

# Oncologic superiority of extralevator abdominoperineal excision for low rectal cancer

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## SUMMARY

**Background:** Rectal cancer treatment has been dramatically improved during the last two decades in terms of a lower local recurrence rate and prolonged survival. This improvement was achieved mainly due to a better surgical technique (implementation of a total mesorectal excision-TME) and neoadjuvant chemo and radio therapy. A more radical approach to abdominoperineal excision, extralevator abdominoperineal excision technique in the prone Jack-knife position, may improve the oncological outcome. The aim of this study is to show our early experience by using extralevator abdominoperineal excision.

**Methods:** Extralevator abdominoperineal excision has been used routinely at Oncology Institute of Vojvodina since 2011. In the last 23 months, we had 11 operations. Clinical and pathological data were obtained from operative protocols, histopathological data and patients' medical history.

**Results:** An audit of results showed reduced rate of intra-operative perforations and circumferential resection margin involvement. Late postoperative complications have occurred in two patients, sexual dysfunction in one and pelvic pain in the other. The follow up period is too short (min 2 months, max 23 months, median 8 months) for analysis of local recurrence.

**Conclusion:** Extralevator abdominoperineal excision, with the emphasis on the perineal dissection and prone Jack-knife position, may help achieve the goals of radical resections for low rectal cancer. This technique could be associated with less intra-operative perforations and circumferential resection margin involvement.

**Key words:** Rectal Neoplasms; Surgical Procedures, Operative; Digestive System Surgical Procedures

Arch Oncol 2013;21(1):11-3.

UDC: 616.351-006:615.38:615.849.

1-616.089.8

DOI: 10.2298/A001301011L

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Received: 13.02.2013

Provisionally accepted: 18.02.2013

Accepted: 20.02.2013

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## INTRODUCTION

During the past two decades there has been a dramatic improvement in rectal cancer treatment, especially in terms of a lower recurrence rate, prolonged survival and improved quality of life. This is mainly due to implementation of a total mesorectal excision (TME) in standard surgical practice, use of staplers and preoperative irradiation.

First successful rectal excision was performed by Jacques Lisfranc in 1826. During that period, distal rectal cancer was treated by a perineal excision with several modifications: amputation of the anorectum and healing by scar, perineal rectal excision and formation of perineal colostomy. These techniques were in relation to high mortality and high local recurrence rate (1). Furthermore, the first combined abdominoperineal procedure for rectal cancer was performed by Czerny in 1884, which was continued and developed by Ernest Miles who described a new approach to distal rectal cancer management over 100 years ago (2).

In January 1907 Ernest Miles performed his first rectal excision by using a combined abdominal and perineal approach with a wide excision of ischio-rectal fat and perineal skin, levator ani muscle and mesenteric lymph nodes (1). Despite a high mortality rate, there was a great success in reduced local recurrence. Ever since the original technique was performed and described, there have been a number of modifications until today (3). One of these modifications is extralevator or extended APE, described by Prof. T. Holm from Karolinska hospital, Stockholm, Sweden (4).

The main issue in rectal cancer surgery remains local recurrence. When compared to a low anterior resection (LAR), abdominoperineal

excision (APE) is associated with considerably worse oncological outcomes with higher rates of circumferential resection margin (CRM) positivity and intra-operative perforation in the short term, and higher local recurrence rates and reduced survival in the longer term (5-7). The difference among outcomes may be explained by a combination of the anatomic and surgical difficulties associated with the standard APE surgery.

A more radical extralevator APE (ELAPE) Figure 1-3, technique may improve oncological outcome in patients with very low rectal cancer, especially in advanced cases and the ones of local recurrence. The aim of this study is to show our early experience by using the ELAPE operation in the prone Jack-knife position.

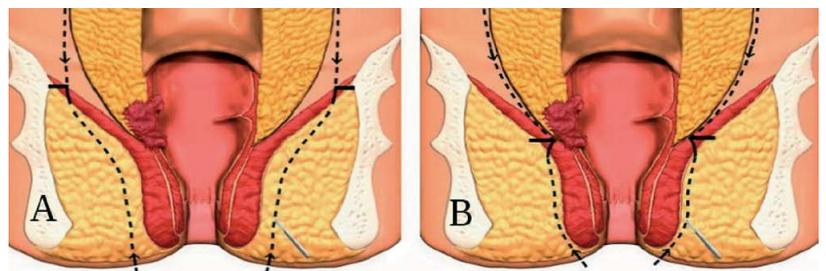


Figure 1. A) ELAPE, B) APE

(Taken from: Holm T, Ljung A, Haggmark T, et al. Extended abdominoperineal resection with gluteus maximus flap reconstruction of the pelvic floor for rectal cancer [Image]. Br J Surg. 2007)



Figure 2. ELAPE – prone position, surgical specimen removed



Figure 3. ELAPE – Cylindrical surgical specimen

## PATIENTS AND METHODS

The cylindrical technique has been used routinely at the Oncology Institute of Vojvodina since 2011 after one surgeon attended an educational program at Karolinska hospital, Stockholm (Prof. T. Holm). It is performed mainly for locally advanced and recurrent rectal cancer. In the last 23 months we had 11 ELAPE operations. Characteristics of patient population are presented in the Table 1.

The technique involves completing the abdominal component by stopping the pelvic dissection before the mesorectum is dissected of the levator ani muscles. The dissection is not continued to the pelvic floor. It is stopped at the upper border of the coccyx posteriorly and just below the level of the seminal vesicles or cervix anteriorly. Antero-laterally, the abdominal dissection is stopped just below the inferior hypogastric plexus. A medium sized swab should be placed behind the rectum to act as a guide for the perineal part of the operation. The abdomen is closed after stoma formation and the patient's position is changed. The perineal approach is performed with the patient in the prone jack-knife position. The anus is closed with a purse-string suture and an incision is made close to the anus and extended to the coccyx in a tear-drop shape. The coccyx may be disarticulated and the levator ani muscles are divided under direct vision as laterally as possible, close to obturator internus muscle. Removal of the coccyx improves the access to the levator plane and facilitates the wider operation. It is not an absolute prerequisite of this type of operation and can be omitted, but the surgical difficulty may be increased. A randomized trial of removal versus retention

Table 1. Characteristics of patient population

ELAPE (n=11)	n
Age: median (range)	59 (50-78)
<b>Gender</b>	
male	8
female	3
<b>ASA classification</b>	
ASA I	4
ASA II	7
ASA III	0
ASA IV	0
<b>Preoperative radiotherapy</b>	6
<b>Comorbidity</b>	3
<b>Indications</b>	
Primary tumor	10
Local recurrence	1
<b>Stage</b>	
I	4
IIa	4
IIb	0
IIIa	0
IIIb	3
IIIc	0
IV	0
<b>TNM</b>	
T1	0
T2	3
T3	7
T4	1
N0	6
N1	4
N2	0
Nx	1
M0	10
M1	1

has not been performed. The result is a wide, cylindrical excision of the anorectum and mesorectum. The surgery is ended with closing of the perineal wound by using a muscle flap (gluteus maximus, rectus abdominis, gracilis), a biological or synthetic mesh, omentoplasty or with primary closure (4).

## RESULTS

An audit of results showed reduced rate of intra-operative perforations and CRM involvement.

There were 2 cases of intra-operative bowel perforation and there was no CRM involvement.

Operating time was from 120 min to 300 min (median 200 min). Hospital stay was min. 8 days, max. 25 days, (median 14 days).

Late postoperative complications have occurred in two patients, sexual dysfunction in one and pelvic pain in the other.

In one surgical specimen, the pathologist could not find any lymph nodes (Nx) although this patient was not preoperatively irradiated. The number of examined lymph nodes was: min. 1, max. 26, mean 8.7. Liver metastases were preoperatively verified in one patient.

The follow up period is too short (min 2 months, max 23 months, median 8 months) for analysis of local recurrence, but until now we have not had any.

## DISCUSSION

Surgical therapy for low rectal cancer remains the primary treatment. The goals of surgical treatment for patients with rectal cancer include long-term survival and lower local recurrence rate. The objective of this surgical treatment is to obtain negative resection margins and to avoid intra-operative bowel perforation. The advantages of ELAPE operation versus APE still remain a point of discussion. There is a major problem caused by a higher rate of CRM involvement and bowel perforation concerning the standard APE operation. All of this is due to technical difficulty associated with operating deep in the pelvis through abdominal approach, which is in relation to the increased chances of local recurrence and higher mortality rate. On the other hand, ELAPE operation allows extended perineal dissection in the prone Jack-knife position, therefore removing the anal canal, levators and low mesorectum altogether. By en block removal of levator muscles a more cylindrical specimen is created and more clearance is provided which reduces CRM involvement. Secondly, the prone position also gives the surgeon a better visualization which should reduce chances of entering the wrong surgical plane and perforating the specimen (8,9). Early reports suggest that the cylindrical method of excision can improve patients' prognosis without a significant increase in morbidity (10).

Our results have shown reduced rate of intra-operative bowel perforations and CRM involvement, which are comparable to the following studies. West et al. series showed, according to the operative technique, a statistically significant reduction in both CRM positivity and surgical perforation. One Leeds General Infirmary surgeon reduced CRM positivity and surgical perforations by using the same technique (8). Holm et al. showed that using ELAPE decreases CRM involvement and rectum perforation (11). Stelzner et al. also suggested that ELAPE results in superior oncologic outcome as compared to standard techniques. The rate of bowel perforation and the rate of CRM involvement for ELAPE versus APE were significantly reduced (12). On the contrary, our early experience has shown no similarities with those studies. Asplund et al. study showed no difference in CRM involvement and bowel perforation between standard APE and ELAPE operation. CRM involvement and intra-operative perforation did not differ significantly between the groups (13). Also, de Campos-Lobato et al. study showed no significant difference between APE versus ELAPE (14). Anderin et al. also showed that ELAPE is not superior to APE regarding CRM positivity (9). Messenger et al. indicated that the conventional approach to abdominoperineal resection can produce oncologic outcomes comparable to the extralevator approach (15). There was no significant difference between ELAPE CRM involvement from West et al. and the APE CRM involvement from Messenger et al., nor when it comes to intra-operative bowel perforation. Moreover, ELAPE produces a larger pelvic floor defect which demands some form of perineum reconstruction. If further studies show no superiority of ELAPE, it would be unnecessary to use ELAPE in case good results have already been achieved by APE (9). The risks of intra-operative complications during the perineal phase are probably reduced because of the improved visualization of the operative field. In our opinion, ELAPE technique, with the emphasis on the perineal dissection and prone Jack-knife position, may help achieve the goals of radical resections for low rectal cancer.

The prone position allows improved visualization of the perineal portion of the operation by the surgeon, assistants and observers which permits clear demonstration for teaching this phase of abdominoperineal excision.

ELAPE operation allows extended perineal dissection and it is indicated mostly in locally advanced and recurrent rectal cancer.

Our results showed that ELAPE is associated with less CRM involvement and intra-operative perforation. This should reduce local recurrence rate and improve survival but this has to be proven in a randomized trial.

### Conflict of interest

We declare no conflicts of interest.

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