

Laparoscopic TME in rectal cancer – electronic supplementary: op-video

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Abstract

Background Laparoscopic total mesorectal excision (TME) for rectal cancer has been proved in various studies. The minimal invasive procedure is feasible and safe which was demonstrated in many studies. However, the results of prospective, randomized studies providing valuable evidence are still not available. Compared to conventional surgery, the laparoscopic technique has short-term advantages including less pain, shorter duration of postoperative ileus, less fatigue, better pulmonary function, and less blood loss (Leung et al., *Lancet* 363:1187–1192, 2004; Braga et al., *Dis Colon Rectum* 48:217–223, 2005; Jayne et al., *J Clin Oncol* 25:3061–3068, 2007; Agha et al., *Surg Endosc* 22:2229–2237, 2008).

Methods The autonomic nerve sparing TME technique is the gold standard in rectal cancer resection even in conventional or laparoscopic procedure. With regard of the oncological dimension, the laparoscopic TME technique is not different compared to the open procedure. However, a standardized laparoscopic step-by-step procedure may simplify the operation and can reduce operation time.

Results There are no studies available which compare different types of TME procedures. Most surgeons start the operation left laterally mobilizing the sigmoid colon first. In the laparoscopic technique, we recommend the medial to

lateral approach starting the operation at the right side of the rectum and sigmoid colon. A nerve sparing TME technique can be performed easier, and the identification of the left ureter may be simplified. After multiple workshops and extensive discussion with national and international experts, we developed a standardized laparoscopic “10 step TME procedure.” Reviewing the results of laparoscopic TME the studies do not allow firm conclusions as to the questions of whether the safety and efficacy of laparoscopic TME is equal or superior to open TME (Breukink et al. 2006). Actually, we are waiting for large prospective randomized studies comparing laparoscopic TME with the traditional open procedure (Bonjer et al., *Dan Med Bull* 56:89–91, 2009).

Conclusion Laparoscopic TME appears to have clinically measurable short-term advantages in patients with primary resectable rectal cancer based on evidence mainly from nonrandomized studies (Breukink et al. 5). In nearly all published studies, the efficacy and technical feasibility of laparoscopic surgery for rectal cancer could be demonstrated regarding perioperative morbidity and oncological outcome. A standardized laparoscopic TME technique can be strongly recommended.

Keywords Laparoscopic rectal resection · Laparoscopic TME · Rectal cancer · Operation technique · Oncological outcome · Video rectal resection

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Introduction

Laparoscopic total mesorectal excision (TME) is technically feasible and safe; however, the oncological outcome has not been evaluated by large studies with high evidence level to date [7–13]. Large prospective randomized studies comparing laparoscopic-assisted with the conventional TME are not available. Actually, well-documented prospective patient series represents an important contribution to the evaluation

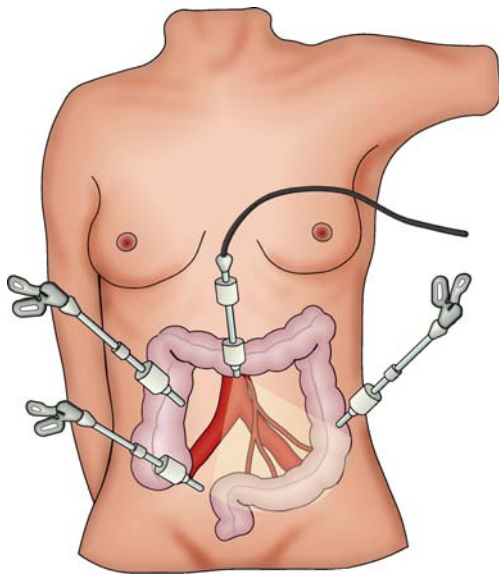


Fig. 1 Trocar position of laparoscopic rectal cancer surgery

of surgery adopting the laparoscopic-assisted technique. For colorectal carcinoma, advantages of the minimally invasive surgery have been indicated by several studies [11, 14, 15]. Multicenter prospective randomized studies have shown comparable postoperative morbidity and oncological outcomes for colon carcinoma [16–18].

Standardized surgical technique of laparoscopic TME

1. Position of the patient (Video 1)

The positioning of the patient is essential in laparoscopic TME. The patient is positioned in the perineal lithotomy position. The operating table must have enough mobility to facilitate a head down and right-sided position simultaneously.

2. Trocar position

An open access of the first trocar is recommended. The position of the camera trocar is 2 cm above the umbilicus.

Two trocars are localized at the lower part of the abdomen and one trocar at the right middle part (Fig. 1). A fifth trocar is optional.

3. Ten-step procedure of laparoscopic TME (*Video 2)

A standardized laparoscopic procedure helps to make the operation easier and faster. Especially the “medial to lateral approach” helps to keep the autonomic nerves intact and simplifies the mobilization of the left colon and the identification of the left ureter (Table 1).

4. Colonic pouch

A short 5-cm-long colonic J-pouch is recommended as shown by an international prospective randomized study [19].

5. Protective ileostomy

According to the guidelines, a protective ileostomy is recommended after TME in almost all countries.

*Video clips of several patients

Conclusion

Laparoscopic TME for rectal cancer is still a matter of controversial discussions. One important question is whether laparoscopic surgery achieves the oncological quality criteria of conventional rectal surgery. The results of retrospective and prospective studies published to date on rectal cancer suggest that minimally invasive surgery is able to maintain the recommended oncological standards of conventional tumor surgery, and that morbidity and mortality do not differ significantly from open surgery. However, few centers are able to present larger numbers of laparoscopically treated patients with rectal cancer. At present, there are only short-term results available, without significant differences found between the laparoscopic and the open resection [1, 2, 4, 7–9, 12, 14, 20–24]. Thus, more studies with high patient

Table 1 Standardized ten-step procedure of laparoscopic TME

1	Medial to lateral preparation of arteria rectalis superior and autonomic nerves
2	Identification of the left ureter
3	Clip the arteria mesenterica inferior
4	Clip the vena mesenterica inferior
5	Mobilization of the left colon (medial and lateral)
6	Mobilization of the left flecture (medial/lateral/omental)
7	Preparation along the mesorectal plane
8	Division of the distal rectum (endostapler)
9	Extra-abdominal division of the descending colon
10	Anastomosis with a transanal stapler device

numbers and long-term follow-up are needed to compare patient outcome and long-term survival rates after open or laparoscopic surgery (color II trial in progress) [6].

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