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Original Article

Simultaneous Laparoscopy-Assisted Resection for Synchronous Colorectal and Gastric Cancer

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동시성 결장직장암 및 위암 환자에서 복강경 수술을 이용한 동시 절제술의 적용

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Objectives: The purpose of this study is to evaluate feasibility and safety of simultaneous laparoscopy-assisted resection for synchronous colorectal and gastric cancer.
Methods: From January 2001 to December 2013, a total of 29 patients underwent simultaneous resection for synchronous colorectal and gastric cancers. Medical records were reviewed, retrospectively.
Results: Eight patients (5 male) underwent laparoscopy-assisted resection (LAP group) and twenty one patients (17 male) underwent open surgery (Open group). In the both group, the mean age (65.2 vs. 63.7 years, p =0.481), body mass index (22.6 vs. 22.3, p = 0.896) was comparable, respectively. In LAP group, laparoscopy-assisted distal gastrectomy was performed for all eight patients. In Open group, subtotal gastrectomy with billroth I gastroduodenostomy was most common procedure (66.7%). The operation time, blood loss volume was similar between the two groups. Gas out was earlier (3.0 vs. 4.6 days p = 0.106), postoperative hospital stay was shorter (12.0 vs. 18.3 days, p = 0.245) in LAP group. The postoperative complications were an ileus, a wound seroma and a bile leakage in LAP group, pneumonia (10.0%), wound bleeding (5.0%) and leakage (5.0%) in Open group.
Conclusions: The simultaneous laparoscopy-assisted resection for synchronous colorectal cancer and gastric cancer is a feasible and safe procedure.

Key Words: Colorectal cancer, Gastric cancer, Laparoscopic surgery, Synchronous

Laparoscopy-assisted colorectal surgery has been widely accepted in recent years. Several studies suggest laparoscopy-assisted surgery for colorectal cancers may have some benefits-such as less wound pain, earlier recovery, better cosmetic results-with similar postoperative outcome and long-term oncologic results compared with open surgery.[1-3]

In 1994, Kitaro et al.[4] reported the first laparoscopy-assisted distal gastrectomy for early gastric cancer. Recently, Korean Laparoscopic Gastrointestinal Surgery Study (KLASS) group randomized trial showed that there was no significant

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increase in the morbidity and mortality between laparoscopy-assisted gastrectomy group and open surgery group.[5] Other studies showed that laparoscopy-assisted gastrectomy for gastric cancer had acceptable long-term oncologic outcome comparable to those of the conventional open surgery.[6,7]

In several Asian countries, including Korea, Japan and China, multiple primary cancers with colorectal and gastric cancer is not rare. It has been reported that the frequency of multiple primary cancers with colorectal and gastric cancer ranges between 0.8% and 3.9%.[8-10] Colorectal and gastric cancers are sometimes diagnosed as synchronous cancers. If it is indicated, simultaneous surgical complete resection with lymphadenectomy is the standard treatment for both colorectal and gastric cancer.[11,12]

For simultaneous resection of colorectal and gastric cancer, conventional open surgery needs wide laparotomy, which results in a poor cosmetic result and increase morbidities. Simultaneous laparoscopy-assisted resection for both colorectal and gastric cancer may have some advantages, such as a shorter surgical incision, earlier recovery. Herein, in the present study, surgical outcomes following simultaneous resection for colorectal and gastric cancer were investigated in both open surgery and laparoscopy-assisted surgery.

Patients and Methods

From Jan. 2001 to Dec. 2013, twenty-nine patients underwent simultaneous resection for synchronous colorectal and gastric cancer. Laparoscopic-assisted surgery was performed in 8 patients (Lap group), open surgery in 21 patients (Open group).

The medical records were reviewed for clinical characteristics such as age, gender, American Society of Anesthesiologist (ASA) score, body mass index (BMI), tumor locations and operation methods. For surgical outcomes, we reviewed about operation time, operative blood loss, hospital stay, postoperative complications.

Surgical Procedures of Laparoscopy-Assisted Resection

The patients were placed in supine position. A camera port was placed at the infra-umbilicus area using a 10-mm trocar. Pneumoperitoneum was instituted with carbon dioxide and maintained at 12 mmHg. First, gastric surgery was performed. Under laparoscopic observation, a 10-mm trocar was introduced into the epigastric are for stomach traction. Two main trocars, each 5 mm and 12 mm in diameter, were inserted along the right preaxillary line, respectively. For assistant role, a 5-mm trocar and a 10-mm trocar were inserted along the left preaxillary line. The operator stood to the right side of the patient. Omental and lymph node dissection was done by using hemostatic devices including a laparosonic coagulating shears (Harmonic Scalpel, Ethicon Endo-Surgery, Inc, Cincinnati, OH, Ligasure) Gastrectomy was performed distal gastrectomy with D1 + β lymphadenectomy. Specimen extraction was done through upper midline incision about 6-7cm. Extracorporeal gastroduodenostomy was performed using a double-stapling technique. Second, colorectal surgery was performed using a standard laparoscopic technique. Two more 5-mm trocars were inserted at

both low quadrant abdomen. All vessels were ligated at their origin. Specimen extraction was done through upper midline incision used for gastric surgery. For right and exrtended right colectomy, extracorporeal side-to-side anastomosis was performed using a specimen extraction site. For anterior resection and low anterior resection, end-to-end anastomosis was performed intracorporeally using a double-stapling technique.

Statistical Analysis

Differences in proportions were compared with chi-squared test and Fisher's exact test where appropriate. Changes in continuous outcomes between groups were compared using independent Student's t-tests or the appropriate nonparametric equivalent. All statistical analyses were performed with SPSS version 17.0 for Windows software (SPSS Inc., Chicago, IL, USA). Statistical significance was defined as p of < 0.05.

Results

Mean age was 65.2 years (range, 49-80 years) in Lap group, 63.7 years (range, 47-76 years) in Open group. Body mass index was not significantly different in both groups (22.6 vs. 22.3, p=0.896). In Lap group, colorectal cancers were located at the ascending colon in two patients, the sigmoid colon in four patients and the rectum in two patients. Gastric cancers were in the body in five patients and the antrum in three patients (Table 1). In Lap group, the patient with an ascending colon cancer had a family history of colorectal cancer. Subtotal colectomy was performed. For gastric cancers, all of patients in LAP groups underwent laparoscopy-assisted distal gastrectomy

Table 1. Characteristics of synchronous colorectal and gastric cancers

	LAP group (n=8)	Open group (n=21)	P value
Age (year)*	65.2 (49-80)	63.7 (47-76)	0.481
Sex			0.357
Male	5 (62.5)	17 (81.0)	
Female	3 (37.5)	4 (19.0)	
ASA score (>2)	5 (62.5)	18 (85.7)	0.063
Body mass index (kg/m^2)*	22.6 (24.1-24.9)	22.3 (17.3-28.6)	0.896
Location of gastric cancers			0.664
Cardia-fundus	0	2 (9.5)	
Body	5 (62.5)	12 (57.1)	
Antrum, pylorus	3 (37.5)	7 (33.3)	
Location of colorectal cancers			0.428
Ascending colon	2 (25.0)	4 (19.0)	
Transverse colon	-	1 (4.8)	
Descending colon	-	1 (4.8)	
Sigmoid colon	4 (50.0)	4 (19.0)	
Rectum	2 (25.0)	11 (52.4)	

* Values are mean (range); other values in parentheses are percentage

Table 2. Operation methods for synchronous colorectal and gastric cancers

	LAP group (n=8)	Open group (n=21)
Surgery for colorectal cancers		
Right hemicolectomy	1	4 (20.0)
Transverse colectomy	0	1 (4.8)
Left hemicolectomy	0	1 (4.8)
AR and LAR*	6	13 (65.0)
Abdominoperineal resection	0	2 (9.5)
Subtotal colectomy†	1	0
Surgery for gastric cancers		
Distal gastrectomy	8	0
Subtotal gastrectomy	0	15 (71.4)
Total gastrectomy	0	3 (14.3)
Wedge resection	0	3 (14.3)

* AR and LAR; anterior resection and low anterior resection, † in a patient with family history of colorectal cancers

(LADG). In Open group, subtotal gastrectomy with billroth I gastroduodenostomy was most common procedure (Table 2).

The surgical outcomes are summarized in Table 3. The operation time, blood loss volume was similar between the two groups. Gas out was earlier (3.0 vs. 4.6 days p = 0.106), postoperative hospital stay was shorter (12.0 vs. 18.3 days, p = 0.245) in LAP group. The postoperative complications were an ileus, a wound seroma and a bile leakage in LAP group, pneumonia (10.0%), wound bleeding (5.0%) and leakage (5.0%) in Open group. The number of retrieved lymph node for colorectal cancers was higher in LAP group (22.7 vs. 11.8). There was no recurrence in LAP group with 23.9-month mean follow-up period (range, 2-29.3 months).

Discussion

In the present study, we investigated surgical outcomes after simultaneous resection between laparoscopy-assisted surgery and open surgery for synchronous colorectal and gastric cancer. Our data showed that simultaneous laparoscopy-assisted resection is a feasible and safe procedure compared with open surgery.

For colorectal cancer, laparoscopy-assisted surgery has been widely accepted as a surgical option. Several studies suggest laparoscopoic-assisted surgery for colorectal cancers may have some benefits-such as less wound pain, earlier recovery, better cosmetic results-with similar postoperative outcome and long-term oncologic results compared with open surgery.[1-3] Recently, laparoscopy-assisted gastrectomy also has been considered as a feasible and safe procedure for gastric cancer according to surgical complication, long-term oncologic outcome.[5-7]

In several Asian countries, including Korea, Japan and China, the stomach has been reported as the most common extra-colonic organ of the multiple primary cancers in the colorectal cancer patients.[13-15] Colorectal and gastric cancers are sometimes diagnosed simultaneously as synchronous cancers. If it is indicated, simultaneous surgical complete resection with lymphadenectomy is the standard treatment for both colorectal and gastric cancer.[11,12] With conventional

Table 3. Outcomes of simultaneous resection for colorectal and gastric cancer

	LAP group (n=8)	Open group (n=21)	P value
Operation time (min)	281.9 (200 - 350)	312.6 (205 - 465)	0.407
Blood loss (cc)	281.3 (50-500)	467.5 (200-700)	0.648
Gas out (day)	3.0 (1-4)	4.6 (1-9)	0.106
Hospital stay (day)	12.0 (7-18)	18.3 (9-80)	0.245
Complications	3 (37.5%)*	5 (23.8%)†	0.646
Lymph node sampling			
Colorectal cancers	22.56 (10-58)	11.78 (0-39)	
Gastric cancers	30.78 (11-42)	22.16 (3-54)	
Stage of Colorectal/Gastric Cancer			
0	-	1 / 0	
1	2 / 7	3 / 10	
2	2 / 1	6 / 2	
3	4 / 0	10 / 5	
4	-	1 / 1	

* ileus (1), wound seroma (1), bile leakage (1); † ileus (1), pneumonia (1), anastomotic bleeding (1), anastomotic leakage (1)

open surgery, long incision wound is required from the epigastrium to the pubic area, which results in a poor cosmetic result and increase morbidities.

Simultaneous laparoscopy-assisted resection for both colorectal and gastric cancer may have some advantages, such as a shorter surgical incision, lesser postoperative pain, and earlier recovery. However, only a few cases have been reported as simultaneous laparoscopy-assisted resection for synchronous colorectal and gastric cancer.[11,12,16-19] Tagaya et al[20] reported simultaneous partial resection of the sigmoid colon, partial resection of the gastric fundus and cholecytectomy for benign tumor and cholecystitis. After the report, Zhu et al[11] report the first case of simultaneous laparoscopy-assisted resection for synchronous rectal and gastric cancer. The operation time was 270 min. Matsui et al[12] reported three cases of laparoscopy-assisted combined resection for synchronous colorectal and gastric cancer. The operation time was 432-746 min. All of the gastric tumors were early gastric cancer. The colorectal tumors were stage III in two cases. With 30.7 months of mean follow-up, there was no recurrence. Tokunaga et al[16] reviewed the surgical outcomes in seven consecutive patients. The mean operation time was 392 min (range, 263-576 min). They included two cases of total gastrectomy and one case of pylorus-preserving gastrectomy. They concluded that simultaneous laparoscopic surgery is feasible and should be indicated, and provided by an experienced surgeon. In present study, the operation time was 296.7 min (range, 275-325 min). The operation time was similar in both LAP group and open group. In our cases, the surgeries were performed by gastric surgeon and colorectal

surgeon, who experienced at laparoscopic surgery. The laparoscopic surgery by experienced surgeons at each colorectal and gastric surgery may shorten operation time.

We performed laparoscopy-assisted distal gastrectomy as first phase. First, hepatic flexure or splenic flexure mobilization may result distorting the anatomy for lymph node dissection.[17] Second, the upper midline incision for gastric surgery can be shared for colorectal surgery. After gastric surgery, two more trocars were inserted at both low quadrant abdomen for colorectal surgery.

In present study, there were severe limitations for comparing surgical outcomes of both groups. The case number is small and the operation methods were heterogenous. However, simultaneous laparoscopy-assisted resection for synchronous colorectal cancer and gastric cancer is a feasible and safe procedure.

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