

Laparoscopic-Assisted Surgery in the Management of Colorectal Cancer : The Surgical Technique and its Evaluation

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ABSTRACT

We describe the basic surgical procedures of laparoscopic-assisted colectomy (LAC) and present our assessment of invasiveness through a comparison of outcomes in patients with colon cancer treated with LAC or open surgery. The technique of LAC includes pneumoperitoneum and intra-abdominal radical dissection above the D1 level. Operative time, blood loss, length of hospitalization, length of the postoperative wounds, and the serum concentration of interleukin (IL)-6 24 hours after surgery were assessed in 80 patients treated with LAC and 160 patients who underwent open surgery in our department in the last 4 years. In patients undergoing LAC mean blood loss, postoperative wound length, and serum IL-6 concentrations were significantly less (84 ml, 8.4 cm, and 67 pg/ml) but operative time was significantly longer (193 minutes) than in patients undergoing open surgery (220 ml, 19.6 cm, 178 pg/ml, and 150 minutes). Although the degree of invasiveness cannot easily be compared between open surgery and LAC, the lower blood loss and shorter postoperative wound with LAC suggests that it is less invasive. The increase in inflammatory cytokines was slight with LAC. (Jikeikai Med J 2003 ; 50 : 45-50)

Key words : colorectal cancer, laparoscopic-assisted colectomy, invasiveness of surgery

INTRODUCTION

Since May 1992 we have performed laparoscopic-assisted colectomy (LAC) in more than 150 patients with colorectal cancer. Because of instrumental insufficiency and inexperience in this type of surgery, operative times were approximately 300 minutes initially but have since decreased to 120 minutes owing to better instrumentation and improvements in operative techniques.

In this paper we describe the basic surgical procedures of LAC and present our assessment of invasiveness through a comparison of outcomes in patients with colon cancer who underwent LAC or open surgery at our institution.

SUBJECTS AND METHODS

The study period chosen was the most recent 4 years, by which time we had acquired considerable experience in LAC. The subjects were 80 patients with colon cancer treated with LAC and 160 patients treated with open surgery in our department. The invasiveness of both techniques was assessed on the basis of comparisons of operative time, blood loss, length of hospitalization, length of postoperative wounds (including all ports and additional incisions), and the serum concentration of interleukin (IL)-6 24 hours after surgery. The serum concentration of IL-6 was measured with a chemiluminescent enzyme immunoassay¹. Statistical analysis was performed

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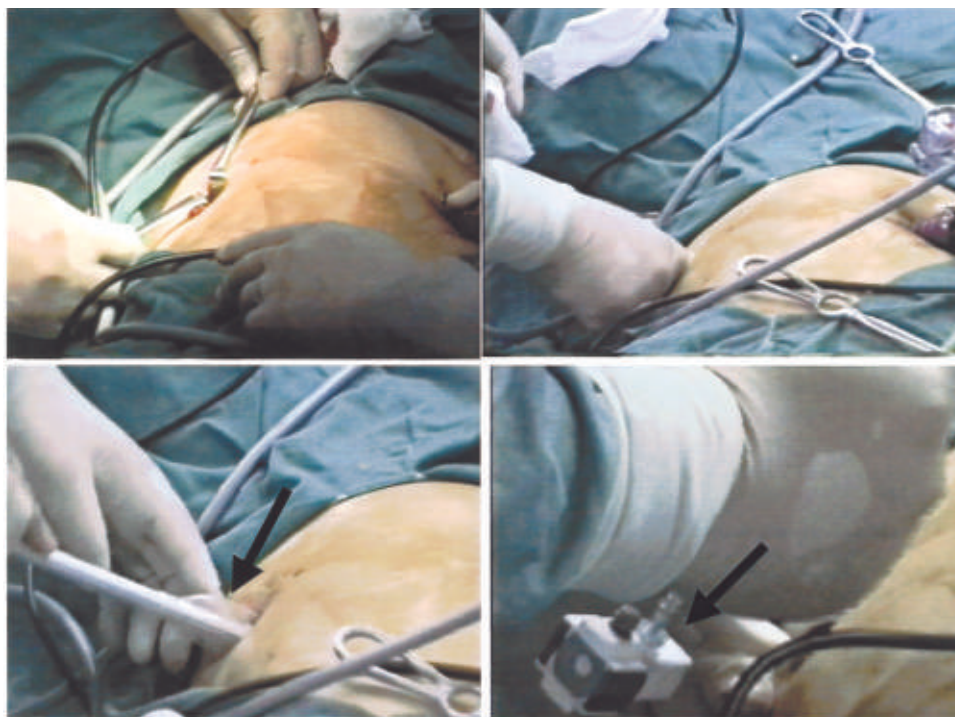


Fig. 1. Retroperitoneal approach-1

- | | |
|----|----|
| 1a | 1b |
| 1c | 1d |
- 1a. Incision and approach the retroperitoneal cavity.
 - 1b. Dilate the retroperitoneal cavity by index finger.
 - 1c. Insert the balloon dilator into the retroperitoneal cavity.
 - 1d. Dilate the retroperitoneal cavity by balloon dilator.
- * ←
Balloon dilator

with the t -test and the χ^2 test. Differences with a p value of 0.05 or less were considered significant.

The surgical procedure of LAC involves pneumoperitoneum, intra-abdominal radical dissection above the D1 level, and anastomosis, which varies with the section of colon operated on. In resection of the cecum, ascending, transverse, or descending colon, anastomosis is performed with extra-abdominal hand suturing of a functional end-to-end anastomosis or with extra-abdominal side-to-side anastomosis with linear staplers. In sigmoid colectomy either hand suturing or double stapling with intra-abdominal manipulation is used. In proctectomy (Rs and Ra) the double-stapling method is used. Four ports are created (2 of 12 mm and 2 of 5 mm), 1 of which is incised for removal of the colon. One of the contrived techniques (retroperitoneal approach) for the dissection of lymph nodes is shown in Fig. 1, 2, and 3²⁻⁴.

RESULTS

Of the 80 patients who underwent LAC, 70% had early carcinoma. Of the 160 patients who underwent open surgery (excluding patients who underwent abdominal perineal resections and Hartmann's operations), 95% had advanced carcinoma. Mean blood loss, postoperative wound length, and serum IL-6 concentrations were less in patients who had undergone LAC (84 ml, 8.4 cm, and 67 pg/ml) than in patients who had undergone (220 ml, 19.6 cm, and 178 pg/ml), but operative time was significantly longer with LAC (193 versus 150 minutes). However, the length of hospitalization did not differ between the procedures (Fig. 4a, 4b, 4c, 4d, 4e).

DISCUSSION

LAC has become as accepted as has laparoscopic cholecystectomy owing to the advantages of de-

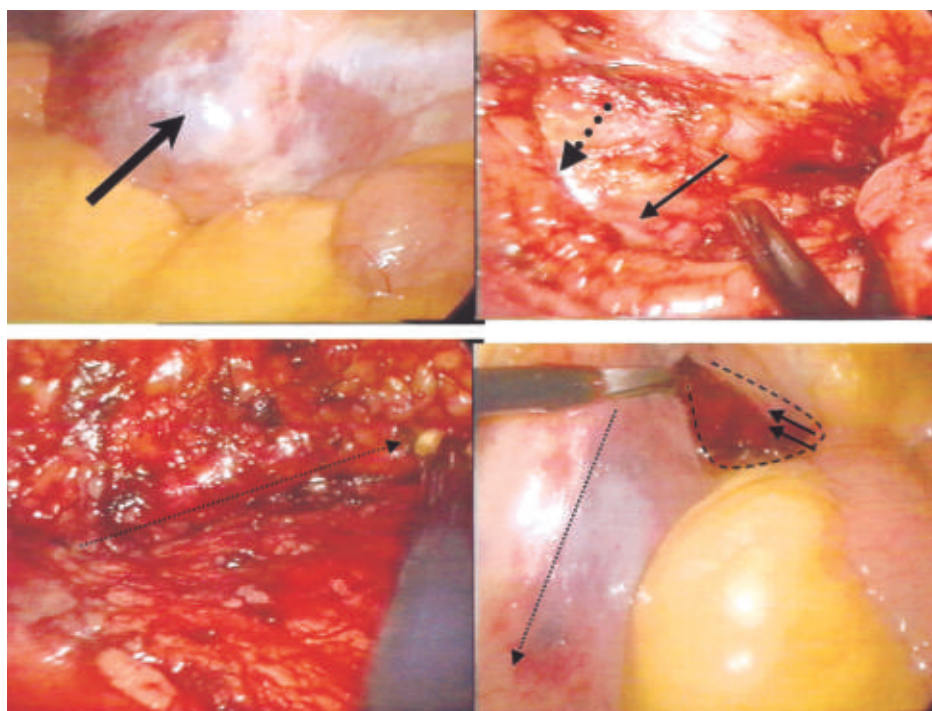


Fig. 2. Retroperitoneal approach-2 (laparoscopic view and view from retroperitoneal cavity)

abdominal cavity	2a	retroperitoneal cavity	2b	a. Balloon dilation (laparoscopic view).
				b. Ovarian A., V (ova.) and left ureter (ure.) in the retroperitoneal cavity.
retroperitoneal cavity	2c	abdominal cavity	2d	c. Dissected inferior mesenteric artery (IMA) in the retroperitoneal cavity.
				d. Preparation of IMA in the abdominal cavity (laparoscopic view).

creased pain, shorter hospitalization, and cosmetic benefit. Although LAC is generally considered to be less invasive than open surgery, there is no evidence for this assumption in Japan and maybe in the world in our given period of time. But some studies about this assumption were now in progress^{5,6} Every type of surgery is invasive to some degree, but invasiveness can be minimized. The “second attack” theory of Ogawa⁷ suggests we should strive to decrease the incidence of complications, enhance injury repair, and prevent “second attack” to minimize the invasiveness of the operation as “first attack.” Retrospective analysis was performed whether the invasiveness of LAC was low or not compared with Open group in the

same period. Because this study was not a randomized, controlled trial, a simple comparison between the LAC and open surgery could not be made. However, the blood loss, the postoperative wound length, and the slight increase in IL-6 with LAC in this study suggests that the invasiveness of LAC is low.

CONCLUSION

Although most of our patients undergoing LAC had early carcinoma and the two patient groups could not be easily compared, the blood loss, the postoperative wound length, and the increase in inflammatory cytokines with LAC in this study suggests that the

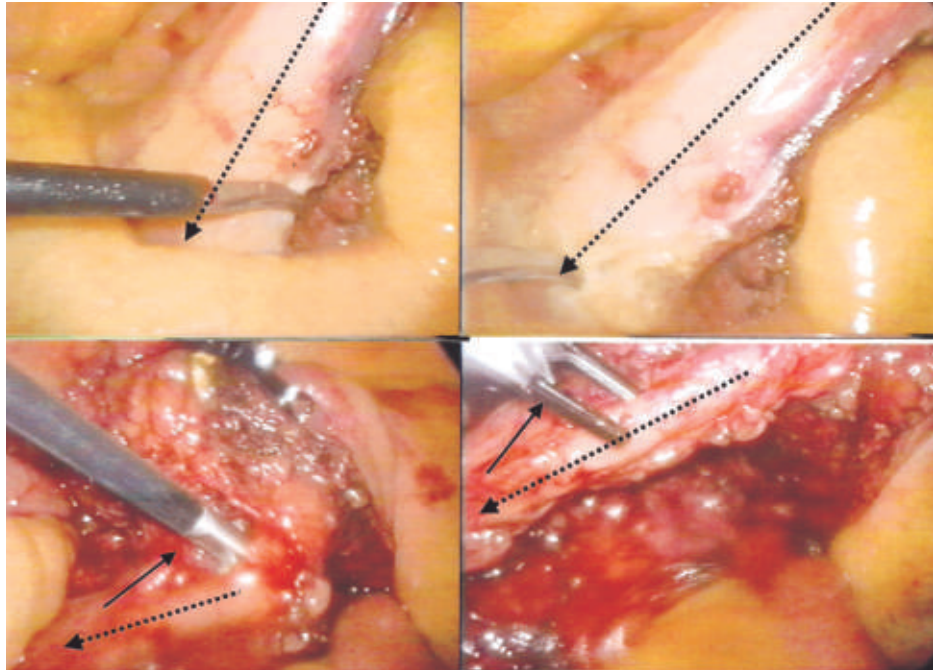


Fig. 3 Retroperitoneal approach-3

3a	3b
3c	3d

- 3a. and 3b. Dissect the root of IMA
- 3c. Dissect left colonic artery from IMA
- 3d. Clipping IMA
- (laparoscopic view)

IMA
 Left colonic artery

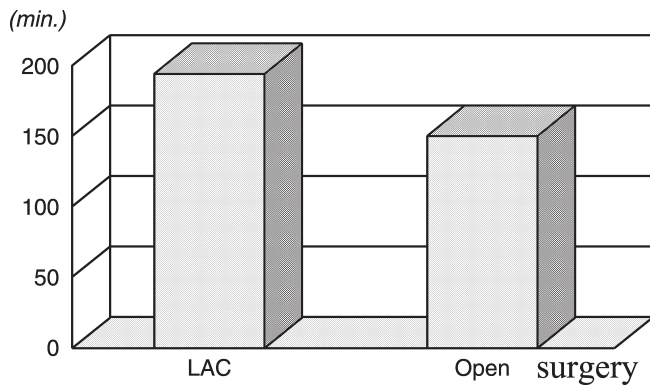


Fig. 4a. Operative time
 LAC average 193 min.
 (range : 85-315)
 Open average 150 min.
 (range : 65-275)
 No significant (N.S.)

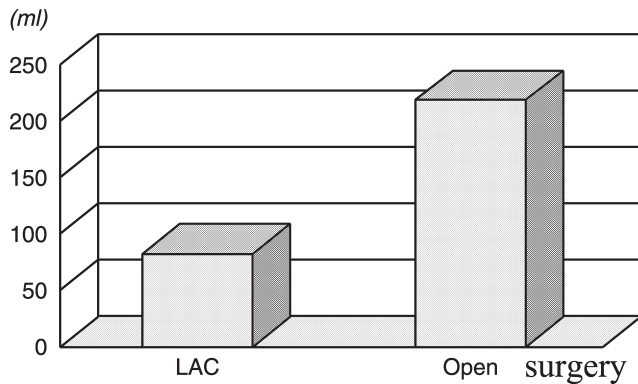


Fig. 4b Loss of Blood
 LAC average 84 ml
 (range : 0-420)
 Open average 220 ml
 (range : 0-620)
 P<0.05

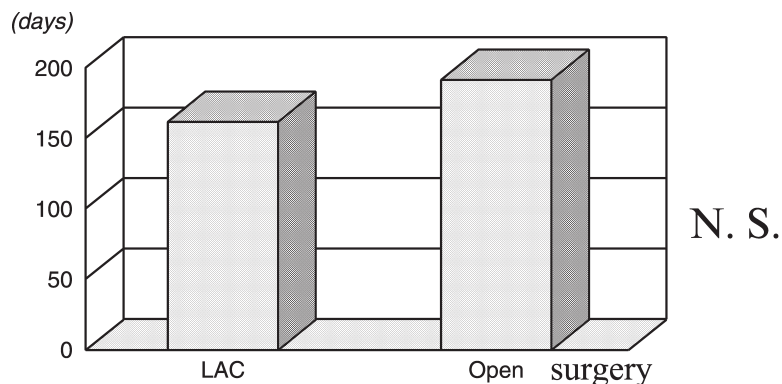


Fig. 4c The length of hospitalization
LAC average 16 days
(range : 8-21)
Open average 19 days
(range : 13-24)
No significant (N.S.)

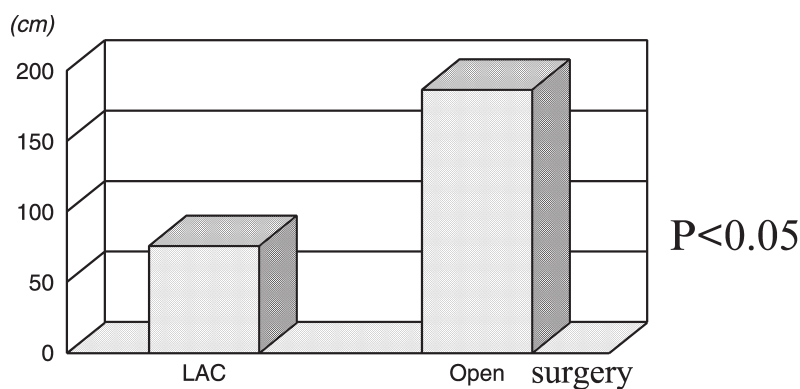


Fig. 4d The length of the postoperative wound
LAC average 8.4 cm
(range : 6.4-10.4)
Open average 19.6 cm
(range : 10.0-28.0)
P < 0.05

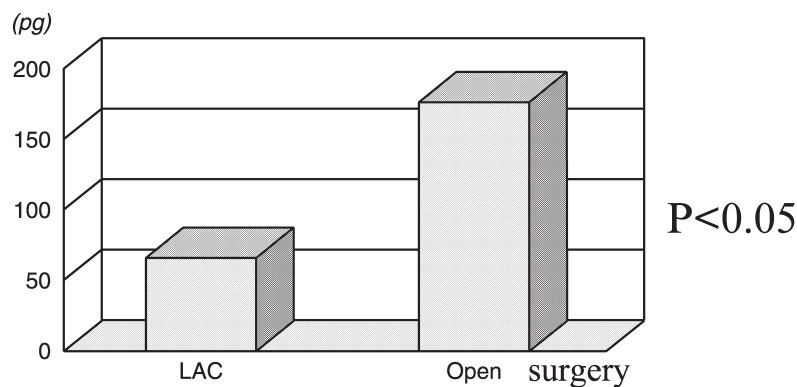


Fig. 4e The serum concentration of IL-6
LAC average 67 pg/ml
(range : 14.6-124)
Open average 178 pg/ml
(range : 64-420)
P < 0.05

invasiveness of LAC is low. However, a randomized, controlled trial should be done to evaluate the role of laparoscopic surgery in the treatment of colorectal carcinoma.

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