC group, p=0.244) between the two groups. At a median follow-up of 59.4 months (IQR 59.8-63.6), 3-year disease-free survival rates were 86.9% (95% CI 82.5-91.5) in the EAC group versus 86.6% (82.2-91.3) in the CAC group (hazard ratio 0.67, 95% CI 0.69-1.78; p=0.672). Three-year overall survival rates were 93.0% (95% CI 89.6-96.5) in the EAC group versus 94.5% (91.5- 97.6) in the CAC group (hazard ratio 0.31, 95% CI 0.76-2.35; p=0.313). In the perprotocol analysis, both 3-year disease-free survival and overall survival were comparable between the two groups.

**CONCLUSION**: The first randomized controlled trial investigating the time for adjuvant chemotherapy for colon cancer concluded that administering adjuvant chemotherapy within 2 weeks after surgery for stage III colon cancer did not prolong disease-free survival.

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<sup>&</sup>lt;sup>5</sup>Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea,

<sup>&</sup>lt;sup>6</sup>Pusan National University Yangsan Hospital,

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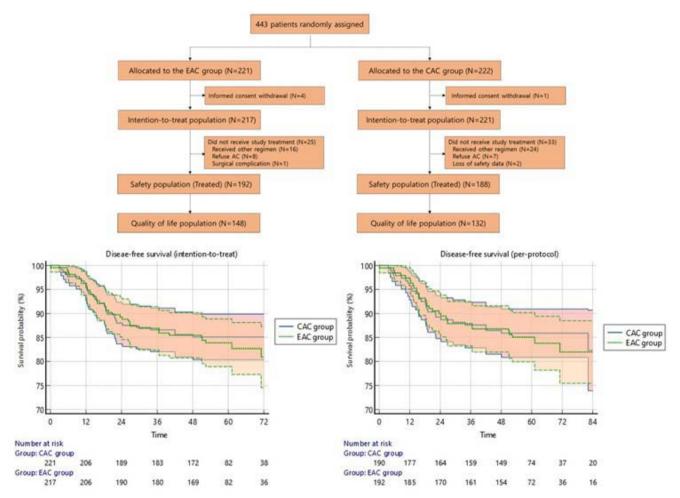


Figure. Flow of patients. Disease-free survival curves (IIT&PP)

#### Perianal Paget's Disease: Clinical Experience of a Single Center

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Yonsei University, College of Medicine, Severance Hospital

BACKGROUND: Perianal Paget's Disease (PAPD) is a rare subset of extramammary Paget's disease, affecting the perianal skin and frequently associated with anal and colorectal malignancies. The rarity of PAPD poses challenges in standardizing treatment protocols.

**PURPOSE**: This study aims to share our institutional experience with PAPD, particularly those cases involving the anal mucosa.

MATERIALS AND METHODS: We conducted a retrospective review of PAPD cases involving the anal mucosa at our institution from 2013 to 2023. Data were extracted through an electronic medical record review, including demographics, clinical and pathological manifestations, treatment methods, recurrence, oncological outcomes, and mortality.

**RESULTS**: A total of 21 patients were included in the study. Among them, 57.1% were male, with a median age of 70 years and a median lesion size of 8.0 cm. Four (19.0%) had invasive anal adenocarcinoma at diagnosis. Five patients (23.8%) developed a recurrence of

PAPD, with or without concurrent adenocarcinoma. During the study period, there were two patient deaths, one of which (4.7%) was related to the disease. Initially, one patient (4.7%) were treated with abdominoperineal resection (APR) followed by chemoradiotherapy, twenty (95.2%) underwent local resection. Among those treated with local resection, one patient developed inguinal lymph node metastasis and received chemoradiation, four experienced recurrence in the anal canal leading to APR, and one had a unique case of bone marrow recurrence but was lost to follow-up. Nevertheless, 81.0% of the patients did not experience PAPD recurrence, with the median follow-up time being 31.7 months.

**CONCLUSION**: Our findings indicate a lower recurrence rate and a less aggressive nature of anus involving PAPD than previously reported in literature. This underscores the necessity for further large-scale and long-term follow-up studies to establish more standardized treatment approaches for this rare yet significant disease.

#### Comparative Analysis of Surgical Approaches for Rectal Gastrointestinal Stromal Tumor (GIST) with Neoadjuvant Chemotherapy

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<sup>1</sup>Soonchunhyang University Seoul Hospital, <sup>2</sup>Asan Medical Center

BACKGROUND: Gastrointestinal stromal tumors (GISTs) of rectum are rare and exhibit a poor prognosis. To accomplish total excision of rectal GIST, radical resection is frequently necessary, however, local excision may potentially be an option for this disease. Therefore, the optimal surgical for rectal GIST is still controversial PURPOSE: In this study, we tried to compare the clinicopathologic features and oncologic outcomes of different surgical approaches (Total mesorectal excision (TME) versus local excision (LE)) in the management of rectal GISTs.

MATERIALS AND METHODS: This retrospective study included 128 patients who underwent surgical resection for rectal GIST between January 2000 and April 2023 at Asan Medical Center. The clinicopathological features were compared in patients with TME and LES, and the oncologic outcomes including overall survival (OS) and recurrence free survival (RFS) were also analyzed.

**RESULTS**: Of 128 patients, 43(33.6%) received TME and 85(66.4%) received LE, and 9(7.0%) patients died and 10 (7.8%) patients experienced recurrence in overall cohort. Location from anal verge was similar between TME and LE group (3.53±2.80 vs. 3.36±1.26), and patients with tumor>5cm was more in TME group (60.5% vs. 12.9%), whereas patients with tumor <2cm was more in LE group (7.0% vs. 36.0%). In subgroup analysis for tumor size with 2-5cm, 48 patients (77.4%) received local excision and 33% of them

received neoadjuvant chemotherapy (CTx). In addition, the median tumor size reduced from 52.6mm to 37.1mm with neoadjuvant CTx in rectal GIST in this subgroup. Neoadjuvant CTx resulted in a reduction of the median tumor size from 66.5mm to 49.4mm for the overall cohort. Patients. Additionally, there was no significant difference between TME and LE group in 5-year OS (OS: 88.5% vs. 96.8%, p=0.061), moreover, LE group showed higher RFS than TME group significantly (RFS; 82.9% vs. 67.4%, p=0.006). There was also no discernible difference in OS and RFS in the subgroup with tumor sizes between 2-5cm (P=0.191, P=0.361, respectively) **CONCLUSION**: In this study, the location from anal verge of tumor showed clinically similar values in the TME group and LE group, and the larger the size, the higher the rate of TME, and the smaller the size, the higher the rate of LE. As a result, it was established that the size had a significant influence on the surgical approach. Furthermore, the tumor size can be decreased with neoadjuvant CTx, allowing the possibility of local excision by bringing the tumor's size down from more than 5cm to less than 5cm. In conclusion, local excision is an effective treatment option that can treat rectal GIST while preventing side effects of radical excision. Additionally, even in cases where the size of the rectal GIST is substantial, we have to consider the possibility to try local excision by size reduction applying the neoadjuvant CTx.

Table1. Demographic and clinicopathologic characteristics of patients according to type of surgery

12		Type of ourgery	
Variables	TME	Local excision	p-value
	(s=43)	(n=64)	
Gender			0.534
Male	27 (62.8%)	46 (54.8%)	
Female	16 (37.2%)	38 (44.7%)	
Age			0.900
<60	26 (60.5%)	53 (62.4%)	
200	17 (39.5%)	32 (37.6%)	
Tumor size (cm)			< 0.000
<2	3 (7.0%)	26 (30.6%)	
2.5	14 (32.6%)	48 (56.5%)	
25	26 (60.5%)	11 (12.9%)	
Mitoric rates (mitores/90HPFs)			0.510
53	22 (51.2%)	50 (58.8%)	
6-10	6 (14.0%)	10 (11.8%)	
>10	\$ (18.6%)	19 (22.4%)	
urknown	7 (16.3%)	6 (7.1%)	
Anal verge			0.035
	3,5312,797	3.36:1.257	
Neondjavant CTs			0.016
No	22 (51.2%)	63 (74.1%)	
Yes	21 (40.8%)	22 (25.9%)	
Adjevant CTs		and generally	0.807
No	18 (41.9%)	39 (45.9%)	
Yes	25 (58.1%)	46 (54.1%)	
RD resection			0.022
Ne	5 (11.6%)	1 (1.2%)	
Yes	36 (83.7%)	82 (96.5%)	
Unknown	2 (4.7%)	2 (2.4%)	
Sphincter saving resection			<0.001
No	11 (25.6%)	0 (0.0%)	
Yes	32 (74.4%)	E5 (100.0%)	
Complication	100,000	30 (000.00)	0.916
No	39 (92.9%)	78 (95.1%)	
Yes	3 (7.1%)	4 (4.9%)	
Permanent stoney	21/1/10	, with the same of	<0.001
No	11 (74 76)	PE (100 00)	40.001
	33 (76.7%)	85 (100.0%)	
Yes	10 (23.3%)	0 (0%)	-4-11
Temperary stemy			<0.001
No	19 (44.2%)	81 (95.3%)	
Yes	24 (55.8%)	4 (4.7%)	

Vidues are presented as number (%) Abbreviations CTs, claemotherapy

During the study period, of 128 patients, Demographic and clinicopathologic features of patients according to the type of surgery they underwent either TME or LE was summarized in Table 1. There were no significant associations between gender, age, mitotic rates, adjuvant CTx, and complications based on the type of operation. Patients with tumor size larger than 5cm and receiving neoadjuvant CTx was less common in LE group (p<0.001, p=0.008, respectively). Location from anal verge was similar between TME and LE group (3.53 $\pm$ 2.80 vs. 3.36 $\pm$ 1.26), and patients with tumor>5cm was more in TME group (60.5% vs. 12.9%), whereas patients with tumor <2cm was more in LE group (7.0% vs. 36.0%).

## 직장 신경내분비 종양에 대한 후향적 다기관 분석에 대한 연구

신재원', 박성실', 한경수', 하광일', 신재원', 이두석', 정의철', 이은정'

- ¹대항병원, ²한양대학교병원,
- 3국립암센터,
- 4기쁨병원 외과,
- 5제일병원

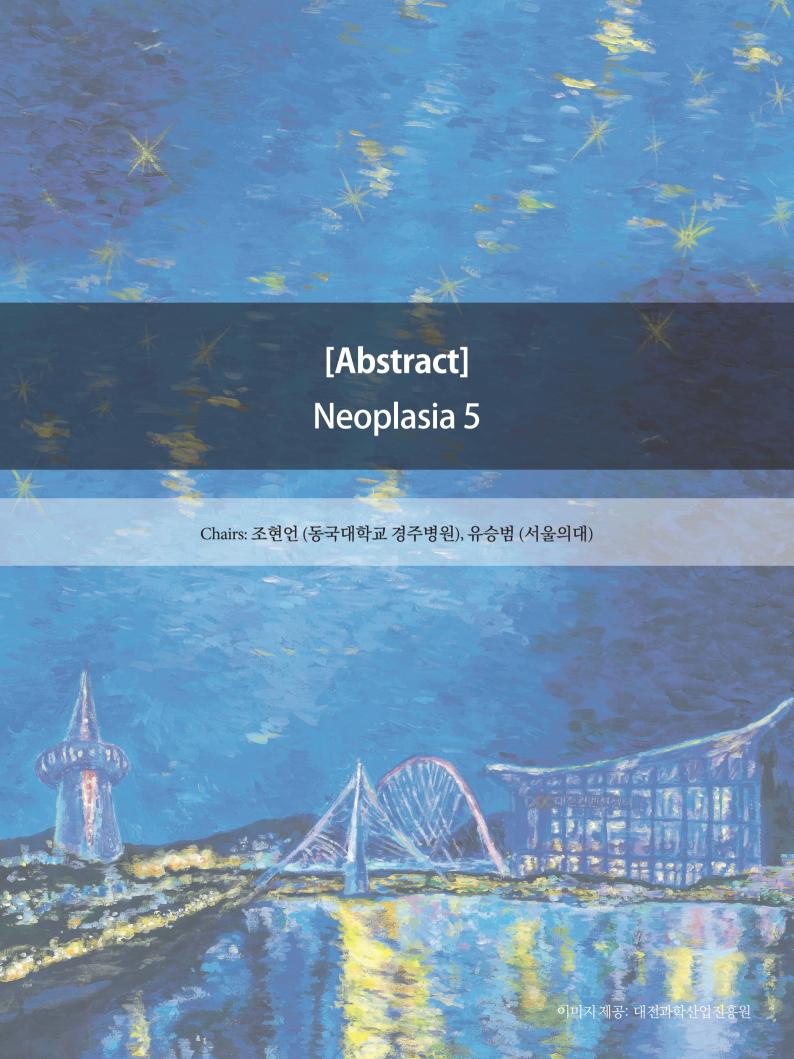
BACKGROUND: 직장 신경내분비 종양은 대장 내시경의 검사 증가와 내시경 기구의 발전으로 발견 빈도가 증가되는 추세이다. 종양은 대부분 작은 크기(<10mm)로 발견되어, 이에 대한 다양한 내시경 절제 방법을 적용하고 있지만, 종양 특성상 저속 성장과 작은 크기에도 전이가 일어날 수 있음을 고려할 때, 언제나 완전 절제가 이루어져야 하지만, 현재까지도 이에 대한 적절한 내시경 절제 방법에 대한 가이드라인이 부족한 실정이다.

PURPOSE: 본 연구에서는 총 6개 기관에서 절제된 작은 크기 (<10mm)의 직장 신경내분비 종양에 대한 자료를 수집, 분석과 그 특성을 파악하여 직장 신경내분비 종양의 내시경 치료에 대한 방향을 제시하고자 연구를 진행하였다.

MATERIALS AND METHODS: 총 6개 기관에서 2010년 1월부 터 2021년 12월까지 대장내시경 검사를 받은 환자 중 직장 신경 내분비 종양이 발견되어 절제를 받은 환자들의 임상 소견, 내시 경 소견, 조직병리 소견, 술 후 합병증, 추적 기간, 재발등을 분석 하였다.

RESULTS: 총 1409명의 환자에서 총 1441개의 종양을 제거하 였다. 절제된 당시 평균 나이는 53.5세, 남여 비율은 62.3% 대 37.7% 로 조사 되었다. 종양의 평균 크기는 5.6mm, 종양의 크기 에 따른 분포는 5mm 이상 10mm 미만의 종양이 52.4%, 5mm 미 만이 39.2%, 직장 내 위치의 경우 상부 직장은 35.9%, 하부 직장 은 64.1%로 조사 되었다. 절제 방법의 경우 점막하 박리술(ESD) 가 47.8%로 제일 많았고 고식적 점막 절제술(traditional EMR) 25.6%, 단순 용종 절제술 (simple snare polypectomy) 는 9.9% 로 조사 되었다. 완전 절제의 경우 전체 76.6%, 이 중 ESD 는 84.9%, tEMR 66.7% simple polypectomy 58.5%를 보였다. 각각을 크기별 로 나누어, 5mm 미만인 경우 절제 방법에 따른 완전 절제는 ESD 87.7%, tEMR 73.4%, simple polypectomy 60.7% 였고 통계적으로 ESD가 완전 절제율이 유의하게 높았다 (p value < 0.001). 5mm 이 상 10mm 미만의 종양에 대해서도 ESD 85.3%, tEMR 67.7%, simple polypectomy 61.2% 로 나와 통계적으로 의미있게 조사 되었 다 (p value < 0.001). 림프혈관 침범(lymphovascular invasion) 의 경우 5mm 미만에서는 3.6% 였으나, 5mm 이상 10mm 미만의 경 우 10.6%로 나왔다. 재발률은 추적 기간(평균 55.2달) 동안 99.4% 가 재발이 없었다.

CONCLUSION: 내시경 소견 상 직장 점막하 종양인 경우 신경 내분비 종양의 가능성을 염두에 두고 내시경 치료 방법 결정에 신중해야 할 것이다. 특히 10mm이하의 직장 신경내분비 종양의 여러 내시경 절제 방법을 분석하였을 때, 완전 절제를 위해서는 ESD 를 시행하는 것이 좋을 것으로 판단된다.



#### Is Adjuvant Chemotherapy Really Not Necessary for Stage I Colon Cancer?: Multi-Institutional Retrospective Comparative Study in Stage I, IIa, and IIIa Colon Cancer

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BACKGROUND: TNM staging is considered an unrivalled system to predict prognosis and to guide treatment strategies in colon cancer. Most guidelines do not recommend adjuvant chemotherapy in stage I colon cancer by TNM staging. However, there are few studies on risk stratification of stage I colon cancer to identify patients at high risk for recurrence.

**PURPOSE**: The aim of this study is to identify the prognostic impact of stage I colon cancer with high risk features compared to the high-risk stage IIa and stage IIIa colon cancers, which are recommend to perform adjuvant chemotherapy.

MATERIALS AND METHODS: Data of patients with non-metastatic colon cancer who underwent curative resection from 2011 to 2018 were extracted from six university hospitals. Among them, we included early colon cancer patients with stage I, IIa, and IIIa in this study. Stage I and IIa patients were divided into low and high risk groups based on the presence of the high risk features, respectively. High risk features were defined as lymphatic-, vascular-, and perineural invasions, obstruction, perforation, and poor histologic grade. We compared long-term oncological outcomes between the groups; low-risk stage I, high-risk stage I, low-risk stage IIa, high-risk stage IIIa, and stage IIIIa. Among them, adjuvant chemotherapy was recommended in the patients with high-risk stage IIa and stage IIIa according to the guidelines.

RESULTS: A total of 2833 non-metastatic colon cancer patients

were identified. Among them, 581 (20.5%), 936 (33.0%), and 104 (3.7%) patients had stage I, IIa, and IIIa, respectively. The patients with at least one of the high risk features were 71 (12.2%) and 431 (46.0%) in stage I and IIa, respectively (p<0.001). In stage I, T2 tumor (vs. T1) [hazard ratio (HR) 3.78, 95% CI 1.64-8.70] and the case with one or more high risk feature [HR 3.97, 1.54-10.23] were independently significant poor prognostic factor. High-risk stage I had significantly worse disease-free survival (DFS) compared to low-risk stage IIa [HR 2.04, 1.01-4.12]. DFS in high-risk stage I were not significantly different with that in high-risk stage IIa [HR 1.21, 0.61-2.40] and stage IIIa [HR1.62, 0.66-3.99]. 5-year DFS rate was significantly worse in the high-risk stage I than in the low-risk stage IIa (84.5% vs 92.4%, p=0.048). 5-year DFS rates were similar between the high-risk stage I and high-risk stage IIa (84.5% vs 87.8%, p=0.583), and high-risk stage I and stage IIIa (84.5% vs. 90.3%, p=0.294). In a sub- analysis of patients who did not receive chemotherapy, the 5-year DFS rate deteriorated in the order of low-risk stage IIa, s high-risk tage I, high-risk stage IIa, and stage IIIa (91.8%, 84.5%, 84.3%, and 78.0%, p=0.010).

**CONCLUSION**: This study showed that high-risk Stage I colon cancer had worse oncological outcomes than in low-risk stage IIa colon cancer and similar oncological outcomes with high-risk stage IIa and stage IIIa colon cancers. Therefore, adjuvant chemotherapy may be needed in stage I colon cancer with high risk factor.

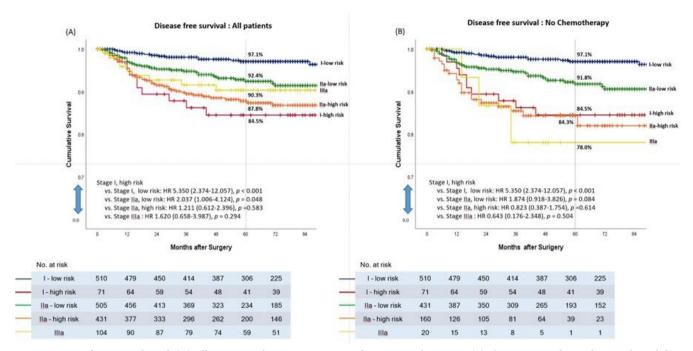


Figure. Disease-free survival graph (A) All patients with stage II, stage IIa, and stage IIIa colon cancer (B) The patients without adjuvant chemohtherapy in stage II, stage III, and stage IIIIa colon cancer

### Transanal Total Mesorectal Excision versus Robotic Total Mesorectal Excision for Low Rectal Cancer after Neoadjuvant Chemoradiotherapy: Long-Term Oncologic Outcomes

Jung Kyoung Shin, Hee Cheol Kim

Samsung Medical Center

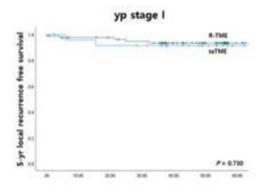
BACKGROUND: To improve the quality of surgery for rectal cancer, both transanal total mesorectal excision (taTME) and robotic total mesorectal excision (R-TME) can be performed. However, few studies have compared oncologic outcomes of taTME and R-TME, especially for patients with low rectal cancer after undergoing neoadjuvant chemoradiation (nCRT).

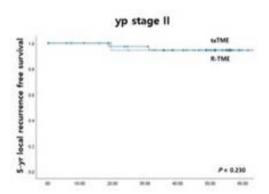
**PURPOSE**: The objective of this study was to compare long-term oncologic outcomes of taTME and R-TME for patients with low rectal cancer after undergoing nCRT.

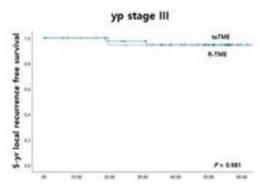
MATERIALS AND METHODS: A total of 306 consecutive patients with low rectal cancer who underwent taTME or R- TME after nCRT between 2008 and 2018 were analyzed retrospectively. Patients were classified into two groups: 1) taTME surgery group (n = 94); and 2) R-TME surgery group (n = 212).

**RESULTS**: Five-year disease-free survival rate was 76.3% in the taTME group and 74.9% in the R- TME, showing no significant (p = 0.926) difference between the two. The two groups also showed similar 5-year local recurrence free survival rates (taTME 95.2% vs. R-TME 91.9%, p = 0.408) and 5-year distant recurrence free survival rate (taTME 80.8% vs. R- TME 77.2%, p = 0.799). In addition, the two groups showed similar survival rates for each yp stage and yT stage. Five-year DFS was also determined for patients with unfavorable factors (male, BMI  $\geq$  25 kg/m2, and undergoing nCRT) as a subgroup analysis. For patients with all three unfavorable factors, the two groups showed comparable outcomes.

**CONCLUSION**: Transanal and robotic TMEs have similar longterm outcomes for patients with rectal cancer after undergoing nCRT.







## Short-Term Outcomes of Intra-corporeal vs. Extracorporeal Anastomosis in Robotic Right Hemicolectomy for Colon Cancer: A Propensity-Score Matching Analysis of Multicenter Cohorts

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BACKGROUND: In the era of minimally invasive surgery, robotic-assisted techniques have revolutionized and showed benefits. For right colectomy, one of surgical issues is choosing between intracorporeal anastomosis (ICA) and extracorporeal anastomosis (ECA). Although recent studies indicated that ICA in right colectomy demonstrated short-term advantages, most of these studies were laparoscopic surgery.

**PURPOSE**: The present study was evaluated to short-term outcomes between ICA and ECA in patients underwent robotic right colectomy for colon cancer.

MATERIALS AND METHODS: Between November 2020 and December 2023, colon cancer patients who underwent robotic right colectomy were retrospective enrolled in 3 tertiary referral centers. Parameters of recovery and complication were analyzed.

**RESULTS**: In a total of 153 patients, ICA was 71 and ECA was 82. There were no difference in demographics the two groups. The overall rate of postoperative complications was 11.7%, and there was no difference between two groups (14.1% vs. 9.8%). Postoperative ileus was most common complication (n=8), followed by surgi-

cal site infection (n=5), and anastomotic leakage (n=2). In terms of postoperative recovery and pain, ICA group showed faster time to the first flatus (3.1 days vs. 2.7 days, p=0.015), lesser pain at postoperatively 1 day (numeric rating scale, NRS 6.8 vs. 5.6; p<0.001) and 3 days (NRS 4.0 vs. 2.6, p<0.001).

**CONCLUSION**: Robotic right colectomy using ICA showed comparable postoperative complication and better postoperative recovery and pain compared to ECA.

Table. Postoperative results and complications

	ICA	ECA	
	(N=71)	(N=82)	p-value
Time of first flatus, POD	2.7 ± 1.0	3.1 ± 0.9	0.015
NRS			
Postoperative day 0	5.2 ± 1.8	6.8 ± 2.0	< 0.001
Postoperative day 1	$3.4 \pm 0.9$	4.6 ± 1.7	< 0.001
Postoperative day 2	2.9 ± 1.0	4.1 ± 1.8	< 0.001
Postoperative day 3	$2.6 \pm 0.6$	$4.0 \pm 1.9$	< 0.001
Postoperative complications	10 (14.1%)	8 ( 9.8%)	0.407
Anastomotic leakage	0 ( 0.0%)	2 ( 2.4%)	0.185
Ileus	4 ( 5.6%)	4 ( 4.9%)	0.834
Surgical site infection	4 ( 5.6%)	1 (1.2%)	0.126

Values are presented as a number (%) or as a mean ± standard deviation unless otherwise indicated. Abbreviations: POD, postoperative days; NRS, Numeric Rating Scale

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#### Clinical Outcomes of Curative Resection for Colorectal Cancer Surgery with Liver Metastasis Alone

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Soonchunhyang University Bucheon Hospital

**BACKGROUND**: The management of colorectal cancer with liver metastasis is still a concern.

**PURPOSE**: The present study compared the peri/postoperative and oncological outcomes of curative resection for colorectal cancer with liver metastasis alon

MATERIALS AND METHODS: Between January 2001 and December 2020, 95 patients who underwent curative resection for colorectal cancer with liver metastasis among stage IV colorectal cancer patients with liver metastasis (n=811) were retrieved from a retrospective database.

**RESULTS**: During follow-up, 3-years overall survival rate was 62.8% and 5-years overall survival rate was 51.3%. Total recurrence rate was 60.0% (n=57). Most common recurrence site was liver

(29.5%, n=28). Among the liver recurrence patient (n=28), 5-years overall survival rate of re-resection group was 60.0% and chemotherapy group was 0.0% (p<0.005). Risk factor of liver recurrence after liver resection was number of liver metastasis (>3), perineural invasion and liver tumor resection margin positive in univariate analysis. In multivariate analysis, number of liver metastasis (>3) was only risk factor. 5-years overall survival rate was higher in number of liver metastasis ( $\leq$ 3) group (60.4%) compared to number of liver metastasis (>3) group (22.4%, p<0.05).

**CONCLUSION**: Base on present data, surgical curative resection and re-resection of colorectal cancer with liver metastasis alone was suitable. The multiple of liver metastasis (>3) was risk factor for oncologic outcome.

# Impact of Prolonged Postoperative Ileus on Oncological Prognosis of Patients with Non-metastatic Colon Cancer Who Underwent Minimally Invasive Surgery: A Single Center Propensity Score Matched Analysis

<u>Jeungho Seung</u><sup>1</sup>, Jung Wook Huh<sup>1</sup>, Woo Yong Lee<sup>1</sup>, Seong Hyeon Yun<sup>2</sup>, Hee C. Kim<sup>1</sup>, Yong Beom Cho<sup>2</sup>, Yoonah Park<sup>3</sup>, Jung Kyoung Shin<sup>1</sup>, Dae Hee Pyo<sup>1</sup>

**BACKGROUND**: Despite advances in surgical techniques and perioperative care, postoperative ileus remains a major impediment to the implementation of ERAS in patients undergoing surgery for colon cancer. However, the impact of postoperative ileus itself on the oncological outcomes of colon cancer is still unclear.

**PURPOSE**: This study aims to analyze the impact of postoperative ileus on the oncological outcomes of patients undergoing colorectal cancer surgery.

MATERIALS AND METHODS: Data of patients with colon cancer who had undergone curative minimally invasive surgery (including conventional laparoscopic, single incision laparoscopic, Robotic surgery) between January 2010 and December 2013 at the Samsung Medical center were extracted retrospectively from an electronic prospectively maintained database. Prolonged postoperative ileus(PPOI) was defined as two or more of 1. nausea/vomiting, 2. inability to tolerate oral diet over 24 h, 3. absence of flatus over 24 h, 4. distension, 5. radiologic confirmation occurring on or after day 4 postoperatively without prior resolution of POI. After propensity score matching, we compared the overall survival and disease-free survival between the PPOI group and the No PPOI group.

RESULTS: A total of 2080 cases was analyzed, among which 118 patients experienced PPOI. The results of multivariate logistic regression analysis indicated that higher ASA score(OR=1.560, 95%)

CI: 1.008-2.412; P=0.046), emergency presentation(OR=3.189, 95% CI: 1.165-8.727; P=0.024), longer operation time(OR=1.007, 95% CI: 1.005-1.010; P<0.001) emerged as independent risk factors, while female gender(OR=0.588, 95% CI: 0.389-0.888; P=0.012) and left-sided colon surgery(OR=0.495, 95% CI: 0.337- 0.729; P<0.001) were identified as independent protective factors. Through 1:1 propensity score matching, a total of 236 individuals were included in the analysis. The results revealed no significant differences in overall survival and disease-free survival between the groups(log rank p-value=0.813, 0.369, respectively). When conducting a subgroup analysis for patients who received adjuvant chemotherapy after surgery, the interval until starting adjuvant chemotherapy was significantly longer in the PPOI group (N= 42 vs 43, mean interval =28.1 vs 33.1, P-value= 0.038). However, in this subgroup analysis as well, no significant differences were observed in OS and DFS (log rank p-value=0.400, 0.289 respectively).

CONCLUSION: The occurrence of PPOI after minimally invasive surgery for colon cancer showed correlations with factors such as gender, ASA score, side-ness of colon surgery, emergency, and duration of operation. Additionally, the interval period until adjuvant chemotherapy following surgery was significantly extended, yet this did not adversely affect oncological outcomes.

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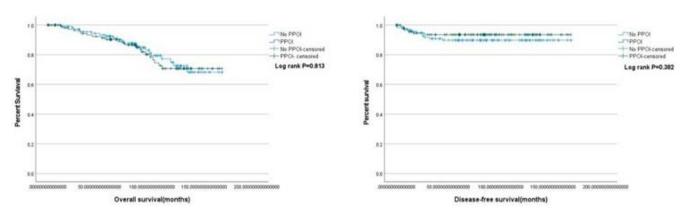


Figure. Kaplan Meier survival analysis of Overall survival and Disease-free survival according to presence of PPOI

### The Impact of Surgical Approach on Cost and Hospitalization in Elderly Patients Aged 80 and Above with Colorectal Cancer: Laparoscopic Versus Open Surgery

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Yonsei University, Wonju Severance Hospital

BACKGROUND: In an aging society, advances in surgical techniques and growing attention to geriatric medicine are broadening the eligibility for curative colorectal cancer (CRC) surgery to include individuals over 80 years of age. In elderly patients with multiple comorbidities, the choice of surgical approach remains a significant issue and an ongoing challenge. While there have been studies on the benefits of laparoscopic surgery in elderly CRC patients, most have been small-scale studies from single institutions, and analyses focusing on medical costs and readmission rates have been scarce.

**PURPOSE**: The aim of this study is to compare the hospital length of stay (LOS), 30-day readmission rates, and medical costs between laparoscopic surgery (Lap-CRS) and open surgery (Open-CRS) in patients aged 80 and above with colorectal cancer (CRC), using HIRA claim data derived from most hospitals in Korea.

MATERIALS AND METHODS: We included patients aged 80 and above, diagnosed with colorectal cancer (CRC), who underwent curative resection in Korea between January 1, 2020, and December 31, 2022. We determined the surgical approach based on the presence or absence of treatment material codes specific to Lap-CRS, based on the health insurance claims data, patients' clinical information was reviewed retrospectively and divided into Lap-CRS and Open-CRS groups.

**RESULTS**: A total of 4,578 CRC patients were included in the study, and 4,043 patients (88.3%) received Lap-CRS. In the univariate analysis, the Lap-CRS showed a shorter LOS compared to the

Open-CRS (11 vs. 15 days, p<0.001), and a lower readmission rate (3% vs. 5.4%, p=0.005). The medical cost was lower in the Lap-CRS, although the difference was not statistically significant. In the multiple regression analysis, Lap-CRS is associated with a 3.8 day shorter LOS compared to Open-CRS (adjusted coefficient=-3.8, 95%CI=-4.43~-3.16, P<0.001). Additionally, Lap-CRS showed a 41% lower incidence of 30-day readmission rates compared to Open-CRS (Odd ratio=0.59, 95% CI=0.38-0.91, P=0.016).

CONCLUSION: According to this population-based study, Lap-CRS demonstrated a shorter LOS and a lower readmission rate in patients aged 80 and above with CRC. Although the study data is limited due to the nature of public data, the results of this study provide supporting evidence that laparoscopic surgery is feasible in elderly CRC in the era of an aging population.

Table. General charateristics for aged 80 and over CRC patients

	Variables	Total	(n=4578)	Open-CRS	(n=535, 11.7%)	Lap-CRS	(n=4043, 88.3%)	p-value
		Case	(%)	Case	(%)	Case	(%)	_
Sex								0.477
	Male	2261	49.4	256	47.9	2005	49.6	
	Female	2317	50.6	279	52.1	2038	50.4	
OP site								< 0.001
	Colon	2198	48.0	349	65.2	1849	45.7	
	Rectum	2380	52.0	186	34.8	2194	54.3	
CCI (Cha	rlson comorbidity inc	lex)						0.169
	0 point	464	10.1	51	9.5	413	10.2	
	1 point	342	7.5	30	5.6	312	7.7	
	2 point	528	11.5	55	10.3	473	11.7	
	≥ 3 point	3244	40.9	399	74.6	2845	70.4	
Readmis	sion							0.005
	Yes	150	3.3	29	5.4	121	3.0	
	No	4428	96.7	506	94.6	3922	97.0	
LOS (Me	dian [IQR])			15.0 [1	1.0, 22.0]	11.0	[9.0, 15.0]	<0.001
Medical	cost (Median [IQR])				96210 5, 154154351		2145460 520, 143679301	0.667



#### Transanal Resection and Anastomosis for Chronic Abscess and Stricture Developed after Low Anterior Resection for Rectal Cancer

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National Cancer Center

BACKGROUND: Anastomotic leakage is one of the complications after low anterior resection(LAR), which is known to occur around 10% of cases. Diversion is usually performed to wait for the healing of the leakage site, but it is often not cured. In these cases, re-do LAR can be tried, but surgery is very difficult. This is because the pelvic cavity is tightly narrowed due to fibrosis caused by previous operation and chronic inflammation, making it difficult to secure the surgical field and to dissect. To overcome these problems, there have been attempts to perform pelvic dissection with a transanal approach, as it is easier to find the correct surgical plane since there is little change from previous surgery.

**PURPOSE**: We performed re-do LAR with transanal resection and anastomosis and checked the feasibility of this procedure.

MATERIALS AND METHODS: The patient was a 61-year-old male who was almost obstructed by rectal cancer located 5 cm above the anal verge. Laparoscopic LAR with partial seminal vesiculectomy and ileostomy formation was performed. Pathology was pT3N0 with angiolymphatic and perineural invasion, and both distal and circumferential margin were clear. On follow up, anastomotic leakage was observed and percutaneous drainage was performed. He received 4 cycles of adjuvant XELOX and underwent ileostomy repair 6 months after LAR. But, 3 months after ileostomy repair, he complained of air and stool when urinating. Ileostomy was performed under the suspicion of rectovesicular fistula. In spite of waiting for 5 months, the fistula and stricture of anas-

tomosis did not improve. Therefore, a re-do LAR was attempted. For the transabdominal approach, a 3-port laparoscopic approach was performed. Left colon and splenic mobilization was performed without the vessel injury. Adhesiolysis was performed due to tight adhesion of small bowel to pelvis. After identification of abscess cavities around the anastomosis during pelvic dissection, the operation was changed to a transanal approach. For this purpose, the Gelpoint path and Airseal system were used. A whole layer proctectomy was performed 2 cm above the anus. Pelvic dissection was done using levator muscle and prostate gland as landmarks until opening the abscess cavity and connecting the peritoneal space. The distal rectum was elevated through this opening and the remaining attachment was resected using a transabdominal approach. The specimen was extracted through the anus and a proximal resection was performed. Coloanal anastomosis by hand sewn maneuver was performed. All surgical procedures were performed with the existing ileostomy maintained.

**RESULTS**: The total operative time was 306 minutes, of which 100 minutes were spent in the transanal approach. Intraoperative blood loss was 210 ml. There was no intraoperative event including vessels or ureter injury.

**CONCLUSION**: The transanal approach is a useful method for pelvic dissection in patients with complicated pelvic inflammation, where traditional open and laparoscopic approaches are challenging.

#### Laparoscopic Intracorporeal Functional End-to-end Anastomosis for Proximal Transverse Colon Cancer

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Department of Surgery, Ewha Womans University School of Medicine

BACKGROUND: In recent years, intracorporeal anastomosis has emerged as a promising approach for faster postoperative recovery. Several techniques for intracorporeal anastomosis are available, among which side-to-side isoperistaltic anastomosis has been traditionally favored in right hemicolectomy. However, achieving sufficient distal margin with this technique remains challenging due to ergonomic challenges posed by the insertion of linear stapler through the left upper abdomen without splenic flexure mobilization.

**PURPOSE**: We compared intracorporeal anastomosis techniques for safe distal resection margins.

MATERIALS AND METHODS: We presented operative videos of laparoscopic extended right hemicolectomy in two patients. The first video demonstrates a conventional approach using intracorporeal side-to-side isoperistaltic anastomosis for ascending colon cancer, while the second video showcases the use of the functional end-to-end anastomosis for intracorporeal anastomosis in proximal transverse colon cancer. In the first case, a linear stapler was inserted through the left upper abdomen, whereas in the second

case, the stapler was inserted through the left lower abdomen.

RESULTS: Both surgeries were completed without any complications. In the case of ascending colon cancer, intracorporeal side-to-side isoperistaltic anastomosis achieved a secure and proper distal resection margin. However, in the case of proximal transverse colon cancer, the length of the distal margin obtained with the conventional technique was deemed insufficient due to the limitations imposed by using a linear stapler through the left upper abdomen without splenic flexure mobilization. By contrast, the functional end-to-end anastomosis, which employs a stapler inserted through the left lower abdomen, was able to achieve a proper distal resection margin without splenic flexure mobilization.

**CONCLUSION**: The intracorporeal functional end-to-end anastomosis might provide the advantage over side-to-side isoperistaltic anastomosis for patients with proximal transverse colon cancer in terms of the distal resection margin. Further research is needed to compare the two intracorporeal anastomosis techniques in a larger patient cohort.

### First Experience of Full-time Usage of Harmonic Dissection and Artisential Device in Laparoscopic Low Anterior Resection: It Is Recommendable for the Beginners of Rectal Surgery

#### Moonjin Kim

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BACKGROUND: Harmonic scalpel is well known dissection device in the field of colorectal surgery. But in most clinical cases of Total Mesorectal Excision (TME) surgery, Harmonic scalpel is selectively employed during overall surgical procedure, for instance, in situations involving bleeding. I have 1 year of rectal surgery and I performed Laparoscopic low anterior resection using Harmonic scalpel during almost entire procedure (IMA ligation, colon dissection to retroperitoneum, TME) for the first time. I found that using the Harmonic scalpel has advantages, especially for beginners, when compared to the monopolar coagulation device. Artisential 5mm grasper arm is recently released and I also used it throughout almost the entire procedure with Harmonic dissection. The combination of these devices made procedure more comfortable and safe. PURPOSE: To show that using harmonic dissection by entire TME is recommendable for the beginners of rectal surgery and the

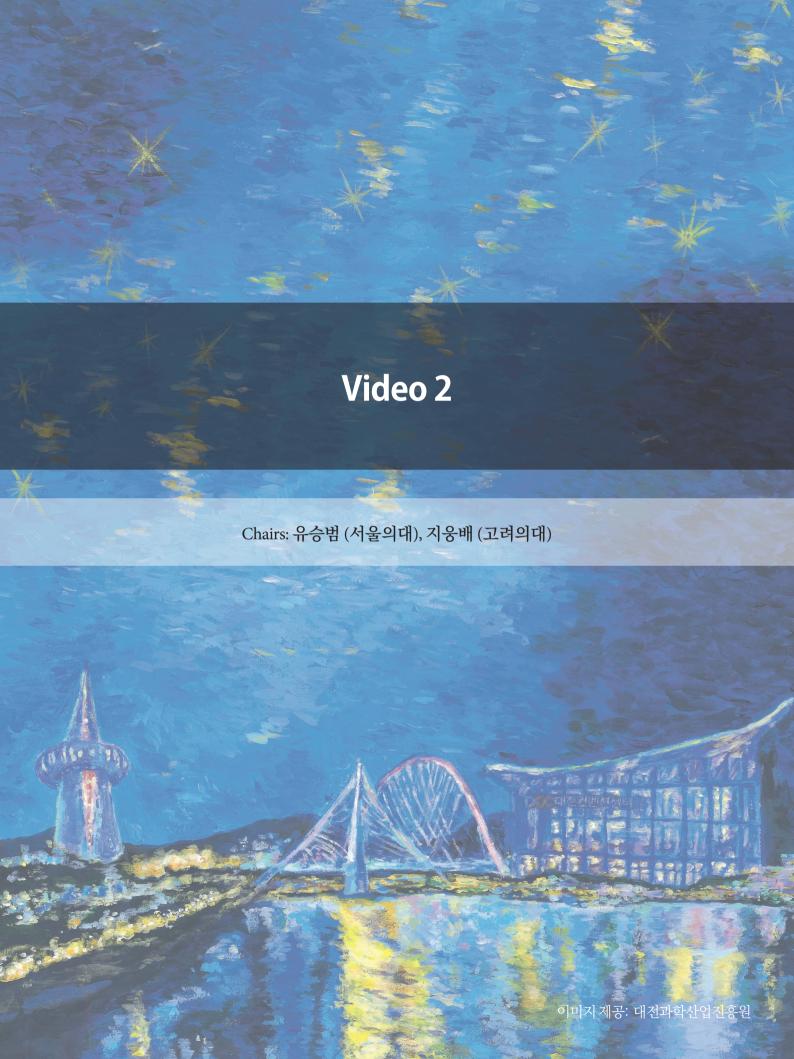
efficacy of 5mm artisential grasper arm.

surgery much more comfortable.

MATERIALS AND METHODS: 56 years of man was referred to colorectal surgery division because of huge polypoid mass in mid rectum (AV 8~10cm). Laparoscopic LAR was done by using Harmonic scalpel and 5mm artisential grasper.

RESULTS: Harmonic dissection made TME plane clean and it helped procedure much easier. Immediate safe bleeding control was also possible. Operation time was 150 minutes, and it was similar to other LAR cases. 5mm Artisential grasper arm was much more easy to handle than previous 8mm arm and wide angle of arm made surgery comfortable especially during posterior TME dissection.

CONCLUSION: Using Harmonic scalpel for the entire LAR procedure is feasible and recommendable for the beginners. Furthermore, by combination of 5mm artisential grasper, It made rectal



## Clinical Feasibility and Technical Aspect of Single Port Robotic Transanal Minimally Invasive Surgery (SP rTAMIS) for Rectal Neoplasm

In Kyeong Kim, In Kyu Lee, Jung Hoon Bae, Yoon Suk Lee

The Catholic University of Korea, Seoul St. Mary Hospital

BACKGROUND: Local excision of anorectal tumors through a transanal approach requires full thickness dissection and suturing in narrow spaces. However, accessibility and movement of equipment is difficult in confined spaces. The single-arm design of the SP robotic platform have three double jointed robotic instruments with articulation and 3D camera with 360-degree rotation. As a trend in minimally invasive surgery, we report our experiences and technical tips for a transanal approach using SP robotic transanal minimally invasive surgery (SP rTAMIS).

**PURPOSE**: The aim of this study was to evaluate the clinical usefulness and short term outcomes, and discuss technical tips of SP-rTAMIS. The primary outcome is the effectiveness and technical safety of the surgery. The secondary outcomes identify clinical and oncological outcomes.

MATERIALS AND METHODS: From January 1, 2023 to November 30, 2023, a total 9 patients who underwent transanal excision using the da Vinci Single-Port (SP) robotic platform (Intuitive Surgical, Sunnyvale, CA, USA) at Seoul St.Mary's hospital. Through endoscopy or abdominal image study, rectal neoplasm located below the pelvic reflection, <30% circumference bowel, and clinical stage T1N0 tumor was performed. Patient s who had previously undergone rectal resection and poorly differentiation on biopsy were excluded. To maintain inflation of rectum, the GelPOINT path

Transanal Access channel (Applied Medical, Rancho Santa Margarita, CA, USA) including the insufflation stabilization bag (ISB) were applied.

RESULTS: A total of 9 patients underwent full-thickness local excision using the SP robotic platform without intraoperative complications. The mean distance from anal verge is 6.41cm. In the first two cases, the lithotomy position was used considering the tumor direction, but in the later cases, the prone position was used to make manipulation useful regardless of the direction due to the 360 rotation. The mean operative time was 66.1 minutes, and all were performed with only one docking. The mean docking time was 8.7 minutes and the mean estimated blood loss was 20.5cc. In postoperative outcomes, oncologic resection margins were all negative, and there have been no finding of recurrence during follow-up to date.

CONCLUSION: By using SP robotic surgery for transanal approach, flexible vision and meticulous procedure in narrow spaces make possible to achieve more feasibility and oncologic safety. It is useful for dissection by minimizing collisions between instruments through the articulating arms, and oncologic safety can be achieved by confirming sufficient margins in all directions of the tumor through the 360 degree flexible camera.

#### Laparoscopic Re-do Ventral Rectopexy, Sacrocolpopexy, and Lateral Uterine Suspension -A Video Vignette

#### **Sung Il Kang**

Yeungnam University Medical Center

**BACKGROUND**: There is limited documentation regarding the surgical introduction and outcomes of redo surgery for ventral rectopexy, sacrocolpopexy, and lateral uterine suspension in patients with recurrent symptoms.

**PURPOSE**: This video aims to present the procedural details of laparoscopic redo ventral rectopexy, sacrocolpopexy, and lateral uterine suspension.

MATERIALS AND METHODS: A 66-year-old woman visited our clinic with difficulties in defecation persisting for several months, despite having undergone prior surgery and conservative treatment, including medication and biofeedback. The patient underwent laparoscopic ventral rectopexy, sacrocolpopexy, and lateral uterine suspension 4 years ago, followed by laparoscopic subtotal

colectomy and transvaginal rectocele repair 3 years ago due to chronic constipation. Severe pelvic descending syndrome and enterocele were observed on MR defecography.

**RESULTS**: The surgery was performed laparoscopically, and the patient was discharged on the 7th day postoperatively without any specific complications. At the 1-month follow-up after surgery, the patient's symptoms have almost resolved. The patient reported having bowel movements 2-3 times a day, and the satisfaction with the surgery was rated at 9 out of 10.

**CONCLUSION**: We report a case of pelvic outlet obstructive constipation in a patient who experienced recurrence after previous surgeries. The patient showed improvement through laparoscopic redo surgery when conservative treatment failed to yield a response.

#### Low Rectal Cancer Undergoing Ultra-low Anterior Resection with Coloanal Anastomosis Using DaVinci Single-Port (SP) Robotic Platform

Hye Jung Cho, Woo Ram Kim

Gangnam Severance Hospital

BACKGROUND: Ultra-low anterior resection using the DaVinci Single-Port (SP) robotic platform is seldomly performed due to the absence of energy and stapler device of the SP robotic platform as well as the difficulty of performing total mesorectal excision upto the intersphincteric plane. However, using only a single port through which ileostomy maturation can be performed, the cosmesis and benefit of the surgery is substantial. With the help of the assistant as well as overcoming the learning curve, ultra-low anterior resection with coloanal anastomosis using the SP robotic platform has its benefits.

**PURPOSE**: We here share our experience of a low rectal cancer undergoing ultra-low anterior resection with coloanal anastomosis using the DaVinci single-port robotic platform

MATERIALS AND METHODS: A 49-year old female was admitted at our oncology department on July 24, 2023 for evaluation of suspicious rectal cancer. Computed-Tomography (CT) showed a 4.5cm probable ulcerofungating lower rectal mass (AV 4.5cm, posterior wall) with several small mesorectal lymph nodes. PET-CT showed similar findings with no distant metastasis. CEA level was 20.3ng/mL (range 0-5ng/mL) and CA 19-9 was 15.1U/mL (range 0-37U/mL). Multidisciplinary team was convened during which upfront surgery was recommended given early stage of the cancer. On July 31, 2023, she underwent Single-Port (SP) ultra-low anterior resection with coloanal handsewn anastomosis with ileostomy us-

ing the DaVinci platform.

RESULTS: A 3cm circular incision was made at right lower quadrant. Glove port was inserted, and single-port trocar was placed through which the DaVinci robotic arm was docked. Inferior mesenteric artery and vein was ligated at root, and splenic full mobilization was performed. A complete total mesorectal excision was performed upto the intersphincteric plane of levator ani muscle. Perineal approach was carried out, and the specimen was extracted through the anus. With proximal and distal margin obtained, coloanal-handsewn anastomosis was performed. Distal ileum was extraperitonealized through the single port incision, and ileostomy was maturated.

CONCLUSION: Total operation time was 312 minutes. She started on clear liquid diet on postoperative day 1 and was discharged on postoperative day 5. Her blood work showed a hemoglobin of 6.9g/dL (range 12-16g/dL) on postoperative day 3 requiring 2 packs of red blood cell transfusion. Her final pathology was pT2N0M0 (stage I) requiring no additional treatment. Sigmoidoscopy and fistulogram on postoperative 3 months showed intact anastomosis site at anal verge 3cm and no evidence of perirectal fistulous tract, stricture, or obstructive lesions. She underwent ileostomy closure on December 19, 2023 and was discharged without any complications on postoperative day 7.



## Robotic Transabdominal Preperitoneal Hernia Repair for Recurrent Incisional Hernia with Incarceration and Intestinal Obstruction

Joo-Yeon Kim, Sungwoo Jung

National Health Insurance Service Ilsan Hospital

**BACKGROUND**: This video introduces a patient who underwent robotic transabdominal preperitoneal (TAPP) hernia repair for recurrent incisional hernia with incarceration and intestinal obstruction.

**PURPOSE**: A 41-year-old male patient with a history of hypertension, diabetes, fatty liver, and splenomegaly, a body mass index of  $36.9 \text{ kg/m}^2$ , underwent umbilical hernioplasty without mesh insertion in November 2020 for a 2x2cm-sized umbilical hernia. There were no specific immediate postoperative complications, but the hernia recurred two months later.

MATERIALS AND METHODS: Five months after his first surgery, incisional hernia repair with mesh insertion was performed by another surgeon. He was treated with postoperative incision site seroma, and hernia recurrence was confirmed five months after the second surgery.

RESULTS: Considering reoperation after weight control, in Jan-

uary 2023, he visited the emergency room due to the incisional hernia with small bowel incarceration and intestinal obstruction. After manual reduction and decompression by Levin tube drainage, robotic TAPP was performed by another surgeon. The fascia defect was 6x5cm, and the omentum and small bowel were incarcerated and adhesion to the previously inserted mesh. After adhesiolysis and reduction using the Da Vinci Xi system, fascia primary closure by barbed suture 2-0 (multiple) was performed. Ventralight ST mesh (11.4x11.4cm, DAVOL INC.) was placed underneath the closed fascia, and closure of the peritoneum was performed. After surgery, a hernia sac site seroma occurred, so an aspiration of 50 cc was performed, and the patient was discharged on POD #7 after improving the obstructive ileus and diet build-up.

**CONCLUSION**: Robotic surgery could be a viable option for recurrent incisional hernia with incarceration and intestinal obstruction.

## You Can Do Submucosal Hemorrhoidectomy Just with Cheap CO2 Laser

#### **Sangmin Youn**

Centum Surgical Clinic

**BACKGROUND**: Submucosal hemorrhoidectomy is a surgical procedure that involves minimal skin incisions to access and dissect the internal hemorrhoidal tissue beneath the mucosa, followed by suturing the remaining skin and mucosa. This method minimizes stricture, making it an ideal approach for hemorrhoidectomy.

PURPOSE: However, submucosal hemorrhoidectomy is not commonly performed. Submucosal hemorrhoidectomy is often considered a difficult and challenging procedure to master, with few doctors performing it, leading to fewer opportunities to learn and become proficient in this technique. In Centum surgical clinic, We routinely perform submucosal hemorrhoidectomy on all patients with hemorrhoids for more 20 years. We introduce how to perform LDSH.

MATERIALS AND METHODS: Fluid mixture for hemorrhoid injection and massage Laser Design & Incision for submucosal

hemorrhoidectomy Submucosal hemorrhoidectomy, Bovieless, Stumpless Interrupt suture by absorbable braded 4-0 material skin tags with external hemorrhoidal tissue excision after hemorrhoidectomy chemical assist with Botulinum toxin

RESULTS: I will inform you of the postoperative results through cases that required reoperation. In the year 2023, a total of 551 hemorrhoid surgeries were performed. There were 3 cases of bleeding on the day of surgery, and only one case required reoperation due to delayed bleeding. Postoperative swelling led to the removal of tags in 2.18% of the surgical patients, while reoperation due to wound infection diseases like fistulas was 2.9%. There was one case of reoperation due to stricture. The total reoperation rate was calculated to be 5.99%.

**CONCLUSION**: Submucosal hemorrhoidectomy is easily performed by anyone. With cheap CO2 laser.

### Young Adult Hernia: High Ligation is Enough!!

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'잠실서울외과, '서울대학교 의과대학 외과학교실

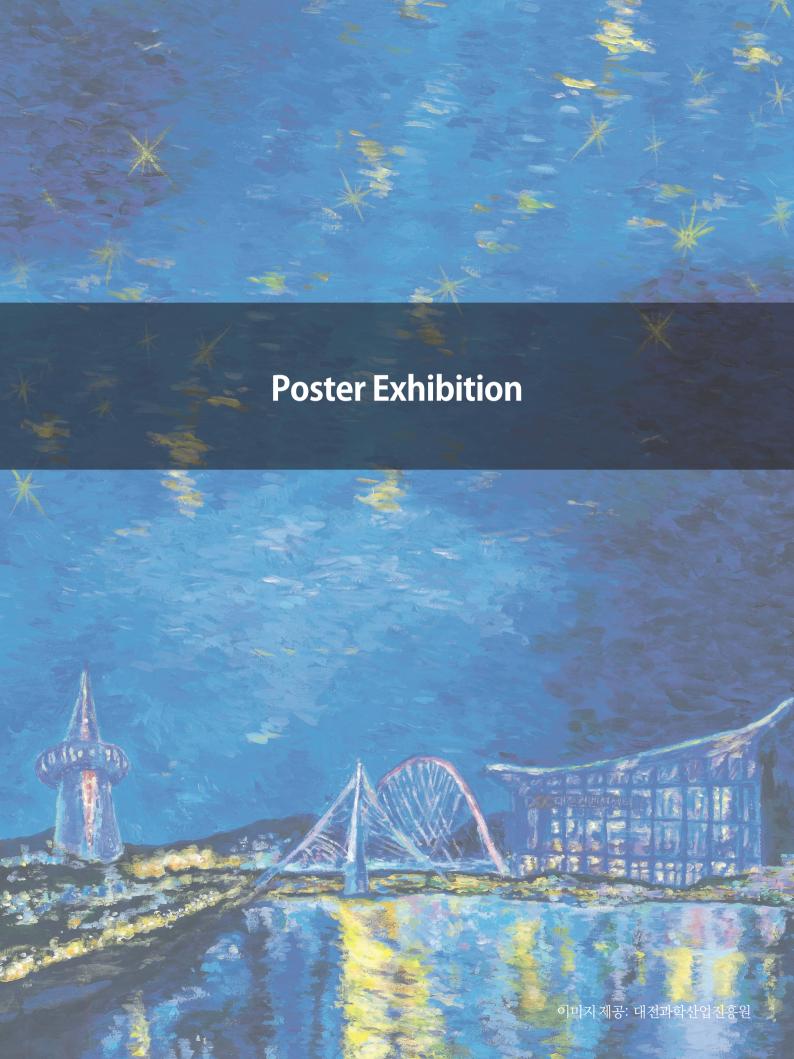
BACKGROUND: The infantile and adult inguinal hernia not only differs in the age of occurrence, but also their pathophysiology. Infantile inguinal hernia occurs when patent processus vaginalis is present which is generally treated with high ligation of hernia sac. On the other hands, main cause of adult inguinal hernia is weakening of posterior wall; it is generally agreed to perform posterior wall repair or mesh implantation to reinforce posterior wall and prevent recurrence. Clearly there are grey zone, when inguinal hernia occurs in young adults, especially when they are aged between 20 to 40. Since posterior wall repair or mesh implantation usually causes more incision, pain, complications and costs, so it is vital to find out if high ligation is enough.

**PURPOSE**: The aim of this study is to compare recurrence rates of high ligation and posterior wall repair in young adults.

MATERIALS AND METHODS: The study design is retrospective, single center study. This study included patients aged between

20 to 40 who underwent surgery under diagnosis of inguinal hernia from Jan, 2007 to Jan, 2021 at SNUH. Fisher's exact test was used to analyze the relationship between type of surgery and recurrence. **RESULTS**: A total number of 126 patients were enrolled in this study. Study included 100 (79.4%) male and 26 (20.6%) female, with mean age of 28 (Range 20-40). They were operated by 2 surgeons. There were 49 (38.9%) cases with high ligation, 77 (61.1%) cases with posterior wall repair were included in this study. There were 7 recurrences, four cases with high ligation and 3 cases with posterior wall repair. There were no significant differences (p=0.43) between high ligation group and posterior wall repair group.

**CONCLUSION**: There were no significant differences in recurrence between high ligation and posterior wall repair in young adult patients. So high ligation without posterior wall repair enough for repairing young adult patients with inguinal hernia.



#### Randomized Comparative Study Of 2D versus 3D Cultured Human Adipose Stem Cells for Smooth Muscle Cells of Internal Anal Sphincter-Targeting Cryoinjured Model

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<sup>1</sup>Department of Surgery, Hallym Sacred Heart Hospital, Hallym University College of Medicine,

BACKGROUND: Randomized comparative study of 2D versus 3D cultured human adipose stem cells for smooth muscle cells of internal anal sphincter-targeting cryoinjured model

**PURPOSE**: This study aimed to identify the cell lineage differentiation and contractile phenotype corresponding to smooth muscle cells (SMCs) of internal anal sphincter (IAS)-targeted model using 2D and 3D-cell cultured human adipose stem cells (hASCs) in IAStargeted animal model.

MATERIALS AND METHODS: 2D- and 3D-cultured hASCs with in-vitro confirmed cell lineage differentiation and contractile phenotype corresponding to SMCs of IAS were used. An IAS-targeted model was developed by rapid freezing of -196°C to dorsal layers of region of interest (ROI) of IAS ring (angle of 125° to 215°) between submucosal and muscular layer through posterior submucosal dissection in 9 weeks female SD rats (n=60) of normal control, sham, and cryoinjured groups. Dil-stained cells (1×106 per site) was implanted at randomly allocated fifty rats with cryoinjury. After one and two weeks of implantation, harvest for whole ring and only ROI of IAS were performed for analysis of SMC marker expressions (SMMHC, SM22a, smoothelin, caldesmon, calponin, α-SMA, and Rho/ROCK-downstream molecules [RhoA, ROCK-II, PP1cd, PKCα, pMYPT1, total MYPT1, pCPI-17, total CPI-17, pMLC20, and total MLC20]), CoL1A1, and fibronectin using quantitative real-time PCR and western blot.

**RESULTS**: In-vitro, it revealed that transformation of 3D-hASCs

with spheroidal morphology consisting of aggregated spindle-like cells into SMCs with phenotype shifting of RhoA with substrates and higher expressions of SMCs markers than 2D-hASCs. IAStargeted cryoinjury induced substantial loss of SM muscular layer confined to anal canal consisted of squamous cells with lower levels of mRNA levels for all SMC and RhoA-related substrates. In-vivo cell implantation stage, 3D-spheroids implantation induced SMCs markers and contractile molecules weakly at 1 week, but the highest level for RhoA. After 2 weeks, accompanying with reducing FN and Col1a1, mRNA level for α-SMA, SM22a, smoothelin, RhoA, CPI-17, PPI1cd in 3D-spheroids group were escalated compared to sham and cryoinjured group without implantation or 2D implantation, significantly. In western blot, expression profiles of RhoA, ROCKII, pMYTP1, PKCα, CPI-17 in 3D-spheroid group showed enhanced pattern compared to non-implantation or sham groups after 2 weeks. While, 3D-spheroids could not induce significant augmentation of protein for SMC differentiation than other groups. **CONCLUSION**: In conclusion, this study was the first attempt to apply 3D-speroid with capacity of in-vitro SMCs differentiation and expression of Rho/ROCK with downstream molecules for SMCs of IAS. In IAS-targeted cryoinjured in-vivo model, implantation of 3D- spheroids induced initially weak but, over time enhanced contractile phenotype shifting characterized Rho/ROCK downstream rather than SMCs myogenic differentiation corresponding to IAS for basal tone, compared to 2D-cultured cells.

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#### 결장직장암 수술 후 배뇨 알고리즘 개발을 통한 업무 효율성 향상

김연정, 조소영

가톨릭대학교 서울성모병원

BACKGROUND: 결장직장암 수술 후 배뇨장애가 초래될 수 있 다는 것은 이미 잘 알려진 사실이다. 더불어 최근에 시행되는 경 막외 척수마취로 인하여 수술 후 배뇨장애 발생빈도가 증가하는 추세이다. 그러나 임상현장에서 배뇨장애 중재에 대한 표준화된 지침이 없어, 배뇨장애 관련 신속한 대처가 어렵고 간호사에 의 한 의사 보고 역시 일관적이지 못하고, 표준화 되지 못한 중재로 인해 간호사의 업무 만족도 저하를 초래하고 있다. 이에 결장직 장암 수술 후 배뇨장애 중재 관련 알고리즘을 개발하여 표준화된 중재를 제공하고 간호사의 업무 효율성을 향상 시키고자 한다. PURPOSE: - 결장직장암 수술 후 배뇨 알고리즘 개발 및 적용 -결장직장암 수술 후 배뇨장애 관련 당직의 보고 건수 감소 - 간호 사 업무 효율성 상승 상세 지표: 배뇨장애 중재의 일관성 및 신속 성 20% 향상 배뇨장애 중재 관련 간호사의 업무 만족도 10% 향상 MATERIALS AND METHODS: 1) 대장항문외과 입원전담전문 의와 참고문헌, 임상경험을 바탕으로 수술 후 배뇨 알고리즘을 만든 후, 병동 수 간호사 및 경력간호사와 수정 보완하여 최종 배 뇨 알고리즘을 개발하였다. 이후 알고리즘을 수행하는 간호사들 에게 교육 후 이해도 및 임상 활용 가능성을 설문을 통해 임상 실 무 적용 전 확인하였으며, 대장항문외과 주치의 및 전공의에게도 전달 교육을 시행하였다. 2) 2023년 5월부터 8월까지 162 unit에

서 입원해 수술 받는 결장 직장암 수술 환자를 대상으로 개발한 알고리즘을 적용하였다.

RESULTS: 1) 수술 후 4시간 경과 후 자연배뇨 여부에 따라 중재를 구분하여 알고리즘을 구성하여 수술 후 배뇨장애과 관련한 일 관적인 중재를 제공하였다. 2) 배뇨장애 중재 관련 당직 의사에게 보고한 건수: 2023년 5월~8월 결장 직장암 수술 130건 중 배뇨장애 당직의 보고 건수: 0건 3) 간호사 업무 효율성 - 배뇨장애 중재의 일관성 27.5%, 신속성 27.7% 향상 - 배뇨장애 중재 관련 간호사의 업무 만족도 14.7% 향상

CONCLUSION: 본 활동은 결장 직장암 수술 후 배뇨장에 시 중 재를 표준화하고 실무에 적용하여 일관된 중재를 신속히 적용함으로써 업무의 효율성을 높이고자 하였다. 그 결과 의사에게 보고 건수, 중재의 일관성 및 신속성, 간호사 업무 만족도가 모두 목표치 이상 초과 달성하였다. 이를 통해 환자는 일관된 중재를 신속히 제공받을 수 있었고, 간호사는 업무의 표준화 및 간소화로 업무 지연이 감소되며 만족도가 향상될 수 있었다. 향후 알고리즘의 지속적인 연구와 수정으로 한 개 병동에 입원한 결장 직장 암환자뿐만 아니라 여러 병동에 입원한 다양한 수술 환자의 배뇨장애 중재에 확대 적용할 수 있을 것이다.

# Is Enhanced Recovery after Surgery (ERAS) Safe and Effective Even in Elderly Patients with High Risk Comorbidities?

In Kyeong Kim, In Kyu Lee, Jung Hoon Bae, Yoon Suk Lee

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BACKGROUND: Enhanced Recovery after Surgery (ERAS) has been widely implemented in colorectal surgery, demonstrating reduced the length of hospital stay (LOS) and lower complication rates. Through the previous studies, ERAS was found to reduce postoperative inflammatory response and postoperative complications in many studies. However, it remains unclear whether these protocols are equally safe, feasible, and effective in patients with high risk factors, such as the elderly or those with specific comorbidities. Some concerned about equally applying ERAS to the elderly and high risk patients, regarding the safety of early feeding without fasting before surgery, as well as the potential risk with low compliance such as early mobilization. There have been no studies that conducted subgroup analyses of ERAS pathways in patients with specific comorbidities.

**PURPOSE**: The aim of our study is to discuss whether ERAS is safe and effective in decreasing LOS and complications in specific patient with elderly and high comorbidities.

MATERIALS AND METHODS: We analyzed patients who underwent elective colorectal cancer surgery for curative resection from the initiation ERAS at Seoul St. Mary's hospital in 2017 until September 2022 through a prospective cohort study. The control group comprised patients under the age of 70 without co-morbidity. Co-morbidity were conditions requiring consistent treatment. Patients over 70 years old or with heart disease, pulmonary disease, renal disease or liver disease of following types were analyzed respectively as experimental groups.

**RESULTS**: Almost all patients had significantly lower preoperative nutritional status (serum albumin) and higher ASA scores compared to the control group. Regarding clinical surgical outcomes, there were no differences except for a shorter operation time and

fewer minimal invasive surgeries in the elderly cohort. In experimental group with old age, heart disease, or pulmonary disease, there was no difference in postoperative complications or length of hospital stay, despite a slight decrease in compliance, which remained over 70%. In contrast, patients with renal disease such as chronic renal disease or end stage renal disease, exhibited a significantly higher complication rate with a lower compliance rate of 67%. No significant differences were observed between patients with liver disease and the control group. In elderly with high risk patient, the results were similar to each experimental groups. However, the LOS of more than 5days was significantly difference in patient with elderly with renal disease.

CONCLUSION: The application of ERAS in elderly and high risk patients yielded results that were not significantly different, except for a longer length of hospital stay in patients with renal disease. Consequently, it is considered reasonable to implement ERAS in high-risk groups, as it effectively reduced the inflammatory response after surgery without increasing complications although compliance slightly decreased in high-risk groups.

Table. postoperative outcomes and compliance between the control group and each experimental group.

	Control	Age ov	er 70	Hear	t	Pulmos	ary	Renal		Liver	
	(n=907)	(n=4	53)	(n=77)		(n=10	(7)	(m=37	)	(n=28)	)
			P		Р		P		P		P
Compliance(%)											
Mean	77.70±11.36	72.51±11.89	< 0.001	73.47±12.61	0.005	74.91±12.5	0.029	67.01±16.22	< 0.001	73.89±13.9	0.16
						1				0	
High (≥70)	706 (78.1)	282 (62.3)	<0.001	55 (71.4)	0.178	75 (70.1)	0.062	16 (43.2)	<0.001	19 (67.9)	0.19
Complication											
Total	211 (23.3)	102 (22.5)	0.734	15 (19.5)	0.440	30 (28.0)	0.281	14 (37.8)	0.043	8 (28.6)	0.52
Major	66 (7.3)	27 (6.0)	0.357	3 (3.9)	0.262	12 (11.2)	0.151	3 (8.1)	0.748	3 (10.7)	0.45
Los											
Mean (day)	5.69±5.11	5.42±4.06	0.285	5.15±2.78	0.155	6.17±5.11	0.366	15 (40.5)	0.094	6.21±4.61	0.56
≥5 days	252 (27.9)	114 (25.2)	0.289	17 (22.1)	0.274	33 (30.8)	0.519	6.03±3.19	0.550	7 (25.0)	0.73

LOS, length of hospital stay, day;

#### Technical Tips for the Mesh Nonfixation Method in Single Port Laparoscopic Total Extraperitoneal (TEP) Inguinal Hernia Repair: A Case of Incarcerated Inguinal Hernia

<u>Chul Seung Lee</u>, Kyung Rak Kim, Jeong sub Kim, Gwanchul Lee, Dong Woo Kang, Jeong Eun Lee, Sang Hwa Yu, Seung Han Kim, Gyu Young Jeong, Choon Sik Chung, Dong Keun Lee

Hansol Hospital

BACKGROUND: Inguinal hernia repair is the most common surgery in general surgery, with 80% of all hernia repairs in adults being for inguinal hernias. Laparoscopic total extraperitoneal (TEP) inguinal hernia repair is a widely adopted technique known for its minimally invasive nature. Recent systematic reviews of mesh non-fixation showed that the risk of recurrence, complications, and postoperative pain did not differ between fixation and non-fixation; However, these reviews did not assess the certainty of technical feasibility of incarcerated inguinal hernia. This study presents technical tips for the Mesh nonfixation method, specifically addressing its application in cases of incarcerated inguinal hernia.

**PURPOSE**: We performed single port laparoscopic TEP hernia repair using an Progrip™ mesh which has a Self-Gripping Property and a articulating laparoscopic instrument.

MATERIALS AND METHODS: A case involving incarcerated inguinal hernias treated with the Mesh nonfixation method during single port laparoscopic TEP repair was conducted. Technical nuances, patient outcomes, and complications were systematically reviewed.

RESULTS: A 35-year-old man visited our outpatient clinic with

right inguinal pain and bulging. His symptoms of groin protrusion began 10 years ago. We performed laparoscopic exploration and reduction of sigmoid colon (Fig 1). The use of multi-joint instruments during lateral dissection is especially convenient when lowering the superior peritoneum. Even when dissecting blood vessels and VAS by unfolding a large indirect sac, using an articulating instrument is convenient because the instruments do not crossover when using a single-incision approach. Progrip™ mesh is folded into an M-shape and inserted into the extraperitoneal space, positioning the center of the mesh at the desired location. The lower part of the mesh is unfolded to prevent folding, and then the upper part is unfolded. The total operation time was 75 min, and the patient's symptoms resolved on post- operative day 1 and discharged. Follow-up on post-operative day 30 showed no symptoms.

CONCLUSION: Mesh nonfixation method in single port laparoscopic total extraperitoneal(TEP) inguinal hernia repair for incarcerated inguinal hernia is technically feasible and safe with Progrip™ mesh and Artisential. The approach suggests potential benefits in terms of operative efficiency and patient comfort.

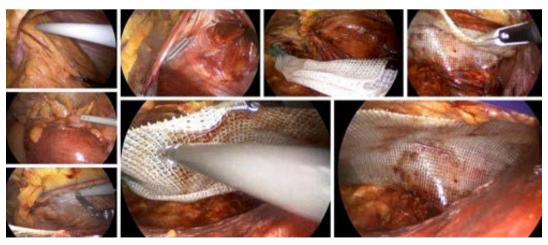


Figure. Mesh nonfixation method in Single port TEP inguinal hernia repair for Incarcerated inguinal hernia

#### Post-polypectomy Coagulation Syndrome after Colonoscopy Polypectomy: A Case Report and Literature Review

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BACKGROUND: Post-polypectomy coagulation syndrome (PPCS) is an uncommon complication related to colonoscopy polypectomy. In contrast to colonic perforation, which often requires surgical management, PPCS should be managed conservatively. Therefore, it is important to recognize PPCS and differentiate it from colonic perforation to avoid unnecessary surgery.

**PURPOSE**: We would like to find difference in computed tomography (CT) findings between PPCS and colonic perforation.

MATERIALS AND METHODS: We presented a case of a patient diagnosed with PPCS who was successfully treated with conservative treatment. Furthermore, a literature discussion of CT findings of PPCS is performed.

RESULTS: A 62-year-old man, who had no previous medical history, visited the Emergency Department of another hospital with symptoms of abdominal pain and fever, 1 day after colonoscopy polypectomy. CT scan demonstrated longer colonic wall thickening with a stratified enhancement pattern. No extraluminal air was observed (Figure 1). The physical examination revealed focal tenderness localized pain on the left sided abdomen. Laboratory tests showed a white blood cell count of 20,770/uL and a c- reactive protein level of 20.05 mg/dL. The patient was admitted for conservative treatment with intravenous fluid and antibiotics. Two days after hospitalization, symptoms improved and follow-up inflammatory index levels also decreased. The patient was discharged without any complications on the 8th day of hospitalization.

**CONCLUSION**: Differential diagnosis between PPCS and colonic perforation poses a challenge due to the similarity in presenting

symptoms, particularly in cases where the perforation is sealed. Moreover, conducting studies with significant sample sizes is challenging due to the significantly low incidence. Among previous studies on PPCS, Shin et al. [Clin Radiol. 2016 Oct;71(10):1030-1036] investigate the CT findings of PPCS (8 patients, 0.14%) and colonic perforation (6 patients, 0.11%) in patients who have undergone colonoscopy polypectomy (total 5542 patients). In addition to the absence of extraluminal air, PPCS showed longer and greater colonic wall thickening, and a mural defect filled with fluid when compared with colonic perforation. As the possible pathophysiology of PPCS is transmural burn injury, its presentation as a segmental or diffuse wall thickening more prominent than that by the perforation group is reasonable. In conclusion, PPCS can be differentiated from colonic perforation using CT findings. It is imperative to exercise caution to avoid unwarranted surgical interventions.



Figure 1. Computed tomography scan. A, Axial view: mural defect filled with fluid in absence of extraluminal air. B, Coronal view: longer and thicker colonic segment and stratified enhancement pattern.

### Laparoscopic Surgery Using Artisential® Instruments for Chronic Pain 5 Years after Emergency Laparoscopic Transperitoneal Preperitoneal (TAPP) Inguinal Hernia Repair

<u>Chul Seung Lee</u>, Kyung Rak Kim, Jeong sub Kim, Dong Woo Kang, Gwanchul Lee, Jeong Eun Lee, Sang Hwa Yu, Gyu Young Jeong, Seung Han Kim, Choon Sik Chung, Dong Keun Lee

Hansol Hospital

BACKGROUND: Chronic postoperative inguinal pain(CPIP) afflicts 10% to 15% of the nearly 700,000 Americans who have inguinal hernia surgery every year. CPIP is difficult to manage because it poses many diagnostic dilemmas. The initial treatment of CPIP should explore all When conservative therapies including medications, physical therapy, interventional pain management and cognitive therapy, surgical interventions have proven to be beneficial for patients with CPIP.

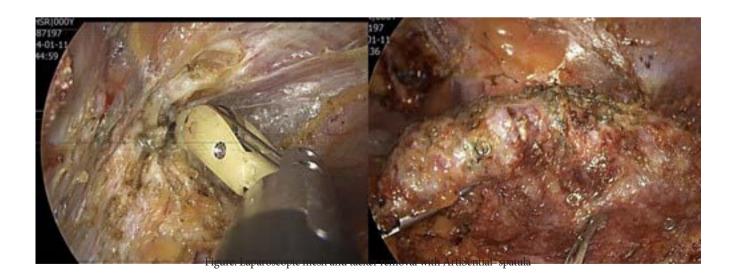
**PURPOSE**: We performed laparoscopic mesh removal using an articulating laparoscopic instrument.

MATERIALS AND METHODS: A 36-year-old man visited our outpatient clinic with right lower quadrant (RLQ) pain. The patient had undergone laparoscopic TAPP hernia repair with the multiple metal tacker for right inguinal hernia 5 years prior at a local clinic. We performed laparoscopic mesh and tacker removal with articu-

lating instrument.

RESULTS: As a result of computed tomography (CT) and abdominal X-ray, several multiple metal tackers were found, and there were no other unusual findings. After failure of conservative therapy including multimodal pain management, laparoscopic surgery with ArtiSential® was performed. Severe adhesion due to previous operation was observed. We performed laparoscopic mesh and tacker removal with ArtiSential® spatula with the right hand (Fig 1). The total operation time was 65 min, and the patient's symptoms resolved on post-operative day 2 and a follow-up on post-operative day 14 showed no symptoms.

**CONCLUSION**: Due to the severe adhesion, mobilization and resection of the mesh and tacker removal can be technically challenging and ArtiSential\* instrument helped us to allow greater manoeuvrability and dexterity.



#### Mesh Migration into Sigmoid Colon Lumen after Laparoscopic Herniorrhaphy

Jin Hwi Kim, Keun Young Kim, Joo Hyun Lee, So Ra Ahn, Won Cheol Park

Wonkwang University Hospital

BACKGROUND: Nowadays, minimal invasive surgery widely used in the treatment of inguinal hernias. Two main technical approaches are Transabdominal preperioneal(TAPP) and Totally extraperitoneal (TEP). Materials like composite mesh can be used in the ways, which can reduce complication like bowel adhesion. Long-term pressure of this materials on bowel, however, can induce the problem or complication occasionally. We report a uncommon case of mesh migration into sigmoid colon, which can confuse clinician as its similarity to malignant mass.

RESULTS: A 61-year-old male patient visited our outpatient clinic department with abdominal pain. His chief complaint was LLQ pain, and he had no other symptoms such as fever, diarrhea or constipation. The patient had the surgical history of laparoscopic TEP with mesh application (3 years ago) due to left inguinal hernia. Laboratory test results indicated the mild inflammation(white blood cell count, 12.93 ×103/mm3; ; CRP, 55.92 mg/L). He underwent CT, MRI, and colonoscopy. CT scan implied a mass might be the reason of the pain as irregular-shaped enhancing lesion about 9 cm was found on LLQ with irregular wall thickening of sigmoid colon. Furthermore, MRI suggested this mass showed the infiltration into left groin, perivesical space, and sigmoid mesocolon - showing fistulous tract formation between sigmoid colon and serosa of bladder. These results intimated to us the presense of sigmoid colon cancer or the metastasis of RCC, but inflammatory mass could not be excluded. In colonoscopy, surprisingly, an web-shaped artifactual structure was found on sigmoid colon. Colonoscope was unable to pass the lesion due to the artifact and bowel edema. The patient underwent laparoscopic anterior resection. In operation finding, massive adhesion on sigmoid colon was connected to left inguinal area with pus discharge. Besides, the artifact was visible on laparoscopic view, penetrating into the lumen of sigmoid colon. Later, it was revealed the artifact was a synthetic mesh used in herniorrhaphy, and no malignant cell was found. The patient was discharged 18 days after surgery keeping the JP drain as continuance of pus discharge. CONCLUSION: In conclusion, we report a case of the bowel perforation and incomplete migration of mesh placed in previous herniorrhaphy. First noticeable point of this case is that prolonged inflammation made a fistula, which guided the mesh on the peritoneum into the bowel lumen. Severe inflammation could form 'barrier' isolating the bowel lumen from peritoneum, and it can protect the occurrence of panperitonitis. Second is that this inflammation confused the radiologists because foreign body reaction and cancer with inflammation is hard to easily differentiated on radiologic or magnetic imaging. Before making medical decisions, surgeons should take into account that foreign body can be mistaken for tumor with inflammation especially the patient have operation history, even though the lesion is in the lumen.



Figure. Specimen of anterior resection. Mesh migrated into the sigmoidal lumen.

## Outcomes of Laparoscopic Ventral Mesh Rectopexy (LVMR) for Internal Rectal Prolapse (IRP)

Jae Won Shin, Doo-Seok Lee, SooMin Nam, Do-Sun Kim

Daehang Hospital

BACKGROUND: Internal rectal prolapse (IRP) is a rough functional disorder that presents with obstructed defication (OD) and/ or fecal incontinence (FI). Over the past 20 years, LVMR has been worldwide treatment for an IRP and external rectal prolapse (ERP). Recently, LVMR have been performed for patients who had IRP or ERP in Asian countries. However, there are still small amount of reports on the functional outcomes of this surgical approach for internal rectal prolapse.

**PURPOSE**: We aimed to evaluate the results of LVMR in patients with IRP

MATERIALS AND METHODS: From September 2013 to November 2023, 103 patients with IRP underwent LVMR in single institute. The patients with IRP had either both constipation and FI or one of them. Preoperatively patients received colonoscopy, a colon transit time test, defecography and anorectal function test. The constipation score and FI score were evaluated by using the Cleveland Clinic Florida (CCF) score preoperatively and post-operatively. The questionnaire for the change of OD or FI symptom after the surgery was given to grade as cured, improved, unchanged and worsened for each survey.

**RESULTS**: The mean age of the patients was  $65.2 \pm 10.1$  years. The mean operation time was  $117.4 \pm 24.1$  minutes, and the mean hospital stay was  $5.6 \pm 2.2$  days. The mean follow-up was  $32.4 \pm 33.1$  (range 0.2 - 117.5) months. One patient had operation for peritonitis which was occurred small bowel injury during LVMR. Another

patient had bladder injury during co-operation for urinary incontinence. There were no mesh related complications. In functional analysis, constipation score (8.21) was significantly improved compared to pre-op score (14.35) (p< 0.001) and FI score was significantly improved after the surgery (10.47 to 4.59, p<0.001) at post op 6 months. At last follow up, it was significantly decreased between pre-op and last F/U (p<0.001). FI score was also significantly decreased compared to pre-op score at last follow up (5.0, p=0.16). But a survey revealed that 14% of patients who underwent the surgery reported no improvement in symptoms postoperatively. For patients who experienced a recurrence of constipation symptoms after surgery, the average duration until symptom relapse was 44.2 months. Among patients who answered last follow-up constipation questionnaires, 13% patients answered the category 'cured' 44% pts 'improved', and 40% patients 'unchanged' and 2% patient 'worse'. In terms of fecal incontinence questionnaire, 29% pts 'cured', 47% pts 'improved' and 23% pts 'unchanged' respectively. The overall satisfaction of LVMR at 6 post-op follow-up was 83.5%.

**CONCLUSION**: Functional outcomes of OD and FI were improved after surgery. The satisfaction of patients was high after the surgery. LVMR is a safe and feasible treatment for IRP. Since there are some patients who don't perceive an improvement of OD or FI, surgeons need to consider carefully and select a strict surgical indications of LVMR for IRP.

#### Giant Colonic Diverticulum in Young Woman: Case Report

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BACKGROUND: Giant colonic diverticulum (GCD), defined as a diverticulum larger than 4 cm, is a rare manifestation of colonic diverticular disease with the potential for severe complications.

PURPOSE: We present the case of a 19-year-old woman who presented to the emergency department with symptoms of intestinal

MATERIALS AND METHODS: Abdominal computed tomography (CT) revealed a suspected large diverticulum in the sigmoid colon with inflammatory changes and fecal impaction.

obstruction and lower abdominal pain.

**RESULTS**: An elective laparotomy was performed, revealing an 18\*16 cm GCD with fibrotic changes in the sigmoid colon. We

conducted an en-bloc segmental resection of the sigmoid colon with the giant diverticulum and an end-to-end anastomosis. Histopathological examination categorized this specimen as a type 3 diverticulum with all layers of the colonic wall. The patient was discharged without postoperative complications.

CONCLUSION: This rare case of type 3 GCD suggests the possibility of a congenital origin, rather than typical diverticular cases. Due to the potential for serious complications, a prompt diagnosis and appropriate surgical treatment are important. We suggest considering type 3 GCD in the differential diagnosis for young patients with a high risk of diverticular disease and abdominal pain

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## Predictive Factors for Irreversible Ischemia in Patients with Closed-loop Small Bowel Obstruction

#### **Hyo Jin Lee**

Asan Medical Center, Seoul

BACKGROUND: Closed-loop small bowel obstruction (CL-SBO) means obstruction of two parts of the intestinal loop at the same point. The mucosa continues to produce secretions, causing distention and wall edema, followed by blood supply disturbances and ischemia. It is crucial to assess bowel viability during the operation. PURPOSE: This study aimed to evaluate predictive factors, including clinical, laboratory and computed tomography(CT) findings in patients who underwent surgery for CL-SBO and analysis post-operative outcomes.

MATERIALS AND METHODS: From January 2020 to December 2023, A total of 74 patients who underwent surgery for suspected CL-SBO in the Division of Acute Care Surgery at Seoul Asan Medical Center were enrolled. Patients were divided into two groups by perioperative outcome, including viable bowel and irreversible ischemia.

**RESULTS**: Of the 74 patients, 50 were in perioperative viable bowel group and 24 were in perioperative irreversible ischemia group. Patients older than 60 years [odds ratio (OR): 5.963, 95% confidence interval (CI): 1.575-22.579] and patients with decreased bowel enhancement on CT (OR: 6.205, 95% CI: 1.923-20.022) had higher risk for irreversible ischemia. There were no significant differences in American Society of Anaesthesiologists (ASA) classification  $\geq$  3, abdominal tenderness, rebound tenderness, leucocytosis and elevated C-reactive protein (> 0.6 mg/dL). On multivariate analysis, Age  $\geq$  60 years (OR 5.828; 95% CI 1.426-23.821) and decreased bowel enhancement on CT (OR 6.066; 95% CI 1.728-21.298) were independently associated with irreversible ischemia. The postoper-

ative hospital stay was longer in patients with irreversible ischemia (median 14 days) than in patients with viable bowel (median 10 days), but there was no significant difference (p = 0.291). Severe Clavien–Dindo classification  $\geq$  IIIa complications were significantly higher in patients with irreversible ischemia (20.8%, P = 0.033) compared with viable bowel (4.0%).

**CONCLUSION**: In the case of CL-SBO, the risk of irreversible ischemia is increased in patients older than 60 years or in patients with decreased bowel enhancement on CT. There is increased post-operative morbidity in patients with irreversible ischemia.

Table. Predictors of irreversible ischemia in closed-loop small bowel obstruction

	Univariate analy	sis	Multivariate analysis		
Variables	Odds ratio (95%CI)	p-value	Odds ratio (95%CI)	p-value	
Age ≥ 60 years	5.963 (1.575-22.579)	0.005	5.828 (1.426-23.821)	0.014	
ASA ≥ 3	0.370 (0.052-2.664)	0.324			
Abdominal tendemess					
No	Reference				
Yes	1.537 (0.376-6.284)	0.740			
Rebound tenderness					
No	Reference				
Yes	1.199 (0.354-4.065)	0.761			
WBC, /uL					
≤10000	Reference				
> 10000/uL	1.941 (0.720-5.231)	0.187			
CRP, mg/d					
≤0.6	Reference				
> 0.6	1.286 (0.450-3.672)	0.638			
CT imaging					
Intact bowel enhancement	Reference		Reference		
Decreased bowel enhancement	6.205 (1.923-20.022)	0.001	2.321 (1.209-4.458)	0.005	

CI, confidence interval; ASA, American Society of Anesthesiologist; WBC, White blood cell; CRP, C-reactive

protein; CT, computed tomography

# Beyond Local Response: Assessing Systemic Impacts in Pathologic Complete Response in Locally Advanced Rectal Cancer: Comparative Study

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Colorectal Cancer Center, Kyungpook National University Chilgok Hospital

BACKGROUND: The role of radiation therapy in managing locally advanced rectal cancers has evolved over the years. In cases of locally advanced rectal cancer, a favorable prognosis is reported when a pathologic complete response is achieved. It is unclear whether this is influenced by the disappearance of the primary tumor due to radiation therapy or if it also affects distant metastasis. Therefore, we conducted a comparative study.

**PURPOSE:** This study aimed to investigate the long-term oncological impact of patients achieving a pathological complete response (pCR) following preoperative chemoradiotherapy (CRT) compared to those who did not achieve pCR and did not receive preoperative CRT in locally advanced rectal cancer.

MATERIALS AND METHODS: This retrospective comparative study included three patient cohorts: Group A (no preoperative CRT), Group B (preoperative CRT without pCR), and Group C (preoperative CRT with pCR). Data from two distinct periods were analyzed, one before and one after the routine implementation of preoperative CRT. Various clinical and oncological parameters

were evaluated.

RESULTS: The study included 1,105 patients, distributed across three groups: Group A included 608 patients, Group B consisted of 407 patients, and Group C comprised 90 patients. Group C demonstrated significantly better 5-year overall survival (96.1%) compared to Group B (81.7%) and Group A (77.6%). Local recurrence rates were significantly lower in Group C (98.8%) compared to Group A (90.1%). Group B showed comparable survival rates to Group A but with significantly reduced local recurrence.

CONCLUSION: Patients who achieved pCR following preoperative CRT for locally advanced rectal cancer demonstrated improved long-term survival and lower rates of local recurrence. In contrast, patients who did not achieve pCR following preoperative CRT showed similar survival rates to those who did not receive preoperative CRT, albeit with better local control. pCR might be interpreted as a result when both local control and distant control are achieved simultaneously.

#### Does Circumferential Oversewing in Rectal Stapled Anastomosis Reduce Anastomotic Leakage? An Inverse-Probability-of-Treatment Weighting Analysis of Multicenter Cohorts

Jin-Min Jung<sup>1</sup>, Yong Sik Yoon<sup>2</sup>

BACKGROUND: In recent years, robotic-assisted surgery has emerged as a viable alternative to conventional open and laparoscopic surgery in the management of rectal cancer. Several studies have investigated the safety and efficacy of robotic rectal cancer surgery, with some reporting favorable results concerning improved short-term outcomes. Although advances in the surgical platform have shown promising surgical outcomes, anastomotic leakage (AL) continues to be a major concern in rectal cancer surgery. The rate of AL following rectal surgery is reported to range from 3.5% to 18.3%. In at-risk patients, a diverting stoma reduces the incidence of AL. Although there have been several techniques used to mitigate the incidence of AL, the most prevalent approach to mitigate the clinical impact of AL is still the creation of a diverting stoma. Furthermore, some studies have verified a reduction in AL after staple line reinforcement with oversewing. Oversewing the staple line with suture material has been employed to enhance the integrity and security of stapled anastomosis in gastrointestinal surgery. Some studies have demonstrated that oversewing the staple line contributes to a reduced risk of anastomotic complications after ileocolic resection in Crohn's disease. Likewise, reinforcement using sutures on the staple line has been established as an effective strategy for minimizing leakage during laparoscopic gastric bypass surgery and sleeve gastrectomy. However, staple line reinforcement with oversewing in rectal cancer surgery is challenging due to the narrow and deep pelvis, and both open and laparoscopic approaches are difficult. Suturing the posterior aspect of the anastomosis, which is prone to dehiscence, is even more challenging. Hence, circumferential oversewing (CO), in which the circular staple line is

encircled with barbed sutures to reinforce the stapled anastomosis, has been challenging to implement in rectal cancer surgery. The introduction of robotic surgery systems has facilitated this suturing in a narrow working space, making CO feasible in rectal cancer surgery.

**PURPOSE**: This study aimed to evaluate the influence of circumferential oversewing (CO) for anastomotic leakage (AL) in rectal stapled anastomosis using da Vinci robotic systems.

MATERIALS AND METHODS: We retrospectively reviewed data of 225 rectal cancer patients who underwent robotic low anterior resection. They were divided into CO and non-CO groups. CO group received circumferential oversewing along circular staple line. AL rate was assessed after inverse-probability-of-treatment weighting adjustment.

**RESULTS**: The overall AL rate was 4.4%. The AL of the CO group (n = 3/153) was 1.7%, which was significantly lower than the 10.3% of the non-CO group (n = 7/72, p = 0.010). In univariable analysis, CO was found to be a protective factor for AL (IPTW-adjusted OR: 0.153, p = 0.010).

**CONCLUSION**: Adding the CO procedure to rectal stapled anastomosis in robotic rectal cancer surgery reduced the rate of AL.

Table. Analysis of AL, overall complications, and re-admission using a logistic regression model before and after adjusting with IPTW.

	Before IPTW				After IPTW			
	Circumferential Oversewing							
	No	Yes	p-value	No	Yes	p-value		
Anastomotic leakage	1	0.222 (0.053-0.906)	0.036	1	0.153 (0.036-0.643)	0.010		
Overall complications	1	0.501	0.127	1	0.656	0.340		
Re-admission	1	0.700	0.700	1	0.797	0.817		

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<sup>&</sup>lt;sup>2</sup>Division of Colon and Rectal Surgery, Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine

# Analysis of Factors Influencing Repetitive Resection in Metastatic Colorectal Cancer Hepatectomy

Yenuk Ju<sup>1</sup>, Sun Il Lee<sup>2</sup>, Jun Woo Bong<sup>2</sup>, Chinock Cheong<sup>2</sup>, SangHee Kang<sup>2</sup>, Byung Wook Min<sup>2</sup>

<sup>1</sup>Korea University, College of Medicine & Hospital,

BACKGROUND: Repeat hepatectomy for liver recurrence is safe and effective in selected patients and can increase the chances of long-term survival., the reported 5-year survival rate is 30-60%. This survival rate is similar to that of patients who underwent a single hepatectomy alone. Numerous prognostic factors have been identified after curative resection (CRLM) in patients with colorectal liver metastases, including the number and size of liver metastases; These include the number and size of hepatic metastases, the presence of extrahepatic disease, high serum CEA levels, synchronous primary colorectal carcinoma and hepatic metastases, lymph node-positive primary tumor, and an involved resection margin. Nonetheless, there were inconsistencies in determining criteria for independent predictors.

**PURPOSE**: Therefore, the purpose of this study is to identify factors influencing the likelihood of repeat liver resection and to establish the groundwork for future predictions.

MATERIALS AND METHODS: We retrospectively reviewed the clinical data of a total of 119 patients who underwent liver resection for colorectal cancer with liver metastases from January 2010 to December 2019 and then underwent re-resection or not. Of these, 54 were patients who underwent liver resection more than twice, and 65 were patients who had residual tumor or recurrence but did not undergo liver resection. Clinical characteristics of patients such as age at diagnosis, gender, primary tumor location, TNM catego-

ry, carcinoembryonic antigen level at diagnosis of liver metastasis, neoadjuvant chemotherapy, longest diameter of liver metastases, total number, tumor budden score, liver metastasis and Information on relevant characteristics and the interval between diagnosis and surgery were analyzed.

**RESULTS**: In univariate analysis, when male, primary T, N stage is high when the distribution of liver metastases was bilateral repeat resection did not proceed. Age CA 19-9 level at each diagnosis, size of liver metastases pathologically confirmed at first surgery and When diagnosing liver metastasis, the length of the largest liver metastasis and Tumor Buddon score were also identified as factors. In multivariate analysis, higher T and N stages were associated with an increased likelihood of repeated resection (OR = 5.262 (1.463-18.925), P = 0.011, OR = 4.674 (1.633-11.782), P = 0.004). Additionally, a larger size of pathological liver metastasis was also identified as a contributing factor (OR = 1.529 (1.114-2.043), P = 0.007). When evaluating liver metastases, a smaller size (OR = 0.560 (0.383-0.889), P = 0.011) increased the likelihood of progression to repeated resection. There was a significant difference in the 5-year survival rate between the two groups: 53.4% vs 26.2% (P<0.01).

**CONCLUSION**: Therefore, when liver metastasis of colorectal cancer was confirmed, primary T stage, N stage, and size of liver metastasis were confirmed as predictors of repeat resection.

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### Long-term Oncologic Impact of Anastomotic Leakage after Curative Surgery in Patients with Non-metastatic Colorectal Adenocarcinoma

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BACKGROUND: Anastomotic leakage (AL) after colorectal cancer surgery remains a major concern to surgeon because it is associated with increased perioperative morbidity rate which induced prolonged hospital stay, and waste health care costs. Although it is clear that AL has a negative impact on short-term perioperative outcomes, long-term oncologic impact of AL is still controversial. PURPOSE: This study is aimed to evaluate the long-term oncologic impact of AL in the patients with non-metastatic colorectal cancer who underwent curative surgery.

MATERIALS AND METHODS: The consecutive colorectal cancer patients who underwent surgery in a single tertiary center between Jan 2004, and Dec 2018 were retrospectively reviewed. Inclusion criteria were as follows; the patients with colorectal adenocarcinoma who underwent curative surgery, and older than 18 years old. Exclusion criteria were as follows; no anastomosis, histologically a type other than adenocarcinoma, metastatic disease, recurrent disease, hereditary colorectal cancer, diagnosed with other cancer within 5 years before surgery, incomplete surgery (R1, R2 resection), and emergency surgery. The data was analyzed according to the presence of anastomotic leakage; anastomotic leakage group (AL group), and no leakage group (No AL group). Baseline characteristics, perioperative outcomes, histopathological outcomes, and

long-term oncologic outcomes were evaluated.

**RESULTS**: A total of 2122 patients were eligible to analysis. The incidence of AL was 3.0% (n=63/2122) and AL group contained larger proportion of rectum than No AL group (63.5% vs 35.5%, p<0.001). In AL group, 3 (4.8%) patients were treated with conservative management, 15 (23.8%) patients were needed intervention, and 45 (71.4%) patients underwent reoperation including stoma formation. Operative time and length of hospital stay were significantly longer in AL group compared to No AL group. There were no statistical differences between two groups for histopathological outcomes. The median follow-up duration was 59.3 months (range: 1.0 to 188.3). Both of 5-year overall survival (OS) and 5-year disease-free survival (DFS) showed no statistical differences between two groups (5-year OS: 76.0% in AL group vs. 84.1% in No AL group, p=0.154, and 5-year DFS: 70.4% in AL group vs. 79.5% in No AL group, p=0.147). On a multivariate Cox regression analysis, AL did not impact long-term oncologic outcomes.

**CONCLUSION**: The occurrence of AL after curative surgery for non-metastatic colorectal cancer did not lead to negative long-term oncologic outcomes in our cohort. Further prospective multicenter study will be required.

## Oncological Outcomes in Case of Anastomotic Leakage between Protective Ileostomy and Primary Anastomosis after Surgery for Rectal Cancer

#### Soeun Park, Jung Wook Huh

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BACKGROUND: Anastomotic leakage (AL) is one of the severe complications after rectal cancer surgery. AL may lead to reoperation, delayed discharge and adjuvant chemotherapy, and increase incidence of mortality. The formation of a diverting stoma like loop ileostomy following rectal cancer surgery is the protection from AL. But AL often diagnosed in the patients who underwent protective ileostomy and detected lately even after discharge.

**PURPOSE**: The aim of this study is to examine the oncological outcomes in case of anastomosis leakage between protective ileostomy group and primary anastomosis group after surgery for rectal cancer.

MATERIALS AND METHODS: We retrospectively reviewed the patients who had an AL after surgery for rectal cancer. 10399 patients had surgery for rectal cancer in Samsung medical center from January 2009 to December 2022. Among them, 243(2.3%) had a AL and were divided in two groups according to the presence of ileos-

tomy. Among 243 patients, patients who underwent protective ileostomy was 72(29.6%) and patients with primary anastomosis was 171(70.4%). We also compared clinicopathological characteristics and postoperative mortality between two groups.

**RESULTS**: We used the Kaplan-Meier method to analyses the oncological outcomes between two groups. The 5 year disease free survival was similar between two groups. However, the 5 year overall survival decreased in protective ileostomy groups. Logistic regression analysis showed that tumor stage is the only factor associated with recurrence between two groups. The rate of mortality cases was higher in protective ileostomy group.

**CONCLUSION**: In case of AL, protective diverting stoma did not affect 5 year disease free survival but decrease 5 year overall survival comparing AL with primary anastomosis. It is considered that the higher mortality rate in the protective ileostomy group is due to the late detection and cause sepsis leading to mortality.

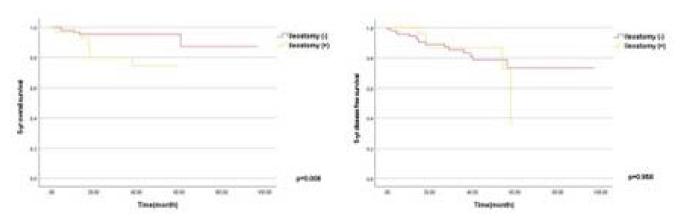


Figure. 5 year overall survival and disease free survival between preventive ileostomy group and primary anastomosis group.

# Impact of Nutritional Markers and Body Composition in Rectal Cancer Underwent Neoadjuvant Chemoradiotherapy

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BACKGROUND: Nutritional status is a significant prognostic factor in cancer patients, and even patients who were initially well-nourished can easily experience malnutrition due to cancer-induced metabolic dyshomeostasis. Body composition is an accurate indicator for evaluating nutritional status in many studies, and body composition, including muscle mass and fat mass, can be easily calculated using computed tomography.

**PURPOSE**: We aim to investigate the impact of commonly used neoadjuvant chemoradiotherapy (CRT) in patients with locally advanced rectal cancer on their nutritional status. Additionally, we analyze to determine whether adverse effects resulting from CRT are more prevalent in patients with myopenia.

MATERIALS AND METHODS: This retrospective study used medical records. Among the patients with locally advanced rectal cancer who underwent neoadjuvant CRT from January 1, 2013 to December 31, 2020, at Soonchunhyang University Cheonan Hospital. We confirmed the results of the blood test performed before and after CRT to evaluate the nutritional status of the patients. The differences between the two groups, myopenia and non-myopenia, were compared. Non-contrast-enhanced CT data were obtained from abdominopelvic computed tomography before and after CRT. The region of interest (ROI) of skeletal muscles, visceral fat, and subcutaneous fat were performed on a single axial slice of the CT scan at the center of the third lumbar (L3) vertebra level. Adverse effects resulting from CRT were classified using the RTOG (Radiation Therapy Oncology Group) criteria.

**RESULTS**: We divided the patients into two groups, myopenia and non-myopenia, based on the skeletal muscle index (SMI) measured before CRT. In both groups, there was a statistically significant decrease in lymphocyte count, prognostic nutritional index, visceral

fat index, total fat index, and visceral-subcutaneous fat ratio before and after CRT. In the myopenia group, there were significant differences in skeletal muscle index and subcutaneous fat index, while in the non-myopenia group, hemoglobin and neutrophil count showed significant decreases. However, the psoas muscle index did not show statistical significance in either group, although the mean values were higher after CRT compared to before. There was no statistically significant difference in the occurrence of adverse effects between myopenia patients (50.0%) and non-myopenia patients (42.1%) (p=0.433). The most commonly reported symptom was lower gastrointestinal symptoms.

CONCLUSION: These results indicate that CRT induces decrease in nutritional markers and fat index in patients regardless of the presence of myopenia. Comparing short term results, there was an increase in skeletal and psoas muscle index after CRT, suggesting a reduction in cancer-associated muscle wasting due to the tumor downsizing effect of CRT. These findings were more pronounced in patients with myopenia.

Table. Comparison of nutrition, inflammatory index, and body composition according to myopenia.

Variable		Oversall(n=038)			ion-myopenia(n=38	Myopeniain-Nii			
(MeanaSD)	Pro-CRT	Post-CRT	P-value	Pre-CRT	Foot-CRT	P-value	Pre-CRT	Post-CRT	P-value
Body mass index(kg/#/)	23.29±3.53	23.78±3.57	0.870	25.89±3.04	23.91e3.14	0.943	21.85±2.94	21.85e2.92	0.872
Serum albumin(g/dl)	4.15±0.44	4.21±0.41	0.156	4.29±0.39	4.63:0.35	0.618	4.08:0.46	4.13±0.42	0.222
Hemoglobini g/dh	14.00±12.98	12.49=1.51	0.015	13.55±1.99	13.20±1.55	0.049	12.49±2.06	12.10±1.83	0.132
Neutrophil count(cells/m m/)	4497.9:1719.3	3997.7±1422.5	0.020	4564.7±2053.4	3490.0:1446.7	0.002	4461.6:1522.9	4211.6±166 5.5	0.063
Lymphocyte count(cells/m m/)	2175.2x731.6	1156 6:443.3	<0.001	2328.41672.9	1106 Sn450 4	+0.001	2092.0x783.1	1183.66422.	40.001
PNI	52.3916.23	47.92±4.77	+0.001	54.51±5.45	49.17x3.96	<0.001	S1.25±6.36	47.25±5.05	+0.001
NLR	2.28:1.15	3.98+2.75	*D.001	2.05±0.99	3.92±3.23	+0.001	2.39:1.22	4.02±2.47	+0.001
5FI (cm//m/)	47.99±27.51	45.09±25.96	0.004	59.60±31.0	57.10±28.5	0.106	41.70±23.33	38.57±22.06	0.019
VFI (cm <sup>2</sup> m <sup>2</sup> )	51.40±31.14	43.68±27.81	<0.001	62.19±27.61	53.54:23.90	<0.001	45.55±31.46	36.33±28.47	+0.001
TFI (cm²/m²)	99.40:51.42	88.77±46.69	*0.001	121.79±51.16	110.65±45.62	<0.001	87.24±47.65	76.90±43.44	<0.001
Visceral- subcutaneous fat satio	1.16:0.60	1.02±0.55	<0.001	1.18±0.62	1.04:0.52	<0.001	1.14:0.59	1.00±0.56	<0.001
SMI (cm²/m²)	45.70±7.95	46.56±8.42	0.004	52.72+6.91	53.5247.10	0.084	41,9045.54	42,7846.66	0.022
PMI (cml/m²)	5.09±1.48	5.30±1.48	0.024	5.98 ± 1.57	6.15 = 1.47	0.234	4.62=1.20	4.84±1.29	0.097

abbreviations: 50, standard deviation; PNI, prognostic nutritional index; NLR, new lacietal muscle index; PNI, pops; muscle index.

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## Evaluation of DRE, ERUS, and Rectal MRI for Detection of Rectal Cancer T stage and Lymph Node Involvement

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BACKGROUND: Accurate staging is crucial for effective rectal cancer treatment planning and prognosis. While MRI is the gold standard for preoperative assessment, its high cost and limited accessibility make ERUS with DRE a practical alternative, especially where MRI is unavailable. ERUS can also reveal details that MRI might miss, highlighting its importance in preoperative evaluation. PURPOSE: This study aimed to evaluate the utility of DRE, ERUS, and rectal MRI for detecting rectal cancer stage T and lymph node involvement.

MATERIALS AND METHODS: This retrospective study, covering the period from 2011 to 2022, evaluates the diagnostic precision of Digital Rectal Examination (DRE), Endorectal Ultrasound (ERUS), and Rectal MRI in rectal cancer patients who underwent surgery. Exclusions were made for stage IV cases, patients treated with neoadjuvant chemoradiotherapy, those without ERUS or MRI data, and individuals who had colonoscopic polyp resection before surgery. For the selected cohort, the study measured each diagnostic tool's sensitivity, specificity, PPV, and NPV across different tumor stages and for lymph node assessment.

**RESULTS**: In a study of 772 rectal cancer patients who underwent surgery, 122 were analyzed. Digital Rectal Examination (DRE) was highly sensitive (81.5%) for movable tumors but less for fixed ones, both with moderate accuracy. Endorectal Ultrasound (ERUS) showed a high sensitivity for advanced stages (94.7% for uT3) and

specificity for early stages (97.8% for uT0/TIS) but lower sensitivity for intermediate stages. ERUS detected node positivity with moderate sensitivity (41.2%) and high specificity (84.1%). MRI excelled in specificity for all stages and showed excellent accuracy for advanced tumors (cT4).

**CONCLUSION**: The study underscores the importance of selecting appropriate diagnostic tools based on the stage of rectal cancer to optimize staging accuracy and guide treatment planning.

Table. Diagnostic sensitivity, specificity, PPV, NPV and accuracy of DRE, ERUS and Rectal MRI

			Sensitivity	Specificity	PPV	NPV	Accurac
DRE (n=80)	Negative for invasion (N=39)		-	-	-	-	-
	Positive for invasion	Movable (n=30)	81.5%	42.9%	73.3%	54.5%	68.3%
	(N=41)	Fixed (n=11)	42.9%	81.5%	54.5%	73.3%	68.3%
ERUS	uT0/TIS		30.0%	97.8%	60%	92.7%	53.5%
	uT1		27.3%	93.9%	69.2%	72.1%	
	uT2		69.7%	69.7%	53.5%	82.1%	]
	uT3		94.7%	80%	52.9%	98.5%	
	uT4		-		-	-	
	Node positivi	ty	41.2%	84.1%	35%	87.3%	76.8%
Rectal MRI	cT0/TIS/T1		16.1%	99.0%	83.3%	76.3%	99.0%
	cT2		51.5%	58.9%	36.2%	72.9%	56.6%
	cT3		60.5%	81.5%	65.7%	77.9%	73.8%
	cT4		57.1%	96.8%	57.1%	96.8%	94.1%
	Node Positivit	ty	69.2%	65%	39.1%	86.7%	66%

### Risk Factors for Lymph Node Metastasis in pT1-2 Rectal Cancer According to Neoadjuvant Chemoradiotherapy Status

#### Young Hae Choi, Jung Wook Huh

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BACKGROUND: According to current guidelines, patients with locally advanced rectal cancer who have received neoadjuvant chemoradiotherapy(nCRT) and radical resection are recommended to receive adjuvant chemotherapy regardless of final pathologic stage. Good responses after nCRT exhibited effective local control comparable to early rectal cancer without nCRT. Therefore, the efficacy of adjuvant chemotherapy in patients without adverse risk factors for distant metastasis has been questioned.

**PURPOSE:** This study aimed to identify the risk factors for lymph node(LN) metastasis in pT1-2 rectal cancer and to determine whether these factors vary based on the presence or absence of nCRT.

MATERIALS AND METHODS: From January 2009 to December 2018, 1,193 patients with pT1-2 rectal cancer who underwent radical surgery were analyzed retrospectively. Patients were divided into two groups according to nCRT status. Risk factors for LN metastasis and survival curves were evaluated for each group.

RESULTS: There were 763 patients (64%) in the non-nCRT group and 430 patients (36%) in the nCRT group. The incidence of lymph node metastasis was 21.2% (n=162) in the non-nCRT group and 17.7% (n=76) in the nCRT group. In the non-nCRT group, multivariate analysis showed that tumor invasion depth (P<0.001), lymphatic invasion (P<0.001), and tumor budding (P=0.006) were significant independent predictors of LN metastasis. The 5-year disease-free survival rate (DFS) was 93.7% in the LN-negative group and 87.6% in the LN-positive group (P=0.042), but there was no difference in local recurrence-free survival rate (LRFS) and overall survival rate (OS). Lymphatic invasion was the only variable af-

fecting DFS in multivariate analysis (P<0.001). In the nCRT group, multivariate analysis revealed that lymphatic invasion (P=0.001) and vascular invasion (P<0.001) were significant independent risk factors of LN metastasis. There was a significant difference in DFS of 85.1% vs. 56.9% (P<0.001) and LRFS of 95.6% vs. 76.1% (P=0.027) in the LN-negative and LN-positive groups, respectively, but no difference in OS. The risk factors associated with DFS were LN metastasis (P<0.001) and perineural invasion (P=0.029), and the factor associated with LRFS was LN metastasis (P=0.023) accroding to multivariate analysis.

**CONCLUSION**: In the non-nCRT group, tumor invasion depth, lymphatic invasion, and tumor budding were significant independent risk factors of LN metastasis. In the nCRT group, lymphatic invasion and vascular invasion were significant independent risk factors of LN metastasis.

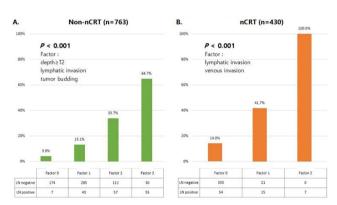


Figure. Risk stratification by grouping the factors influencing lymph node metastasis

### Pelvic Exenteration Should be Considered in T4b Rectal Cancer Below the Peritoneal Reflection

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Kyungpook National Univ.

BACKGROUND: Despite advances in rectal cancer surgery, T4b rectal cancer, characterized by invasion beyond the rectal wall into adjacent structures, poses a clinical challenge. This challenge arises from the imperative need for multi-visceral resection to achieve a clear resection margin. After neoadjuvant treatment, the decision to preserve the pelvic compartment based on tumor response has been left to the discretion of the surgeon. However, there is limited data available regarding oncologic outcomes corresponding to the extent of resection following neoadjuvant treatment in T4b rectal cancer.

**PURPOSE**: This study aimed to assess the impact of the extent of surgery by changing the surgical strategy according to tumor response in T4b rectal cancer identified in initial MRI.

MATERIALS AND METHODS: Between 2011 and 2021, patients with non-metastatic T4b rectal cancer were retrospectively evaluated. Primary outcome measures were local recurrence-free survival (LRFS) and cancer-specific survival (CSS). Surgical procedures were categorized into three groups: total mesorectal excision (TME), extended-TME (eTME) and pelvic exenteration (PE).

**RESULTS**: A total of 108 patients with initial T4b rectal cancer were identified. All patients underwent neoadjuvant treatment. During the operation, 81 patients (75.0%) were still considered T4b, undergoing multi-visceral resection, with 60 patients (55.6%) by eTME and 20 patients (18.5%) by PE. Pathologic examination revealed 32 patients (29.6%) diagnosed as T4b, and 23 (21.2%) were diagnosed with poorly differentiated or mucinous cancer. The 5-year LRFS was 86.8%, and CSS was 82.1%. On multivariate analysis, LRFS was significantly associated with tumor invasion below peritoneal reflection (HR 8.576; 95% CI 1.077-68.296; P = 0.042), perforation with abscess formation (HR 3.4989; 95% CI 1.142-10.657; P = 0.028), and poorly differentiation (HR 6.921; 95% CI 2.163-22.137; P = 0.001). CSS was significantly associated with tumor invasion below peritoneal reflection (HR 6.982; 95% CI 1.465-33.280; P = 0.015), perforation with abscess formation (HR 2.854; 95% CI 1.092- 7.462; P = 0.032), and poorly differentiation (HR 4.211; 95% CI 1.284-13.874; P=0.018). In patients with tumor invaded the adjacent structures below the peritoneal reflection, those who underwent PE showed significantly better 5-year LRFS than those who underwent eTME (70.4% vs. 85.7%, P=0.034).

**CONCLUSION**: This study demonstrates that PE can provide good local control and long-term survival than eTME in patients with T4b rectal cancers below the peritoneal reflection. Although changing surgical strategy in accordance with the tumor response after neoadjuvant treatment in rectal cancer is an attractive concept from the organ preservation strategy, such decision should be carefully guided by considerations of oncologic safety.

Table 1. Multivariate analysis

Local recurrence-free survival	Univariate analysis -	Multivariate analysis			
Eccar recurrence-nee survivar	Cinvariane analysis	HR	95% CI	P value	
Age	0.345				
Sex, male	0.675				
Initial CEA, elevated	0.708				
Initial CA19-9, elevated	0.152	1.720	0.502-5.895	0.388	
Tumor location, lower	0.079				
Tumor invasion, below peritoneal reflection	0.048	8.576	1.077-68.296	0.042	
Preoperative treatment, consolidation chemo	0.479				
MR T downstaging, yes	0.353				
Perforation with abscess formation, yes	0.011	3.489	1.142-10.657	0.028	
Resection, PE	0.306				
Operative T status, T4b	0.306				
Pathologic T downstaging, yes	0.653				
Pathologic N, positive	0.070	2.256	0.614-8.286	0.220	
CRM, positive	0.233				
Differentiation, well/moderately	0.006	6.921	2.163-22.137	0.001	
Lymphatic invasion, yes	0.241				
Extramural venous invasion, yes	0.807				
Perineural invasion, yes	0.810				
Tumor regression grade, good	0.628				
Adjuvant chemotherapy, active	0.762				
Cancer-specific survival	Univariate analysis —		Multivariate analysis		
Cancer-specific survivar	Ollivariate analysis	HR	95% CI	P value	
Age	0.217				
Sex, male	0.774				
Initial CEA, elevated	0.577				
Initial CA19-9, elevated	0.552				
Tumor location, lower	0.035				
Tumor invasion, below peritoneal reflection	0.019	6.982	1.465-33.280	0.015	
Preoperative treatment, consolidation chemo	0.241				
MR T downstaging, yes	0.301				
Perforation with abscess formation, yes	0.003	2.854	1.092-7.462	0.032	
Resection, PE	0.224				
Operative T status, T4b	0.362				
Pathologic T downstaging, yes	0.979				
Pathologic N, positive	0.020	2.490	0.913-6.791	0.075	
CRM, positive	0.271				
Differentiation, well/moderately	0.059	4.221	1.284-13.874	0.018	
Lymphatic invasion, yes	0.505				
Extramural venous invasion, yes	0.722				
Perineural invasion, yes	0.745				

# Factors Associated with Postoperative Recovery and Oncologic Outcomes in Elderly Colorectal Cancer Patients: Multicenter Data

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BACKGROUND: Colorectal cancer is one of the most common malignancies, with an increasing number of older patients in an aging society. In the elderly patients, unlike young individuals, there are numerous variables that impact recovery in addition to disease itself, such as underlying disease, performance status, comorbidities and so on. As a result, attempts to provide individualized and suitable treatment for elderly patients are also increasing.

**PURPOSE**: In this study, we tried to find out modifiable factors that could predict postoperative recovery in an effort to encourage the development of a personalized treatment plan for elderly patients

MATERIALS AND METHODS: We reviewed records of patients who received curative resection for colorectal cancer between January 2005 and November 2011 at Asan Medical Center, Gangneung Asan Hospital, and Ulsan University Hospital. All patients' records were retrospectively reviewed for clinicopathologic features, recurrences and survival status. Data on the existence or non-existence of sarcopenia and the hospital stay was also provided for this cohort. 'Recovery' was evaluated by hospital stay and readmission within 30 days after discharge and 'Sarcopenia' was evaluated with artificial intelligence soft ware using the body composition on Computed Tomography (CT)

RESULTS: Of 1382 patients, 252 (18.2%) were above 70 years old and the mean age was 59.0 (±10.9) years. neutrophil-lymphocyte ratio (NLR), albumin and sarcopenia were related with recovery after operation in elderly patients. (NLR; OR 0.52; 95%CI, 0.28- 0.97, P=0.041; albumin; OR 2.01; 95%CI, 1.06-3.79, P=0.032; sarcopenia; OR 0.44; 95%CI, 0.21-0.94, P=0.034). Fast recovery represented by shorter hospital stay without readmission within 30 days after discharge, pathologic N (pN) stage, and lymphovascular invasion (Lvi) was associated OS (HR 0.64; 95%CI, 0.42-0.97; P=0.036, HR 1.61; 95%CI, 1.04-2.47; P=0.032, HR 1.63; 95%CI, 1.06-2.50; P=0.025, respectively). Additionally, Albumin-globulin ratio and pathologic T stage was associated with RFS (HR 0.56; 95%CI, 0.33-0.97; P=0.038, HR 3.08; 95%CI, 1.44-6.59; P=0.004, respectively). Mean-

while, Sarcopenia was also not associated with both OS and RFS. **CONCLUSION**: According to the results of this study, NLR, albumin and sarcopenia were associated with postoperative recovery in elderly patients and correlation between recovery and oncologic outcomes was also identified. Consequently, we should consider improving the recovery-related elements mentioned in this study before surgery, and additional investigation is required to find out whether there are any other factors that could also affect recovery.

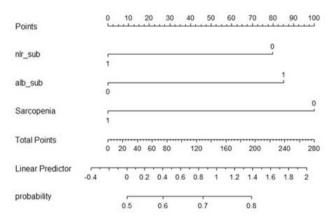


Figure. In multivariable analysis, NLR, albumin and sarcopenia were associated with recovery after operation in elderly patients. (NLR; OR 0.52; 95%CI, 0.28-0.97, P=0.041; albumin; OR 2.01; 95%CI, 1.06-3.79, P=0.032; sarcopenia; OR 0.44; 95%CI, 0.21-0.94, P=0.034). Based on the results of multivariate analysis, significant variables were used to formulate the nomogram for possibility of recovery after operation for elderly patients. We constructed a prediction nomogram model of recovery. A summary of the point value of each variable used to compute the final score is provided. The points per unit of linear predictor is 115.855 and linear predictor units per point is 0.008631514. To begin, a vertical line was constructed to correspond to a certain score in the prediction of recovery based on the value of each variable. Patients with NLR less than 3.0 points had 76 points, with albumin level more than 3.5g/L had 87 points, and without sarcopenia had 100 points. Then, vertical line on total points, which is the sum of three points you read on the points scale can be used to read the possibility of recovery. If patients had total 25 points, the possibility of recovery is 50%, and 75 points with 60%, 129 points with 70%, and 195 points with 80%.

### Impact of Immunologic Changes in the Recovery Process of Elderly Colon Cancer Patients: Prospective Study

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BACKGROUND: The geriatric population is rapidly growing around the world, and the proportion of elderly cancer patients is likewise rising considerably. Approximately 50% of colorectal cancer (CRC) patients are over 70 at the time of diagnosis, and 43% are over 75. In CRC, cancer-related inflammation correlated with the course and prognosis of the disease and elderly patients are becoming more and more interested in 'immunity'.

**PURPOSE**: The purpose of this study is to find out the impact of immunologic factors in the recovery process of elderly CRC patients.

MATERIALS AND METHODS: Patients who received radical resection for colon cancer between September and November 2023 at Asan Medical Center was involved. Routine blood sampling and Immunologic tests including interleukin-6 (IL-6), natural killer cell (NK cell), and tumor necrosis factor-alpha (TNF-alpha) were performed at preoperative day, post operative 3rd day (POD#3), and outpatient clinic day (about POD#21). Patients' subjective health level was also assessed by a simple questionnaire, EuroQol group-5 dimension-3 level (EQ-5D-3L), and Recovery was evaluated by the average hospital day and EuroQol score.

**RESULTS**: Of 40 patients, 24 (60.0%) were male and the mean age was  $66.3 \pm 3.0$  (±13.0) years old. When a shorter hospital stay was the

criterion for repaid recovery, age was not associated with recovery, nor when there was no variation in the EuroQol score before and after surgery was the criterion for quick recovery. Levels of preoperative IL-6 and NK cell at preoperative, POD#3, and POD#21 were significantly higher in elderly group than non-elderly group. In addition, patients with higher pre-operative EQ-5D-3L index values were more prevalent in the fast recovery group (64.7% vs. 33.3% in the elderly patient group), though it was not significant statistically (P=0.701)

CONCLUSION: According to the results of this study, no significant immunologic variables were identified to be associated with recovery and age was not associated with recovery. Furthermore, NK cell and IL-6 levels were often greater in elderly patients. NK cells showed that, in contrast to the non-elderly group, elderly patients do not necessarily have poor outcomes before and after surgery as they were not lower in elderly group. Therefore, elderly patients don't need to be reluctant to get active treatment only because of their advanced age and there is no need to be concerned about a poor recovery following surgery. Additionally, more investigation is required to determine whether factors other than the cytokines utilized in this study also had an impact on recovery.

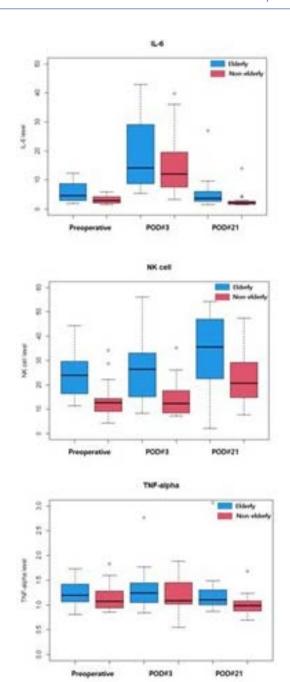


Figure. The average of preoperative IL-6 level was significantly higher in the elderly group than non-elderly group (6.055 vs. 3.230, P=0.002). The elderly group had higher mean values for both the IL-6 level on the postoperative day 3 (POD#3) and postoperative day 21 (POD#21), however, there was no statistically significant difference (POD#3: 18.070 vs. 14.625, P=0.332, POD#21: 13.320 vs. 2.920, P=0.2127). In the case of NK cell, the elderly group exhibited a generally higher total NK cell level. Compared to non-elderly group, the average NK cell value of the elderly group was higher in all preoperative, postoperative day 3, and postoperative day 21, and all of these differences were statistically significant (Preoperative day: 24.375 vs. 13.765, P <0.001, POD#3: 25.670 vs. 14.460, P=0.001, POD#21: 34.161 vs. 22.215, P=0.005). TNF-alpha also showed a higher average value in the elderly group, although there was no discernible difference in the numerical value and not significant statistically.

# Comparison of Sing-port versus Multi-port Surgery for Rectal Cancers: A Single-Center, Randomized Controlled Trial

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**BACKGROUND**: It is unknown whether the da Vinci Single-port (SP) system exhibits the same performance as the previous multiport (MP) system during complicated procedures, such as rectal cancer surgery.

PURPOSE: Therefore, we conducted a randomized controlled trial to compare the short-term clinical outcomes of SP and MP robotic total mesorectal excision (TME) for the treatment of rectal cancer. MATERIALS AND METHODS: This study is a prospective, single-center, randomized, controlled open-label trial involving patients diagnosed with adenocarcinoma located <10 cm from the anal verge and clinically rated as T1-3NxM0, who underwent either SP or MP robotic TME. The primary outcome measured was the ideal hospital stay, evaluated based on five recovery criteria. Secondary outcomes included perioperative morbidity, recovery parameters, pathological results, and quality of life. The trial is registered under the number KCT0006007.

**RESULTS**: A total of 77 patients were eligible for intention-to-treat analysis, with 39 in the SP group and 38 in the MP group enrolled between March 2021 and December 2023. The ideal hospital stay was  $4.2 \pm 1.5$  days in the SP group and  $4.8 \pm 1.7$  days in the MP group (P = 0.105). Intraoperative parameters, including operative time (P = 0.338) and estimated blood loss (P = 0.730), did not differ between the groups. The Visual Analogue Scale (VAS) pain score at

one day after surgery was significantly lower in the SP group (5.2  $\pm$  1.1 vs. 5.8  $\pm$  1.3, P = 0.048). In patients without anastomotic leakage, CRP levels on postoperative day 3 trended to be lower (7.2  $\pm$  3.7 vs. 9.3  $\pm$  5.3 mg/L, P = 0.062) in the SP group compared to the MP group. The overall postoperative complication rate was 17.9% in the SP group and 23.7% in the MP group (P = 0.584). Pathologic outcomes, including circumferential resection margin and the number of retrieved lymph nodes, were not different the between groups. CONCLUSION: In patients with middle or low rectal cancer, SP robotic surgery demonstrated outcomes comparable to those of MP robotic TME. Thus, the SP robot can be considered a viable surgical option for the treatment of rectal cancer.

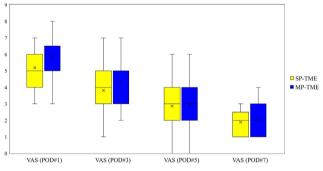


Figure 1. VAS score

# Which Colonic Obstruction Is a Real Prognostic Factor for Stage II Colon Cancer? Endoscopic versus Clinical

Bomi Kim, Sangsik Cho, Sun Mi Moon, Ui-sup Shin

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**BACKGROUND**: Colonic obstruction (CO) is known as one of the poor prognostic factors in stage II colon cancer. However, the definition of CO varies across studies and the influence of CO on the survival outcomes in colon cancer has not been consistent.

**PURPOSE**: This study aimed to evaluate the true meaning of CO as a prognostic factor in colon cancer and to compare the clinical differences of endoscopic CO (eCO) and clinical CO (cCO).

MATERIALS AND METHODS: In this single center retrospective study, from January 2010 to December 2018, patients who had preoperative colonoscopy before curative surgery for stage II colon cancer were recruited and divided into three groups: patients with no obstruction, patients with eCO and patients with cCO. Survival outcomes and clinicopathological features were compared among the groups.

RESULTS: Of the 316 patients, 181 (57.3%) had no obstruction, 46 (14.9%) had eCO, and 88 (27.8%) had eCO. The median follow-up

period was 59 months (range, 1–158 months). There were more patients with high level of carcinoembryonic antigen (CEA), pathologic T4, and large size of tumor in CO groups than no obstruction group. Peri-neural invasion was significantly more in cCO group than no obstruction and eCO groups. Kaplan-Meier curves showed that patients with cCO had worse disease-free survival (DFS) and overall survival (OS) compared to patients with eCO or no obstruction (5-year DFS = 76% vs. 92% vs. 94%, respectively, p < 0.001; 5-year OS = 89% vs. 94% vs. 95%, respectively, p = 0.036). In multivariate analysis, cCO was significantly related with worse DFS (hazard ratio [HR] = 3.525, 95% confidence interval [CI] = 1.659-7.489, p = 0.001), but not in OS (HR = 2.750, 95% CI = 0.947-7.982, p = 0.063), and eCO was not a prognostic factor in both DFS and OS. CONCLUSION: cCO, rather than eCO, might be a significant poor prognostic factor in stage II colon cancer.

## **Appendiceal Cancer Discovered Incidentally Due to Small Bowel Obstruction**

#### Seong Ju Hong, Eun Jung Ahn

Department of Surgery, National Medical Center

BACKGROUND: Malignant neoplasms of the appendix are extremely rare with an age-adjusted incidence that has been estimated to be approximately 0.12 per 1,000,000 person years. The most common symptom of appendiceal cancer is chronic recurrent right lower quadrant (RLQ) pain because it may cause appendicitis or rupture of the appendix.

**PURPOSE**: We herein describe an uncommon clinical course of an old male with recurrent RLQ pain and small bowel obstruction that led to the detection of appendiceal cancer.

MATERIALS AND METHODS: A 70-year-old male with no abdominal surgery history came to the emergency department with recurrent RLQ pain for approximately 2 weeks. The pain was associated with nausea, vomiting and his abdomen was distended with mild RLQ pain. Laboratory analysis was unremarkable.

RESULTS: Contrast enhanced computed tomography (CT) demonstrated a confluent fluid- filled small bowel in RLQ and mild wall thickening, surrounding haziness and regional lymphadenopathy and no detectable appendix. The patient was suspected of having a small bowel obstruction caused by the adhesion band. He was hospitalized and treated conservatively. But symptoms and signs didn't improve. So we decided to perform a diagnostic exploration. On the exploration, It was observed that the omentum covered the entire small intestine and was adhered to terminal ileum and pericecal area. After removal of the attached omentum, an irregular mass measuring 2.5 cm was palpated at the terminal ileum mesentery with multiple loops of small bowel attached. Another mass was identified on cecum, which had been considered as appendiceal orifice but appendix was not found. No other visible mass involved with small bowel and colorectum was noted except previously mentioned lesions. In addition, the other separated mass measuring 0.5 cm was in the right paracolic gutter. The patient underwent ileocecectomy with double barrel ileo-colostomy and peritoneal mass excision. Pathologic result showed moderately differentiated adenocarcinoma with mucin component and presented multiple pericolic lymph node metastasis and perineural invasion. The pathologist suggested that the origin of the cancer was more likely to be the appendix than the small intestine since mucin component was present

**CONCLUSION**: In old-ages with non-operable history, we should always consider tumors as a cause of intestinal obstruction. It is necessary to take into consideration that appendiceal tumor can be causes of small intestinal obstructions, if there is a transition point in the RLQ of abdomen on CT or recurrent RLQ pain.

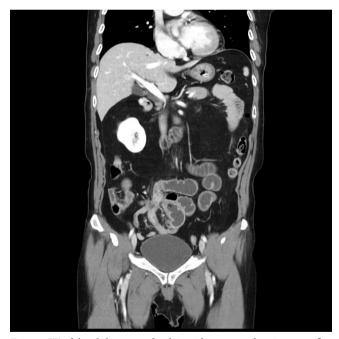


Figure. CT of the abdomen and pelvis with contrast showing a confluent fluid-filled small bowel in RLQ and mild wall thickening, surrounding haziness.

## Colorectal Metastasis from Gastric Cancer: Insights from a 14-year Case Series at Tertiary Hospital

Ji You Jung, Soo Young Lee, Hyeung-min Park, Chang Hyun Kim, Hyeong Rok Kim

Chonnam National University Hwasun Hospital

BACKGROUND: Gastric cancer is one of the most prevalent cancers globally, with common metastatic sites including liver, peritoneal surface, and distant lymph nodes. However, colorectal metastasis from gastric cancer is very rare. Existing literature on this subject is limited to only a few case reports, resulting in a significant gap in our understanding of the prognosis associated with colorectal metastasis from gastric cancer.

**PURPOSE**: We designed this study to investigate clinicopathological features and prognosis of colorectal metastasis arising from gastric cancer.

MATERIALS AND METHODS: A comprehensive analysis was conducted on data from patients who underwent surgical intervention between January 2010 and June 2023. Those exhibiting colorectal metastasis from gastric cancer during this period were included in the study. Clinicopathological characteristics and prognosis were analyzed.

RESULTS: A total of 13 patients with colorectal metastasis from gastric cancer were identified, with 53.8% (7/13) being male and a median age of 60 years (range 39–81). The majority (92.3%) experienced metachronous metastasis, while one patient exhibited synchronous colon metastasis. The median disease-free interval for metachronous metastasis was 36.5 months (range 16–138). Initial

TNM staging of gastric cancer showed a distribution of II (36.4%), III (36.4%), and IV (27.3%), and most of them had poorly differentiated (70.0%) or signet ring cell (20.0%) gastric cancers. Metastatic sites were distributed as 2 (15.4%) in the right-side colon, 7 (53.8%) in the left-side colon, and 4 (30.8%) in the rectum. Surgical resection was performed in 76.9% of cases, with the remaining 23.1% undergoing diverting stomy. Metastatic colorectal tumors were predominantly poorly differentiated (75.0%) or signet-ring cell (25.0%) adenocarcinoma. Among those with surgical resection, 50% (5/10) achieved R0 resection, while the other 50% (5/10) had R1 or R2 resection. Of those with R0 resection, 80% (4/5) experienced recurrence, while the other one patient died postoperatively. Ten (76.9%) had died, and the median overall survival was 11 months, with 2-year overall survival of 18.5%. While R0 resection trended toward improved overall survival (2-year OS, 37.5% vs. 12.5%, p = 0.167), statistical significance was not reached. Notably, one patient who achieved R0 resection defied the odds, surviving for 158 months. CONCLUSION: Colorectal metastasis from gastric cancer demonstrated unfavorable histology and a challenging overall survival. Despite this, the pursuit of R0 resection appears to hold significance, suggesting a potential avenue for improved outcomes.

### The Impact of Elevated Anal Sphincteric Tone on Anastomotic Leakage in Radical Resection of Rectal Cancer

Eonbin Kim<sup>1</sup>, Yong Sik Yoon<sup>2</sup>

<sup>1</sup>Dongguk University Ilsan Hospital, <sup>2</sup>Asan Medical Center

BACKGROUND: Since the introduction of total mesorectal excision (TME) in 1982, surgical approaches for low rectal cancer have evolved, leading to reduced recurrence rates and improved survival. However, despite these advancements, anastomosis leakage remains a significant postoperative complication, with incidence rates ranging from 2.5% to 21%.

**PURPOSE**: This study aims to explore the correlation between preoperative manometry results and surgical outcomes, particularly focusing on anastomosis leakage in rectal surgery.

MATERIALS AND METHODS: Clinical data of patients who underwent low anterior resection or ultra-low anterior resection for rectal cancer at Asan Medical Center from April 2014 to July 2022 was reviewed. Patient demographics, postoperative outcomes, including anastomosis leakage, and preoperative anorectal manometry, focusing on maximum resting pressure (MRP) and maximum squeezing pressure (MSP) data, were analyzed.

**RESULTS**: Of the 248 patients analyzed, complications were observed in 42 patients (16.9%), with anastomosis stricture being the most common. Anastomosis leakage occurred in 10 cases, necessitating additional surgical interventions. The MRP in patients with and without leakage showed no significant differences (p = 0.297), while the MSP showed significant differences (p = 0.036). MRP exceeding the upper limit of 70 mmHg showed significant differences in anastomosis leakage (p = 0.045). Rectal compliance (RC) in patients with and without leakage also showed significant differences (p = 0.030). MRP over the upper limit of 70 mmHg, MSP over 224 mmHg, or RC over 2.25 mL/mmHg may have an impact on anastomosis leakage based on receiver operating characteristic (ROC) curve analysis.

**CONCLUSION**: In planning rectal surgery, the results of anorectal

manometry may help the operator decide whether to create an ileostomy to reduce the risks of anastomosis leakage.

Table Statistical analysis of anastomosis leakage (N=248)

	Leak (-) (N=237)	Leak (+) (N=11)	p
Age (mean ± SD)	57.9 ± 10.7	59.1 ± 6.3	0.717
Sex			0.150
Male	182 (76.8%)	11 (100.0%)	
Female	55 (23.2%)	0 (0.0%)	
DM	40 (16.9%)	1 (9.1%)	0.791
HTN	82 (34.6%)	5 (45.5%)	0.679
BMI (mean ± SD)	$24.4 \pm 3.4$	$23.2 \pm 1.9$	0.241
AV (mean ± SD)	$5.6 \pm 2.5$	$6.5 \pm 2.2$	0.201
lleostomy	175 (73.8%)	6 (54.5%)	0.288
PCRT	109 (46.0%)	2 (18.2%)	0.133
Adjuvant chemotherapy	162 (68.4%)	7 (63.6%)	1.000
MRP (mean ± SD)	$53.7 \pm 18.4$	59.6 ± 19.5	0.295
MRP > upper limit	40 (16.9%)	5 (45.5%)	0.045
MSP (mean ± SD)	$191.6 \pm 64.5$	$234.1 \pm 82.0$	0.036
MSP > upper limit	136 (57.4%)	7 (63.6%)	0.527
RC (mean ± SD)	$1.5 \pm 0.7$	$2.0 \pm 0.9$	0.030
Recurrence	21 (8.9%)	1 (9.1%)	1.000
Operation type			0.856
LAR	90 (38.0%)	5 (45.5%)	
uLAR	147 (62.0%)	6 (54.5%)	

SD, standard deviation; DM, diabetes mellitus; HTN, hypertension; BMI, body mass index; AV, anal verge; PCRT, preoperative chemoradiotherapy; MRP, maximum resting pressure; MRP > upper limit, maximum resting pressure higher than 70 mmHg; MSP, maximum squezing pressure; MSP> upper limit, maximum squeezing pressure higher than 180 mmHg; LA R, low anterior resection; uLAR, ultra-low anterior resection;

Statistical analysis of anastomosis leakage. Leakage was significantly more frequent when the patients' mean resting pressure on preoperative anorectal manometry was greater than the upper normal limit of 70 mmHg (p = 0.045). The mean squeezing pressure showed a statistically significant difference between the leakage group and the no leakage group (p = 0.036).

# Could It Be Rope Worm?; Severe Anastomotic Stricture after Laparoscopic Anterior Resection

### Young-hun Kim, Kyung Jong Kim

Chosun University Hospital

**BACKGROUND**: "Rope worms" may simply be shed pieces of intestinal mucus. Mucus can be more common with certain health conditions, including inflammatory bowel disease and colon cancer.

**PURPOSE**: After anterior resection, severe stenosis occurred at the anastomosis site. In a previous incident, a lump of tissue came out during a bowel movement two weeks after surgery. We report that there is no such case in the literature published so far.

MATERIALS AND METHODS: A 56-year-old male patient was diagnosed with sigmoid colon cancer after polyp removal during colonoscopy at the colorectal clinic and visited our hospital for surgery. A laparoscopic anterior resection was performed, and the patient reported that there was a strong foul odor during defecation, and after 2 weeks, a lump of tissue came out during defecation. Afterwards, he gradually developed symptoms of abdominal disten-

sion and passed watery stools more than 20 times a day.

**RESULTS**: After about 10 months, we performed endoscopic dilatation, but the stenosis was so severe that the guide wire could not be inserted. Afterwards, a self-expandable metal stent was placed and the symptoms improved, but two months later, the stent broke through the hard colon, so a low anterior resection was performed. Currently on surveillance without symptoms.

CONCLUSION: "Rope worms" are reportedly discovered during enemas and colonics. There's little evidence to support the theory that these "worms" are a newly discovered type of human parasite. Bowel preperation performed several times for colon cancer diagnosis and preoperative marking after polypectomy can affect the shedding of the intestinal mucosa, which can cause postoperative anastomotic stricture.

# Early Single Center Experience of DaVinci® Single-Port (SP) Robot Surgery in Colorectal Patients

Hye Jung Cho, Woo Ram Kim

Gangnam Severance Hospital

BACKGROUND: DaVinci Single-Port (SP) robotic surgery offers several benefits compared to traditional multiport laparoscopic or robotic surgeries. One of the main advantages is that it allows for a minimally invasive approach, resulting in a single, smaller incision and reduced trauma to the patient's body leading to less postoperative pain, faster recovery, and reduced risk of complications.

**PURPOSE**: The cosmesis of a single port with minimal visible scarring is also an attractive aspect to the patients; however, many surgeons use an additional port for energy device, stapler use, and drain insertion. Pure single port surgery with one incision is still rare. Here share our experience of first 10 cases using SP robotic platform in colorectal surgery.

MATERIALS AND METHODS: From May 2023 to December 2023, colorectal patients who underwent SP-robotic surgery were analyzed. Placement of the incision was umbilicus for 8 patients, and right lower quadrant for 2 patients through which ileostomy maturation was performed. Data including perioperative parameters and postoperative outcomes were analyzed with a median follow-up of 4.6months (range 0.6-7.4months).

**RESULTS**: A total number of 10 colorectal patients underwent DaVinci<sup>®</sup> Single-Port robotic colorectal surgery at our institution

during this period. Demographics of the patients showed 4 males (40%) and 6 females (60%) with a median age of 63.5 years (range 50-75 years). Median body mass index (BMI) was 22.89 kg/m<sup>2</sup> (range 19.92-26.84kg/m²), and 9 patients were diagnosed with colorectal cancer and 1 patient was diagnosed with rectal gastrointestinal tumor. One patient underwent anterior resection and cholecystectomy simultaneously. Mean operation time was 222min (range 142-316min), and mean wound size was 3.25cm (range 2.5-4.5cm). Nine patients underwent surgery with single incision through which single port trocar was inserted, and one patients had one additional port for drain insertion. Mean hospital stay was 6 days (range 4-8 days) with 1 postoperative complication of bleeding requiring transfusion, but there was no re-admission within 30 days. **CONCLUSION**: Overall, our experience with single-port robotic colorectal surgery has been promising. With only one patient with additional port for drain insertion, all nine patients underwent SP-robotic surgery with single incision for colon as well as rectal surgeries. Compared to an average postoperative length of stay of 6.5-8 days in laparoscopic colorectal surgeries reported in literature, SP-robotic surgery showed faster recovery of 6 days highlighting its benefits in patient recovery and satisfaction.

### Efficacy of Quadratus Lumborum Block for Postoperative Pain Control in Patients Undergoing Ileostomy Closure: A Prospective, Randomized, Single-Blind, Controlled Clinical Trial

<u>Soo Yeun Park,</u> Jun Seok Park, Gyu Seog Choi, Jun Seok Park, Seung Ho Song, Sung-Min Lee, Su Jin Kang, Jinseok Yeo

Kyungpook National University Chilgok Hospital

BACKGROUND: The quadratus lumborum block has been used as a component of multimodal analgesia following abdominal surgery. We introduced ultrasound-guided quadratum lumborum (QL) block for postoperative pain management after ileostomy closure.

**PURPOSE**: This study aimed to investigate the analgesic efficacy of the QL-block compared to placebo in ileostomy closure.

MATERIALS AND METHODS: In this placebo-controlled, single-blinded randomized controlled trial, 60 patients undergoing elective ileostomy closure were randomly assigned (1:1 ratio) to the placebo group (Placebo group) and QL-block group (QL group). The unilateral QL- block was performed under ultrasound guidance immediately after general anesthesia. After the end of surgery, opioid consumption, and numeric rating scores (NRS, 0 [no pain] to 10 [worst pain]) of pain were recorded at 2, 6, 24, 48, and 72 hours postoperatively and were compared between the groups. Primary outcome parameter was resting pain NRS at 6 hours after surgery. Secondary outcomes included the amount of opioid use, pain scores during 72 hours postoperatively, rescue analgesics use, quality of recovery questionnaire-15 score at 24 hours after surgery, postoperative complication, and length of hospital stay.

**RESULTS**: Fifty-four patients (27 patients in each group) completed the study protocol. Baseline characteristics were well balanced between the two groups. The QL-block was not superior to place-

bo for reduction of NRS at rest in 6 hours postoperatively (median [IQR] 4.5 [3, 6] vs. 5.0 [4, 6], p = 0.540). The QL-block also did not show superiority to placebo for the reduction of NRS at rest during 72 hours postoperatively. While there was no difference in NRS at coughing during 48 hours postoperatively, NRS at coughing in 72 hours postoperatively was significantly lower in the QL group compared to the Placebo group (median [IQR] 1.5 [1, 2.5] vs. 3.0 [2, 3], p = 0.015). There were no differences in opioid use, length of stay, and patient-reported quality of recovery.

**CONCLUSION**: In this study, the QL-block did not provide superior postoperative analgesia compared to placebo in ileostomy closure.

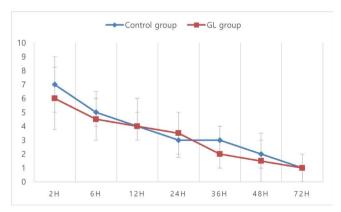


Figure. Pain NRS at rest.

### Multiple High-risk Features in Stage II Colon Cancer Had Worse Oncologic Outcome than Single High-risk Feature

Nahyeon Park<sup>1</sup>, Go Woon Park<sup>2</sup>, Jung Cheol Kuk<sup>3</sup>, Eung Jin Shin<sup>4</sup>, Lim Daero<sup>5</sup>

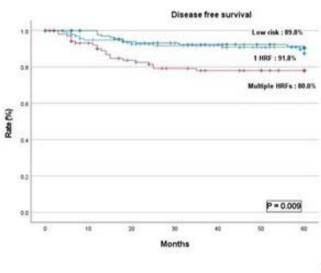
BACKGROUND: Stage II colon cancer with high-risk features (HRFs) had revealed worse oncologic outcome than without HRFs. However, the prognostic value of multiple HRFs(≥2 HRFs) has been poorly studied.

**PURPOSE:** This study aimed to analysis the clinical and oncologic outcome stage II colon cancer between low risk, single HRF and multiple HRFs group.

MATERIALS AND METHODS: Between March 2006 and Dec 2018, 398 patients who diagnosed stage II colon cancer were retrieved from a retrospective database. 146 patients had no HRF as low risk group. 147 patients had a single HRF(1 HRF) and 105 patients had multiple HRFs(≥2 HRFs) in stage II colon cancer. The clinical characteristics and oncologic outcome were statistically analyzed.

**RESULTS**: Median follow up was 48 months. The 5-year disease-free survival rate was better in low risk group (89.8%) and single HRF group (91.8%) compared to multiple HRFs group (80.0%, p=0.009). The overall survival rate was not different in three groups (92.4% vs 93.2% vs 88.6%). Recurrence pattern was compared between single HRF and multiple HRFs group. The total recurrence rate was higher in multiple HRFs (20.0%) compared to single HRF (8.2%, p=0.020). The systemic recurrence was more often in multiple HRFs group than single HRF group (14.2% vs 4.7%, p=0.046). In multivariate analysis, prognostic factors included T stage (T3 vs T4) (HR 2.568, 95% CI 1.230-5.359, p=0.012) and multiple HRFs (HR 2.015, 95% CI 1.057-3.839, p=0.033).

**CONCLUSION**: Base on present data, multiple HRFs group had worse 5-year disease free survival rate than low risk and single HRF group. Therefore, the stage II colon cancer with multiple HRFs should be considered as more aggressive treatment and closed follow-up.



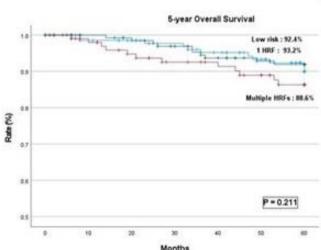


Figure. Oncologic outcome comparing the low risk group, single HRF group and multiple HRF group.

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<sup>&</sup>lt;sup>2</sup>Bucheon Soonchunhyang University Hospital,

<sup>&</sup>lt;sup>3</sup>Soonchunhyang University Bucheon Hospital,

<sup>&</sup>lt;sup>4</sup>Soon Chun Hyang University Bucheon Hospital,

<sup>&</sup>lt;sup>5</sup>Soon Chun Hyang University Hospital

### Learning Curve in Single-Port Robotic Rectal Cancer Surgery: A Single Surgeon's Experience with 117 Consecutive Cases

<u>Seung Ho Song</u>, Hye Jin Kim, Gyu-Seog Choi, Jun Seok Park, Soo Yeun Park, Sung-Min Lee, Min Hye Jeong, Sujin Kang

Colorectal Cancer Center, Kyungpook National University Chilgok Hospital

**BACKGROUND**: Utilizing a smaller incision and workspace, the latest da Vinci\* single-port (SP) robotic system is a viable option for performing rectal cancer surgery.

**PURPOSE**: The objective of this study is to delineate the learning curve associated with SP robotic rectal cancer surgery.

MATERIALS AND METHODS: Data were collected from patients who underwent SP robotic rectal cancer surgery performed by a single surgeon between July 2020 and July 2023. Out of 175 patients who underwent rectal cancer surgery using a SP robot, we focused on 118 consecutive patients who received sphincter-preserving total mesorectal excision (TME) without multivisceral resection. The learning curve was assessed using the Cumulative Sum (CUSUM) methodology, evaluating variations in total operative and console times across the sequence of cases.

**RESULTS:** The analysis of single-port robotic TME revealed distinct operative and console times, which were categorized into three phases: Phase I (Learning Period, cases 1-12), Phase II (Proficiency Period, cases 13-33), and Phase III (Mastery Period, cases 34-117). As the surgeon progressed through these phases, there was a significant reduction in total operative time, console time, and estimated

blood loss.

**CONCLUSION**: The CUSUM analysis identifies three distinct phases in the learning curve for SP robotic TME. For surgeons with prior experience in robotic surgery, proficiency in SP robotic rectal cancer surgery is estimated to be attained after 12 cases.

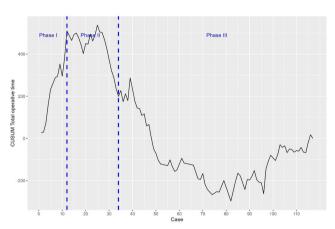


Figure. Three phases of total operative time in terms of the cumulative sum learning curve

### A Prospective Observational Study On the Effects of Screening Colonoscopy on Colorectal Cancer Stage

<u>Seung Ho Song</u>, Gyu-Seog Choi, Jun Seok Park, Soo Yeun Park, Hye Jin Kim, Sung-Min Lee, Min Hye Jeong, Sujin Kang

Colorectal Cancer Center, Kyungpook National University Chilgok Hospital

BACKGROUND: Methods for screening colorectal cancer include testing for occult blood in stool and colonoscopy. In countries like the USA, it is recommended to undergo a colonoscopy every ten years. However, due to insufficient evidence on the efficacy of colonoscopy, it is not commonly included in general screenings in many countries.

**PURPOSE**: This study aims to investigate the impact of screening colonoscopy experience and associated symptoms on the staging of colorectal cancer.

MATERIALS AND METHODS: Patients diagnosed with colorectal cancer who visited the colorectal surgery department of a tertiary hospital from January to October 2023 were surveyed about their previous colonoscopy experiences and symptoms (anal bleeding, abdominal pain, constipation, diarrhea, body weight loss). Radiological examinations and pathological results were prospectively collected. The primary endpoint is the stage of colorectal cancer. RESULTS: The study analyzed 945 participants, excluding 32 non-respondents from the survey. The group that had undergone colonoscopy within the past three years (group A) included 124

patients, while those undergoing their first colonoscopy (group B) numbered 821. During the period, 764 patients underwent surgery (115 in group A, 649 in group B). In group B, 249 patients (38.1%) had pathologic stage 3 or higher, compared to 29 patients (25.2%) in group A (p=0.001). The analysis was divided based on the location of cancer (colon or rectum) and symptoms. Among colon cancer patients, 37.5% in group B and 22.4% in group A had stage 3 or higher (p=0.012). Among rectal cancer patients, 42.3% in group B and 29.2% in group A had advanced stages (p=0.001). In Group B, asymptomatic rectal cancer patients showed no significant difference in pathological staging when compared to the Group A. However, symptomatic rectal cancer patients in Group B exhibited a significant difference compared to Group A. Multivariate analysis identified the lack of screening colonoscopy and the presence of symptoms as significant factors for advanced rectal cancer.

**CONCLUSION**: Screening colonoscopy and symptoms can independently influence the stage of colorectal cancer. Performing screening colonoscopy before the onset of symptoms is expected to aid in the early detection of colorectal cancer.

## Retrospective Study on the Impact of Timing of Stoma Closure on Oncological Outcomes in Patients with Locally Advanced Rectal Cancer

Dongik Shin<sup>1</sup>, Jeonghun Kwon<sup>1</sup>, Taehoon Kim<sup>1</sup>, Jeongmin Lee<sup>1</sup>, Yuna Choi<sup>1</sup>, Junsu Ha<sup>1</sup>, Seung Ho Song<sup>2</sup>

<sup>1</sup>School of Medicine, Kyungpook National University,

BACKGROUND: The management of locally advanced rectal cancer typically involves a multimodal approach. This includes preoperative chemoradiotherapy, followed by surgical intervention with postoperative chemotherapy. Often, an ileostomy is created to protect the anastomosis. However, due to various complications associated with ileostomies, timely closure is essential. There are two potential timings for stoma closure: during postoperative chemotherapy or after completing postoperative chemotherapy.

**PURPOSE**: Our study aimed to identify the optimal timing for ileostomy closure in this context.

MATERIALS AND METHODS: The study was conducted over a period spanning from January 2011 to December 2021. The primary endpoint of the study was 5-year relapse-free survival, with secondary endpoints including 5-year overall survival and postoperative complications within 30 days following ileostomy closure.

**RESULTS**: Baseline characteristics were comparable between the two groups. The primary outcome, 5-year relapse-free Survival, showed no significant difference between the groups (75.2% in the post-chemotherapy group vs. 77.2% in the during-chemotherapy group). Similarly, 5-year overall survival rates were not significantly

different (82.2% in the post-chemotherapy group vs. 91.0% in the during-chemotherapy group). Postoperative hospital stay and post-operative complications were similar between the groups.

**CONCLUSION**: The absence of significant differences between the two groups suggests that ileostomy closure can be safely performed either during or after postoperative chemotherapy. To reinforce these findings, further validation through randomized clinical trials is recommended.

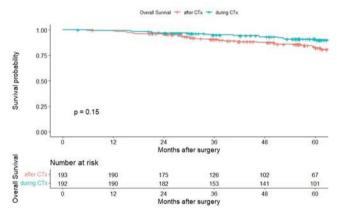


Figure. Overall survival

<sup>&</sup>lt;sup>2</sup>Department of Surgery, School of Medicine, Kyungpook National University

### **Optimal Withdrawal Time of the First Surveillance Colonoscopy after Colectomy for Colorectal Cancer**

Jun Woo Bong, Jiyoung Kim, Sun il Lee

Korea University Guro Hospital

BACKGROUND: Colonoscopy following colectomy for colorectal cancer (CRC) is essential for identifying interval cancer or highrisk adenoma. A minimum withdrawal time (WT) of 6 minutes is commonly advised for colonoscopy to ensure an adequate adenoma detection rate (ADR). However, no definitive agreement exists on the ideal WT following colectomy in individuals with CRC.

PURPOSE: This study aimed to establish precise protocols for postoperative surveillance colonoscopy following colectomy for CRC, specifically emphasizing comparing outcomes across patients who received different surgical interventions.

MATERIALS AND METHODS: The study comprised 1,364 patients who had received the first surveillance colonoscopy after surgical treatments for CRC in our institution from 2015 to 2022. These patients were separated into two groups: 402 patients who got right hemicolectomy for the tumor located on the right side, and 962 patients who underwent anterior or low anterior resection for the tumor located on the left side. WT is the duration between the cecal intubation/ileocolic anastomosis and the anus, omitting the time spent on polypectomies. The ideal WT was evaluated using receiver operating characteristic (ROC) and restricted cubic spline (RCS) analyses.

**RESULTS**: The average duration of colonoscopy in all patients was  $6.6 \pm 2.9$  minutes. The polyp detection rate (PDR) and the ADR were 36.3% and 30.2%, respectively. The average number of polyps identified was 2.0  $\pm$  1.5. The average WT in the right-sided tumor group was  $5.5 \pm 2.1$  minutes, with PDR and ADR rates of 30.1%and 24.4%, respectively. The average WT in the left-sided tumor group was  $7.1 \pm 3.1$  minutes, with PDR and ADR values of 38.9%and 32.7%, respectively. The ROC analysis revealed that the optimal duration for WT was 5.05 minutes for the right tumor group (AUC = 0.661) and 6.05 minutes for the left-sided tumor group (AUC = 0.660). The RCS curves showed that the odds ratio for ADR consistently went up when the WT went over 5 minutes in the group with the right tumor and 6 minutes in the group with the left tumor. Moreover, when the group of tumors on the right side was split according to a 5-minute WT, the ADR was 37.2% for individuals with WT above 5 minutes and 13.3% for those with WT below. When divided based on a 6-minute threshold, the ADR for the left-sided tumor group was 44.5% for WT above 6 minutes and 19.5% for WT

**CONCLUSION**: This study proposes the most effective WT for the first surveillance colonoscopy following different types of CRC surgery. Customizing the timing of WT based on the surgical procedure may improve the efficiency of surveillance colonoscopy in patients with CRC.

Table. The adenoma and polyp detection rates according to the optimal withdrawal time of the right hemicolectomy and (low) anterior resection groups.

		WT.>	5	WT s 5		
Micha barrianta assert No. 485		N = 185	%	N = 217	%	
Right hemicolectomy, N = 402	ADR	69	37.2	29	13.3	
	PDR	86	46.4	35	16.1	
		WT >	6	WT ± 6		
Sand Associat contaction At - 667		N = 507	%	N = 455	%	
(Low) Anterior resection, N = 962	ADR	226	44.5	89	19.5	
	PDR	266	52.4	108	23.7	

# Is Colonoscopy Alone Adequate for Surveillance in Stage I Colorectal Cancer?

Seijong Kim, Yong Beom Cho

Samsung Medical Center

BACKGROUND: Throughout the world, colorectal cancer is one of the most common cancers. Since the introduction of screening system of colorectal cancer, pathologic staging has been down staged. Stage I colorectal cancer shows favorable oncologic outcome after radical surgery with disease-free survival of 92%-100% in colon cancer and 89%-96% in rectal cancer. Due to favorable oncologic outcome, surveillance after radical surgery of colorectal cancer is simple than stage II-IV colorectal cancer. NCCN guideline and ASCRS guideline recommended only colonoscopy for surveillance after radical surgery of stage I colon cancer.

**PURPOSE**: Therefore, this study was performed to evaluate the recurrence rate and recurrence patterns of stage I colorectal cancer and is colonoscopy alone is really adequate for survelliance in stage I colorectal cancer.

MATERIALS AND METHODS: A retrospective analysis was conducted on 2248 patients with stage I colorectal cancer who underwent radical surgery at Samsung Medical Center between January 2007 and December 2018. Exclusions included familial cancer, recurrent cases, preoperative treatments, local excisions, insufficient data, and inadequate follow-up. Pathological staging was performed through colonoscopy, chest, and abdomino-pelvic CT. Surveillance included colonoscopy, routine laboratory tests, and CT

scans at specified intervals. Statistical analyses, nomogram validation, and risk factor assessments were conducted.

RESULTS: Stage I colorectal cancer patients exhibited favorable 5-year disease-free survival (98.3% in colon cancer, 94.6% in rectal cancer) and overall survival (99.7% in colon cancer, 99.2% in rectal cancer). Recurrence patterns varied between colon and rectal cancer, with distant metastasis being prevalent in colon cancer and local recurrence in rectal cancer. Elevated preoperative CEA levels and perineural invasion were identified as risk factors for recurrence in stage I colon cancer, while tumor budding was significant in stage I rectal cancer. Nomograms were developed and validated internally, demonstrating good predictive accuracy. Colon cancer predominantly exhibited distant metastasis as the primary recurrence pattern (92.3%), while rectal cancer primarily manifested local recurrence as the dominant pattern (50%).

CONCLUSION: Our nomogram simplifies the prediction of recurrence risk in stage I colorectal cancer patients after radical resection. The implementation of regular surveillance, incorporating abdomino-pelvic and chest CT scans along with blood test with carcinoembryonic antigen and colonoscopy in patients at risk of recurrence, may enable early detection and treatment, leading to favorable oncologic outcomes.

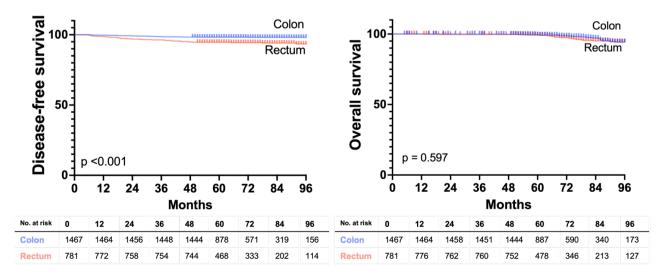


Figure 1. Disease-free survival and overall survival of stage I colon and rectal cancer.

# Short-term Outcomes of da Vinci SP versus Xi for Rectal Cancer Surgery. A Propensity- Score Matching Analysis of Multicenter Cohorts

Min Hyun Kim<sup>1</sup>, Songsoo Yang<sup>2</sup>, Jong Lyul Lee<sup>3</sup>, Yong Sik Yoon<sup>1</sup>

**BACKGROUND**: Robotic surgical systems are continuously evolving to enhance patient outcomes, of which the most recent da Vinci SP system allows minimally invasive surgery with reduced ports.

**PURPOSE**: We report our initial experience comparing perioperative outcomes of robotic rectal cancer surgrery between da Vinci SP and Xi.

MATERIALS AND METHODS: Patients who underwent robotic surgery for rectal adenocarcinoma from January 2016 to September 2023 at two tertiary referral centers were included. A retrospective analysis was conducted, comparing patient cohorts before and after propensity-score matching. Key parameters assessed included patient demographics, tumor characteristics, operation time, incision length, pain scores, hospital stay and postoperative complications. RESULTS: A total of 378 patients (SP:65 vs. Xi:313) were analyzed. In the SP group, a higher proportion of females underwent surgery (SP:Xi; 44.6% vs. 28.4%;p=0.016), and tumors were located higher (8.25 cm vs. 6.71 cm from anal verge; p<0.001). SP surgery showed advantages in shorter total incision length (4.9 vs. 9.2; p<0.001),

lower maximum pain scores (5 vs. 7; p<0.001), and reduced hospital stay (6 vs. 7 days; p<0.001). Operation time (175 vs. 182 minutes; p<0.829), and postoperative complications (9.2% vs. 12.1%; p<0.650) did not significantly differ. Lower lying rectal tumors were more frequently treated by the Xi system, resulting in a higher diverting stoma rate (SP:Xi; 13.8% vs. 45.4%; p<0.001), and a lower anastomosis level (SP:Xi; 4.6 vs. 3.3cm; p<0.001). After 1:1 matching (65 patients/group) for each group, the SP group maintained advantages in incision length (p<0.001), maximum pain scores (p=0.001), and hospital stay (p<0.001). Overall postoperative complication rates were similar between SP and Xi groups (10.8% vs. 12.3%, p=0.777).

**CONCLUSION:** The da Vinci SP system offers continued minimal invasive benefits in rectal cancer surgery. However, the Xi system's instrument diversity provides an advantage, particularly in cases involving low lying rectal tumors. Tailoring robotic approaches based on individual patient characteristics remains pivotal for optimizing outcomes in rectal cancer surgery.

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# The Impact of Lymph Node Harvest on Recurrence in Rectal Cancer Following Neoadjuvant Chemoradiotherapy

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<sup>1</sup>Seoul National University Bundang Hospital, <sup>2</sup>Seoul National University Hospital

**BACKGROUND**: The current guidelines recommended a minimum of 12 lymph nodes to accurately stage rectal cancer. However, the appropriateness of this recommendation is a topic of debate, particularly in patients with rectal cancer who have undergone neoadjuvant chemoradiotherapy.

**PURPOSE**: This study aims to assess the oncologic significance of the numbers of harvested lymph nodes (HLNs) in rectal cancer patients who received neoadjuvant chemoradiotherapy.

MATERIALS AND METHODS: We conducted a comprehensive analysis of 1,596 patients who underwent radical surgery after neoadjuvant chemoradiotherapy for rectal cancer, between April 2004 and December 2021. The patients were divided into two groups based on the number of HLNs, with a cut-off value of 12. The previously known risk factors for recurrence, such as T and N stages were also analyzed. Our study compared clinicopathologic outcomes between the two groups (HLNs  $\geq$  12, and <12), and multivariable analyses were performed to identify factors influencing recurrence.

**RESULTS**: Of the total patients, 321 (20.1%) patients showed

HLNs<12, while 1,275 (79.9%) patients showed HLNs≥12. No significant differences were observed in age, sex, tumor height from anal verge, and proximal and distal resection margins between the two groups. HLNs≥12 groups showed more advanced ypT, ypN and overall stage, and higher proportion of high risk features such as venous invasion and perineural invasion. In the univariable analysis, HLNs<12 group showed higher recurrence rate compared to HLNs≥12 group (24.6% vs 18.8%, P = 0.026). In the multivariable analysis, HLNs<12 group [OR=1.861, 95% CI; 1.274-2.718, P = 0.001], advanced ypT stage [OR=2.763, 95% CI; 1.895-4.028, P < 0.001], ypN+ stage [OR=2.852, 95% CI; 2.076-3.918, P < 0.001], positive circumferential radial margin [OR=1.855, 95% CI; 1.188-2.897, P = 0.007] and lymphatic invasion [OR=2.003, 95% CI; 1.316-3.048, P = 0.001] emerged as independent risk factors for recurrence.

**CONCLUSION**: This study demonstrates that HLNs < 12 poses a substantial risk for recurrence in rectal cancer patients who received radical surgery after neoadjuvant chemoradiotherapy.

### Development of the Polysaccharides-Folic Acid Conjugates for Colon Cancer Treatment

Kwan Mo Yang<sup>1</sup>, SangGuan You<sup>2</sup>

<sup>1</sup>GangNeung Asan Hospital, <sup>2</sup>Gangneung-Wonju National University

**BACKGROUND**: Polymer drug conjugates offer several advantages in the field of drug delivery, contributing to improved therapeutic outcomes and reduced side effects.

**PURPOSE**: The aim of this study is to synthesize the sulfated polysaccharides-Folic acid (FA) conjugates and the sulfated polysaccharides-FA-5-FU conjugates, and to evaluate the structural characteristics and drug release behavior of the conjugates

MATERIALS AND METHODS: The fraction of polysaccharide from Cnidium officinale (F2) exhibited the highest NK cell activation and cytotoxicity in a previous study. Aiming to create a conjugate, F2 was combined with folic acid through a process involving various temperatures, reaction times, and mixtures with different ratios. The FA-F2 conjugate was combined with 5-FU using two different combinations of catalysts. Cytotoxicity assay were tested using WST-1 assay, and expression of mitogen- activated protein kinases (MAPKs) and nuclear factor kappa-light-chain-enhancer of activated B cells (NF-κB) was tested by western blot analysis. Following the labeling of conjugates with Flamma\* 675 Dichlorotriazine, the qualitative and quantitative distribution of Flamma 675 Dichlorotriazine-loaded CFP2-C-5-FU and CFP2-C-5-FU-FA conjugates was investigated in mice with HCT116 tumors after administration via the tail vein injections.

**RESULTS**: The apoptosis study in HCT116 cell lines showed higher induction of cells into apoptotic states after exposure to the targeted (CFP2-5-FU-FA) and no-targeted (CFP2-5-FU) cojugates than after exposure to free 5-FU. HCT 116 treated with CFP2-5-FU-FA were significantly enhanced as compared with control, free drug, CFP2, CFP2-FA, and CFP2-5-FU treatments. These data suggested that CFP2-5-FU and CFP2-5-FU-FA effectively stimulated HCT116 cell via NF-κB and MAPKs signaling pathways. The CFP2-5-FU-FA conjugates could directly cause cytotoxicity, high cellular uptake efficacy, induce cellular apoptosis of colorectal cancer. After injection of Flamma®675 Dichlorotriazine loaded conjugates, the fluorescence intensity in the tumor area of group injected Flamma®675 Dichlorotriazine loaded targeted conjugates (CFP2-5FU-FA) was much higher than that of non-targeted conjugates (CFP2-5-FU), suggesting that the folate targeted conjugates could enhance the drug delivery and accumulation of conjugates into targeted tumor areas.

CONCLUSION: This in vivo antitumor study proved that CFP2-C-5-FU-FA could successfully deliver C- 5-FU to cancer cells via folate targeted conjugate and exert the antitumor effects by inhibiting tumor cell proliferation and inducing cellular apoptosis by activating immune cells.

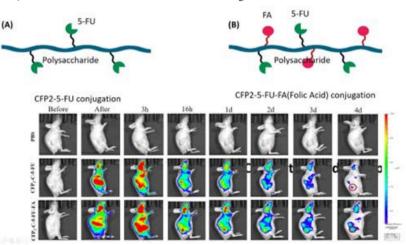


Figure. In vivo biodistribution fluorescence imaging of subcutaneous HCT-116 tumor-bearing BALB/c nude mice after injection of 100  $\mu$ l PBS, Flamma\*675 Dichlorotriazine-loaded CFP2-5-FU and CFP2-5-FU-FA

## Clear Cell Sarcoma Arising in the Pelvic Retroperitoneum

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BACKGROUND: Clear cell sarcoma (CCS), also previously referred to as "malignant melanoma of soft parts," is a very rare and aggressive soft tissue neoplasm, comprising approximately 1% of all diagnosed sarcomas. It occurs most commonly in the extremities, near aponeuroses and tendons of young adults.

**PURPOSE**: CCS is more common in female than in male patients and is linked to a high tendency of developing regional or distant metastases. Occurrence of this tumor on sites other than the extremities is extremely rare. We recently report the female case of CCS arising in the retroperitoneum and occupying the pelvic cavity. MATERIALS AND METHODS: A 27-year-old woman, without any remarkable medical history, presented to our hospital with a palpable abdominal mass in the right lower quadrant of 6 months. She related that the mass had remained stable for 4 months, with no pain or increase in size. Two months prior to presenting at the hospital, she reported that the mass had started to enlarge, elicit pain. Physical examination revealed a tender firm mass with an irregular surface in the right lower quadrant of abdomen measuring approximately 4.0 x 3.0 cm. Magnet resonance image revealed a heterogenous peripheral enhancing mass adjacent to the right external iliac vessels that was solid with necrotic areas. This mass was protruded toward the anterior abdominal wall muscle, which was judged to be a direct tumor invasion. At the time of admission, her serum CA-125, CA19-9, carcinoembryonic antigen (CEA), and other tumor

markers for germ-cell tumor; i.e.,  $\alpha$ -fetoprotein and human chorionic gonadotropin  $\beta$  subunit, were all within normal ranges.

**RESULTS**: Laparotomy revealed a lump of cystic mass measuring 4.0 x 3.0 x 2.5 cm and containing chocolate-colored materials that was partly solid and cystic changed. Frozen section was diagnosed as "primary malignant melanoma". This tumor was resected as completely as possible during surgery. The immunohistochemical analysis showed positive staining for HMB45, S100 and SOX10. The molecular / cytogenetics description by RT-PCR methodology revealed positive for EWSR1 gene translocation. These features were consistent with the diagnosis of clear cell sarcoma. The immediate postoperative course was uneventful and the patient was discharged without any complications on the 9th postoperative day. **CONCLUSION**: Even when treated with seemingly appropriate therapies, the overall prognosis for CCS is poor. The size and necrosis of the tumor are important indicators of prognosis. The larger the tumor and the more necrosis the tumor has, the worse the prognosis. The treatment of choice for localized CCS is wide surgical resection, although radiation therapy is used in some situations. Chemotherapy is predominantly employed in patients with metastatic disease. Our multidisciplinary team recommended appropriate chemoradiation therapy to our patient after surgery, but unfortunately, she refused further evaluation and treatment, and even outpatient follow-up was lost.

### The Effect of Alprostadil/Prostaglandin E1 in Enhancing Anastomotic Healing and Preventing Anastomotic Disruption in Rectal Cancer Surgeries

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<sup>1</sup>Kangbuk Samsung Hospital, Sungkyunkwan University, <sup>2</sup>Samsung Kangbuk Hospital

BACKGROUND: Anastomotic leakage remains a significant challenge in colorectal cancer surgeries, often leading to increased morbidity and prolonged hospitalization. Alprostadil, known for its improving microcirculation (vasodilation, platelet aggregation inhibition and erythrocyte deformation promotion) properties, has been hypothesized to enhance anastomotic healing and prevent anastomotic disruption.

**PURPOSE**: The objective of this study is to assess the effectiveness of Alprostadil in laparoscopic low anterior resection. particularly in preventing anastomotic leakage and assessing the risk of bleeding as a potential side effect of the alprostadil.

MATERIALS AND METHODS: This retrospective study at the Division of Coloproctology, Department of General Surgery, Samsung Kangbuk Hospital, reviewed records of 50 patients who underwent laparoscopic low anterior resection for rectal cancer with postoperative administration of alprostadil infusion from December 2019 to August 2023. We analyzed data spanning pre-operative, intra-operative, and post-operative phases, focusing on anastomot-

ic integrity and complications. Alprostadil was administered by infusing 10 micrograms diluted in 100 cc of normal saline at 50 cc/hour, starting on the day of surgery after checking for bleeding in the ward and continued for 5 days (postoperative day 1-5).

**RESULTS**: The cohort had a mean age of  $64.42 \pm 13.26$  years, with a gender distribution of 58% male and 42% female. Key findings included no instances of anastomotic leakage and postoperative bleeding among patients who received Alprostadil. This contrasts with established leakage rates in the literature, suggesting a potential protective effect of Alprostadil on anastomotic integrity.

CONCLUSION: Alprostadil shows promise in reducing anastomotic complications in rectal cancer surgeries without increasing the risk of postoperative bleeding. The absence of anastomotic leakage in the Alprostadil group suggests its potential protective effect. This study provides preliminary evidence supporting its use, although further investigation is required to establish its efficacy definitively.

### Impact of Early Oral Feeding on Postoperative Outcomes After Elective Colorectal Surgery: A Systematic Review and Meta-analysis

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<sup>1</sup>Chonnam National University Hwasun Hospital, <sup>2</sup>Dongnam Institute of Radiological & Medical Sciences

BACKGROUND: Enhanced Recovery After Surgery (ERAS) has emerged as a transformative approach to perioperative care, emphasizing evidence-based strategies to optimize recovery. While ERAS protocols have shown success in various surgical contexts, their specific impact on postoperative outcomes following elective colorectal surgery warrants focused investigation. The role of early oral feeding, a key component of ERAS protocols, in shaping postoperative outcomes after elective colorectal surgery remains a topic of ongoing debate.

**PURPOSE:** This study aimed to evaluate the influence of early oral feeding on postoperative outcomes in elective colorectal surgery through a systematic review and meta- analysis.

MATERIALS AND METHODS: We searched PubMed, Embase, and the Cochrane Library. Two authors independently screened the retrieved records and extracted data. Data were pooled, and overall effect size was calculated using random effect models. Early oral feeding was defined as feeding that started after the surgery, while delayed oral feeding commenced after the resolution of gastrointestinal flatus or ileus. The primary outcome was total complication, and the secondary outcomes were anastomotic leakage, vomiting, nasogastric tube reinsertion, time to flatus, hospital stay, and mor-

tality. Categorical data were combined using odds ratio (OR), and continuous data were combined using mean difference (MD).

**RESULTS**: We screened 13 studies with 1,556 patients included in the analysis. The early oral feeding group exhibited lower total complications (OR 0.50; 95% confidence interval [CI] 0.38–0.65; 12 = 56%). Anastomotic leakage was also reduced in the early oral feeding group (OR 0.40; 95% CI 0.19–0.83; I2 = 0%), yet an increased incidence of vomiting was observed (OR 1.58; 95% CI 1.11–2.26; I2 = 0%), accompanied by a slightly higher rate of nasogastric tube reinsertion though statistically insignificant (OR 1.49; 95% CI 0.96–2.31; I2 = 0%). The early oral feeding group demonstrated a decreased time to flatus (MD -0.88; 95% CI -1.01 to -0.75; I2 = 85%) and shortened hospital stay (MD -0.78; 95% CI -0.91 to -0.65; I2 = 80%). No significant difference in mortality was observed between the two groups (OR 0.54; 95% CI 0.15–2.01; I2 = 0%)

**CONCLUSION**: Early oral feeding proved to be a safe and effective practice for patients undergoing elective colorectal surgery, although the heightened incidence of vomiting necessitates careful consideration. This research provides valuable insights for clinicians, aiding in the refinement and implementation of ERAS protocols to optimize patient recovery in colorectal surgery.

### Comparative Analysis of Functional End-to-End and End-to-Side Anastomosis in Laparoscopic Right Hemicolectomy for Colon Cancer

Jung Wook Huh, Seijong Kim

Samsung Medical Center

**BACKGROUND**: Despite advancements in laparoscopic right hemicolectomy for right-sided colon cancer, the choice between functional end-to-end anastomosis (FETE) and end-to-side anastomosis (ETS) remains a topic of debate.

**PURPOSE**: This study aims to compare these two techniques in terms of postoperative complications and disease-free survival.

MATERIALS AND METHODS: This retrospective analysis included 1202 patients who underwent laparoscopic right hemicolectomy for non-metastatic colon cancer at Samsung Medical Center between January 2007 and February 2016. Patients were divided into FETE (n=968) and ETS (n=234) groups based on the anastomosis technique used. Patients' characteristics, oncologic results, operative outcomes and postoperative complications were analyzed.

RESULTS: The baseline characteristics were similar between the two groups, except for a higher incidence of cancer obstruction in the ETS group (p<0.001). No significant differences were observed in operation time, blood loss, or length of hospital stay. Anastomotic leakage rates were comparable (FETE 0.7% vs ETS 0.4%, p=0.999). The FETE group had a higher rate of postoperative ileus (4.4% vs 1.3%, p=0.022). Multivariable analysis indicated age, sex, and anas-

tomosis type as significant predictors of postoperative ileus. There was no significant difference in disease-free survival between the groups (90.3% FETE vs 89.7% ETS, p=0.818).

CONCLUSION: The study demonstrates that both FETE and ETS anastomosis techniques in laparoscopic right hemicolectomy are comparable in terms of operation metrics and disease-free survival. However, FETE is associated with a higher incidence of postoperative ileus. These findings can guide surgical decision-making in the treatment of right-sided colon cancer.

Table. Intraoperative and postoperative outcomes of patients who underwent laparoscopic right hemicolectomy for colon cancer

Variable	Functional end to end (n=968)	End to side (n=234)	P- value
Operation time	(H 300)	(11 25 1)	0.354
Median (range),	132 (80-260)	127(64-277)	
Estimated blood loss			0.562
Median (range),	50 (5-700)	50(10-300)	
Length of hospital stay	0.00,49 0.000		0.514
Median (range)	7(4-30)	6(4-36)	
Anastomotic leakage			0.999
Yes	7(0.7%)	1(0.4%)	
No	961(99.3%)	233(99.6%)	
Postoperative ileus	2 (2)		0.022
Yes	43(4.4%)	3(1.3%)	
No	925(95.6%)	231(98.7%)	
Time to first meal			0.326
Median (range)	2(2-18)	2(2-7)	
Time to first flatus			0.916
Median (range)	3(1-14)	3(1-15)	

### A New Assistant-Free Traction Method in Endoscopic Surgery Using a Rubber Band and Conventional Clothing Hooks

Eunhae Cho1, Jin Kim2

<sup>1</sup>Korea University Medical Center Anam Hospital,

BACKGROUND: In any abdominal surgery, appropriate traction and countertraction are integral to surgical success. Laparoscopic surgery has become the gold standard in colorectal cancer surgery these days. Laparoscopy, while non-inferior oncologically, gives a significant advantage in postoperative pain control, cosmetics and length of hospital stay. In most laparoscopic colorectal surgeries, surgery is done with an assistant who is not only looking at the surgical field in a mirrored fashion, but is also provinding countertraction to the operator in a non-physiological fashion. This limitation in view and angle of motion often results in unstable, laborious assistance with an indequate amount of force.

**PURPOSE**: In our practice, we devised an endoscopic traction system to appease the limited, possibly unstable traction from a human assistant. In this paper, we describe the making and the advantages of the newly-devised traction system.

MATERIALS AND METHODS: The new traction system consisted of four components: 1) a rubber band, 2) an endoscopic clip, 3) a 2-0 nylon suture with a straight needle and 4) a sterilized conventional clothing hook modified in design for the purposes of surgical use. The rubber bands used in this device, the Unitek™ Elastics from 3M, were safe to use intraperitoneally, as they were made originally for orthodontics use. Clipped to the peritoneum for traction, the rubber bands are hung onto a clothing hook that is being pulled towards the abdominal wall by a nylon suture material

tunnelled through the skin by a straight needle and held by Kelly forceps extracorporeally. As the surgeon dissects through the surgical plane, the retaining tension on the colon is increasingly released. The rubber band's elasticity naturally allows increasing amount traction accordingly. The rubber bands can be clipped at different foci along the dissection plane. A single or just two hooks can be applied to clips at different locations, resulting in varying angles and degrees of traction. From May 2023 to December 2023, 25 cases of low anterior resections were performed laparoscopically by a single surgeon at Korea University Anam Hospital. Among them, 10 cases utilized the new traction system. We calculated intraoperative and postoperative outcomes of conventional laparoscopic surgery vs. laparoscopic surgeries using the new method of traction.

**RESULTS:** There was no statistically significant difference in baseline characteristics between the two groups. The length of operation time and amount of blood loss were comparable between the two methods. In average, one less physician was required using the new method. Patients tended to have a shorter postoperative hospital stay, although not statistically significant.

**CONCLUSION:** The new method of traction, minimal in cost and easy to assemble, allows an assistant-free laparoscopic colorectal surgery with adequate force in a desired angle of countertraction, resulting in comparable perioperative outcomes.

<sup>&</sup>lt;sup>2</sup>Korea University Anam Hospital

### A Rare Complication after Colorectal Surgery; Endogenous Endopthalmitis

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**BACKGROUND**: Endogenous endophthalmitis which is result from bacterial seeding of eye during bacteremia is a rare and fatal ophthalmic emergency that usually results in vision- threatening sequelae.

**PURPOSE**: Here, we present an extremely rare but serious complication after colorectal surgery.

MATERIALS AND METHODS: A 49-year old female with dyslipidemia presented with upper abdominal pain, constipation and tenesmus.

RESULTS: Abdominal computed tomography (CT) scan showed 3.8cm encircling mass at ascending colon with pericolic infiltration and enlarged lymph nodes, suggestive of malignancy. Right adrenal gland mass and left ovarian mass were noted as well, suspicious for metastasis. The patient received right hemicolectomy, right total adrenalectomy and left salpingo-oophorectomy. Two days after surgery, the patient complained of fever, abrupt and severe head-

ache with visual disturbances of both eyes. Laboratory test showed leukocytosis and elevated liver enzymes. Blood culture showed no microbial growth. The ophthalmological examination was performed. Slit-lamp microscopy revealed fibrinous membrane on anterior chamber of eye, suggestive of endopthalmitis. Next day, the pateint underwent pars planar vitrectomy and intravitreous antibiotics injection, both. Over 2 weeks, patient's headache and visual disturbance gradually improved. Three weeks later, the patient was discharged without ophthalmic sequalae. Pathologic stage for colorectal cancer was pT3N1c and the patient is currently on 9th cycle of adjuvant chemotherapy.

**CONCLUSION**: We report a rare case of endophthalmitis after surgery. Although its incidence after surgery is very rare, it is crucial for a surgeon to suspect endophthalmitis if clinical information correlates.

<sup>&</sup>lt;sup>2</sup>Department of Surgery, Hanyang University College of Medicine, Seoul, Korea

## Predictors of Postoperative Complications in Terms of Body Composition and Systemic Inflammatory Response in Colorectal Cancer Surgery

Minsuh Park, Kyung Jong Kim

ChoSun University Hospital

BACKGROUND: The differences in body composition lead to differences in systemic metabolism and the immune system. Preoperative systemic inflammation has been associated with a higher prevalence of postoperative infections after colorectal resections.

PURPOSE: This study aims to investigate the association between the preoperative status of patients related to systemic inflammation response(SIR) and body composition, and the occurrence of postoperative complications.

MATERIALS AND METHODS: This retrospective study was carried out with 89 subjects diagnosed with CRC and underwent elective surgery between November 2021 and May 2023. The systemic inflammatory response was indicated by NLR (Neutrophil to Lymphocyte Ratio), LMR (Lymphocyte to Monocyte Ratio), and PLR (Platelet to Lymphocyte Ratio), which were calculated based on blood tests conducted within 30 days prior to surgery. For body composition assessment, the selected indicators included the Total Psoas Area Index (TPAI), superficial and visceral fat area, as well as preoperative total protein and albumin concentrations. The Clavien-Dindo classification was used for categorizing complications: zero indicates no complications, grades 1 and 2 are classified as minor complications, and grades 3, 4, and 5 as major complications. RESULTS: Significant differences were observed in minor and

**RESULTS:** Significant differences were observed in minor and major complications related to abdominal conditions and operation duration. The superficial and visceral fat areas (measured in

Hounsfield Units) of minor complications, primarily Surgical Site Infections (SSI), were found to be larger compared to those with no complications or major complications. However, these differences were not statistically significant. Preoperative LMR and PLR showed significant results. In the univariate analysis, patients who presented with an obstruction sign at diagnosis had a 9-fold increase in the odds ratio (OR) for minor complications and a 4.9-fold increase for major complications compared to patients without complications. Similarly, the postoperative LMR showed that patients with minor complications had an OR 0.65 times lower than those without complications, while patients with major complications had an OR 0.58 times lower. We also found statistically significant differences in the presence of obstruction signs at diagnosis, stage, ASA score, operation type, duration of operation, preoperative albumin concentration in serum, preoperative LMR, and PLR. A lower value of preoperative albumin concentration and LMR indicated a higher possibility of extended hospitalization.

CONCLUSION: This paper demonstrates that systemic inflammatory response has a greater impact on complications than body composition in patients undergoing elective colorectal surgery. In cancer patients, lymphocytes are depleted in the process of destroying cancer cells, leading to a decrease in their numbers. The state of lymphocytopenia makes patients more susceptible to infections, thus increasing the likelihood of complications.

Table. Analysis of factors and odds ratio by complications

The state of the state of			Complication		p-value	Minor complication				Major complication			
Policet charac	teristics	0.200		San State		Universida	CHIEF.	Multivariete		Université		Multivariet	
	Control of		Minut	Major	ilmkvaristn	08(95% CD)	p-value	883(89%-CB	p-value	68(Y5% CD)	p-value	GR(95% CI)	p-waker
to, of persons	545-44	63(76.8)	HORRS .	19(11.2)		VA 14100		-97-1-0000000				07740.0707	
ebdyminal condition	780	38(95.2)	9(19.1)	707.80	9.081	an access town		Contraction of		Long States St.		1911959551115Ar	
	CHEVEN	3(34)	7(7,8)	2(3.4)	J	9.022(2.399-94.643)	9.002	13.819(3.382-81.543)	1.003	4.873(0.972-20-427)	0.672	13.137(8.500-243.345)	0.525
Op Nort	Open	9(19.1)	5(54)	4(4.5)	0.082			25/20/18/19/19/19					
	Lepert	34(36.7)	1101849	6(6.7)		0.367(5.163-1.367)	5:334			8.250(5.659-1.004)	8.67	6.677(6.253-176.179)	6.250
Duration of operation	(rin)	196314637	209-25149-07	243.80473.50	1.000	1.004(3.903-0.004)	9.453			3,016(3,804-1,029)	0.00	1.025(1.000-1.048)	9,625
Presperative CEA (IV	40)	49(4.6845.27	11/9/309147	6754,55657,56	9.094	\$26603,666 5,2005	0.124			1.003(3.005-3.304)	0.638	1.00(0.00) 1.100	0.462
Booky compr	refilem	1500000				0.0000000000000000000000000000000000000	- c.266n			Ultramousta to		ENTERNA DE LA COMPANSION DE LA COMPANSIO	19.15
Superficed Part Arrest?	40	323.59158.91	141,86163	122.39143.79	8,463	3.000(3.967-1.013)	6.213			1-000(3-909-1-012)	3.985		
Viscardi Pat: Area(HJ		138.47419.63	190.23101.06	104.57463.77	8.313	1.001(3.994-1.009)	0.701			0.892(0.891-1.092)	0.000		
Presponence Total pr	980(0×24)	0.3010.61	6,9410.31	6.7545.73	6.750	1.181(9.30+3.162)	0.806			0.099(120+2.003)	0.342		
Prespondine Albumin		3.8149.33	3.7710.33	3,7516.50	9.500	9.428(9.719-1.892)	0.367			0.56(0.109-2.009)	6.36		
TWAG	NIC	34(66.7)	14(315.7)	8(8.4)	6.863								
	36	9(39.1)	20120	10.0		0.857(0.166-4.423)	0.809			1.860(1.279-8.232)	<b>C.466</b>		
Systemic Inflame	allory Index							6		57 L			
Presperavto NSE	- 10	7.8411.80	2,9112.08	3,2015.14	6.270	1.018(1.79E 1.390)	8.8			L/(2(3.79E).330)	0.348		
Prespositive LMR.		3,4843,56	2.7210.00	2,3516.8	8.049	S.452(1.412-1.031)	6.007	0.623(5.359-6.042)	6390	0.383(3.309-1.008)	6.876	0.736(0.254-2.131)	0.370
Pracporative PLR		17141911515	258,04049.22	237.04484.67	6.237	S. 898(S. 942- L. 102)	6.387			1.005(1.909-1.007)	0.000	1.007(9.940-1.020)	6.333

## Prognostic Significance of CA19-9 Antigen Change in Patients with Nonmetastatic Colorectal Cancer

### Wooram Choi<sup>1</sup>, Jeonghyun Kang<sup>2</sup>

<sup>1</sup>Yonsei University College of Medicine, Gangnam Severance Hospital, <sup>2</sup>Yonsei University College of Medicine Department of Surgery

BACKGROUND: In contemporary colorectal cancer (CRC) treatment, Carbohydrate Antigen 19-9 (CA 19-9) serves as an additional tumor marker alongside carcinoembryonic antigen (CEA). While CA 19-9 may exhibit lower sensitivity in tumor screening, certain research highlights its prognostic importance.

**PURPOSE**: The primary objective of this study was to assess the correlation between CA19-9 levels and survival probability, aiming to validate its effectiveness as a tumor marker in individuals diagnosed with non-metastatic CRC. The study sought to investigate the prognostic implications of preoperative, postoperative, and sequential variations in CA 19-9 levels among CRC patients.

MATERIALS AND METHODS: This was a retrospective, single-institutional study conducted at Gangnam Severance Hospital, Yonsei University College of Medicine. The study included patients who underwent colorectal surgery between January 2004 and April 2014 and were histologically confirmed to have stage I-III adenocarcinoma of the colon and rectum. Optimal cutoff values for preoperative CA19-9 (CA19-9-pre) and early postoperative CA19-9 (CA19-9-post) were established to maximize distinctions in overall survival (OS) across different groups. CA19-9-pre was assessed within two months of the operation date, while CA19-9-post was measured 4-7 days post- operation. Patients were categorized into three groups based on CA19-9 change (CA19-9 trend): normal (G1) with low CA19-9-pre, decreased (G2) with high CA19-9-pre/ low CA19-9-post, and elevated (G3) with low CA19-9-pre/high CA19-9-post. Prognostic significance was evaluated through univariable and multivariable analyses, and the discriminatory power of all variables was compared using the Concordance Index (C-index).

RESULTS: A total of 816 patients diagnosed with stage I–III colorectal cancer (CRC) were included in the study. The determined cutoff values for CA19-9-pre and CA19-9-post were 18.9 U/mL and 21.4 U/mL, respectively. Kaplan-Meier survival curve analysis confirmed that higher CA 19-9 levels, both before and after sur-

gery, were associated with lower survival rates. While subgroup dichotomization revealed associations of CA19-9-pre and CA19-9-post with overall survival (OS) in univariable analysis, CA19-9 trend emerged as the only independent prognostic factor in multivariable analysis (G1 vs. G2, Hazard Ratio 1.682, 95% Confidence Interval 1.043-2.710, P=0.032; G1 vs. G3, Hazard Ratio 2.882, 95% Confidence Interval 1.899- 4.371, P<0.001). The C-index value of CA19-9 trend (0.636, 95% confidence interval [CI] = 0.509-0.682) surpassed those of CA19-9-pre (0.625, 95% CI = 0.579-0.667) (bootstrap C-index mean difference = 0.012, 95% CI = 0.003-0.02) and CA19-9-post (0.592, 95% CI = 0.551-0.63) (bootstrap C-index mean difference = 0.044, 95% CI = 0.014-0.075).

**CONCLUSION**: The amalgamation of CA19-9-pre and CA19-9-post demonstrated enhanced prognostic stratification, allowing for a more detailed classification of non-metastatic colorectal cancer patients.

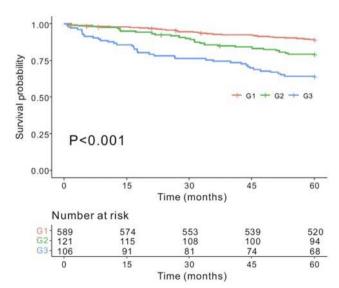


Figure. The Kaplan–Meier survival curve analysis according to CA19-9change (CA19-9 trend)

## Significance of Pretreatment MRI for Predicting Lymph Node Metastasis in ypT0-2 Rectal Cancer Following Chemoradiotherapy

Soo Young Lee, Hyeung-min Park, Chang Hyun Kim, Hyeong Rok Kim

Chonnam National University Hwasun Hospital

**BACKGROUND**: Organ-preserving strategies such as local excision have gained increasing prominence in treating locally advanced rectal cancer showing favorable responses to chemoradiotherapy. Accurate prediction of lymph node (LN) metastasis is crucial for the successful implementation of local excision.

**PURPOSE**: This study aimed to identify clinicopathological factors predicting pathological LN metastasis in patients with rectal cancer who underwent radical surgery following chemoradiotherapy.

who underwent radical surgery following chemoradiotherapy. MATERIALS AND METHODS: A retrospective review of locally advanced rectal cancer patients undergoing radical surgery after chemoradiotherapy at Chonnam National University Hwasun Hospital (2013–2019) was conducted. Patients with pathological stage ypT0-2 were included, and those with distant metastasis at the time of diagnosis were excluded. Clinicopathological factors, including pretreatment and post-treatment MRI staging, were analyzed to identify factors predicting pathological LN metastasis. Prognostic factors predicting disease-free survival were also analyzed.

**RESULTS**: Among the 180 patients, LN metastasis was confirmed in 22 (12.2%). Clinicopathological factors related to LN metastasis included pretreatment mrN stage (mrN0, 7.1%; mrN1, 20.4%; mrN2, 21.1%; p = 0.028) and ypT stage (ypT0, 3.1%; ypT1, 15.4%; ypT2, 17.8%; p = 0.021). Post-treatment mrN stage also showed a marginal relationship with pathological LN metastasis but lacked statistical significance (ymrN0, 11.2%; ymrN1, 30.0%; p = 0.077). In multivariable analysis, pretreatment mrN stage (p = 0.046) and ypT stage (p = 0.049) were independent predictive factors for pathological LN metastasis. Multivariable survival analysis identified ypN stage (p < 0.001) as the only significant prognostic factor for disease-free survival.

CONCLUSION: In rectal cancer patients with ypT0-2 undergoing chemoradiotherapy, pretreatment mrN stage, along with ypT stage, independently emerged as significant predictors for pathological LN metastasis. These results could contribute significantly to identifying suitable candidates for local excision.

### 소장림프종에 의한 장폐쇄 환자에서 소장절제술 1예

### 강기창

청주한국병원

BACKGROUND: 원발성 위장관 림프종은 드물게 발생하지만 위 다음으로 소장에서 흔하게 발생한다. 증상은 복통, 장마비, 체 중감소, 복부종괴등 비특이적인 증상이 많아 장천공이나 장폐쇄 등의 합병증이 발생할수 있다. 대부분의 소장림프종의 치료는 항 암치료가 우선이며, 합병증이 발생하였을시 수술적 치료가 진행되는데 이환자의 경우 림프종에 의한 장폐쇄로 항암치료이전 소 장절제술을 시행한 예이다.

PURPOSE: 대부분의 소장림프종 환자는 수술이 필요한 정도의 합병증 이전에 진단이 되어 항암치료를 먼저 받는다. 합병증이 진행되어 항암치료이전 소장절제술 받은 증례보고가 드물어 증 례보고를 함.

MATERIALS AND METHODS: 전신마취하에 배꼽으로 12mm port를 이용하여 camera를 넣고 RLQ. LLQ 각각 5mm port를 삽입 하여 소장림프종으로 인한 장폐쇄부위를 확인후 배꼽의 12mm port 부위로 소장을 꺼내어 총 42cm의 소장절제술 시행후 end-to-end anastomosis 시행함. 병변의 크기는 총 6cm 이었다.

RESULTS: 수술후 장폐쇄로 인한 증상은 호전되었고 POD #5이후 식이진행하였으며, POD#7 특이소견 없이 퇴원하였다. 조직검사상 mucosa-associated lymphoid tissue(MALT)로 진단되었으며, 항암치료 예정중임

CONCLUSION: 소장림프종으로 인해 항암치료이전에 장폐쇄로 인하여 소장절제술을 시행한 경우는 드물다. 이러한 합병증발생 이전에 비특이적 증상이 있는 경우 소장림프종의 가능성을 두고 소장내시경등의 적극적인 검사를 통하여 조기진단을 하여야할것이다.

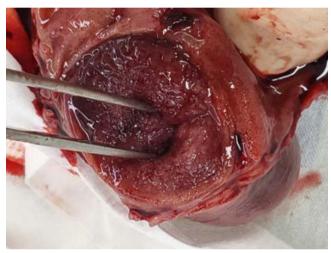


Figure. 림프종 절제 단면

# **Surgery for Colorectal Cancer in Octogenarians - Complications, Risks, and Outcomes**

### Jeong Hee Han, Byoung Chul Lee

Pusan National University, College of Medicine & Hospital

BACKGROUND: In the midst of a global trend toward aging populations, the number of elderly colorectal cancer patients is steadily increasing. However, healthcare professionals continue to approach the treatment of elderly patients with consideration for the potential coexistence of complications relative to their age. There is a tendency to define and limit treatment options for "elderly patients" at a relatively younger age. Given the progression of aging societies and the aging of colorectal cancer patients, the impact of age on post-surgical outcomes should be analyzed to guide treatment decisions and ensure the highest quality of care for this demographic. PURPOSE: This study aimed to compare outcomes in patients aged approximately ≤80 years who have undergone surgery after being diagnosed with colorectal cancer at the National Pusan University Hospital.

MATERIALS AND METHODS: A retrospective observational study was conducted on 502 patients who underwent surgery after being diagnosed with colorectal cancer at Busan National University Hospital between January 2018 and December 2022.

**RESULTS**: Elderly patients underwent open surgery more frequently. No significant differences in surgical outcomes were found between the two groups. Complications and length of hospital stay also did not show differences. Among patients requiring emergency surgery, the elderly group demonstrated a significant higher proportion of emergency surgeries and complications associated with regular surgeries compared to the younger group.

**CONCLUSION**: Age does not influence the surgical results, postoperative morbidity and mortality. But in case of emergency setting, the surgical risk and postoperative complications can increase in elderly patients.

Table 3. Postoperative morbidity

Characteristic	Overall	Group A (<50 years)	Group B (≥50 years)	P-value
а	502	439	63	
Hospital day (mean:SD)	9.7±7.5	9.8±7.9	9.2±4.4	0.368
Postoperative mortality (%)				0.235
No	500 (99.6)	438 (99.8)	62 (98.4)	
Yes	2 (0.4)	1 (0.2)	1 (1.6)	
Re-intervention (%)				0.315
No	493 (99.2)	432 (98.4)	61 (96.8)	
Yes	9 (1.8)	7 (1.6)	2 (3.2)	
Complication (%)				>0.99
No	433 (86.3)	379 (86.3)	54 (85.7)	
Yes	69 (13.7)	60 (13.7)	9 (14.3)	
Anastomosis site leak	13 (2.6)	11 (2.5)	2 (3.2)	0.672
Intra-abdominal infection	11 (2.2)	9 (2.1)	2 (3.2)	0.636
Surgical site infection	20 (4.0)	19 (4.3)	1 (1.6)	0.493
Bleus	15 (3.0)	14 (3.2)	1 (1.6)	0.706
Bleeding	0 (0.0)	0 (0.0)	0 (0.0)	NA
Urinary tract infection	1 (0.2)	1 (0.2)	0 (0.0)	>0.99
Paeumonia	5 (1.0)	2 (0.5)	3 (4.8)	*0.016
Acute kidney injury	0 (0.0)	0 (0.0)	0 (0.0)	NA
Myocardial infarction	0 (0.0)	9 (0.0)	0 (0.0)	NA
Stoke	0 (0.0)	0 (0.0)	0 (0.0)	NA
Sepsis	0 (0.0)	0 (0.0)	0 (0.0)	NA

SD, standard deviation

#### \*: significance level of 5% (two-tailed tests)

There was no significant difference between the two groups in postoperative complications or length of hospital stay (Table 3). However, pneumonia was more prevalent in the elderly group.

## Risk Factors for the Failure of Endoscopic Balloon Dilation to Manage Anastomosis Stricture from Colorectal Surgery

Young Il Kim<sup>1</sup>, Seok-Byung Lim<sup>2</sup>

- <sup>1</sup>Asan Medical Center,
- <sup>2</sup>Asan Medical Center, Seoul

**BACKGROUND**: An anastomosis stricture after colorectal surgery is principally managed by endoscopic balloon dilation (EBD). Although this intervention is effective, however, subsequent procedures or surgical interventions are often required.

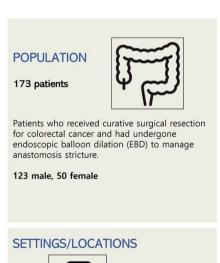
**PURPOSE**: This study aimed to assess the long-term outcomes of EBD for anastomosis stricture arising from colorectal cancer surgery.

MATERIALS AND METHODS: We analyzed 173 patients who received curative surgery for colorectal cancer at our hospital between January 2000 and December 2022 and had undergone EBD to manage anastomosis stricture. The medical records of these cases were retrospectively reviewed to assess the outcomes and risk factors for restenosis and permanent stoma.

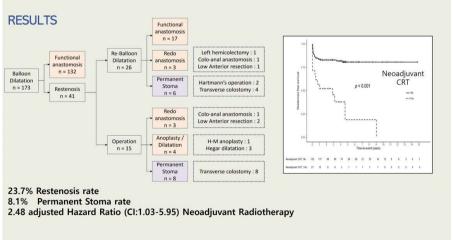
**RESULTS**: Of the 173 study patients, 41 (23.7%) presented with restenosis with a median time to recurrence of 49 [37-150] days. The restenosis group was significantly younger (55.6 years versus

60.8 years), with a more prominent rectal location (80.5% versus 57.6%), a higher incidence of manual anastomosis (24.4% versus 5.3%), and a higher percentage of neoadjuvant radiotherapy (34.1% versus 5.3%, P<0.001). Multivariable analysis indicated neoadjuvant radiotherapy (adjusted HR, 2.48; 95% CI, 1.03-5.95) and cerebral vascular disease (adjusted HR, 6.97; 95% CI, 2.15-22.54) as independent prognostic factors for restenosis. Fourteen patients (8.1%) required a permanent stoma due to treatment failure. All cases needing a permanent stoma were male (14 patients, 100%, P = 0.007) and this group had a higher rate of neoadjuvant radiotherapy, adjuvant chemotherapy, and manual anastomosis.

**CONCLUSION**: Patients receiving neoadjuvant radiotherapy are most prone to restenosis after an EBD intervention to manage an anastomosis stricture. Neoadjuvant radiotherapy is also a strong risk factor for requiring a permanent stomas due to treatment failure.



Single tertiary cancer center



#### CONCLUSION

Patients frequently experience restenosis after EBD to manage anastomosis stricture. Neoadjuvant radiotherapy is an independent risk factor for restenosis.

### Safety and Feasibility of Conversion of Double Stapling Technique to Single Stapling Technique for Reducing the Anastomotic Leakage after Rectal Cancer Surgery

<u>Sujin Kang</u>, Gyu-Seog Choi, Hye Jin Kim, Jun Seok Park, Soo Yeun Park, Seung Ho Song, Min Hye Jeong, Sung Min Lee

13.3 minutes.

Kyungpook National University Hospital

BACKGROUND: Defunctioning stoma can be the most powerful way to reduce the AL after rectal cancer surgery. However, it also has the disadvantage including stoma itself or stoma-related. Therefore, optimal use of defunctioning stoma is essential. Recently, our center has identified that AL is prone to occur at the point where the stapler lines cross. Hence, we examine the feasibility of reducing the risk of AL by converting to SST, avoiding dog ears and potentially minimizing the need for stoma formation.

**PURPOSE**: To present that the transition from DST(Double Stapling Technique) to SST(Single Stapling Technique) is safe, with the aim of reducing AL(Anastomotic Leakage)

MATERIALS AND METHODS: This retrospective analysis involves 107 patients who underwent surgery for mid or lower rectal cancer. The study collected data from August 2023 to December 2023. Among them, 18 patients underwent a transition from DST to SST anastomosis. 1:2 propensity score matching was done using

3 variables: age, tumor height, and preoperative radiotherapy. **RESULTS**: AL was observed in 8(10.2%) patients in the DST group and 2(10.5%) patients in the group that underwent conversion to SST. In both groups, the tumor height averaged 8cm. There were no significant differences between the two groups in terms of sex, preoperative treatment, stage, operation time(average 174.3min), tumor location(average 8.05cm), or the number of linear staplers used. However, it is noteworthy that the rate of protective diversion was lower in the group that underwent SST conversion (5.6% vs 30.6%). The suture time for changing from DST to SST averaged

**CONCLUSION**: In the SST group, the AL rate remained comparable to that of the DST group despite a significant reduction in diversion. Consequently, SST may be considered as a procedure aimed at ultimately mitigating the factors that increase AL risk, thereby minimizing the necessity for stoma creation.

### A Case of Mpox Virus Proctitis on Sigmoidoscopy

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<sup>1</sup>Department of Surgery, National Medical Center,

BACKGROUND: Since its emergence in May 2022, Mpox has been increasingly reported in non- endemic regions, including Europe, the United States, and Asia. Especially proctitis has been reported in 14%–36% of Mpox patients.

**PURPOSE**: This case study aims to contribute to the existing literature by detailing a unique presentation of Mpox, initially manifesting solely as proctitis with endoscopic evaluation.

MATERIALS AND METHODS: A 31-year-old male patient who is living with HIV and a history of syphilis infection was admitted on June 28, 2023 via department of outpatient due to severe anal pain had started four days ago. Digital rectal examination revealed tenderness at 4, 9 o'clock in lower rectum, but not showed anal bleeding.

**RESULTS**: Sigmoidoscopy performed on first day of hospitalization showed a diffuse area of friable mucosa with contact bleeding in the lower rectum and anal canal. A localized area of severe inflammation characterized by erythema, friability, mucous plugs, and shallow ulcerations with exudate was found extending 20 cm from the anal verge. Abdomen-pelvic CT (APCT) showed enhanced wall thickening in the most part of rectum and with perirectal haziness and some enlarged perirectal nodes. Also, thickening of left pelvic wall and enhancement of right levator ani muscle were observed in CT images. Sigmoidoscopy as a follow-up investigation was performed on 3rd day of admission, and it showed less mucous plug and exudate than last time, but overall friable mucosa, localized erythema, and shallow ulcerations were still observed. Histopathological examinations accompanying with the endoscopy were unremarkable. Considering the patient's medical history, the possibility of Mpox infection was considered, and the patient was asked about his sexual history and confirmed that he had anal intercourse with the other man 8 days before the onset of symptoms. We recommended an infectious medicine consultation and examination for Mpox, but he wanted to discharge and procced test and treatment in outpatient settings, and was discharged without complications on 7th day of hospital stay. The day after discharge, he visited Infectious disease outpatient clinic and was led to Mpox PCR test of newly discovered skin lesions and anal tissue taken from sigmoidoscopy during hospitalization. Eventually Mpox was confirmed on July 7, 2023. Proctitis was markedly improved and only tiny erosions were remained on a follow-up sigmoidoscopy about 2 weeks after admission.

**CONCLUSION**: In the current Mpox epidemic period, detailed patient history taking and physical examination are crucial for diagnosis, especially in cases of unexplained proctitis.

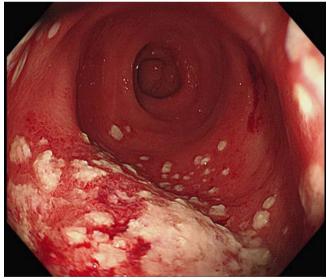


Figure. Redness, multiple white patches and mucous plug in the lower rectum on sigmoidoscopy performed on June 28, 2023

<sup>&</sup>lt;sup>2</sup>Division of Infectious Diseases, National Medical Center

# The Intraperitoneal Onlay Mesh Repair (IPOM)-Only Surgical Approach Cannot Correct the Perineal Hernia

Nina Yoo<sup>1</sup>, Yoon Suk Lee<sup>2</sup>, In Kyu Lee<sup>3</sup>, Jung Hoon Bae<sup>3</sup>, In Kyeong Kim<sup>4</sup>, Do Sang Lee<sup>4</sup>, Tae Gyu Kim<sup>4</sup>

<sup>1</sup>The Catholic University of Korea,

BACKGROUND: Postoperative perineal hernia (PH) is an infrequent but significant complication following abdominoperineal resection (APR), with abdominal contents herniating into the perineal region. Incidence rates are potentially underestimated, with some studies indicating up to 7%. Symptoms are often limited to a perineal lump, but without intervention, PH can progress to complications such as urinary dysfunction, skin erosion, and bowel obstruction. Surgical repair remains challenging due to the lack of a standardized approach and the complexity of the condition.

**PURPOSE**: This study evaluates the outcomes of PH repair using an intraperitoneal onlay mesh (IPOM)-only approach, documenting a case of recurrence.

MATERIALS AND METHODS: We present a case of a 78-year-old female who developed a 10cm perineal hernia post-APR. The

repair involved laparoscopic adhesiolysis, reduction of hernia contents, resection of excess hernia sac, and laparoscopic fixation of a coated mesh to the sacrum and pelvic sidewalls.

**RESULTS:** The patient experienced a large postoperative seroma and showed signs of hernia recurrence at three months, leading to consideration of reoperation. Recurrence may be attributed to factors such as limited pelvic space, insufficient mesh overlap, unstable mesh fixation, and compromised pelvic tissue and musculature.

CONCLUSION: While various surgical techniques for PH repair have been explored, recurrence rates remain high. This case underscores the inadequacy of IPOM-only repair due to potential mesh rupture without underlying support. A combined laparoscopic-perineal dual fixation approach may offer a more robust solution to reduce the risk of recurrence.

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# Anorectal Anatomy Illustration using the 3D Endocavitary Ultrasound: Standard Procedure for the Optimal Delineation of Anorectal Anatomy

Nina Yoo<sup>1</sup>, Yoon Suk Lee<sup>2</sup>, Hyeon-Min Cho<sup>3</sup>, Bong Hyeon Kye<sup>3</sup>

<sup>1</sup>The Catholic University of Korea, Medical College,

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BACKGROUND: The diagnostic accuracy of 3D endocavitary ultrasound for anorectal diseases is highly contingent upon the operator's proficiency, which necessitates a period of acclimatization to overcome the learning curve. Standardizing the scanning process, particularly for 3D reconstruction, is imperative to enhance diagnostic precision, consistency, and repeatability.

**PURPOSE**: This abstract delineates the establishment of essential anatomical reference points to discern spatial correlations with adjacent pelvic structures and muscular formations during scanning procedures.

MATERIALS AND METHODS: Our protocol involves a simplified bowel preparation, typically only requiring a bisacodyl laxative, with sedation being optional based on patient comfort. The scanning utilizes a high multifrequency endoprobe for 3D image

construction. A water-infused balloon technique is employed for rectal expansion and artifact minimization, with patient positioning in the left lateral decubitus position to facilitate probe insertion and imaging.

**RESULTS:** Scanning begins at the peritoneal reflection, moving caudally to visualize seminal vesicles or the uterus, depending on the patient's sex, and further down to the extraperitoneal distal rectum. The obturator internus muscle is also assessed, and the anal canal is examined in three segments based on muscle anatomy and ultrasound appearance.

CONCLUSION: A standardized scanning protocol is essential for precise 3D endocavitary ultrasound diagnoses. A deep understanding of pelvic anatomy is crucial for detecting pelvic organ pathologies and planning treatment strategies.