



Towards the  **Best**
based on *Evidence*

INTEGRATION SESSION

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KOREAN
SURGICAL SOCIETY



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SYMPOSIUM: WHICH APPROACH ARE YOU GOING TO CHOOSE FOR COLORECTAL SURGERY?

Laparoscopic Surgery

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Laparoscopic surgery is current standard for elective colorectal disease. Laparoscopic surgery has benefits of minimally invasive surgery in terms of pain, recovery, and cosmesis. Since 1990s, many randomized controlled studies proved equivalence between laparoscopy and open surgery for oncologic outcomes of colon and rectal cancer. In complex and difficult cases, open or robotic surgery can be adjusted alternatively. As well as inflammatory bowel disease including Crohn's disease and ulcerative colitis, laparoscopic surgery is considered as preferred approach rather than classic open surgery. Most common surgery for Crohn's is laparoscopic ileocelectomy. In cases with huge phlegmon, complex enteric fistula, and dense adhesion, open surgery or conversion can be used for alternative method. Many studies also reported applicability of laparoscopic surgery even for recurrent Crohn's disease. Laparoscopic surgery can be applied to other benign disease (diverticulitis, rectal prolapse, etc) as primary option.

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Robotic Surgery

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Single-port Surgery

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Since the first laparoscopic colectomy was described in 1991, minimally invasive colorectal surgery has continued to grow. The expanding use of laparoscopy has been the greatest technical and clinical advance in the field of colorectal surgery. Furthermore, there is the continued drive towards reduced port and scarless surgery, and single incision laparoscopic surgery (SILS) was developed to further the outcomes of multiport laparoscopy. Multiple studies have proven SILS is safe and feasible for the full array of benign and malignant colorectal disease, and its applications continue to grow. From early reports, SILS had similar postoperative outcomes, including complication, intraoperative conversion, and readmission rates. Oncologic outcomes, including the feasibility of R0 resection, specimen length, number of lymph nodes harvested, and proximal and distal margins were comparable to multiport laparoscopy. However, the use of SILS introduced several technical challenges, which may limit widespread use of the platform. Working through a small incision with multiple parallel instruments competing for the same space at the fulcrum of the entry port decreases the range of motion and external working space, increasing instrument collisions. With increasing operator experience, these ergonomic and technical challenges can be readily overcome. Technical instruments and procedural adaptations have been developed to help work through these challenges. Recently, robotic surgical system for single-incision surgery was developed to overcome the difficulties in SILS. In this overwhelming tendency towards minimally invasive surgery, the ultimate goal would be to perform scarless surgery with similar safety profiles, efficacy, and long-term outcomes as the standard laparoscopic surgery. Natural orifice transluminal endoscopic surgery (NOTES) is the ideal illustration of possible achievement of this objective, providing a scar-free surgery with the abolishment of incision-related complications, postoperative pain and adhesions. For colorectal surgery, transanal NOTES has been safely applied to proctectomy and colectomy. Multiple clinical trials of transanal total mesorectal excision (taTME) demonstrated the feasibility and oncologic safety of this approach for rectal cancer. In the near future, robotic single incision surgery with NOTES seems to be pursued. It is expected to provide a completely or nearly complete scarless surgery regardless of location of the lesion in the abdomen.

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The Development of Technology Will Change the Strategies of Colorectal Surgery

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Advances in technology have made it possible to access areas of the human body that are impossible with conventional methods and are bringing about changes in approach strategies beyond providing additional options for colorectal surgery.

In the 20th century, the advent of endoscopy and laparoscopy opened the era of minimal invasive surgery. The advent of surgical robots in the mid-20th century made it possible to overcome the technical challenges in the pelvis while maintaining both oncological outcomes results and the advantages of minimally invasive techniques.

In the 21st century, the emergence of technologies such as flexible access surgery, robotic microsurgery, 3D imaging, 4K resolution, and 5th generation wireless systems allow access to areas that are difficult to access with existing technologies, and more sophisticated surgery is possible.

Artificial intelligence is influencing not only the diagnosis but also the treatment direction. 3D bioprinting, augmented reality and virtual reality technologies enable preoperative planning and training as an anatomical replica or virtual reality of patients with acceptable dimensional correlation.