



Reduced-Port Laparoscopic Surgery for Patients With Proximal Transverse Colon Cancer With Situs Inversus Totalis: A Case Report

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Situs inversus is a rare hereditary disorder in which various anomalies have been reported with internal rotation abnormalities. This case involved an 85-year-old woman who had been diagnosed with transverse colon cancer and who underwent reduced-port laparoscopic surgery. All intra-abdominal organs were reversed left to right and right to left. The aberrant midcolic artery was identified during surgery. The total surgery time was 170 minutes, and the patient lost 20 mL of blood. The patient was discharged on the 8th postoperative day without complications.

Keywords: *Situs inversus; Colonic neoplasms; Reduced port laparoscopic surgery*

INTRODUCTION

Situs inversus totalis (SIT) is a rare congenital anomaly with complete inversion of all thoracic and abdominal organs. The incidence rate of SIT is one in 5,000–20,000 people, and it is generally an autosomal recessive genetic condition [1-5]. The surgical approach in these patients is more difficult regarding mirroring the positions of all organs. However, the use of developed instruments, especially in laparoscopic surgery, has led to many successful results in operations on SIT patients [6]. Moreover, reduced-port laparoscopic surgery (RPLS), which is single-incision plus

one more port laparoscopic approach, may decrease collisions between the operator and the camera holder [7]. We present a case of a patient with SIT and proximal transverse colon cancer who underwent RPLS.

CASE REPORT

An 84-year-old female visited a local clinic due to a history of hematochezia. Except for high blood pressure and diabetes mellitus, she had no medical or surgical history. Upon colonoscopic examination, a colonic mass was found at the transverse colon. Through colonoscopic biopsy, the colonic tumor was diagnosed as a well-differentiated adenocarcinoma. The patient was referred for surgical treatment to the Division of Colorectal Surgery at our institution. The physical examination was nonspecific. The laboratory study did not confirm anemia (hemoglobin, 14.9 g/dL; haematocrit, 43.3%), and the serum level of carcinoembryonic antigen was 2.98 ng/mL. A chest X-ray showed dextrocardia and right-sided subphrenic gas in the stomach (Fig. 1). Abdominal computed tomography showed a complete transposition of the intra-abdominal organs, confirming SIT. Furthermore, the colon cancer was situated in the transverse colon and located somewhat proximally (Fig. 2). No metastases were suspected as a result of a positron emission tomography scan of the patient's entire body.

Based on the endoscopic findings above, we performed a laparoscopic hemicolectomy under general anesthesia with the pa-

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• This article contains Supplemental Video S1.

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Fig. 1. A chest radiograph showing dextrocardia and a right sub-phrenic gas in the stomach.

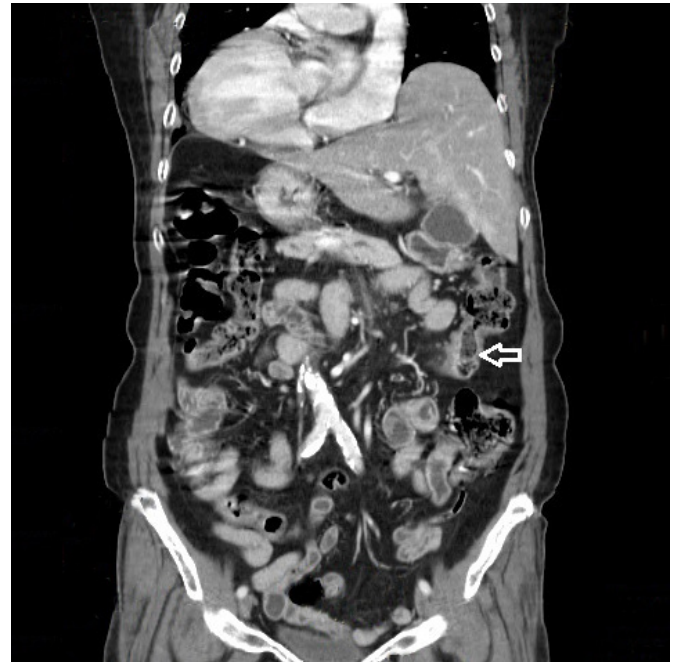


Fig. 2. Computed tomography image showing complete inversion of the abdominal viscera and location of the colon cancer (blank arrow).

tient in a lithotomy position tilted to the right and with the patient's head down. The surgeon and the camera holder were situated on the right side of the patient, and the first assistant was positioned on the left side. A 4-cm-sized transverse incision, including the umbilicus, was done, and a single-port device (Octoport, Dalim SurgNET, Seoul, Korea) was installed to establish a pneumoperitoneum with an intraperitoneal pressure of up to 12 mmHg. A 5-mm trocar was placed 10 cm caudally from the umbilicus (Fig. 3).

Laparoscopic exploration of the abdominal cavity revealed that colon cancer was present at the proximal transverse colon (Supplemental video clip 1); no evidence of peritoneal metastasis was found. All internal organs on the left side and on the right side were reversed as predicted before the operation. After the small intestine and the greater omentum had been placed on opposite sides, a medial to lateral dissection was started. For the D3 lymph node dissection, the ileocecal pedicle was elevated to expose the ileocolic vessels, after which those vessels were ligated with clips at their origins (Fig. 4). Dissection was carried out along the superior mesenteric vein toward the right colic and the mid colic vessels. At the level of the inferior border of the pancreas, 2 arteries originated from the superior mesenteric artery. The smaller one supplied blood to the right-sided colon, and the larger one supplied blood to a more distal area between the distal ascending colon and the mid transverse colon (Fig. 5; right colic and aberrant midcolic artery). The mid colic vein (MCV) and the gastrocolic trunk of Henle (GCT) were found just above those arteries. The

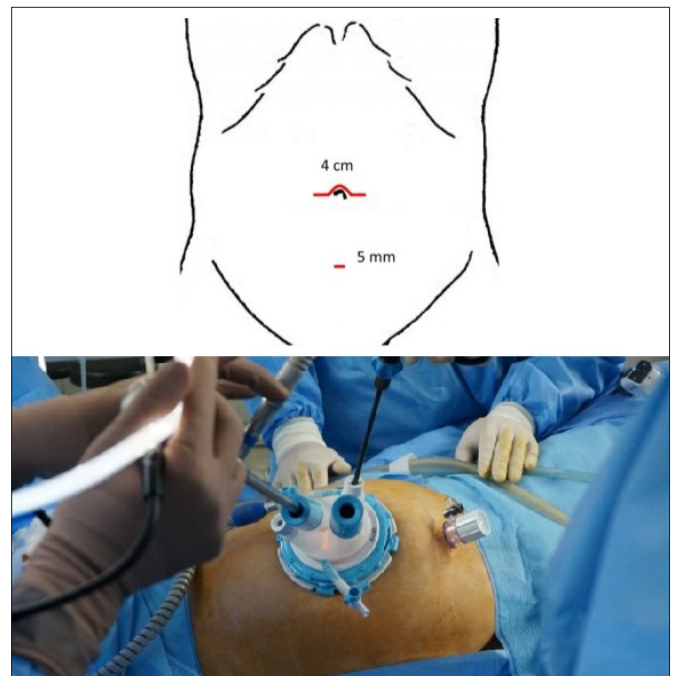


Fig. 3. Trocar placements for reduced-port laparoscopic surgery.

right colic vein (RCV) and the right gastroepiploic vein draining to the GCT were identified, but no other arteries were seen until a lesser sac was opened. The right colic artery, the mid colic artery

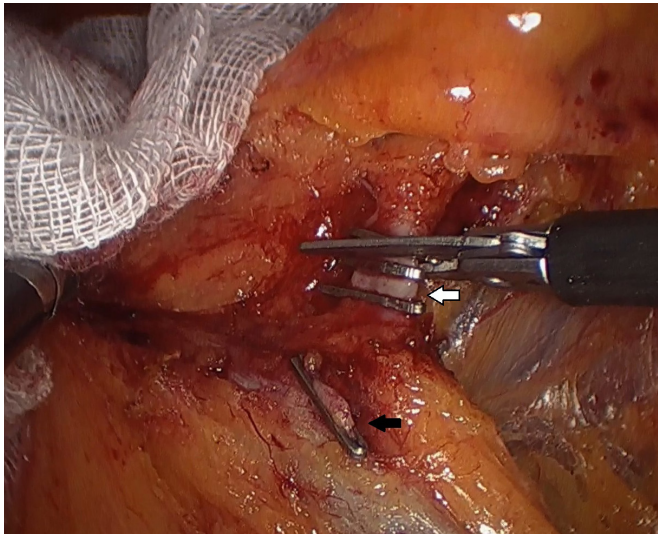


Fig. 4. Division of the ileocolic artery (white arrow) and vein (black arrow).

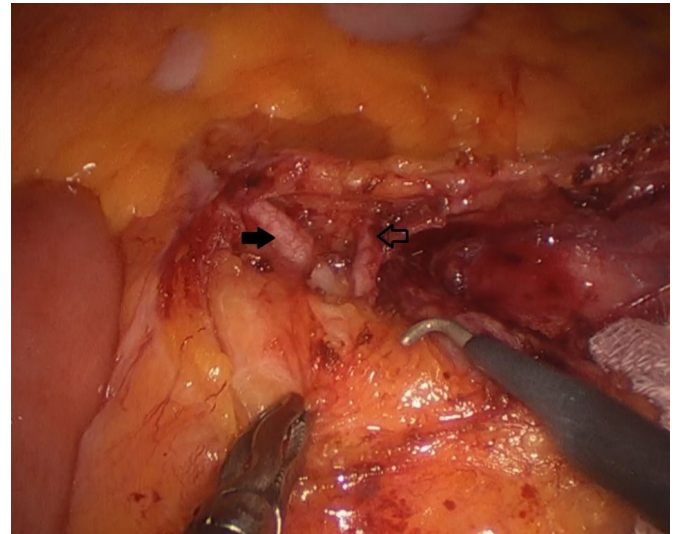


Fig. 5. Aberrant midcolic artery (filled arrow) and right colic artery (blank arrow).

(MCA), the RCV and the MCV were ligated, and lateral dissection was initiated for colonic detachment from the retroperitoneum. Finally, the greater omentum was divided to the area of the distal margin of colon, including right gastroepiploic arteries, and a remnant retroperitoneal dissection was done.

Through a transumbilical incision, the colon and the ileum were extracted, and the colon cancer was resected with a safety margin. Extracorporeally, a functional end-to-end ileocolic anastomosis was carried out using 2 NTLC 75-mm staplers (Ethicon, Livingston, UK), and the anastomosis was reinforced with seromuscular vicryl 3-0 sutures. The total operative time was 170 minutes, and the total blood loss was 20 mL.

Grossly, the ulcerofungating tumor was located in the transverse colon, and the tumor size was 30 mm × 28 mm. Histologic examination of the resected specimen showed a well-differentiated adenocarcinoma with pericolic soft tissue invasion. No metastasis to 82 isolated lymph nodes had occurred. The final pathologic stage was stage II (pT3N0) according to the seventh edition of the American Joint Committee on Cancer Staging System. The patient's post-operative hospital stay was 8 days, and she was discharged without surgical complications. This case report was approved by the Chonnam University Hwasun Hospital Institutional Review Board (TMP-2018-048) and was eligible for exemption from the requirement to obtain written informed consent from the patient.

DISCUSSION

SIT is a very rare congenital condition that presents itself in 1 of 5,000–20,000 people and is inherited in a simple autosomal recessive manner [1-5]. SIT is the complete inversion of thoracic or-

gans and abdominal viscera. Laparoscopic surgery in patients with SIT remains a technical challenge for the surgeon and is relatively rare, with few reported cases. Although surgical techniques are needed to establish a meaningful surgical outcome, several previous reports on laparoscopic surgery for SIT patients confirmed the feasibility of using the laparoscopic approach [1-6].

Single-incision laparoscopic surgery (SILS) for patients with colon cancer is known to be safe and feasible [7-10]. SILS needs a smaller incision than conventional colon cancer surgery, and patients who undergo SILS experience less pain. However, SILS involves difficulties, such as the risk of instrument crowding due to loss of triangulation. RPLS is an alternative method that can be used to avoid this difficulty [9]. Insertion of one more port is not a failure of minimally invasive surgery; rather, it can reduce “sword fighting” between the surgeon and the camera holder [11].

In the present case, an extended right hemicolectomy via RPLS was performed on a patient with SIT. In SIT patients, an inferior vena cava (IVC) interruption and numerous arterial branches, the ipsilateral abdominal aorta and IVC, the intraperitoneal pancreas, polysplenia, and incomplete rotation of intraabdominal organs are reported by radiologists and autopsists [12, 13]. During the surgery, we also faced difficulties resulting from the mirror-image anatomy and vascular anomalies. We performed the surgery performed via the routine procedure used for patients with normal anatomies, and fortunately, we encountered no significant problems. However, we did experience the “sword fighting” that very often occurs between the camera holder and the holder of a nearby instrument. We found the distant additional 5-mm port to be very useful for avoiding such collisions.

RPLS was a safe and feasible option for this patient with the rare congenital condition SIT. Nevertheless, RPLS should only be per-

formed on such patients after proper preoperative evaluation to identify combined abnormalities; furthermore, RPLS for such patients should only be performed by an expert laparoscopic surgeon who can rapidly address unexpected situations resulting from the abnormalities.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

SUPPLEMENTARY MATERIAL

Supplementary video clip 1 can be found via <https://doi.org/10.3393/ac.2018.05.29.1.v001>.
Video clip 1. RPLS for a SIT patient.

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