Ensuring the Safety of Robotic-Assisted Right Hemicolectomy in Patients with a History of Abdominal Aortic Aneurysms: Expanding Indications through Port Placement Modifications

Shinya Yamamoto, Takeshi Yanagita, Futoshi Teranishi, Takeyasu Katada, Shuji Koide, Tsuyoshi Saito, Reo Yamazaki, Kaita Suzuki
(Dept. of Surgery, Toyokawa City Hospital)

INTRODUCTION

Robotic-assisted surgery poses a risk of organ and vascular injury due to the lack of tactile feedback, especially in patients with abdominal aortic aneurysms (AAA) or iliac artery aneurysms. Careful modifications in port placement may enable safer procedures in these high-risk cases. At our institution, robotic right hemicolectomy is performed using a reverse L-shaped port placement, a modified Pfannenstiel incision, and intracorporeal anastomosis (Fig. 1).

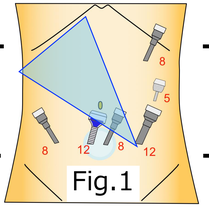
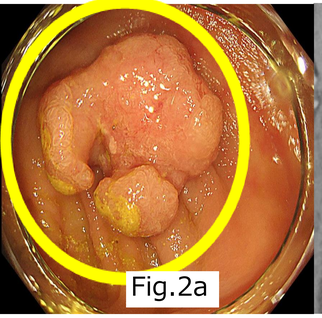
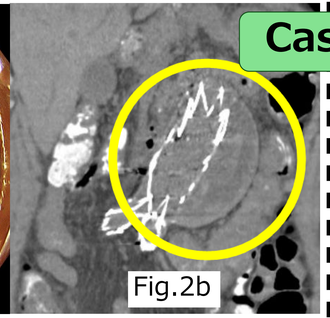


Fig.1

METHODS AND PROCEDURES

Case 1


Fig.2a


Fig.2b

An 84-year-old male with a history of EVAR for AAA and left iliac aneurysms was diagnosed with cecal cancer (cT2N0M0, cStage I) and underwent robotic ileocecal resection. (Fig. 2a) Despite residual aneurysms (AAA 67 mm, left common iliac 29 mm, left internal iliac 18 mm) (Fig. 2b), he was discharged without complications on postoperative day 9.

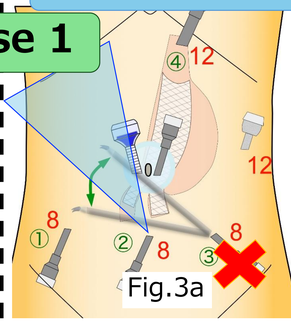


Fig.3a

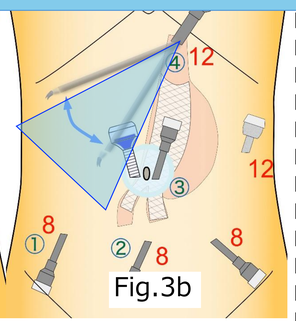
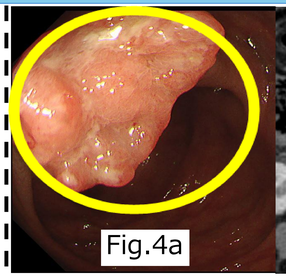
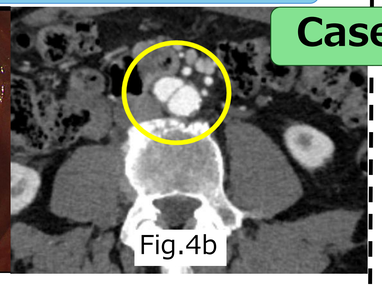


Fig.3b

The retroperitoneal approach was modified to avoid contact with the AAA by placing a fenestrated bipolar in Port 1, a Maryland bipolar in Port 2, a camera at the umbilicus, and a tip-up grasper in Port 4 (Fig. 3a). To prevent arm interference near the duodenum, the setup was adjusted to a tip-up grasper in Port 1, a fenestrated bipolar in Port 2, a camera at the umbilicus, and a Maryland bipolar in Port 4 (Fig. 3b).

Case 2


Fig.4a


Fig.4b

A 66-year-old male with an untreated AAA (23mm), who was diagnosed with ascending colon cancer (cT2N0M0, cStage I) (Fig. 4a/4b) and underwent robotic-assisted right hemicolectomy. He was discharged on postoperative day 8.

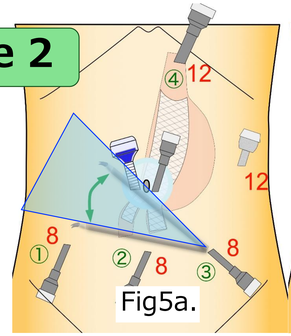


Fig5a.

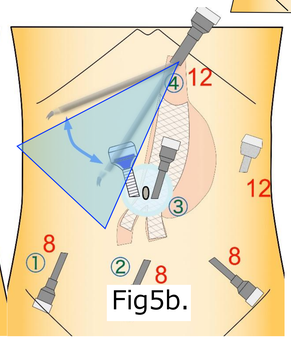


Fig5b.

The retroperitoneal approach was performed using the standard port placement. (Fig. 5a) To avoid contact with the AAA around the duodenum, the setup was modified as follows: a tip-up grasper in Port 1, a fenestrated bipolar in Port 2, a camera at the umbilical port, and a Maryland bipolar in Port 4. (Fig. 5b) The surgery was successfully completed with this arrangement.

DISCUSSIONS

The advantages of robotic surgery include enhanced visualization and precise manipulation using robotic arms. However, cases with a high risk of vascular injury, such as AAA, are often considered unsuitable for robotic surgery. In right hemicolectomy, there is a risk that the Maryland bipolar and tip-up instruments on the patient's left side may come into contact with the AAA. To mitigate this risk, ports were placed closer to the midline, and instrument exchanges were performed under direct visualization, ensuring a safe surgical procedure. Although meticulous handling was required, the operative time was longer than that of a standard right hemicolectomy, highlighting the need for further strategies to reduce operative duration. Even in cases traditionally considered unsuitable for robotic surgery, such as AAA, careful preoperative evaluation and patient selection may enable safe implementation, contributing to the expansion of robotic surgery indications.

CONCLUSIONS

Careful modifications in port placement can reduce the risk of vascular injury, enabling robotic surgery for high-risk patients with abdominal aortic aneurysms