

Case Report

Minilaparotomy Approach Employing a Küstner Incision for Rectal Cancer Resection: Report of Three Cases

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A minilaparotomy approach (≤ 7 cm) for colorectal cancer resection is feasible and safe. Such minilaparotomy generally employs a small vertical incision. A low transverse abdominal incision (a Küstner incision) has been shown to be associated with cosmetic advantage, less postoperative pain, and fewer wound-complications than the midline incision. We report three cases (75-year-old female, 64-year-old male, and 74-year-old female) who underwent anterior resection of rectal cancer via a minilaparotomy approach employing the Küstner incision. No hand-port or laparoscope was used. The median body mass index was 18.9 (range, 18.3-19.3) kg/m². The rectal tumors were located in the rectosigmoid and the upper rectum. There were no intraoperative complications. The median operating time and operative blood loss were 160 (range, 159-162) min and 80 (range, 30-90) ml, respectively. All tumors were curatively resected. The patients quickly returned to normal function without morbidity or mortality. No patients developed wound-related complications. During a median follow-up period of 27.4 (range, 26.8-29.0) months, all patients are alive without tumor recurrence. In addition, neither incisional hernia nor nerve damage developed. We conclude that the minilaparotomy approach employing a Küstner incision is a less invasive and an attractive method with a cosmetic advantage for rectal cancer resection in selected patients.

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Introduction

Over the last decade, a laparoscopic approach for colorectal cancer resection has been shown to offer certain advantages over traditional laparotomy. Advantages of the laparoscopic approach include decreased pain, earlier return of bowel function, and shorter hospitalization.¹ The use of smaller incisions may be the major reason for reduced invasiveness of laparotomy.^{1,5}

Recent studies reported that a minilaparotomy approach (≤ 7 cm), without hand-port or laparoscope, is technically feasible and safe for colorectal cancer resection.^{2,4} This minilaparotomy approach is less invasive with respect to early postoperative outcomes.^{3,4} Such a minilaparotomy approach generally employs a small vertical incision.⁵

A low transverse abdominal incision (Küstner incision) has been mostly used for gynecologic and pelvic procedures, and offers several advantages, representing an aesthetically more pleasing "bikini-line" scar.^{6,7} The Küstner incision, combined with a minilaparotomy (≤ 7 cm), for rectal cancer resection has not been reported. In this report, we describe the cases of three patients who underwent ante-

rior resection for rectal cancer via a minilaparotomy approach employing the Küstner incision for rectal cancer resection.

Patients and Methods

Between November 2005 and February 2006, 3 patients underwent anterior resection of the rectum via a minilaparotomy approach employing a Küstner incision (Table 1). The minilaparotomy approach for resection of colorectal cancer was defined as a resection performed through a skin incision less than 7 cm in length.^{3,5} The American Joint Committee on Cancer (AJCC) Classification and Stage groupings were used for tumor assessment.⁸ Macroscopic types of tumors and level of lymph node dissection were classified according to the *Japanese Classification of Colorectal Carcinoma*.⁹ The median age and body mass index (BMI) were 74 years and 18.9 kg/m², respectively. The median distance between the tumor lower margin and the anal verge was 10 (range, 9-15) cm. Macroscopic types of the tumors for Patient 1, 2, and 3 were Type 0 IIa (later-

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Table 1. Patient characteristics

	Patient 1	Patient 2	Patient 3
Age (years)	75	64	74
Gender	Female	Male	Female
Previous laparotomy	No	Total gastrectomy	No
Body Mass Index (kg/m ²)	18.9	19.3	18.3
Tumor location	Upper rectum	Rectosigmoid	Upper rectum

ally spreading tumor (LST)), Type 2, and Type 0 IIa (LST), respectively.⁹ Early cancers for Patient 1 and 3 and advanced cancer for Patient 2 were preoperatively diagnosed by colonoscopy.

Operative technique

The patients were placed in the lithotomy position. The operation was started with a Küstner incision.^{6,7,10,11} A 7-cm low transverse incision of skin and underlying fat tissue were made at a point approximately 2 cm superior to the symphysis pubis (Figure 1), and the subcutaneous cephalic layer was then raised as a flap and dissected from the fascia up to the umbilicus. Electrical coagulation was used to seal the small vessels that penetrated the fascia. A 7-cm vertical incision was then made through the linea alba, the rectus muscle were separated, and the peritoneum was opened in the vertical midline. The Lap-Protector[®] device (Hakko Co., Ltd., Nagano, Japan) was used for laparotomy incisions to protect the



Figure 1. Operative scar of minilaparotomy employing a low transverse abdominal Küstner incision on postoperative day 22 in Patient 3.

minilaparotomy wound from bacterial infection and from contamination by tumor cells.^{4,5} Anterior resection with minilaparotomy technique using an OMNI-TRACT[®] retractor system (Omni-Tract Surgical, Inc., Minneapolis, MN, USA) was performed according to the previous report.⁴ Lymph nodes at the root of the inferior mesenteric artery were removed for Patient 2, but not for Patients 1 and 3. A double-stapling technique was used for colorectal anastomosis. When closing the abdomen, the peritoneum was sewn with a continuous synthetic absorbable suture, and the rectus fascia was closed using interrupted synthetic absorbable sutures in the vertical midline. The subcutaneous fat was fixed to the fascia with some stitches. Finally, the skin was closed with stapled sutures. No suprafascial drainage tube was placed.

Results

There were no intraoperative complications such as massive bleeding, bowel perforation, or problems with the anastomosis. Although Patient 2 had undergone total gastrectomy 22 years before, the previous laparotomy did not prevent success of minilaparotomy approach. The median operating time and operative blood loss were 160 min and 80 ml, respectively. The median maximum tumor diameter was 4.5 cm. The median number of lymph nodes removed was 8 (range, 5-10). All tumors were curatively resected (Table 2).

There was no operative mortality. The median times to standing, to walking, with use of a urinary catheter, to passage of flatus, to liquid food, and to solid food were 1, 2, 2, 2, 4, and 6 days, respectively. The median analgesic (pentazocine) usage was 15 mg. There was no postoperative complication. No patients developed wound-related complications such as wound infection, subcutaneous hematoma/seroma, or wound breakdown. The median postoperative hospital stay was 16 days (Table 3).

Table 2. Operative procedures and pathological features of tumors

	Patient 1	Patient 2	Patient 3
Length of skin incision (cm)	7	7	7
Operating time (min)	162	159	160
Operative blood loss (ml)	90	80	30
Type of operation*	LAR	HAR	LAR
Level of lymph node dissection**	D2	D3	D2
Anastomosis***	DST	DST	DST
Maximum tumor diameter (cm)	2.5	6.0	4.5
Histologic grade****	Well	Well	Well
T	Tis	T3	Tis
N	N0	N1	N0
M	M0	M0	M0
Stage	0	III	0

* HAR, high anterior resection; LAR, low anterior resection.

** *Japanese Classification of Colorectal Carcinoma.*⁹

*** DST, Double-stapling technique.

**** Well, Well differentiated.

Table 3. Postoperative course

	Patient 1	Patient 2	Patient 3
Time to standing (days)	1	2	1
Time to walking (days)	2	2	1
Time with urinary catheter (day)	2	2	1
Time to passage of flatus (days)	2	3	2
Time to liquid food (days)	4	4	3
Time to solid food (days)	6	7	6
Analgesic (pentazocine) usage (mg)	15	15	0
Postoperative complication	No	No	No
Postoperative hospital stay (days)	16	35	15

During a median follow-up period of 27.4 (range, 26.8-29.0) months, all patients alive and have not developed tumor recurrence. In addition, neither incisional hernia nor nerve damage (ilioinguinal and/or iliohypogastric nerve) has occurred.

Discussion

A transverse lower abdominal incision has been used for gynecologic and pelvic procedures, and offers cosmetic advantages. Although different types of transverse incisions are described in surgical textbooks,¹² only the Pfannenstiel incision has gained worldwide acceptance.^{6,7,10} The Küstner incision, devised in 1896,¹¹ has also become popular. The low transverse incisions of skin and underlying fat tissue are similar in both incisions.^{7,10,12} However, the Pfannenstiel incision involves transverse fascia incision and dissecting the rectus fascia away from the underlying rectus muscles, whilst the Küstner incision involves dissecting the subcutaneous layer from the fascia and subsequent longitudinal incision of the fascia (linea alba).

In the literature, the Pfannenstiel incision shows a lower complication rate (fewer incisional hernias, fewer wound infections, fewer hematoma formations, and less postoperative pain) compared with the low midline incision and minimizes scar formation.¹³ However, with the Pfannenstiel incision, the nerves and blood vessels that enter the fascia from the underlying muscle are severed. Especially, in the case of wide lateral extension, injury to the iliohypogastric and ilioinguinal nerves may occur.¹⁴ In addition, some authors note the restricted access to the operating area.¹³

With the Küstner incision, the cosmetic advantage of a transverse skin incision is combined with that of a longitudinal fascial incision, which avoids nerve injury.¹³ In addition, the Küstner incision allows better surgical exposure and less postoperative pain than the Pfannenstiel incision.⁶ Moreover, when placing a self-retaining abdominal retractor, there is no risk of damage to the rectus muscles, which are protected by the fascial edges.⁶ In our experience of this series, the curative resection of rectal cancers was successfully accomplished via a Küstner's minilaparotomy in

cision without operative complications. Surgical exposure seemed to be good, and damage to the rectus muscle by the OMNI-TRACT® retractor system did not develop. In addition, the postoperative early outcomes were less invasive without mortality or morbidity, and during the postoperative follow-up period (median, 27.4 months), no nerve injury and incisional hernia developed.

Maartense et al. reported that the Küstner incision contributes to a higher incidence of incisional hernias than the Pfannenstiel incision⁷ because the subcutaneous pocket that is created after the transverse skin incision increases the likelihood of hematoma and infections and thus the potential for incisional hernias due to disturbed wound healing.⁷ In order to prevent such complications, subcutaneous drainage may be necessary.¹⁰ In addition, we believe that meticulous and complete hemostasis in the subcutaneous pocket and the fixation with some stitches between the subcutaneous fat and the rectus fascia, which was performed in our cases, should be performed.

Our experience included thin patients with a relatively low BMI (18.9, 19.3, and 18.3 kg/m²). Almost all surgeons seem to consider that obesity reduces the technical feasibility of the minimally-invasive laparoscopic and minilaparotomy approaches.¹⁴ The incidence of overweight or morbidly obese patients in Japan is probably lower than in the Western countries, so we feel that a Küstner's minilaparotomy is a suitable technique for many Japanese patients.⁴

We conclude that a minilaparotomy approach employing a Küstner incision seems to be less invasive, and an attractive method with a cosmetic advantage for rectal cancer resection in selected patients.

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