Perineal Wound Complications Following Extralevator Abdominoperineal Excision: Experience of a Regional Cancer Center

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Abstract

Extralevator abdominoperineal excision (ELAPE) results in a large perineal defect which needs reconstruction by a flap or biological mesh. The incidence of perineal wound complications is thought to be higher following an ELAPE compared to conventional abdominoperineal excision (APE). We aimed to analyze the perineal wound complications following ELAPE in our institution. This was a retrospective analysis of all consecutive patients who underwent an APE (conventional and ELAPE) procedure in our institution between 2012 and 2015. We retrieved the demographic data, treatment data, and pathological data from the case records. Reconstruction of the perineal defect after a prone perineal dissection was performed using a local muscle flap. The incidence of perineal wound complications, hospital stay, and time to initiate adjuvant chemotherapy was compared between the two groups. A total of 71 patients underwent APE over a period of 41 months of which 21 patients underwent ELAPE. The perineal dissection during ELAPE was done in the prone position in 18 patients and in the supine position in 3 patients. Perineal wound complications were seen in 9 patients (42%) who underwent ELAPE compared to 17 patients (34%) who underwent conventional APE ($p = 0.52$). The mean duration of hospital stay was significantly longer in patients who underwent ELAPE when compared to those who underwent conventional APE (22.9 ± 3.6 days vs 14.6 ± 1.0 days, $p = 0.03$). The median interval between ELAPE and initiation of adjuvant chemo was 54 days (range 32–120 days) compared to 50 days (range 30–100 days) in patients undergoing conventional APE. A delay in initiating adjuvant chemotherapy of more than 12 weeks was seen in 4 patients (19%) following ELAPE. The incidence of perineal wound complications following ELAPE in this study was comparable to that reported in literature. Although the hospital stay following ELAPE was significantly longer than that following conventional APE in our institution, it did not unduly prolong initiation of adjuvant chemotherapy. Improving the perineal reconstruction techniques and selecting patients who will benefit from ELAPE may help to reduce the wound complications.

Keywords Extralevator abdominoperineal excision (ELAPE) · Intra-op perforation (IOP) · Circumferential resection margin (CRM) · Perineal wound complications · Gluteal muscle flap

Introduction

Extralevator abdominoperineal excision (ELAPE) was introduced by Holm et al. in 2007 [1] to overcome the

problem of surgical waisting seen following conventional abdominoperineal excision (APE). ELAPE has been found to significantly decrease the rates of intra-op perforation (IOP) and positive circumferential resection margin (CRM) when compared to APE [2–4].

Wide excision of the levators in ELAPE leaves a big defect in the perineum which can lead to perineal hernias if a primary closure of the wound is attempted. Hence, it is advisable to reconstruct the perineal defect using either local flaps or a biological mesh [3]. However, the technique is fraught with perineal wound complications ranging from a simple dehiscence to flap loss. The aim of this study was to analyze the perineal complications following ELAPE in our institution.

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Fig. 1 **a** Perineal defect at completion of ELAPE, **b** gluteus muscle flap being raised, **c** perineal defect covered by the gluteus flap, and **d** final appearance of the perineal wound

Materials and Methods

This was a retrospective analysis of all consecutive patients who underwent an APE (conventional and ELAPE) procedure in our institution between 2012 and 2015. We retrieved the demographic data, treatment data, and pathological data from the case records. Patients with adenocarcinoma rectum with clinical stage T3/T4 or N1/N2 based on an MRI scan were treated with neoadjuvant chemoradiation (NCRT) with 50.4 Gy radiation along with oral capecitabine. A post-treatment MRI was done and if the residual tumor was abutting or infiltrating the levators, an ELAPE was performed with the perineal dissection done either in the prone or supine position. The technique of ELAPE has been described previously [1]. In patients undergoing prone dissection, reconstruction of the perineum was done using a gluteal muscle flap in the initial cases (Fig. 1) and using a gluteal adipofascial flap in the later ones, whereas in patients undergoing supine dissection, a primary closure of the perineum was performed without a flap. A supine position was used in patients with a low volume disease and low BMI where the surgeon felt that a wide excision of the levators could be done in the supine position easily. The post-operative complications were graded according to the Clavien-Dindo score [5] which was documented at the time of discharge. The two sample *t* test was used to compare means and the two sample proportion test to compare proportions. A *p* value of < 0.05 was considered to be significant.

Results

A total of 71 patients underwent APE over a period of 41 months of which 21 patients underwent ELAPE. The demographic details are given in Table 1. Median age of the patients who underwent ELAPE was 50 years (range 20 to 68 years). There was a slight male preponderance. All the patients received neoadjuvant chemoradiation except a 20-year-old unmarried girl who underwent upfront surgery along with ovarian transposition.

The perineal dissection during ELAPE was done in the prone position in 18 patients and in the supine position in 3 patients. Table 2 highlights the details of treatment. Perineal

Table 1 Demographic factors

Variable	Result
Median age in years (range)	50 (20–86)
Gender	
Males	13
Females	8
Clinical stage	
Stage II	1
Stage III	20
Pathological stage	
Pathological complete response	5
Stage II	2
Stage III	14

Table 2 Treatment factors

Variable	Result
Patient position	
Prone	18
Supine	33
Median blood loss in ml (range)	250 (50–2300)
Intra-op perforation	
Yes	3
No	18
Circumferential resection margin	
Positive	8
Negative	13
Median hospital stay in days (range)	17 (10–80)
Clavien-Dindo morbidity	
Grade 0	12
Grade I	5
Grade II	0
Grade III	4

wound complications were seen in 9 patients (42%) who underwent ELAPE compared to 17 patients (34%) who underwent conventional APE ($p = 0.52$). Among the patients who underwent ELAPE, 4 (19%) had wound infection, 4 (19%) had wound dehiscence and 1 patient (4%) had flap loss. Clavien-Dindo grade I and III complications were seen in 5 and 4 patients, respectively. Three patients needed secondary suturing while the remaining 5 were managed with wound dressings. The patient with flap loss had reconstruction done using a perforator-based medial thigh flap. Of the 3 patients in whom a supine dissection was done and the perineum closed primarily, one patient had a wound dehiscence which was managed with dressings. The mean duration of hospital stay was significantly longer in patients who underwent ELAPE when compared to those who underwent conventional APE (22.9 ± 3.6 days vs 14.6 ± 1.0 days, $p = 0.03$).

Two patients did not receive adjuvant chemotherapy—one patient defaulted and the other, the multidisciplinary tumor board decided not to offer adjuvant chemotherapy. In the remaining 19 patients, the median interval between ELAPE and initiation of adjuvant chemo was 54 days (range 32–120 days)

compared to 50 days (range 30–100 days) in patients undergoing conventional APE. A delay in initiating adjuvant chemotherapy of more than 12 weeks was seen in 4 patients (19%) following ELAPE.

Discussion

Perineal wound complications following ELAPE have been reported to range from 20 to 46% [2, 6–9]. The perineal complication rate of 42% in our study is within this range (Table 3). The wide excision of the levator muscles in ELAPE leaves a large defect in the perineum. Although a primary closure of the perineal wound is possible like in conventional abdominoperineal excision (APE), there is a higher likelihood of perineal hernia formation if this is attempted. Hence, it is recommended to use either a local flap or a biological mesh. In this study, flap closure was performed in 86% of patients, whereas in other large series, flap closure was used in only 21–24% of patients and primary closure was performed in more than 50% [6, 9].

The incidence of perineal wound complications following ELAPE in our study was higher than that following conventional APE, although the difference was not statistically significant. While some earlier reports mention that delayed perineal wound healing is significantly higher after ELAPE than after an APE [6, 9, 10], three meta-analyses report comparable perineal wound morbidity [11–13]. The uniform use of neo-adjuvant chemoradiation (NCRT) in our study would have further contributed to the delayed healing of the perineal wound. A recent nationwide study from Denmark reported that both the extralevator technique and NCRT were independent prognostic factors for long-term perineal wound complications [9]. The technique for perineal closure in the ELAPE arm was changed from a musculocutaneous flap to a fascio-adipose flap during the course of the trial since we felt that this would lead to less functional problems and earlier mobilization. We did not find any difference in the perineal morbidity between the two techniques although the latter was easier and required less time.

Our study showed no perineal hernia as compared to 2% in a study examining chronic perineal complications from

Table 3 Comparison of perineal wound complications

Author	Type of study	No. of ELAPE patients	Perineal wound complication (%)
West NP et al. [2]	Combined retrospective-prospective	176	38
Prytz et al. [6]	Registry data	519	20
Ortiz et al. [7]	Matched case-control	457	21
Asplund et al. [9]	Registry data	222	21
Current study	Retrospective	21	42

ELAPE: extralevator abdominoperineal excision

ELAPE [14]. Some studies have reported on the long-term complication of chronic perineal pain after ELAPE [9, 14].

Although the hospital stay was significantly longer following ELAPE compared to conventional APE, this did not lead to a difference in the time to initiate adjuvant chemotherapy. The median time to start adjuvant chemotherapy after ELAPE was around 8 weeks in this series. A recent study reported that the median time to receive adjuvant chemotherapy following conventional APE was 9 and 11 weeks in patients who had a primary closure or flap closure of the perineal wound, respectively [15].

The high rate of CRM positivity in this series may be a result of bad patient selection in the initial part of our learning curve. When we began performing ELAPE, we chose patients with large volume tumors—the so-called ugly tumors. Also, in some of the tumors, the preoperative MRI showed involvement of the mesorectal fascia even above the level of the levators. An ELAPE would not have resulted in a negative CRM in these patients. Recent studies have shown that ELAPE may not be helpful in all patients requiring APE [16].

The limitations of this study include a small sample size and the retrospective nature of the analysis even though the complications were recorded prospectively.

Conclusion

The incidence of perineal wound complications following ELAPE in this study was comparable to that reported in literature. Although the hospital stay following ELAPE was significantly longer than that following conventional APE in our institution, it did not unduly prolong initiation of adjuvant chemotherapy. Improving the perineal reconstruction techniques and selecting patients who will benefit from ELAPE may help to reduce the wound complications.

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