

Two Cases of Rectal Cancer with Retzius Shunt Treated with Robot-Assisted Surgery

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ABSTRACT

The retroperitoneal intestinal vein-general circulation anastomotic pathway is referred to as a Retzius shunt; however, it is not a well-recognized condition. Here, we describe two patients with a Retzius shunt who underwent robot-assisted surgery for rectal cancer. The first case was an 81-year-old woman who had tested positive for fecal occult blood. A type 0-Is tumor was found in the middle rectum, and we used robot-assisted surgery for resection. Intraoperative findings included a dilated vein between the inferior mesenteric artery (IMA) and inferior mesenteric vein (IMV); further, computed tomography (CT) revealed flow into the inferior vena cava (IVC). We clipped the vein without major bleeding and the tumor-specific mesorectal excision was completed. Thereafter, we reviewed relevant literature and identified the structure to be a Retzius shunt. The second case was 77-year-old man with type 1 advanced cancer in the middle rectum who underwent robot-assisted surgery. In this case, we recognized the Retzius shunt on preoperative CT due to our experience with the first case and surgery was completed without any problems. Preoperative recognition of vascular malformations, such as the Retzius shunt by CT is critical to ensure the safety of robot-assisted surgery.

Key words rectal cancer; Retzius shunt; robot-assisted surgery; venous malformation

Many short circuits are formed between the portal vein-general circulation anastomotic pathway, particularly in the presence of portal hypertension. Such shunts are the cause of major clinical morbidities, such as varicose veins and hepatic encephalopathy, and hence, clinically significant venous shunts are named. For example, a Retzius shunt is an anastomotic pathway between a

retroperitoneal intestinal vein and general circulation that typically occurs in patients with portal hypertension. Although it is primarily induced by liver cirrhosis, it can also occur in patients without cirrhosis. A Retzius shunt may be encountered in the operative field during gastrointestinal surgery, but as it is infrequently seen, few reports have described this condition or its management. In addition, it is crucial to recognize it preoperatively because injury to the shunt during surgery could lead to excessive hemorrhage. Here, we describe two cases of Retzius shunt between the inferior mesenteric vein (IMV) and the inferior vena cava (IVC) in patients with rectal cancer who underwent robot-assisted surgery.

PATIENT REPORT

Case 1

An 81-year-old woman presented due to a positive fecal occult blood test. Her medical history included cesarean section and uterine fibroid surgery. Colonoscopy showed a tumor lesion in the middle rectum and contrast-enhanced computed tomography (CT) showed no swollen lymph nodes or distant metastases. Therefore, we decided to perform robot-assisted low anterior resection using the Da Vinci Xi system. Intraoperatively, we found a dilated vein crossing the inferior mesenteric artery (IMA) and the IMV (Figs. 1a and b), and CT identified it as flowing into the IVC (Figs. 1c and d). The vein was clipped without major bleeding and the tumor-specific mesorectal excision was completed. Subsequently, we recognized the structure to be a Retzius shunt based on a review of available literature. Procedure time was 5 h and 58 min, and blood loss was 5 mL. Her postoperative course was stable and she was discharged on postoperative day eight. Pathological analysis of resected tissue revealed the tumor to be adenocarcinoma (tub1 > tub2) with invasion up to the submucosa (T1b). No lymph node metastases (N0) or distant metastases were found (M0) at the time of surgery; thus, the lesion was diagnosed as stage I with histological TNM staging of the tumor.

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Abbreviations: CT, computed tomography; IMA, inferior mesenteric artery; IMV, inferior mesenteric vein; IVC, inferior vena cava

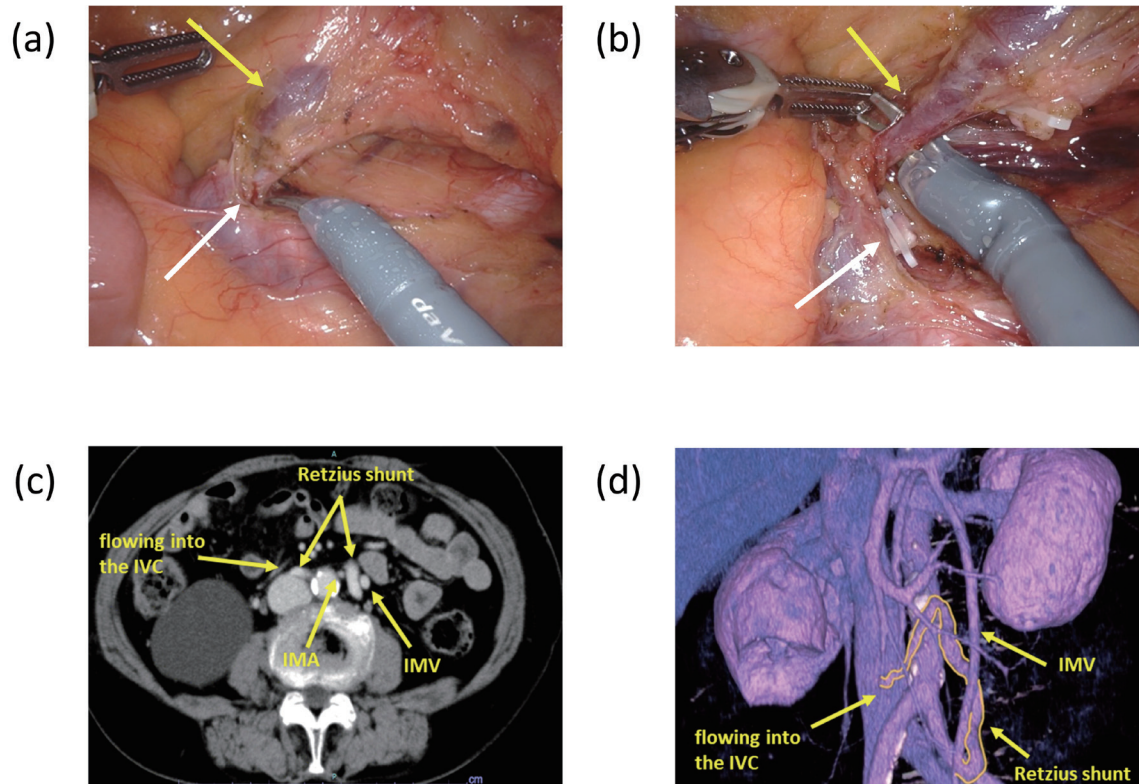


Fig. 1. Intraoperative findings. (a, b) Intraoperative findings indicate a dilated vein (yellow arrow) outside the IMA (white arrow). (c, d) Contrast-enhanced CT (c) and 3D CT (d) show the Retzius shunt crossing the IMA and the IMV flowing into the IVC.

Case 2

A thickened rectal wall was coincidentally noted in a 77-year-old man during a close examination of pulmonary lesions. His medical history included open surgery for appendicitis and gastric cancer that was cured ago. Colonoscopy showed a tumor lesion in the middle rectum and contrast-enhanced CT showed no swollen lymph nodes except for two pulmonary nodules that were diagnosed, after biopsy, as primary lung cancer and pulmonary metastasis of rectal cancer, respectively. We concluded that both pulmonary lesions were resectable and planned a robot-assisted low anterior resection with the Da Vinci Xi system was planned. Notably, we recognized the presence of a Retzius shunt during preoperative CT imaging because of our experience with case 1 (Figs. 2a and b). Therefore, we could easily identify the Retzius shunt intraoperatively, which was clipped and dissected without any complications (Figs. 2c and d). The operation time was 5 h and 21 min, and blood loss was 20 mL. His postoperative course was stable and he was discharged on postoperative day ten. Pathological evaluation revealed the tumor to be an adenocarcinoma (tub2>>tub1) with invasion up to the muscularis propria (T2) but no lymph node metastases

(N0). Thus, we diagnosed stage IVA cancer with histological TNM staging of the tumor. Both lung lesions were later curatively resected at the Division of Thoracic Surgery.

DISCUSSION

Venous shunts are classified according to their location as paraumbilical, splenorenal, superior (left gastric shunt, azygos vein shunt), inferior (mesenteric shunt), or intrahepatic shunts, and are a part of the portosystemic shunt.¹ They are clinically relevant since they contribute to the occurrence of hepatic encephalopathy in patients with liver cirrhosis or those requiring hemodialysis; hence, they are known in the fields of gastroenterology and radiology. The use of laparoscopic or robot-assisted approaches in gastrointestinal surgery has led to more precise surgery with anatomical deformities leading to more severe surgical consequences. The Retzius venous shunt was first reported in 1835 and described a connection from the duodenum to the IVC and from the left colon to the left renal vein.² At present, an anastomotic pathway from a retroperitoneal intestinal vein to general circulation is termed the Retzius shunt.^{3,4} The etiology of the Retzius shunt is not completely understood;

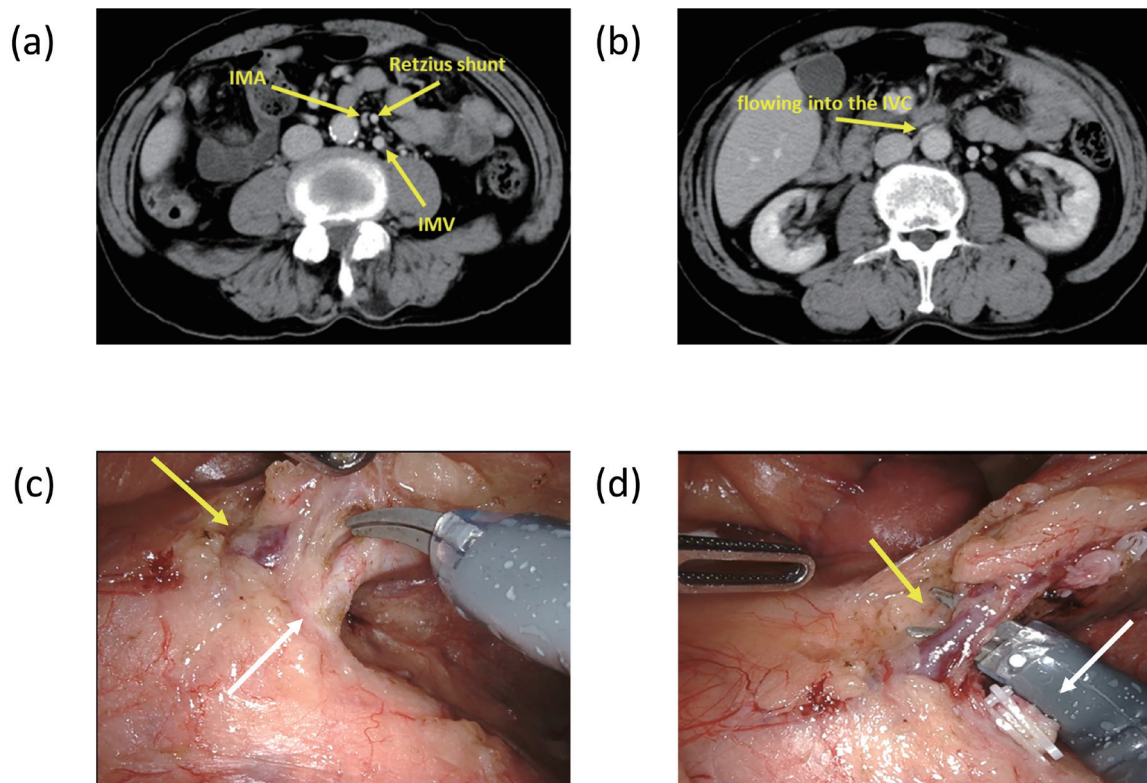


Fig. 2. Intraoperative findings. (a, b) Contrast-enhanced CT shows the Retzius shunt crossing the IMA and the IMV flowing into the IVC. (c, d) Intraoperative findings indicate the Retzius shunt (yellow arrow) outside the IMA (white arrow).

however, two major theories have been proposed.^{5–11} The first attributes congenital factors, such as malposition, adhesions, or vascular patency of abdominal organs during embryonal development, while the second posits that acquired factors, such as open surgery, trauma, or portal hypertension secondary to chronic liver disease, are the etiological agents. Although Retzius shunts have been described in patients with portal hypertension due to cirrhosis, Ibukuro et al. have reported that these shunts were visible on CT arterial portography in about 50% of patients each with and without liver cirrhosis, indicating that they may be rather frequent.¹² Both the cases presented here had a history of open surgery; however, it is unclear if the etiology was congenital or acquired.

In recent years, as surgery has become less invasive, complications, in particular hemorrhage, requires more attention than ever before.^{13, 14} It is generally considered that robot-assisted surgery enables accurate blood vessel detachment and amputation and causes less bleeding. However, and especially in robot-assisted surgery, once bleeding occurs, it is sometimes difficult to control it. Thus, preoperative identification of vascular abnormalities is crucial, and in cases with the type of Retzius shunt presented here, intraoperative injury due

to inadequate knowledge or preparation can lead to life threatening hemorrhage. In the first case described here, we were unaware about the Retzius shunt, were shocked by the intraoperative findings, and utilized CT imaging to confirm anatomy as well as determine whether it could be dissected. In the second case, we recognized the Retzius shunt preoperatively, which enabled us to calmly perform surgery. CT imaging is routinely acquired in patients with cancer for preoperative staging, and it may be similarly useful for preoperative identification of vascular malformations, which can prevent critical situations, such as unexpected bleeding or conversion to open surgery. Notably, excluding the present cases, there has been only one report of a Retzius shunt at the time of rectal cancer surgery, implying that this condition may be extremely rare.¹⁵ Thus, we believe that is report will be instructive for surgeons treating rectal cancer.

In summary, we describe two cases of a Retzius shunt in patients undergoing robot-assisted surgery for rectal cancer. As the presence of a Retzius shunt is easily recognized on CT, careful evaluation of a preoperative CT for minimally invasive surgery, including robotic surgery, and recognition of vascular abnormalities, would be very critical.

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The authors declare no conflict of interest.

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