Laparoscopic Radical Resection of Low Rectal Carcinoma Integrating Transanal Endoscopic Microsurgery: A Case Report

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Received: 16 November 2011 / Accepted: 21 June 2012 / Published online: 7 July 2012
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Abstract A male patient with lower-segment rectal carcinoma underwent laparoscopic radical resection and regional lymph node dissection. The extracorporeal rectoanal anastomosis was completed using transanal endoscopic microsurgery (TEMS) without requiring any additional abdominal incision. The pathological examination identified a clean margin. At the postoperative 6-month visit, the patient exhibited generally normal defecation, urination, and sexual function, but no sign of local recurrence or distant metastasis. TEMS integrating laparoscopy is a surgically and oncologically feasible, effective, and safe procedure for lower anterior resection.

Keywords Rectal carcinoma · Lower segment · Transanal endoscopic microsurgery · Laparoscopy · Radical resection

Introduction

Laparoscopic total mesorectal excision (TME) for middle- and lower-segment rectal carcinoma is used as an adjunct to the conventional Heald's TME procedure [1]. The two procedures have shown a comparable surgical and oncological outcome in terms of the number and distribution of lymph node dissections, local recurrence, and overall survival [2, 3]. Buess et al. [4] reported the use of transanal endoscopic microsurgery (TEMS) for rectal adenomas, enabling the regional resection of mid- and high-segment rectal tumors

up to 25 cm distant to the anal verge. Here, we report a case of laparoscopic radical resection of low rectal carcinoma and regional lymph nodes. The rectoanal anastomosis was extracorporeally completed in this patient using TEMS in the absence of any additional abdominal incision.

Case Report

A previously healthy 49-year-old man, with a body mass index of 23 kg/m², presented chronic painless hematochezia. The digital palpation identified a solid mass, 5 cm proximal to the anal verge, with a rough surface but well mobilized. Fibrocolonoscopy showed a 4.5 cm × 5.0 cm ulcerated tumor, 5 cm above the anal verge, which was diagnosed as rectal carcinoma on biopsy. Pelvic MRI showed a regionally thickened rectal wall 5 cm proximal to the anal verge and a 3.5 cm long strictured rectal lumen, along with an unclear boundary to the prostate. Nodular soft tissue shadows, 0.6 cm × 0.8 cm, were visible inside the rectal mesentery. A selective laparoscopic radical resection of the rectal carcinoma integrating TEMS was therefore scheduled. The patient received no neoadjuvant chemo- or radiotherapy.

The patient was placed in the lithotomy position. The placement of trocar sites was the same as in conventional laparoscopic lower anterior resection (LAR). The inferior mesenteric vessels were dissected using an ultrasonic dissector (Ethicon Endo-Surgery, Cincinnati, OH). The inferior mesenteric vessels were transected and ligated with bioabsorbable titanium clips. The lower-segment rectum was laparoscopically mobilized along Denonvilliers' fascia until the level of the levator ani. The proximal sigmoid colon was transected 10 cm proximal to the upper margin of the tumor. Following anal dilation, a pair of ovum forceps was inserted

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through the anus to pull through the mobilized rectum in an inverted manner. The rectum was transected 2 cm below the lower margin of the tumor. The lower margin of the distal rectum was fixed to the perianal, and a TEMS sleeve (Karl Storz, Tuttlingen, Germany) was inserted into the inverted rectum through the anus to retract the proximal sigmoid colon extracorporeally from the anus (Fig. 1). An end-to-end rectocolonic anastomosis was manually completed (Fig. 2). A perianal drain was inserted into the presacral space, and an additional peritoneal drain was maintained at the left lower quadrant trocar site. The volume of blood loss was estimated to be 100 ml, requiring no blood transfusion. The whole procedure lasted 290 minutes. On postoperative day (POD) 3, the presacral drain was removed following the anal passage of gas. The patient had fecal incontinence at a daily frequency of 7–10, which resolved spontaneously at the time of discharge on POD 6.

The pathologic examination identified a differentiated tubular adenocarcinoma involving the outer fibroadipose tissues and 1/18 mesenteric lymph nodes, with a clean margin ($T_3N_1M_0$). At the last follow-up visit, the patient exhibited a defecation frequency of three to four daily and normal urination and sexual function, but no local recurrence or distant metastasis.

Discussion

TEMS is initially indicated for benign rectal lesions, but its use for LAR has widely been recognized. TEMS is currently indicated for stage I and II diseases, which are less likely to metastasize to regional lymph nodes [5]. TEMS alone is mainly effective in the dissection of the tumor itself rather than regional lymph nodes; however, at least 12 lymph nodes must be dissected in curative resection [6].

Laparoscopic assistance in TEMS enabled a scarless abdominal incision and rapid postoperative recovery.

Fig. 1 TEM sleeve was inserted into the inverted rectum through the anus to assist the pull-through of the transected sigmoid colon

Fig. 2 End-to-end rectocolonic (extracorporeal) anastomosis

Laparoscopy is comparable to laparotomy in the number of lymph nodes dissected and the rate of clean margin [7]. The pull-through procedure in this case ensured a clean lower margin and the minimization of peritoneal contamination. Laparoscopy-assisted TEMS is mainly indicated for a small (diameter ≤ 3 cm, or no more than the half the rectal circumference), early (T_2 or T_3 , requiring the accurate pre-operative evaluation of lymph node involvement), and well-differentiated adenocarcinoma.

TEMS is comparable to conventional surgical procedures in the incidence of procedure-related complications. In contrast to endoscopic assistance alone, the incorporation of laparoscopy decreases the risk of bleeding mainly because of better visualization and retraction [8]. Anal incontinence, a common unwanted event, occurred transiently in this patient.

In summary, TEMS integrating laparoscopy is a surgically and oncologically feasible, effective, and safe procedure for the resection of indicated low rectal carcinoma. The indications, long-term outcomes of survival, and quality of life should be further investigated in prospective randomized controlled studies.

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