Case Report

Laparoscopic Surgery for the Transverse Colon Carcinoma Associated with Non-rotation Type Intestinal Malrotation

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ABSTRACT

A 48-year-old man was referred to our hospital for surgical treatment of an advanced colon carcinoma that had been diagnosed with colonoscopy. Barium enema examination demonstrated the ascending colon running transversally in the mid-abdomen and an apple-core sign at the right side of the colon loop. Contrast-enhanced computed tomography of the abdomen showed the superior mesenteric vein to the left of the superior mesenteric artery, which is so-called superior mesenteric vein rotation sign. Therefore, intestinal malrotation was strongly suspected before surgery. The patient underwent laparoscopic surgery, at which nonrotation-type intestinal malrotation with colon carcinoma was diagnosed. Because the tumor was located at the oral side of the transverse colon, partial transverse colectomy was performed laparoscopically. Postoperative pathological examination revealed a well to moderately differentiated tubular adenocarcinoma that had invaded the subserosal layer without nodal involvement. Therefore, the TNM stage was IIa (T3, N0, M0). Nonrotation-type intestinal malrotation with concurrent transverse colon carcinoma is rare and is rarely treated which laparoscopic surgery.

Key words: laparoscopic surgery, malrotation, transverse colon carcinoma

INTRODUCTION

Malrotation of the midgut is a congenital anomaly of intestinal rotation and fixation, which usually presents in the first month of life1,2, is classified as nonrotation, malrotation, reversed malrotation, or paraduodenal hernia based on the type of faulty rotation3. Cases of malrotation associated with colon carcinoma in adults are so rare that our search of the literature yielded only 27 cases4-30. Here we report on a patient who underwent laparoscopic partial colectomy for transverse colon carcinoma associated with nonrotation-type intestinal malrotation.

CASE PRESENTATION

A 48-year-old man visited a clinic because of shortness of breath; while undergoing colonoscopy he was found to have colon carcinoma (Fig. 1). He was referred to our hospital for further examination and treatment. The family history was noncontributory. Except for hemoglobin of 8.1 g/dl, results of blood tests, including the carcinoembryonic antigen level, were within normal limits. Barium enema examination showed the ascending colon running transversally in the mid-abdomen and an apple-core sign at the right side of the colon loop (Fig. 2). Con-
Contrast-enhanced computed tomography (CT) of the abdomen showed the superior mesenteric vein (SMV) to be located to the left of the superior mesenteric artery (SMA), which is the so-called SMV rotation sign (Fig. 3). Therefore, intestinal malrotation was diagnosed.

The patient underwent laparoscopic surgery with 5 ports for advanced colon carcinoma. Laparoscopic examination demonstrated that the third and fourth parts of the duodenum descended vertically without the ligament of Treitz and that the jejunum and ileum were located on the right. The colon from the transverse colon to the ascending colon was located ventrally to the second and third parts of the duodenum (Fig. 4, 5). The ascending colon ran transversely in the abdominal cavity, and the hepatic flexure of the colon was not found. Nonrotation-type intestinal malrotation with colon carcinoma was diagnosed. Because the tumor was located at the oral side of the transverse colon, partial transverse colectomy was performed laparoscopically. The transverse colon and the ascending colon were adherent to each other. However, both had a
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Mesocolon. A functional end-to-end anastomosis was performed between the transverse colon and the ascending colon with linear staplers. The ligament of Treitz could not be clearly identified (Fig. 6). The tumor was 70 mm in diameter, pathological examination revealed a well to moderately differentiated tubular adenocarcinoma (Fig. 7), and the carcinoma had invaded the subserosal layer (T3) (Fig. 8).

Six lymph nodes were harvested, but none showed metastasis. Therefore, the TNM stage was IIa (T3, N0, M0). The postoperative course was uneventful, and the patient was discharged 10 days after surgery.

Discussion

During embryologic development, the midgut rotates 270 degrees counterclockwise around the SMA and fixes to the retroperitoneum. Intestinal malrotation is an anomaly of this rotation, and most cases are found incidentally at the time of digestive tract examination or surgery. Cases associated with colon carcinoma in adults are rare. In only 7 of these cases was the laparoscopic approach used because of its safety and reliability.

In the present case, we performed laparoscopic partial colectomy for transverse colon carcinoma in an adult patient with nonrotation-type intestinal malrotation, which is 1 of 4 types of malrotation.

Multidetector-row CT (MDCT) is useful for establishing a preoperative diagnosis in patients with diseases resulting from abnormal anatomy and for planning laparoscopic surgery. Our patient was found to have intestinal malrotation after undergoing barium enema examination.
and contrast-enhanced CT of the abdomen before surgery, and the precise diagnosis was established with laparoscopic evaluation.

Because the tumor in the present case was located at the oral side of the transverse colon, partial transverse colectomy was performed laparoscopically. The tumor was supplied by the middle colic artery, which was found in the mesocolon of the transverse colon loop. Because dissection of the middle colic artery was possible, right hemicolectomy was not necessary.

In nonrotation-type intestinal malrotation, functional end-to-end anastomosis between the transverse colon and the ascending colon can easily be performed with linear staplers because the transverse colon and the ascending colon run parallel to each other.

Previously reported cases of intestinal malrotation with colon carcinoma are summarized in Table 1. The patients had an average age of 63.5 years, and 19 were male. The 26 cases in which the type of intestinal rotation was reported were as follows: nonrotation type, 18 cases (69.2%); malrotation type, 4 cases (15.4%); and reversed rotation type, 4 cases (15.4%). The location of tumors was ascending colon, 9 cases; cecum, 7 cases; transverse colon, 6 cases; rectum, 4 cases; sigmoid colon, 2 cases; and the appendix, 1 case.

The surgical approach, which was described for 28 cases, was open surgery in 18 cases and laparoscopic surgery in 9 cases (1 case of which was converted to open surgery). Of all colorectal cancers, more than 70% are in the sigmoid colon or rectum, but of colorectal cancer associated with intestinal malrotation only 20.7% are found there. In other words, 79.3% of colorectal cancers in cases of malrotation...
tation are located from the appendix to the transverse colon. Therefore, the anatomic malposition of the colon appears to be correlated with the development of colon carcinoma.

Authors have no conflict of interest.

REFERENCES

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