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# Simultaneous total laparoscopic curative resection for synchronous gastric, cecal and rectal cancer: Report of a case



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## ABSTRACT

**INTRODUCTION:** Gastric cancer (GC) and colorectal cancer (CRC) are often diagnosed simultaneously. Recent technological advances in surgical techniques and devices have enabled the use of laparoscopic approaches for GC and CRC. Laparoscopic resection is expected to increase the number of cases of synchronous gastrointestinal (GI) cancers that meet the indication for laparoscopic surgery, owing to early detection of GI cancers and extended indications for laparoscopic surgery.

**PRESENTATION OF CASE:** We herein report a successful simultaneous total laparoscopic curative resection for synchronous early GC, early cecal cancer and advanced rectal cancer. The total time of the operation was 600 min, and the estimated blood loss was 250 ml. The patient was discharged on postoperative day (POD) 10 without postoperative complications.

**CONCLUSION:** Simultaneous total laparoscopic surgery is a minimally invasive, feasible treatment option for synchronous GI cancers.

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## 1. Introduction

The co-existence of primary tumors makes it difficult to manage cancer treatment. In particular, gastric cancer (GC) and colorectal cancer (CRC) are often diagnosed simultaneously. Yoo et al.<sup>1</sup> reported that the prevalence of colorectal neoplasms was higher in patients with GC than in a normal population of patients who underwent screening colonoscopies. Most recently, Suzuki et al.<sup>2</sup> also revealed that synchronous colorectal neoplasms were often observed in patients with surgically treated GC and proposed that screening colonoscopy should be offered to patients with GC.

Surgical curative resection remains the mainstay of therapy for patients with primary localized GC and CRC. A recent study revealed that laparoscopic resection for both GC and CRC is feasible and safe. Therefore, laparoscopic resection has been accepted widely as a minimally invasive approach in the surgical treatment of early GC and CRC.<sup>3,4</sup> In early GC, a large-scale study showed the efficacy and safety of laparoscopic gastrectomy in terms of long-term survival, morbidity, and mortality.<sup>5</sup> In CRC, short-term surgical safety and clinical benefits of laparoscopic D3 dissection for Stage II/III disease

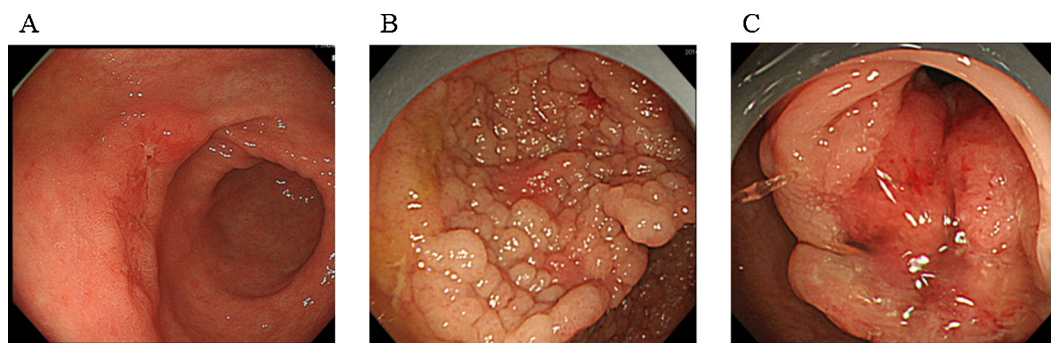
were demonstrated.<sup>6</sup> Also, in rectal cancer, laparoscopic surgery resulted in safety, resection margins, and completeness of resection similar to those of open surgery, and recovery was improved after laparoscopic surgery compared with open surgery.<sup>7</sup>

Although laparoscopic resection is expected to increase the number of cases of synchronous GI cancers that meet the indication for laparoscopic surgery, there are few reports concerning simultaneous total laparoscopic curative resection for synchronous GC and CRC. Simultaneous laparoscopic surgery has some advantages, such as less invasiveness, and some disadvantages, such as a longer operation time. We herein report a successful simultaneous total laparoscopic curative resection for synchronous early GC, early cecal cancer and advanced rectal cancer.

## 2. Presentation of case

A 61-year-old woman who had no past medical history (ASA Physical Status: 1, BMI: 20.4 kg/m<sup>2</sup>) was referred to our hospital complaining of melena. Upper gastrointestinal (GI) endoscopy disclosed a 0-IIc lesion in the lower portion of the stomach that was diagnosed as moderately differentiated adenocarcinoma (Fig. 1A). Lower GI endoscopy disclosed a laterally spreading tumor (LST) in the cecum that was diagnosed as papillary adenocarcinoma (Fig. 1B) and a type 2 tumor in the rectum that was diagnosed

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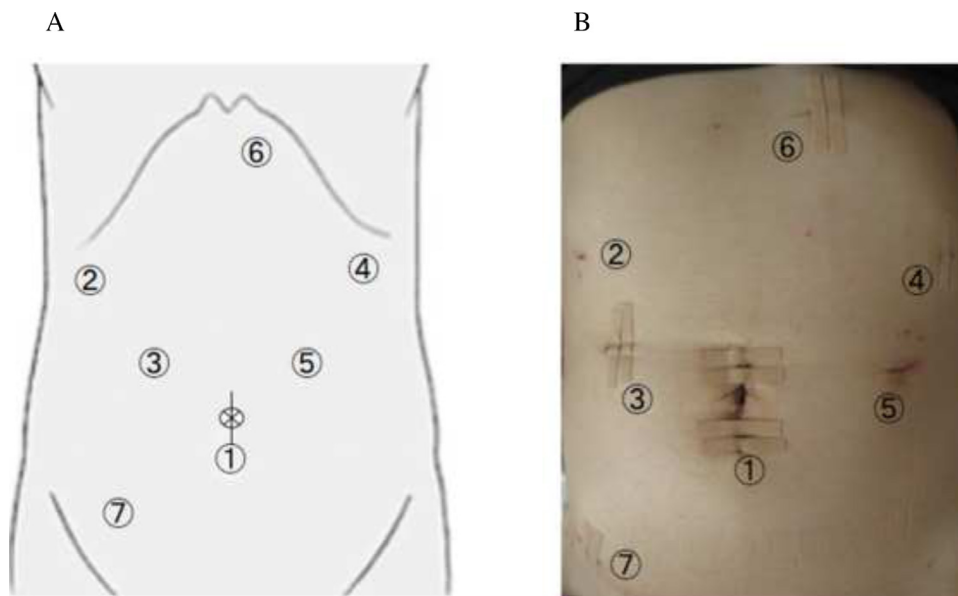
**Fig. 1.** The findings of GI endoscopy.

(A) A 0-IIc lesion in the lower portion of the stomach that was diagnosed as moderately differentiated adenocarcinoma, (B) an LST in the cecum that was diagnosed as papillary adenocarcinoma, (C) a type 2 tumor in the rectum that was diagnosed as moderately differentiated adenocarcinoma.

as moderately differentiated adenocarcinoma (Fig. 1C). The rectal tumor in the rectosigmoid~upper part of rectum has grown through the muscularis propria and into the outermost layers of the rectum but not through them. Chest and abdominal computed tomography (CT) revealed no definitive lymph node metastases or distant metastases. We determined that laparoscopic distal gastrectomy (LDG) with D1 + lymph node dissection was indicated for the GC (TNM stage T1b N0 M0: IA), and laparoscopic low anterior resection (L-LAR) with D3 dissection was indicated for the advanced rectal cancer (TNM stage T3 N0 M0: IIA). For the cecal cancer, we decided that laparoscopic ileocecal resection (LAC) with D1 dissection was indicated because of the technical difficulty of endoscopic resection (TNM stage T1 N0 M0: I). Therefore, we planned to perform simultaneous laparoscopic combined resection for each cancer.

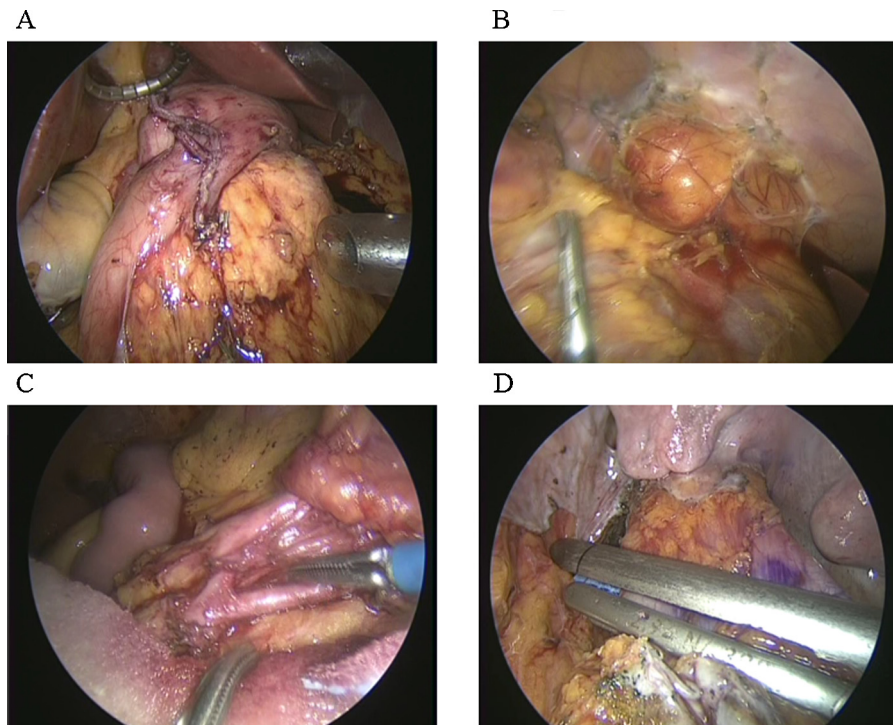
The operation was performed with the patient under general anesthesia and in a supine position with her legs apart to accomplish low anterior resection. An umbilical port was used for the laparoscope (30-degree scope), and intra-abdominal pressure was maintained at 8–10 mm Hg. LDG with D1 + lymph node dissection according to Japanese gastric cancer treatment guidelines was first performed using six ports (Fig. 2A: ①–⑥).<sup>8</sup> In brief, perigastric

(Nos. 1, 3, 4sb, 4d, 5 and 6) and suprapancreatic (Nos. 7, 8a and 9) lymph nodes were dissected en bloc as previously reported.<sup>9</sup> The resected stomach was extracted through the mini-laparotomy wound (4 cm), extended umbilical port wound (Fig. 2A: ①). Intra-corporeal gastroduodenostomy (Delta-shaped anastomosis) was performed with a laparoscopic linear stapler (ENDOPATH® ENDOCUTTER ETS45 ETHICON) (Fig. 3A)[10]. This part of the operation was accomplished within 240 min, and the estimated blood loss was 80 ml. Next, LAC was performed using three ports (Fig. 2A: ①, ④, ⑤). Mobilization of the right colon from the cecum to the hepatic flexure was performed laparoscopically (Fig. 3B). The mobilized colon was delivered through the same incision (Fig. 2A: ①). Reconstruction was performed extracorporeally with a functional end-to-end anastomosis. This part of the operation was accomplished within 90 min, and the estimated blood loss was 20 ml. Finally, L-LAR was performed using five ports (Fig. 2A: ①, ③, ④, ⑤, ⑦). A total mesorectal excision was performed with THUNDERBEAT (OLYMPUS). Lymph nodes along the inferior mesenteric artery were dissected, preserving the left colic artery according to Japanese Society for Cancer of the Colon and Rectum guidelines 2010 for the treatment of colorectal cancer (Fig. 3C).<sup>11</sup> The distal



**Fig. 2.** Port placement.

(A) Port placement: The standard six ports for an LDG (①–⑥), three ports for an LAC (ileocecal resection) (①, ④, ⑤) and five ports for an L-LAR (①, ③, ④, ⑤, ⑦). ①: 12 mm, ②: 5 mm, ③: 12 mm, ④: 12 mm, ⑤: 12 mm, ⑥: 5 mm, ⑦: 12 mm (ENDOPATH® XCEL, ETHICON), (B) abdominal surgical wound (POD 28)



**Fig. 3.** Operative procedures.

(A) Intracorporeal gastroduodenostomy (Delta-shaped anastomosis), (B) the laparoscopic mobilization of the right colon from the cecum to the hepatic flexure, (C) lymph node dissection along the inferior mesenteric artery preserving the left colic artery, (D) the transection of the distal rectum intracorporeally with a laparoscopic linear stapler.

rectum was transected intracorporeally with a laparoscopic linear stapler (Fig. 3D) (ECHELON FLEX™ ETHICON). The transected rectum was extracted through the same incision (Fig. 2A: ①). A colorectal anastomosis was performed intracorporeally with a double stapler technique (PROXIMATE ILS CDH29, ETHICON). This part of the operation was accomplished within 270 min, and the estimated blood loss was 150 ml. Two drainage tubes were placed at each anastomotic site through the port site (gastro-duodenum: ②, colon-rectal: ⑤ Fig. 2A).

Flatus was passed on postoperative day (POD) 2, and a liquid diet was started on POD 3. No complications occurred postoperatively, and all of the drainage tubes were removed consecutively. The patient was discharged on POD 10. Pathological examination revealed a moderately differentiated adenocarcinoma invading the submucosal layer without lymph node metastasis (0/21) for the GC, a papillary adenocarcinoma within the mucosal layer without lymph node metastasis (0/10) for the cecal cancer and a moderately differentiated adenocarcinoma invading the subserosal layer without lymph node metastasis (0/15) for the rectal cancer. Pathologically negative margin more than 5 cm is confirmed in all specimens. We assessed it appropriate oncologically to perform simultaneous laparoscopic combined resection for these cancers.

### 3. Discussion

We herein report a successful simultaneous total laparoscopic curative resection for synchronous early GC, early cecal cancer and advanced rectal cancer. Although there are some reports of simultaneous laparoscopic surgery for synchronous GC and CRC,<sup>12–16</sup> to the best of our knowledge, there is no report of simultaneous total laparoscopic curative resection for three or more synchronous cancer types.

Synchronous GI cancers have been treated conventionally with open surgery. A long medial incision from the xiphoid to the pubis

is needed for simultaneous distal gastrectomy and low anterior resection, resulting in poor cosmetic results and compromise of postoperative quality of life. Recent technological advances in surgical techniques and devices have enabled the use of laparoscopic approaches for GC and CRC. Tokunaga et al.<sup>15</sup> revealed that simultaneous laparoscopic gastrectomy and LAC were safe and feasible in seven consecutive patients.

However, some problems with simultaneous laparoscopic surgery must be resolved. First, it generally requires a longer operation time compared with open surgery. Actually, mean operation time for simultaneous laparoscopic gastrectomy and colorectal resections was 437 min (263–746) in previous reports.<sup>12–16</sup> In our case, it took about 10 h to complete the surgery. Not only the surgeon, but also the assistant, the scrub nurse and the anesthesiologist become exhausted after the long operation. In our case, simultaneous laparoscopic surgery was performed by two surgeons: one for LDG and L-LAR, and another for LAC. We did not experience any trouble during the operation. However, surgeons should not hesitate to convert to open surgery if intraoperative complications, such as massive bleeding and organ injury, occur or if the surgery requires a longer time to complete. Second, there is an issue regarding which procedure should be performed first. Laparoscopic gastrectomy and reconstruction were performed prior to colorectal resection in most of the previous reports.<sup>12,13,15,16</sup> Some factors, such as the stage of progression of each cancer, location, port placement and mini-laparotomy should be taken into account to determine the sequence of surgical procedures. We first performed LDG followed by LAC and L-LAR for the following two reasons: (1) For the stage of cancer progression, preoperative examination suggested that the rectal cancer was the most progressive disease and the gastric and cecal cancers were in the early stages of disease. We observed the inside of the abdominal cavity laparoscopically and confirmed the disease progression of each cancer before initiating the first procedure, resulting in rectal cancer without serosal



invasion, even for the advanced cancer. If we assessed it inappropriate oncologically to perform L-LAR due to serosal tumor invasion or bulky lymph node metastasis, we do not hesitate to convert to conventional open LAR. In such situation, only lower abdominal median incision is required for open LAR without a long skin incision. (2) For the location of the cancer and port placement, we assumed that detachment of the greater omentum from the transverse colon during gastrectomy can lead to the mobilization of the right side of the colon for ileocecal resection. Furthermore, intracorporeal gastroduodenostomy (Delta-shaped anastomosis) enabled us to share the same ports and mini-laparotomy wound for LAC and L-LAR without an unnecessary mini-laparotomy for gastroduodenostomy. We believe that these ingenious technical attempts can lead to the successful completion of simultaneous total laparoscopic curative resection for synchronous cancer. Therefore, it is important to plan the sequence of surgical procedures and the port placement preoperatively to complete the entire procedure smoothly.<sup>14</sup>

Synchronous GI cancers that meet the indication for laparoscopic surgery will occur in increasing incidence in the future, because indications for laparoscopic surgery have been extended. We believe that simultaneous laparoscopic surgery for synchronous GI cancers is a minimally invasive treatment option, although further analysis is required to confirm that it is technically and oncologically safe and feasible.

#### Conflicts of interest

Masaaki Iwatsuki and other co-authors have no conflict of interest.

#### Funding

We declare that we have no sources of funding.

#### Ethical approval

Documented informed consent was obtained from patient.

#### Author contributions

Masaaki Iwatsuki: writing the paper, study concept or design.  
Hideyuki Tanaka: study concept or design.  
Kenji Shimizu, Katsuhiko Ogawa, Kensuke Yamamura, Nobuyuki Ozaki, Shinichi Sugiyama, Kenichi Ogata,  
Koichi Doi: data collection, data analysis or interpretation.  
Hideo Baba and Hiroshi Takamori: reviewed and supervised the report.

#### Consent

Written informed consent has been already obtained from this patients and we describe about it in our manuscript.

#### Gurantor

Hiroshi Takamori.

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