



Pelvic Exenteration for Locally Advanced Rectal Cancer: an Initial Experience from North-east India

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Abstract

Pelvic exenteration is a surgery done to achieve margin negative resection in locally advanced rectal cancer infiltrating pelvic organs anterior to it. A retrospective observational study of patients undergoing pelvic exenteration for locally advanced rectal cancer was done at a single surgical unit of a tertiary care cancer centre. The period of study was from 1st January 2019 to 30th June 2021. A total of twelve patients underwent pelvic exenteration for locally advanced rectal cancer during the study period. The median duration of surgery was 310 min (range 250 to 380 min). The median duration of hospital stay was 14 days (range 12 to 30 days). Seven patients had documented postoperative complications, either major or minor, with a complication rate of 58.3%. Three patients required re-admission for complications. Two patients had COVID19 infection in the postoperative period but had uneventful recovery. Margin negative resection (R0) was achieved in eight patients (66.67%). Pelvic exenteration for locally advanced rectal cancer is a definitive surgery associated with a high morbidity rate.

Keywords Pelvic exenteration · Rectal cancer · Surgical morbidity · Radical surgery · COVID19

Introduction

Pelvic exenteration is an umbrella term that is generally used to refer to any of total pelvic exenteration, anterior pelvic exenteration, posterior pelvic exenteration, and supralelevator exenteration [1].

The term pelvic exenteration or evisceration refers to the complete en bloc resection of at least two contiguous organic structures from the pelvis as needed to obtain negative surgical margins in cases of advanced neoplasms of the pelvic organs [2].

In total pelvic exenteration (TPE), all the organs in the true pelvis in men and women are removed. In women, exenteration may also be anterior (rectum-sparing) or posterior (bladder-sparing). Total pelvic exenteration (Fig. 1) and

posterior exenteration (Fig. 2) may be classified as either supralelevator or infralevator depending on whether an ano-rectal stump is preserved or not, respectively.

Locally advanced rectal cancer which involves an adjacent organ is staged as T4b disease and these cancers need multimodality treatment. Neoadjuvant chemoradiotherapy or total neoadjuvant treatment (TNT) is utilised prior to surgery in order to downstage the tumour and often the extent of the disease may necessitate a pelvic exenteration in order to achieve margin negative status.

Pelvic exenteration is historically associated with high incidence of postoperative morbidity and mortality [2]. Our study aims to share our initial experience with this technically challenging surgery.

Materials and Methods

This is a retrospective, observational study done in a single surgical unit of a tertiary care cancer centre of North-East India. The study period was from 1st January 2019 to 30th June 2021. All patients with a proven histological diagnosis of rectal adenocarcinoma and who underwent pelvic exenteration were included in the study. The medical records of

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Fig. 1 Specimen of total pelvic exenteration



Fig. 2 Specimen of posterior pelvic exenteration

the patients, both physical and electronic medical records (EMR), were comprehensively reviewed. Data obtained

were recorded in a proforma with details including socio-demographic profile of the patient, tumour characteristics, treatment history, details of surgical intervention, postoperative recovery and complications, re-admission, histopathological report, and further treatment history and follow-up period. The data obtained were analysed and results were tabulated and studied with the use of statistical software (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corporation).

Results

A total of twelve patients underwent pelvic exenteration for rectal cancer during the study period. Out of them, three patients were males and nine were females. The mean age was 40.5 years (range 24 to 57 years) (Table 1).

Seven patients had received total neoadjuvant therapy (TNT), two patients got conventional long course of adjuvant chemoradiotherapy, and the remaining three patients underwent upfront surgery by virtue of being upper rectal and rectosigmoid primaries. Five of the patients who received neoadjuvant treatment required diversion colostomy before the start of definitive treatment (Table 1).

In the four patients who had rectosigmoid and upper rectal primary, gastrointestinal continuity was restored with a colo-rectal anastomosis. The remaining eight patients had permanent colostomy on account of the disease extending to involve the anal sphincters. Five patients underwent en bloc cystectomy, three total and two partial. The three patients with total urinary bladder resection had reconstruction with ileal conduit. Two patients underwent perineal reconstruction with the use of pedicled VRAM (vertical rectus abdominis) flap. The median operative time was 310 min

Table 1 Preoperative characteristics of patients

Characteristics	Number of patients (N= 12)
Age (years)	40.5 (24–57 years)
Sex ratio (M:F)	3:9
Presentation	
Per-rectal bleeding	9
Abdominal pain	5
Acute/sub-acute intestinal obstruction	5
Associated comorbidities	
Hypertension	1
Diabetes mellitus	1
Neoadjuvant therapy	
Total neoadjuvant therapy	7
Long-course chemoradiotherapy	2
None	3

(250–380 min). The median duration of ICU stay was 2 days (1–6 days) (Table 2).

We noted complications in seven patients (58.3%). Three patients had urinary retention and overflow urinary incontinence after removing catheter and required re-catheterisation. This improved spontaneously over a median period of 20 days (range 17 to 25 days). Three patients had wound infection which required bedside drainage of pus and regular wound care followed by re-suturing under local anaesthesia after control of infection and one patient developed burst abdomen for which enmass abdomen closure was done under general anaesthesia. One patient had documented urinary tract infection which was managed with appropriate antibiotics. One patient had grade 1 bedsore which healed after a period of 2 weeks with proper wound care. The median duration of hospital stay was 14 days (12–20 days). Three patients required readmission for wound complications (Table 3).

The histopathological features of the surgical specimens are enlisted in Table 4. Whereas eight patients had microscopic margin negative (R0) resection, the remaining four patients were found to have microscopic margin positivity (R1 resection). Among the latter, circumferential resection margin (CRM) was positive in three patients and distal margin was positive in one patient.

Out of twelve patients, nine patients have received adjuvant chemotherapy of which six have completed and three patients are receiving chemotherapy. Two patients also

Table 2 Intra-operative and surgical characteristics

Characteristics	Number of patients (N=12)
Extent of exenteration	
Complete	5
Partial	7
Tumour invasion	
Uterus	2
Ovary	2
Fallopian tube	3
Seminal vesicle	1
Urinary bladder	1
Digestive tract reconstructive procedures	
Colorectal anastomosis	4
Terminal colostomy	8
Urinary tract reconstructive procedures	
Ileal conduit	3
Partial cystectomy without augmentation	2
Perineal reconstructions	2
Median blood loss (ml)	300 ml (200–900 ml)
Median duration of surgery	310 min (250–380 min)

Table 3 Post-operative characteristics

Characteristic	Value
Median duration of ICU stay (days)	2 days (1–6 days)
Median duration of hospital stay (days)	14 days (12–30 days)
30-day mortality	0
Postoperative complications	
Wound infection	2
Urinary incontinence (except those patients with ileal conduit)	3
Paralytic ileus	1
Urinary tract infection	1
Grade 1 bedsore	1
COVID-19 infection	2
Re-admission	3

received postoperative radiotherapy. At a median follow-up period of 9 months (range 3–27 months), all the patients are alive without recurrence, either locoregional or systemic.

Table 4 Histopathological characteristics of the specimen

Characteristics	Number of patients (N=12)
Tumour size	
≤ 5 cm	4
> 5 cm	6
No tumour seen (pathologic complete response)	2
Histology	
Adenocarcinoma	9
Signet ring cell carcinoma	1
No tumour seen	2
Degree of differentiation	
Well differentiated	6
Moderately differentiated	3
Poorly differentiated	1
Type of resection	
R0	8
R1	4
Nodal status	
pN+/ypN+	1
pN0/ypN0	11
Lympho-vascular invasion	
Yes	1
No	9
Not reported	2
Peri-neural invasion	
Yes	2
No	6
Not reported	4

Discussion

Pelvic exenteration is a radical surgical option for definitive management of locally advanced rectal cancer which has infiltrated adjoining pelvic organs. It encompasses a group of surgeries that include pelvic organ resections, urinary diversion, bowel or urinary diversions, and/or anastomosis. Due to the complexity and extent of such a surgical procedure, it is prone to various complications. When a patient has a locally advanced rectal cancer which has infiltrated adjoining pelvic organs like the uterus and adnexa in females and the urinary bladder in both sexes, it requires this kind of a radical procedure which induces a significant modification of the quality of life [3–5].

A margin negative (R0) resection is the most important factor for improved survival. With an advanced malignancy with large volume tumour in the constrained space of the pelvis with associated anatomical distortion, it may be technically challenging to achieve negative margins. One of the most difficult tasks when performing surgery in such cases is distinguishing between tumour invasions, radiation-induced fibrosis, or local inflammation [6].

The postoperative morbidity is mostly due to urinary and intestinal diversion or reconstruction and from the management of the resulting empty pelvic cavity with a large volume of dead space (Fig. 3). Thus, a total pelvic exenteration is associated with more morbidity than a posterior pelvic exenteration where the rectum is removed along with

the female genital organs. In some patients, intestinal and urinary reconstruction is possible after pelvic exenteration without the need of stomas [7].

Gannon et al. [8] reported 72 cases of pelvic exenteration for primary LARC where 43% cases had complications and 5-year disease-free survival (DFS) was 52%. We, being a new centre to adopt this aggressive surgical approach, are striving to get the morbidity figures down but we can see that centres who have done a high number of such cases have also reported high morbidity for this procedure. Ike et al. [9] reported a 66.2% complication rate and 51.4% 5-year survival in 71 patients with rectal cancer who underwent curative TPE in Japan.

We understand that our study has the drawback of fewer number of patients included in the study by virtue of it being reported from a peripheral cancer centre in India where the expertise is newly acquired. However, this article will throw insight into the problems associated with such an initial experience.

Conclusion

Pelvic exenteration carries a high risk of morbidity and re-admissions but is still a potentially curative surgical option for locally advanced rectal cancer infiltrating adjoining pelvic organs with reasonable margin negative resection rates despite the high tumour load and technical difficulties.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s13193-022-01529-3>.

Declarations

Conflict of Interest The authors declare no competing interests.

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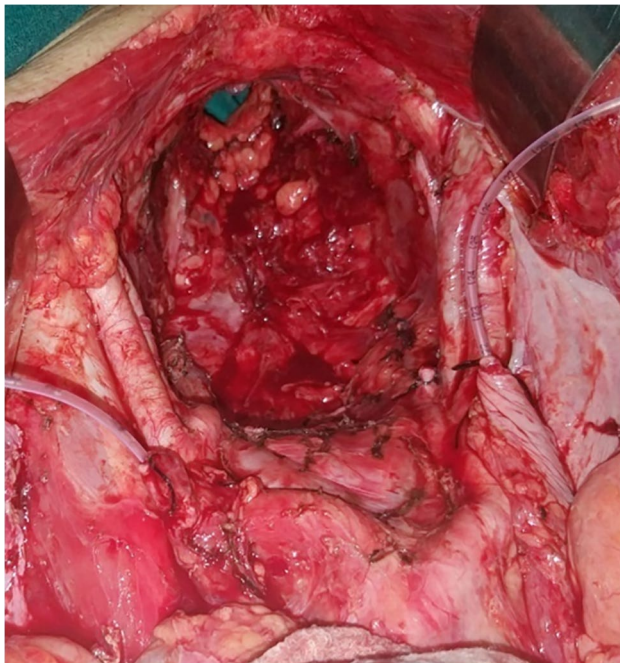


Fig. 3 Resection bed after total pelvic exenteration

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