English Symposium

2025年11月14日(金) 13:20 ~ 14:40 第10会場

## [ESY2] English Symposium 2 New Era of Robotic Surgery

Moderator:Micheal Powar(Cambridge University Hospitals), Junichiro Kawamura(Kindai University)

[ESY2-1]

### The New Era of Robotic Colorectal Surgery with the da Vinci Xi

Mina Ming-Yin Shen (China Medical University Hsinchu Hospital, Taiwan)

[ESY2-2]

### da Vinci SP and 5 in Colorectal Surgery: Early Experience and Future Perspectives

Yasumitsu Hirano (Saitama Medical University International Medical Center)

[ESY2-3]

### Flexible Endoscopic Robotic System

Simon Ng (Department of Surgery, The Chinese University of Hong Kong)

[ESY2-4]

### Carina surgical robot -assisted radical resection of colorectal cancer single center experience

Yuping Zhu (Zhejiang Cancer hospital)

[ESY2-5]

### Surgical stress response in Kangduo versus Da Vinci robot-assisted for colorectal cancer

Yunxiao Liu, Yuliuming Wang, Guiyu Wang (Department of colorectal cancer surgery, the Second Affiliated Hospital of Harbin Medical University)

[ESY2-6]

### Clinical deployment of ANSUR, a surgical robot based on a new concept

Masaaki Ito (National Cancer Center Hospital East)

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### [ESY2-1] The New Era of Robotic Colorectal Surgery with the da Vinci Xi

Mina Ming-Yin Shen (China Medical University Hsinchu Hospital, Taiwan)

Background: Escalating demands for oncologic precision, reconstructive quality, and operating-room (OR) efficiency are redefining colorectal surgery. The da Vinci Xi platform enables a shift toward reproducible oncologic dissection and suture-centric reconstruction while easing manpower pressures.
Objective: To outline a practice model that leverages Xi capabilities for (1) hand-sewn end-to-end and single-stapling anastomoses, (2) standardized CME or TME oncological resection, (3) OR workforce optimization, and (4) near-term innovation.
Approach: Multi-quadrant Xi port mapping, stable optics, and wristed instrumentation support precise intracorporeal suturing, tension control, and mucosa-to-mucosa apposition with facile revision. For colorectal cancer operation, the platform delivers steady counter-traction and high-fidelity views along embryologic planes to achieve specimen integrity, central vascular ligation, and nodal clearance. A surgeon-controlled camera, programmable arm choreography, and standardized docking/checklists reduce bedside dependency and streamline turnover; dual-console coaching and instrument economy further enhance scalability.
Key Advantages:
Reconstruction: Sutured EEA and single-stapling anastomosis minimize device constraints, improve orientation in the narrow pelvis, and integrate perfusion assessment.
Oncology: Consistent CME/TME through stable exposure and precise energy/sealing.
Operations: Fewer assistants required per case, clearer role definition, and repeatable workflows.
Future Directions: Quantified perfusion analytics, automation-assisted camera control, augmented-reality anatomy overlays, telementoring, and data-driven coaching will extend safety, efficiency, and indications.
Conclusion: The Xi system operationalizes a workforce-aware, high-quality paradigm for robotic colorectal surgery - advancing sutured anastomosis, standardizing CME/TME, and laying a credible path to the next wave of innovation.

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### [ESY2-2] da Vinci SP and 5 in Colorectal Surgery: Early Experience and Future Perspectives

Yasumitsu Hirano (Saitama Medical University International Medical Center)

The advent of next-generation robotic systems has significantly advanced colorectal surgery, enabling procedures that are more precise, less invasive, and ergonomically favorable for surgeons. At our institution, we have performed over 100 cases using the da Vinci SP system in gastrointestinal surgery, exploring the full potential of single-port robotic approaches. The SP system offers excellent maneuverability in confined pelvic spaces, reduces the number of incisions, and improves cosmetic outcomes. Furthermore, its compatibility with the concept of "solo surgery" minimizes reliance on experienced surgical assistants, allowing the primary surgeon to perform procedures independently. This system has shown particular advantages in anatomically complex cases, such as patients with previous pelvic surgery, ileal conduit reconstruction, or kyphosis. In contrast, the newly introduced da Vinci 5 system represents a state-of-the-art robotic platform, offering enhanced console ergonomics, real-time force feedback, and advanced system analytics. Features such as energy usage monitoring and intraoperative motion tracking support the integration of surgical data into clinical practice. From our initial experience, the da Vinci 5 has enabled safe and efficient procedures and shows great promise for broader application in colorectal surgery. In this presentation, we will compare the technical refinements, clinical performance, and initial implementation challenges of both systems. Through these insights, we aim to provide a forward-looking perspective on the future of robotic colorectal surgery, integrating the philosophy of single-port access with the innovations of next-generation robotic technology.

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### [ESY2-3] Flexible Endoscopic Robotic System

Simon Ng (Department of Surgery, The Chinese University of Hong Kong)

The recent progress in endoscopic technologies and interest in colorectal cancer screening have enabled the diagnosis of a larger number of early colorectal neoplasms. Most of these lesions are treated with laparoscopic resection. An alternative minimally invasive therapeutic option for these early lesions is endoscopic submucosal dissection (ESD). However, ESD is technically very challenging and carries a relatively high risk of complications. Furthermore, ESD has a very long learning curve.
To overcome these technical problems, people thought about the application of robotic technology. In order to perform endoluminal surgery such as colorectal ESD, the development of a flexible endoscopic robot that can travel along the colon is essential. A prototype endoscopic robot known as the Master And Slave Transluminal Endoscopic Robot (MASTER) was designed and built in 2006. In a preclinical study using ex vivo porcine stomach model, even non-clinician novices were able to successfully perform ESD using the prototype MASTER system, without any perforation. Endoscopy experts and non-experts could perform ESD much faster with the MASTER system.
The original prototype MASTER system was quite crude and bulky, with wires or exoskeleton mounted on a standard double-channel endoscope. With further technologic upgrades, a second-generation endoscopic robot, the EndoMaster EASE (Endoluminal Access Surgical Efficacy) System, was developed. The new system consists of an independently designed, flexible platform with a built-in endoscopic imaging system and three working channels, two for the passage of robotic arms and one for accessories. Recently, our research group at CUHK has completed the world's first clinical trial on robotic colorectal ESD (n = 43) using the EndoMaster EASE System. Our study has confirmed the safety and efficacy of this novel endoscopic robotic system. Further evaluation is needed before this system can be routinely used in clinical practice.

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### [ESY2-4] Carina surgical robot -assisted radical resection of colorectal cancer single center experience

Yuping Zhu (Zhejiang Cancer hospital)

The Carina surgical robot system is a recently introduced robot-assisted endoscopic surgical device originally designed in China. The modular architecture of the Carina platform is easily configurable to address clinical needs of urological, thoracic, gynecological, and general surgeons. Unlike Da Vinci integrated system, Carina surgical robot is composed by independent mobile, modular patient carts with separate operation arm, easily adjusts to any operating room setup The purpose of this study was to ascertain whether the Carina system was substantially equivalent to a comparable robotic device in terms of safety, efficacy and treatment costs during colorectal cancer resection, and evaluate the learning curve of Carina platform robotic surgery. Preliminary result: Successfully completed the procedure without any conversion to open or laparoscopic surgery. Time to first flatus and incidence of perioperative adverse events were comparable to da Vinci surgical robot. Additionally, no disparities were observed in pathological outcomes.

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### [ESY2-5] Surgical stress response in Kangduo versus Da Vinci robot-assisted for colorectal cancer

Yunxiao Liu, Yuliuming Wang, Guiyu Wang (Department of colorectal cancer surgery, the Second Affiliated Hospital of Harbin Medical University)

Background: The efficacy and safety of Kangduo robotic technology in colorectal cancer (CRC) surgery have been fully verified. However, no studies have yet reported its short-term impact on surgical stress response.
Methods: This study conducted a post-hoc analysis using the data from a previous non-inferiority randomized controlled trial (ChiCTR2200063172). Patients with stage I-III CRC who underwent robotic-assisted radical colorectal cancer surgery between June 2022 and May 2023 were included. Participants were randomized 1:1 to receive either Kangduo or Da Vinci robotic-assisted surgery. The primary outcomes were changes in systemic stress response markers, including alanine aminotransferase (ALT), aspartate aminotransferase (AST), white blood cell count (WBC), hemoglobin (HB), neutrophil count (NEU), albumin (ALB), creatinine (CR), blood urea nitrogen (BUN), and lymphocyte count (LY).
Results: A total of 100 CRC patients were enrolled: 50 in the Kangduo robotic-assisted group and 50 in the Da Vinci robotic-assisted group. No significant differences were observed between the two groups in any of the measured stress response markers. Similar findings were noted in the subgroup analysis of patients without postoperative complications.
Conclusion: Kangduo robotic-assisted CRC surgery induces systemic stress response changes comparable to those observed with the Da Vinci robotic system.

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### [ESY2-6] Clinical deployment of ANSUR, a surgical robot based on a new concept

Masaaki Ito (National Cancer Center Hospital East)

The entry of new technologies has significantly transformed the field of surgical treatment. One of the most significant revolutions in the surgical realm over the past 30 years has been the rise of laparoscopic surgery. In Japan, laparoscopic surgery has become widespread for many diseases, with reports indicating comparable survival rates to standard treatments and good short-term outcomes.
In recent years, the introduction of surgical assistance robots has gained traction, and many surgical procedures for various disease areas have received insurance coverage in Japan. The number of cases using robotic-assisted surgery has been increasing. While the advantages of robots in terms of overwhelming operability are undeniable, studies comparing robotic-assisted surgery and laparoscopic surgery have shown that the superiority of robotic surgery is limited in terms of clinical outcomes, and no studies have proven an increase in survival rates. Considering this point, discussions from multiple perspectives regarding the future direction of robotic-assisted procedures and the development of robotic devices are awaited.
We established A-traction Co., Ltd., a venture company focused on "surgical support robot development," and have promoted the creation of Japan's first innovative medical devices with different features and concepts from existing surgical robots, obtaining medical device sales approval in 2023 as a National Cancer Center-certified venture company. The concept of our developed robot involves the surgeon performing dissection operations at the bedside, using the right hand and foot interface to control three robotic arms. In other words, the surgeon can intuitively mange two instruments - in conjunction with an endoscope - single-handedly.
We conducted the First-in-Human (FIH) procedure in November 2023, and it has been implemented in several medical facilities across the country. So far, our hospital has performed over 70 colorectal cancer surgeries, realizing one of our goals, which is the reduction of workload for healthcare.