Single Incision Laparoscopic Right Colectomy Using the Techniques of Open Surgery Through the Small Incision

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Abstract To perform single-incision laparoscopic colectomy (SILC) safely while maintaining the minimal invasiveness of SILC and the quality of the lymph node dissection, we have used hybrid single-incision laparoscopic colectomy (H-SILC). Preliminary experience with H-SILC in advanced colon cancer is reported. First, a multi-flap gate was inserted through a 4.0 cm transumbilical incision, and three 5 mm ports were placed in the converter sheet. The procedures were much the same as in usual laparoscopic colectomy excluding a lateral to medial approach. The initial identification or exposure of the ileocolic vessels was performed through a small incision, and lymphadenectomy was mainly achieved using laparoscopic technique. In the course of laparoscopic procedures, whenever we felt stress, we used the techniques of open surgery through the small incision. The procedure was completed successfully without any perioperative complication and no need to extend the skin incision. The operative time was 191 min. Postoperative follow-up did not reveal any umbilical wound complication or any recurrence. Our experience indicates H-SILC is safe and feasible for selected patients with colon cancer with improved cosmesis.

Keywords Single incision laparoscopic colectomy · Single incision laparoscopic surgery · Laparoscopic colectomy

Introduction

Laparoscopic surgery has steadily become a safe and practical treatment option for diseases of the colon and rectum [1]. Single-incision surgery is a rapidly evolving technique in the field of minimally invasive surgery, but only more recently [2–4] has this technique been applied to colorectal surgery. Single-incision laparoscopic colectomy (SILC) has been described through case reports and small case series [5–7]. The single-incision technique results in improved cosmesis with the potential for decreased pain and fewer incisional hernias. In SILC, however, lymphadenectomy even along the superior mesenteric vessels is difficult because of the unfavorable visual field, the low tension under the tissue to be dissected, the small space between those vessels and the ports, and the confusions among laparoscopic instruments. To perform these procedures safely while maintaining the minimal invasiveness of SILC and the quality of the lymph node dissection, we have used hybrid single-incision laparoscopic colectomy (H-SILC). This is the report on hybrid single-incision laparoscopic right colectomy in advanced colon cancer with D3 lymph node dissection.

Case Report

An 81-year-old man who had undergone endoscopic resection for bladder cancer and distal gastrectomy for gastric cancer presented to our department for the treatment of the cecal tumor. Colonoscopy revealed a mass in the cecum and biopsy demonstrated adenocarcinoma. An abdominopelvic computed tomography showed enhanced wall thickening in the cecum and no distant metastasis. The patient's body mass index was 19.0.

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Fig. 1 A multi-flap gate (MFG; Sumitomo Bakelite, Tokyo, Japan) consisted of a converter and a wound retractor (right)

The patient's consent to single-port laparoscopic surgery was obtained.

Surgical Technique

Under general anesthesia, the patients were placed in the modified lithotomy position. First, a multi-flap gate (MFG; Sumitomo Bakelite, Tokyo, Japan) (Fig. 1) was inserted through a 4.0 cm transumbilical incision, the wound was protected, and the operative field was secured. Next, a sterilized cotton surgical towel, measuring approximately 40 cm × 40 cm when unfolded, is soaked with warm saline and inserted into the peritoneal cavity with the surgeon's hand via the multi-flap gate. The towel is placed over the small intestinal loops under the direct visualization. The loops of bowel can then be gently housed inside the towel and carefully displaced away from the operative site. Three 5 mm ports were placed in the converter sheet of the MFG. Almost all the procedures were performed with usual laparoscopic instruments such as the Harmonic ACE (Ethicon Endo-Surgery, Cincinnati, OH, USA), and the operative procedures were much the same as in usual laparoscopic surgery excluding a lateral to medial

approach using a flexible 5 mm scope. First, the retroperitoneal plane was established followed by takedown of the ileocolic attachments, the white line of Toldt, and hepatic flexure. After performing mobilization of the colon, we adopted hand-assisted surgery to perform lymphadenectomy. That is, the initial identification or exposure of the ileocolic vessels was performed through a small incision, and lymphadenectomy around the ileocolic vessels and the superior mesenteric vein was mainly achieved using single-incision laparoscopic technique (Fig. 2). All the soft tissue anterior to the superior mesenteric vein was completely removed and D3 lymph node dissection was achieved. In the course of these procedures, whenever we felt stress including the unfavorable visual field, the low tension under the tissue to be dissected, and the confusions among laparoscopic instruments, we performed some procedures using the techniques of open surgery through a small incision with the MFG (Fig. 3). The specimen was extracted through the small incision. Resection was achieved following extracorporealization, and the anastomosis was performed extracorporeally using staplers.

Fig. 2 Single-incision laparoscopic procedure in lymph node dissection along the superior mesenteric vein

Fig. 3 Operative procedure using the techniques of open surgery through a small incision

The procedure was completed successfully without any perioperative complications, and there was no need to extend the skin incision. The operative time was 191 min. Macroscopically, the specimen was 5.8 cm×3.9 cm, and microscopically, the tumor consisted of papillary adenocarcinoma. There were 21 harvested lymph nodes and there were no positive lymph nodes. The pathologic staging of the tumor was T3N0M0.

Postoperative Period

The patients received oral food on the third postoperative day. He was discharged on the eleventh postoperative day. Postoperative follow-up did not reveal any umbilical wound complications or any recurrences.

Discussion

In single-incision laparoscopic surgery, we often encounter the difficult situation owing to the unfavorable visual field, the low tension under the tissue to be dissected, the small space between those vessels and the ports, and the confusions among laparoscopic instruments, and this situation may spoil the safety of the operation itself and the quality of the lymph node dissection.

In H-SILC, we can perform some procedures using the techniques of open surgery through a small incision with the MFG when we feel stress including the unfavorable visual field, the low tension under the tissue to be dissected, and the confusions among laparoscopic instruments. With the use of this technique, we can acquire not only the proper understanding of anatomic structure or some part of procedures through the small incision but with the dynamic development of the surgical field or the sense of touch from

the open procedures but the delicate procedures under the magnified visualization from laparoscopy, and which makes SILC safe and raises the quality of the lymph node dissection.

In H-SILC, we can insert the surgical towel and displace small intestine under direct visualization via the MFG. This technique proves easy optimal exposure of the operative site and keeps this without steep Trendelenburg positioning, which leads to minimize the risk of complications.

We presented initial experience of hybrid single-incision laparoscopic right colectomy for colon cancer. Our experience indicates H-SILC is safe and feasible for selected patients with colon cancer with improved cosmesis.

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