



Laparoscopic modify extralevator abdominoperineal resection for rectal carcinoma in the prone position

Kai Ye, Jianan Lin, Yafeng Sun, Yiyang Wu, Jianhua Xu

Department of Oncology Surgery, Second Affiliated Hospital of Fujian Medical University, Quanzhou 362000, China

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Correspondence to: Kai Ye. Department of Oncology Surgery, Second Affiliated Hospital of Fujian Medical University, Quanzhou 362000, China. Email: Yekai72@163.com.

Background: Laparoscopic technique applying for low rectal Carcinoma excision and the extralevator technique applying for abdominoperineal resection are involved with emerging technologies. The aim of this study was to introduce a modified approach of a direct visible resection: the levator muscles with laparoscopic technique and the alteration of patient's position to a PJK position for the perineal resection of T3–T4 low rectal carcinoma.

Methods: A 54-year-old woman with rectal carcinoma within 4 cm of the anal verge, the pathology confirmed adenocarcinoma. The enteroscopy showed that a cauliflower-like carcinoma was seen in the back of rectum. MRI and ERUS showed that the carcinoma of the lower rectum infiltrate muscular and no enlarged lymph node around the rectum be noted. Preoperative TNM-staging was T3NxM0, and the patient was underwent an modified approach of a direct visible resection: the laparoscopic technique and the alteration to PJK position.

Results: The operation cost 180 min with bleeding of about 50 mL. The patient recovers well postoperation and discharged from hospital on the 7th day.

Conclusions: Laparoscopic modify extralevator abdominoperineal excision (ELAPE) for rectal carcinoma can be safely performed without the occurrence of short-term complications.

Keywords: Abdominoperineal resection (APR); LELAPR; PJK position; rectal carcinoma

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Introduction

Conventional abdominoperineal excision for low rectal carcinoma, because of retained the levator muscles, due to rectal perforation or the positive circumferential resection margin (CRM), which induced the main risk of higher local recurrence and lower survival (1,2), however, an extralevator abdominoperineal excision (ELAPE) may be more feasible through en bloc resection of the levator muscles covering the distal mesorectum and removing of more tissue in the

distal rectum, but this technique may increase the incidence of postoperative perineal wound complications, urinary and sexual dysfunction, and the occurrence of chronic pain in regio perinealis (3). We performed a modify ELAPR with transabdominal transection of the approach of a direct visible resection: the laparoscopic technique and the alteration to PJK position. A laparoscopic approach to the resection can bring the lower postoperative complication, and the modify ELAPR reduced the perineal complications, simplified the operation and accelerated patient recovery.



Figure 1 Laparoscopic modify extralevator abdominoperineal resection (6). Available online: <http://www.asvide.com/articles/1139>

Methods

Surgical indications

It was considered that patients with rectal tumours located within 4 cm of the anal verge and the plane between the tumour and the levator ani muscles was not clear were suitable for laparoscopic abdominoperineal excision (LELAPE) (4). And the patients with cT3+ and/or lymphatic metastasis need the neoadjuvant chemoradiotherapy (5).

In the present video (*Figure 1*), the patient is a 54-year-old woman who was diagnosed moderately differentiated adenocarcinoma of lower rectum tumours located within 4 cm of the anal verge by colonoscopy and histological test. The tumor stage was assessed to be cT3N0M0 by MRI scan preoperation.

Surgical procedures

LELAPE was followed the principles of total mesorectal excision. Patients were placed in the improving lithotomy position and a modified five-hole method was performed. From medial to lateral, the sigmoid colon and rectum was dragged from retroperitoneal structures. Along the left Toldt's space, the operation need well protected ureter and pelvic autonomic nerves, cut the inferior mesenteric artery from its origin, dissect the lymph nodes near the artery.

Pelvic dissection proceeds alternating posterior, both sides and anterior between visceral and parietal endopelvic fascia. Between the mesorectal fascia and the Waldeyer's presacral fascia, hypogastric nerve and the parasympathetic sacral nerve roots from S2 to S4 is well preserve. Anteriorly, dissection would start at the level of rectovaginal septum

in female, and the plane above the seminal vesicle in male. Laterally, dissection should well preserve the hypogastric plexus and neurovascular bundle. The mesorectum was separated from the levator ani muscles downward as far as its origin. And the clearly defined tissue such as the neurovascular bundle laterally, the upper part of the vagina/ seminal vesicles anteriorly and the coccyx posteriorly was found thought laparoscopically.

In our operation, extralevator resection has been modified. The dissection external of the levator ani muscles should depend on the location and invasion direction of tumor, and the coccyx bone has been preserved. The levator muscles in tumor side are arc and vertically cut down under direct laparoscopic visualization, and the other sides mostly reserved. The dissection lines along the rectum meet at the apex of the coccyx bone. the R0 resections and no CRM involvement are required in the operation, we defined it as extralevator resection.

A laparoscopic linear stapler was used to cut off the sigmoid colon, and pulled out the proximal colon to make a colostomy incision. And altered the patient's position to a PJK position for the perineal resection, dissection begun firstly on the posterior side, dissection is performed behind the coccyx bone, as levator muscles have been transected by laparoscopic transabdominal approach. The dissection plane is relatively easy to find, lateral dissection follow the levator ani muscle stump. the distal rectum is anteriorly pulled out from the pelvic cavity through the perineal wound. The approach could identify boundary of the anterior rectal wall, vagina or seminal vesicles/prostate with excellent visualization. And limited dissection is performed on the anterior, it must preserve the urethra in males and the posterior vaginal wall in females (perineal body). Therefore it's removing the anal canal, levators and low mesorectum altogether with "*en bloc*".

Since the dissection extent of the levator ani muscles have been modified, the pelvic and perineal incisions can easily close by suturing subcutaneous tissue and the skin, and suturing the residue of the levator muscles is necessary.

Results

It took about 150 min to finish the whole operation with bleeding of about 50 mL. The pathology outcome after the surgery shows it the moderately differentiated adenocarcinoma with 1/15 lymph nodes positive staging T3N1M0 (IIIB). And the proximal margin, the distal margin and the CRM was no tumor residual. The patient

recovers well postoperation without sexual dysfunction, perineal wound breakdown any and discharged from hospital on the 7th day.

Discussion

Conventional abdominoperineal resection (cAPR) for rectal cancer has been found the relatively high rate of positive CRMs and intra-operative perforations, as well as the higher local recurrence. As a consequence, the extralevator APR (ELAPR) is increasingly used, which through removal of more tissue in the distal rectum to reduce the rate of intraoperative perforation, and CRMs involvement (1,7). But ELAPR has the disadvantages of perineal complications, urinary and sexual dysfunction, aggressive trauma, and reconstruction of the pelvic defect and laparoscopic surgery (LS) has made the rectal surgery revolutionize.

LS for colorectal cancer has been considered to be oncologically equivalent to open surgery, in addition to short-term postoperative benefits such as pain less, recover quicker and scar less (8).

We performed LELAPR with transabdominal transection of the levator muscles and the perineal part resection in a PJK position. Pelvic dissection and rectal mobilization must be performed according to TME principles. Laparoscopic mobilization of the mesorectum is as far as downward the origin of the levator ani muscles. And the clearly defined tissue such as the neurovascular bundle laterally, the upper part of the vagina/seminal vesicles anteriorly and the coccyx posteriorly was found thought laparoscopically. LELAPR well protect the pelvic nerves and vascular structures along the lateral pelvic wall under direct visualization. It reduced the high rate of urinary retention in male cases and patient-reported impotence. A further question in ELAPE surgery are perineal reconstruction, the majority of cases in our hospital have high quality preoperative imaging, pathology reporting and neoadjuvant therapy. We present the less aggressive procedure being an appropriate treatment for most LELAPE operations. With division of the levator ani muscles at their origins has been modified individually, the dissection external of the levator ani muscles should depend on the location and the invasion direction of rectal tumor. The extra-excised levator muscles in the tumor side to reduce the CRM positivity, with a controlled excision of the levator muscles and preserved the coccyx, the healthy tissue left will make it easier to close the pelvic incision.

The majority of shortcoming of Lloyd-Davies position is related to the limited vision to the surgical site, which

lead the dissection to be mostly blind and blunt, and did not follow the principle of tumor-free technique. The prone jackknife position enables a sharp, standardized, and direct vision resection of the rectal stump, which ensuring en bloc excision of the primary tumor, lesser CRM positivity, and lower perforation rates (9,10). Since the levator ani muscles have been resection by laparoscopic, the perineal phase of prone jackknife position became easy, also this modify technique reduce blood loss and operative times, and the benefits oncologically equivalent to the ELAPR.

Conclusions

Modify LELAPR with the best oncological approach of laparoscopic technique and the alteration of patient's position, enables to achieve a cylindrical specimen, and an acceptable perioperative and pathological outcomes such as minimally invasive, oncological acceptable and easily performed procedure.

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Footnote

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/ales.2016.08.04>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study is approved by the institutional ethical committee of Second Affiliated Hospital of Fujian Medical University (No. 2013051) and obtained the informed consent from every patient.

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