Reduced port laparoscopic surgery for right-sided colon cancer performed using ArtiSential® articulated instruments

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INTRODUCTION

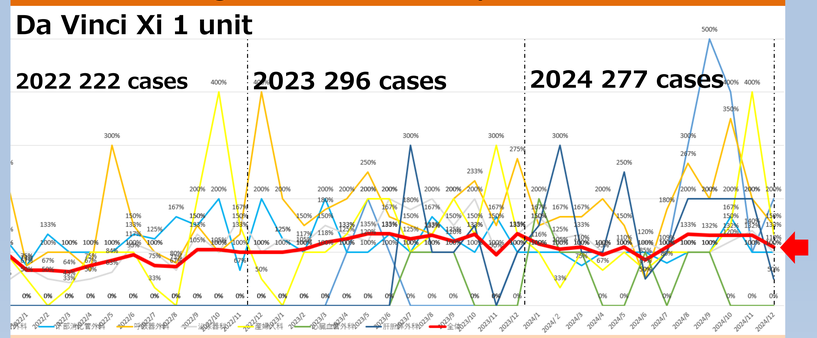
Current Surgical Procedures of Reduced Port Laparoscopic Surgery (RPS)

- Ostomy creation or closure
- Uncomplicated appendectomy
- Resectable benign intestinal tumor
- Uncomplicated cholecystectomy

Management of Minimally Invasive Surgery for Colorectal Cancer

- Colectomy ⇒ Conventional Lap for the education of young surgeons
  Robotic surgery
- Rectal resection ⇒ Robotic surgery

Utilization of Surgical Robot in Our Hospital



- The surgical robot system (Da Vinci Si, later upgraded to Xi) was introduced in 2018 and has since been utilized across various departments.
- Since 2020, a single Da Vinci Xi system has performed over 200 cases annually. By 2022, its utilization rate exceeded 100% (red arrow).

Surgical Robot (We got another one!)

Da Vinci Xi



INTUITIVE SURGICAL®

hinotori™ Medicaroid

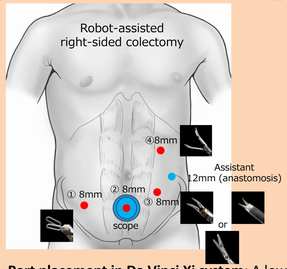


"hinotori™" is a Japan-made surgical robot developed by Medicaroid and introduced in 2024.

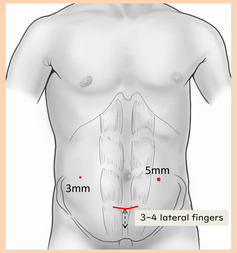
PROCEDURES

Port Placement in Robot-assisted Surgery and RPS

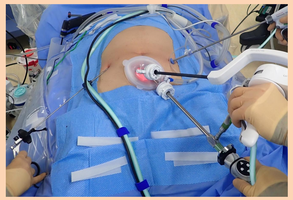
1.



2. A.

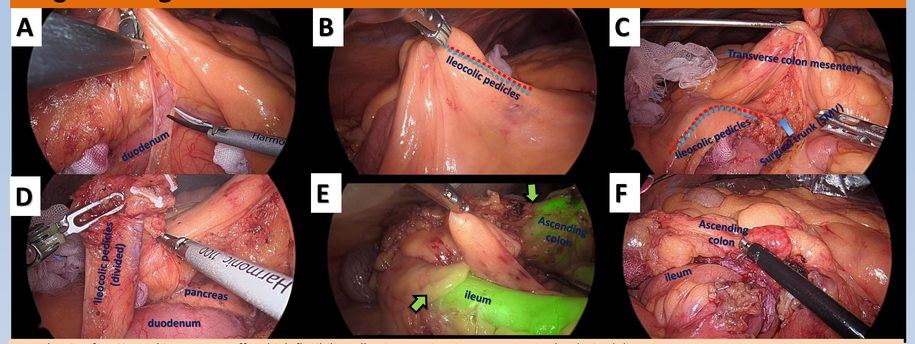


B.



1. **Port placement in Da Vinci Xi system**: A lower abdominal transverse incision is made, and a wound protector and a cover to maintain pneumoperitoneum are attached. The camera is then inserted through this site. In addition, a total of hour ports, including an assistant port, are inserted to perform the procedure.
2. **A. Port placement in RPS**: The lower abdominal incision is made in the same manner, through which both the camera and a 12mm port are inserted. The 12mm port site is used for ArtiSential ® is used as the surgeon's left hand. Additionally, a 5mm port is used for the surgeon's instrument, and a 3mm port is placed for the assistant.
   B. Actual images

Surgical Images of RPS



A,B: The tip of ArtiSential instrument offers high flexibility, allowing precise tissue traction in the desired direction.

C: A 3mm assistant forceps was inserted and used for traction of the transverse colon.

D: During the dissection of the right colonic mesentery, the flexible tip allows precise traction in the optimal direction, ensuring adequate exposure and a wider surgical field.

E: Assessment of blood flow using near-infrared fluorescence with ICG for intracorporeal anastomosis (Arrows indicated demarcation line)

F: After intracorporeal anastomosis using functional end-to-end anastomosis (FEEA)

The surgical field within the abdominal cavity was expanded with ArtiSential ®, while instrument collisions outside the cavity were minimized (image not showing).

RESULTS

	Age	M/F	BMI	Diag.	His.	OR time (min.)	EBL (g)	LN disection	Reconstruction (intra-/extra-corporeal)
	64	M	21.8	Cecal ca.	tub1	186	5	D3	FEEA (intracorporeal)
	56	M	27.5	Appe. mucocele	ade.	186	5	D2	FEEA (extracorporeal)
	77	M	26	Cecal ca.	tub2	181	5	D3	FEEA (intracorporeal)
	64	F	25.7	Cecal ca.	tub1	172	5	D3	FEEA (intracorporeal)
	80	M	22.6	Cecal ca.	tub2	137	5	D3	FEEA (extracorporeal)
	57	M	24.1	Cecal tumor	ade.	180	20	D2	FEEA (extracorporeal)
Median	64	-	24.9	-	-	180.5	5	-	-

M/F, Male/female; HT, Hight; BW, Body Weight; BMI, Body Mass Index; Diag., Diagnosis; His., Histology; ade., Adenoma; EBL, Estimate Blood Loss; FEEA, Functional End-to-End Anastomosis

PROS & CONS

- **Pros**
  - Fewer instrument collisions than conventional laparoscopic surgery (RPS)
  - Less postoperative pain
  - Reduced costs compared to robotic surgery
- **Cons**
  - Requires training to use
  - Necessity of performing intracorporeal anastomosis with the left hand
  - The process of opening and closing the abdomen is complicated
  - How should the wound be managed in case of conversion to open surgery?

CONCLUSIONS

In conclusion, we are currently in an era dominated by robotic surgery. However, in the near future, surgical approaches for colorectal cancer may be chosen based on each case, with robotic surgery, conventional laparoscopic surgery, or RPS being appropriately selected. Therefore, I believe it is crucial to maintain a wide range of surgical options.

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COI disclosure
Name of first author: **Kazuki Ueda MD**
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