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Laparoscopic surgery for colon cancer with intestinal malrotation in adults: Two case reports and review of literatures in Japan

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ABSTRACT

INTRODUCTION: Intestinal malrotation is a congenital anomaly, and its occurrence in adults is rare. Colon cancer with intestinal malrotation is far more rare. We herein report two cases of colon cancer with intestinal malrotation treated with laparoscopic surgery and reviewed the literatures in Japan.
PRESENTATION OF CASES: Case 1 involved a 78-year-old man. Abdominal enhanced computed tomography (CT) showed that the tumor was located in the sigmoid colon. Intraoperatively, the cecum and ascending colon were located along the midline and the small intestine occupied the right side of the abdomen. The tumor was located in the cecum, and the patient was diagnosed with cecal cancer with intestinal malrotation. We performed laparoscopy-assisted ileocecal resection. Case 2 involved a 81-year-old man. Colonoscopy revealed a laterally spreading tumor in the cecum. Intraoperatively, the position of the small intestine and the ascending colon was similar to case 1, and Ladd's band was found in front of the duodenum. Thus, we diagnosed the patient with a laterally spreading cecal tumor with intestinal malrotation and performed laparoscopy-assisted ileocecal resection.
DISCUSSION: A review of the literature revealed 49 cases of colon cancer with intestinal malrotation and laparoscopic surgery performed at 30.6%. If laparoscopic mesenteric excision for colon cancer with intestinal malrotation is unsafe because of the abnormalities of the artery, mesenteric excision should be performed outside the body.
CONCLUSION: If the intestinal malrotation is diagnosed preoperatively, 3D-CT angiography should be used to reveal the vascular anatomic anomalies for safe performance of laparoscopic surgery.

1. Introduction

Intestinal malrotation is a congenital anomaly that may cause intestinal obstruction or midgut volvulus in infants. The diagnosis of intestinal malrotation in adults is rare because most patients remain asymptomatic.

The incidence of colorectal cancer has gradually increased. In 2016 in Japan, this cancer was ranked as the second and fourth most common type among women and men, respectively [1]. The laparoscopic approach for colon cancer has recently become a practical technique, but the optimal surgical procedure for treatment of colon cancer with intestinal malrotation has not been established because of the rarity of intestinal malrotation.

We herein report two cases of laparoscopic surgery for colon cancer with intestinal malrotation in adults and reviewed the literatures in Japan.

This case report is compliant with the SCARE Guidelines [2].

2. Presentation of cases

2.1. Case 1

A 78-year-old man visited our clinic because of constipation. Colonoscopy revealed a type II tumor located 50 cm from the anal verge (Fig. 1A). Abdominal enhanced computed tomography (CT) showed that the tumor had thick walls and was located in the center of the abdomen without lymph node swelling or metastatic lesions. From these findings, we diagnosed the patient with sigmoid colon cancer preoperatively. Intestinal malrotation was not suspected preoperatively, but a subsequent review of the imaging study demonstrated that the superior mesenteric vein (SMV) was located on the left side of the superior mesenteric artery (SMA) (Fig. 2A). We scheduled laparoscopy-assisted sigmoid colectomy. Intraoperative examination revealed that the small intestine was

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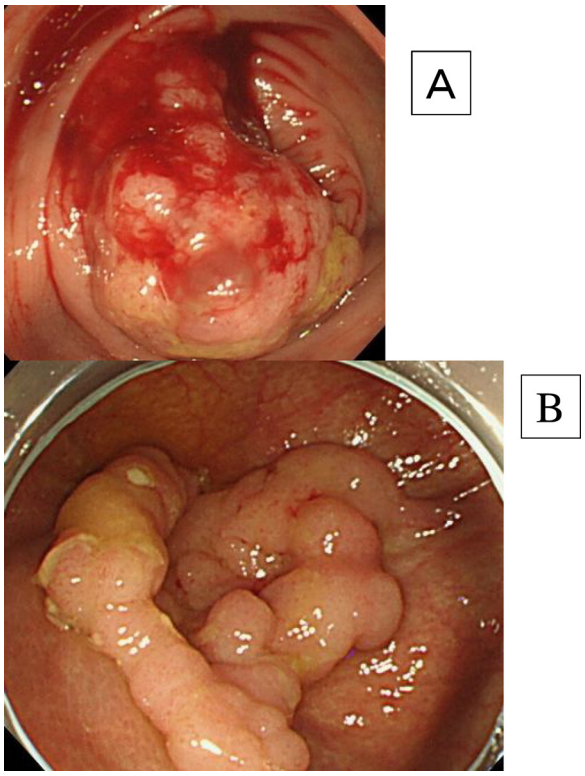

Fig. 1. (A) In Case 1, colonoscopy showed a type II tumor located 50 cm from the anal verge. (B) In Case 2, colonoscopy showed a laterally spreading tumor located in the cecum.

occupied the right side of the abdomen. The ileocecal region was located along the midline of the abdomen, and the marking for the tumor was found in the ascending colon. The ascending colon and cecum were not fixed with the retroperitoneum, and the ligament of Treitz could not be clearly identified. The patient was diagnosed with cecal cancer with intestinal malrotation (nonrotation type) (Fig. 3A, B). Laparoscopic mesenteric excision was considered unsafe because of the vascular and lymphatic anomalies. After mobilization of the ascending colon from the transverse colon, ileocecal region take out outside body from umbilical wound and mesenteric excision was performed outside the body. Because of the abnormalities of the artery, it was unsafe to perform right hemicolectomy with D3 lymph node dissection. Finally, we performed the ileocecal resection with D1 lymph node dissection. We considered D1 lymph node dissection was not adequate oncologically. Histopathological examination revealed well-differentiated tubular adenocarcinoma of the cecum infiltrating the subserosal layer without lymph node metastasis (pT3N0M0 = pStageIIA). Postoperative adjuvant chemotherapy was not performed and he has followed without recurrence for 5 years.

2.2. Case 2

A 81-year-old man visited another hospital because of fecal occult blood. Colonoscopy revealed a laterally spreading tumor in the cecum (Fig. 1B). Abdominal enhanced CT showed that the tumor was located in the center of the abdomen. No lymph node swellings or metastases were present. Intestinal malrotation was not suspected preoperatively. However, a retrospective review of the CT image demonstrated that the SMV was located on the left side of the SMA and that the small intestine and colon occupied the right and left sides of the abdominal cavity (Fig. 2B). These signs were identical to those in Case 1. We scheduled laparoscopy-assisted ileocecal resection. Intraoperative examination revealed that the omentum was extensively adhered to the right wall of the abdomen. Upon peeling off this adhesion, the small intestine was found to occupy the right side of the abdomen. A further search of the intraperitoneal region showed that Ladd's bands were lying in front of the duodenojejunal junction, and the duodenum (which was free from the retroperitoneum) passed straight down to join the jejunum to right upper quadrant (Fig. 3C, D). We diagnosed the patient with a laterally spreading cecal tumor with intestinal malrotation (nonrotation type). The adhesion between the ascending colon and transverse colon was exfoliated by sharp dissection. After mobilization of the ascending colon, lymphadenectomy was performed outside the body because of the vascular and lymphatic anomalies. Finally, we performed ileocecal resection with D1 lymph node dissection. Histopathological examination revealed well-differentiated tubular adenocarcinoma of the cecum infiltrating the mucosal layer without lymph node metastasis.

3. Discussion

The midgut rotates 270° counterclockwise around the SMA and is fixed to the retroperitoneum at 4–12 weeks of fetal life. The process of rotation has been conveniently divided into three stages [3]. The first stage is essentially that of an umbilical loop with two limbs lying beside one another, the second is the stage of beginning of intestinal rotation, and the third is the stage of fixation of the intestine and fusion of its mesentery. Intestinal malrotation is defined faulty rotation with fixation of the midgut. In several reports, the various forms of intestinal malrotation has been clas-

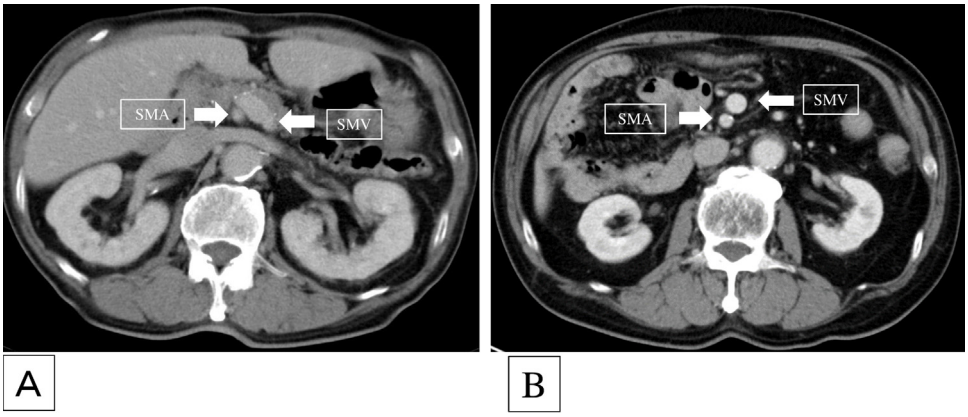

Fig. 2. (A, B) Abdominal enhanced computed tomography showed that the superior mesenteric vein (SMV) was located on the left side of the superior mesenteric artery (SMA) (SMV rotation sign) in both cases.