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Pelvic exenteration case series: A single surgeon's experience at one institution in Trinidad and Tobago



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ABSTRACT

INTRODUCTION: Pelvic exenteration (PE) is an ultra-radical surgical procedure characterized by the en bloc resection of the pelvic organs.

METHODS: In this case series, we report retrospectively on four patients who underwent PE in Trinidad and Tobago from 2012 to 2016. One male patient had rectal cancer while one each of three women had cervical, colon, or rectal cancer.

RESULTS: Early postoperative complications (≤ 30 days) occurred in all patients, while late complications (> 30 days) occurred in one patient (Grade 1 – Clavien-Dindo classification). Disease recurrence occurred in 50% of patients, and the median overall survival was 8 months (range, 4–15 months).

DISCUSSION: There are many inherent challenges to conducting such major procedures in developing countries, including inadequate blood product supplies, intensive care unit beds, and pre- and post-operative support services. With increased surgical capacity and support infrastructure, hospitals in these regions would be equipped to perform PEs with better outcomes.

CONCLUSION: This case series adds to existing data on the feasibility of performing PE in developing countries. We demonstrate that PE can be performed without major postoperative complications in a resource-limited hospital. To the best of our knowledge, this is the first case series that describes PE in the Caribbean.

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1. Introduction

Pelvic exenteration (PE) is an ultra-radical surgical procedure that was initially performed at the Ellis Fischel Cancer Center and later described by Brunschwig in 1948 [1,2]. It is characterized by the en bloc extirpation of the internal reproductive organs, pelvic peritoneum, regional lymph nodes, anal canal, distal colon and rectum, bladder, and inferior ureters. Pelvic exenteration is indicated in cases of persistent or recurrent malignancy in the pelvic

region post chemoradiation, tumor confinement to the central pelvic region, and possible resectability to R0 margins.

Public exenteration is rarely performed in developing countries. A literature search in PubMed/Medline and EMBASE databases using the search topics “pelvic exenteration” and “Africa” and/or “developing countries” and/or “Latin America” and/or “South America” and/or “Central America” and/or “low income countries” and/or “Caribbean” retrieved 16 citations. To the best of our knowledge, this is the first case series that describes PEs in the Caribbean. We report on all PEs carried out at the Eric Williams Medical Sciences Complex (EWMSC), Champ Fleurs, Trinidad and Tobago as performed by a single surgeon. This case report was prepared according to the Process Guidelines, which provide a framework for reporting surgical case series [3].

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Table 1
Patient demographics.

Patient no.	Gender	Ancestry	Age (years)	BMI	Family history of cancer	Alcohol/smoking history
1	Female	Indian	45	13.7	Father: Throat CA, Breast CA Mother: Breast CA	None
2	Female	African	52	31.6	None	None
3	Male	Indian	51	16.9	None	Smoker: 80 pack years Alcohol: Heavy
4	Female	Indian	65	15.4	None	None

BMI, body mass index; CA, cancer.

Table 2
Preoperative indications.

Patient no.	Preoperative diagnosis	Preoperative co-morbidities	Preoperative complications	Preoperative surgical history	nCRT
1	Uterine leiomyomata, locally advanced stage 4 cervical CA (left side ureter and rectovaginal fistula invasion)	Hypertension	Pelvic and rectal bleeding, constipation, constant pain (lower abdomen, lower back, limbs), bilateral hand swelling, persistent anemia, obstruction of left nephrostomy tube due to atrophic left kidney, scoliosis, pelvic passage of urine and stool	Myomectomy, partial hysterectomy, radical total abdominal hysterectomy with bilateral salpingo-oophorectomy, left and right nephrostomy	6 weeks Taxol and Gemcitabine, 6 weeks radiation
2	Colon CA eventually invading the bladder	None	Severe constipation, abdominal pain, infection post colonoscopy	Partial colectomy	1 week chemotherapy, 1 week radiation
3	Rectal CA eventually invading the bladder, prostate, and right hepatic lobe	Anemia	Change in bowel movements associated with perineal pain, tenesmus, melena, constipation, post radiation difficulty urinating	None	6 cycles Xelox and Avastin, 20 fractions radiation
4	Rectal CA stage IV with vaginal invasion, rectovaginal fistula	Type 2 diabetes mellitus	Vaginal bleeding, constipation, anemia	Hysterectomy and ileostomy	4 cycles chemotherapy, 1 cycle radiation

nCRT, neoadjuvant chemoradiotherapy.

2. Materials and methods

This case series involved retrospective review of PE cases performed at a public tertiary teaching hospital in Trinidad and Tobago from 2012 to 2016 by a single general surgeon with subspecialty training in surgical oncology.

3. Results

Patient demographics, family history of cancer, behavioral characteristics, preoperative indications, and pre- and postoperative complications are described in Table 1, Table 2, and Table 3, respectively. Preoperative computed tomography (CT) images are shown in Fig. 1. Elements of the operative procedure have been reported previously [4] and will be briefly reviewed here. In general, there are three types of PEs: anterior exenteration, posterior exenteration, and total or radical exenteration. Each type is divided into two phases: the exenterative phase, which aims to achieve clear pathologic margins, and the reconstructive phase, which aims to optimize functional outcomes by creating an ileal conduit, reinforcing the pelvic floor, and restoring bowel continuity. In each case, the patient was placed in the lithotomy position and the abdomen and perineum were cleaned and draped. Following a midline incision, the abdomen was opened in layers. A thorough exploration of the peritoneal cavity and retroperitoneal spaces was executed, including opening the retroperitoneal spaces and developing them all the way to the pelvic floor. Next, the sigmoid colon and/or

ureters were completely mobilized and divided. Then, the organs to be removed were mobilized. For anterior exenterations, these can potentially include the bladder, vagina, uterus or prostate/seminal vesicles, cervix, and adnexae. For posterior exenterations, these can potentially include the rectosigmoid colon, vagina, uterus or prostate/seminal vesicles, cervix, and adnexae. Finally, total or radical exenterations removed all of the listed tissues. The appropriate organs were mobilized en-bloc by utilizing sharp and blunt dissection, clamp-cut-tie sequences, and/or electro-surgical devices to address the relevant vascular supplies and suspensory attachments. After that, an elliptical perineal incision was made and infralevator resection of the external genitalia and/or anus was undertaken as indicated by disease extent. Individualized urinary diversion and vaginal and/or perineal reconstruction were then performed. To complete the procedure, a Jackson-Pratt closed suction drain was sutured in to the perineum. Selected intraoperative and specimen images are shown in Fig. 2.

All four patients had a PE with colostomy, ileal conduit, urinary diversion, and R0 margins. Patients 1, 2, and 4 were N0, while patient 3 was positive for lymph node metastasis. The postoperative complications graded by the Clavien-Dindo [5] classification and summarized in Table 3 show that none of the patients had major complications (>grade 3) in the late postoperative period. The long term oncologic outcomes are summarized in Table 4. With a median follow-up of eight months (range 4–15 months), two patients remain alive with no sign of recurrence.

Table 3
Pre- and postoperative complications, according to Clavien-Dindo classification.

Patient number	Type of postoperative complication A (<30 days after surgery): 0 = No complication 1 = Infection 2 = Fistula 3 = Bleeding/hematoma 4 = DGE/N&V 5 = Cardiopulmonary 6 = Liver insufficiency 7 = Neurologic 8 = Pain 9 = Allergy 10 = Pancreatitis 11 = Other	Description of complication A	Grade of complication A 1 = Grade I 2 = Grade II 3 = Grade IIIa 4 = Grade IIIb 5 = Grade IVa 6 = Grade IVb 7 = Grade V	Type of postoperative complication B (>30 days after surgery): 0 = No complication 1 = Infection 2 = Fistula 3 = Bleeding/hematoma 4 = DGE/N&V 5 = Cardiopulmonary 6 = Liver insufficiency 7 = Neurologic 8 = Pain 9 = Allergy 10 = Pancreatitis 11 = Other	Description of complication B	Grade of complication B 1 = Grade I 2 = Grade II 3 = Grade IIIa 4 = Grade IIIb 5 = Grade IVa 6 = Grade IVb 7 = Grade V	Grade of highest complication 1 = Grade I 2 = Grade II 3 = Grade IIIa 4 = Grade IIIb 5 = Grade IVa 6 = Grade IVb 7 = Grade V	Overall total number of complications
1	1	UTI	1	1	Wound infection	1	1	5
1	8	Pain in left leg from stenosis of left common and external iliac arteries	1					
1	11	Wound dehiscence	4					
1	11	Decrease in appetite	1					
2	11	Wound dehiscence	4	0				2
2	11	Decrease in appetite	1					
3	8	Pain at wound site	1	0				1
4	1	Wound infection	1					4
4	8	Pain at wound site	1	0				
4	11	Stoma ischemia	4					
4	11	Decrease in appetite	1					

DGE/N&V, delayed gastric emptying/nausea and vomiting; UTI, urinary tract infection.

Table 4
Intraoperative and postoperative features and outcomes.

Patient no.	Date of PE	Radical	Reconstruction details	Operative findings	Operative time, min	Blood loss, ml	Specimens collected	Pathological stage	PRM	Length of postoperative hospitalization	Evaluation 5 months post-surgery	pCRT	Outcome
1	2016	Yes	PE, colostomy, ileal conduit, urinary diversion	Adhesions, frozen pelvis with partial radiation changes, rectovaginal fistula, gross pelvic tumor growth	720	400	Iliac lymph node, colon proximal resection with vascular pedicle, anal verge, rectum with fistula, bladder with urethra, vulva, vagina	pT4N0M0	Negative	ICU (3 days), surgical ward (8 days), re-hospitalization (54 days)	Unavailable	None	Alive
2	2014	Yes	PE, colostomy, ileal conduit, urinary diversion	Fumigating necrotic mass located 5 cm from rectal surgical resection margin, extending into urinary bladder and vaginal cuff	600	4000	Section from rectal end of surgical resection margin; 2nd surgical resection margin, mass in bowel, ureters, urinary bladder, vaginal wall	pT3 b/c pNX pM1.M1	Negative	90 days	Relief of constipation and pain, psychological relief, hopeful for extended life. Unable to continue job but able to travel and live independently.	Yes	Passed away 369 days post PE of tumor recurrence
3	2012	Yes	Anterior pelvic exenteration, ileal conduit, urinary diversion	Large rectal tumor invading bladder and prostate; nodules palpated in liver segments 3,6 7	601	2000	Left ureter, right ureter, distal sigmoid colon, rectum, anus, bladder, prostate	pT4B	Negative	9 days	Returned to job and preoperative QoL	Yes	Passed away 470 days post PE of tumor recurrence
4	2016	Yes	Posterior exenteration, colostomy, ileal conduit, urinary diversion, double-J stent placement	Pelvic visceral peritoneum, abdominal wall, ileum, liver adhesions	451	200	Anus, sphincter complex, lower rectum, posterior vaginal wall, caecum, ascending colon, distal ileum	pT4B pNX pM0	Negative	HDU (14 days), surgical ward (35 days)	Unavailable	None	Alive

HDU, high dependency unit; ICU, intensive care unit; pCRT, post discharge chemoradiotherapy; PRM, pathological resection margin; QoL, quality of life.

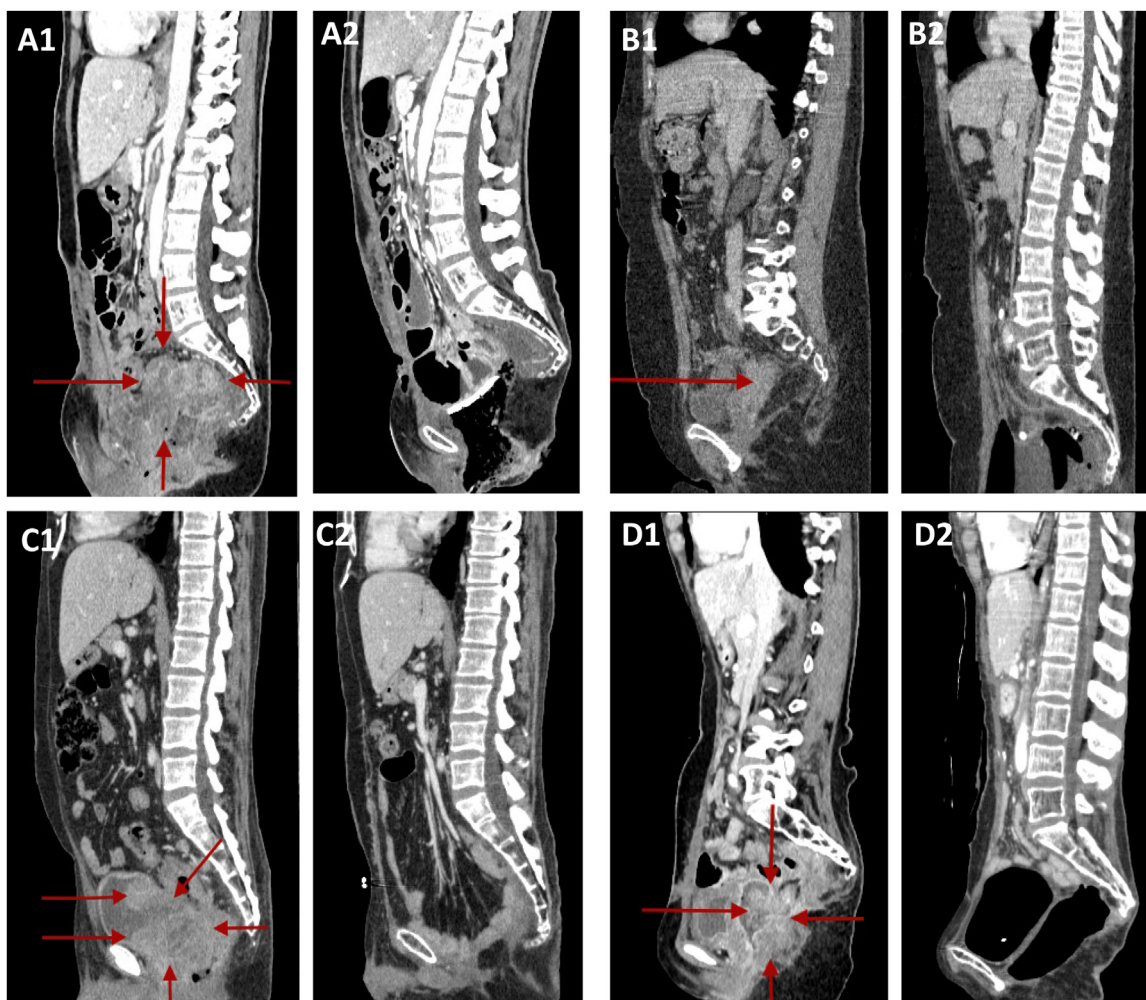


Fig. 1. Pre- and postoperative CT images. Red arrows indicate the regions invaded by the tumors. A1) Patient 1 preoperative, A2) Patient 1 postoperative, B1) Patient 2 preoperative, B2) Patient 2 postoperative, C1) Patient 3 preoperative, C2) Patient 3 postoperative, D1) Patient 4 preoperative, D2) Patient 4 postoperative.

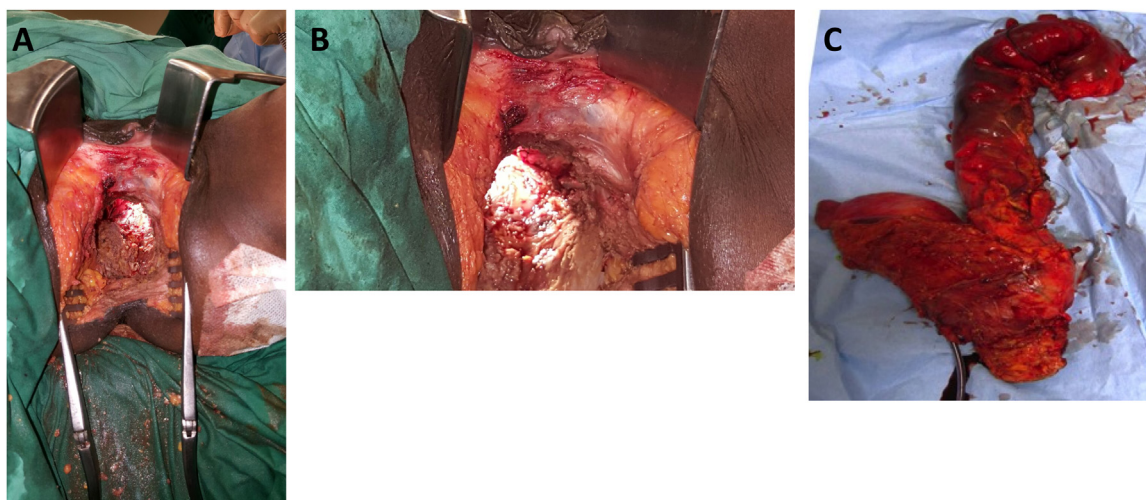


Fig. 2. Intraoperative images. A) Patient 2, completed perineal dissection including urethra, vagina, and anus; B) Patient 2, perineum closed, suction drains placed; C) Patient 3, specimen following pelvic exenteration in a male patient, including rectum, anus, prostate, and bladder.

4. Discussion

Pelvic exenteration is the only potentially curative intervention for patients with advanced and recurrent pelvic cancers. In

this case series, we report on four patients who underwent PEs in Trinidad and Tobago as performed by a single surgeon. Despite its status as a high income country [6], there are challenges to performing this type of operation in Trinidad and Tobago given the

absence of a surgical team dedicated to such procedures. In this case series, a general surgeon with subspecialty training in surgical oncology led the operative teams. This surgeon performs a wide range of procedures, ranging from general cases to intra-abdominal and breast cancer surgeries. In contrast, high volume specialty hospitals typically employ a two-team approach to PEs, with one team conducting the exenterative phase of the PE and a second team performing the reconstructive phase. When PEs are conducted by such surgical teams in hospitals with specialty expertise, the operative 30-day mortality drops from 3.7 to 1.5% [7]. Other challenges to conducting these radical surgeries in developing countries include limited availability of blood products and intensive care unit beds. In these settings, pre- and postoperative support services such as physiotherapy, nutrition, and psychology are often stretched thin. Additionally, PEs take more than 10 h on average, which increases the waiting time for other surgical cases. Remarkably in this case series, there were no peri- or postoperative mortalities during the first 12 months following surgery. Additionally, only three and zero patients suffered major complications (grade 3 or above) in the early and late postoperative periods, respectively.

In this series, only one patient was positive for lymph node metastasis. The literature is inconclusive on the impact of tumor-involved lymph nodes. Some case series have reported that lymph node involvement was not predictive of survival [8,9], while others have reported that positive lymph nodes are associated with an increased risk of recurrence and should be a contraindication for PEs [10,11]. The literature is more definitive in relation to tumor-involved margins as a poor prognostic indicator. In our series, all of the patients had R0 resections. Given the poor prognosis associated with positive surgical margins after PE and the significant morbidity, even mortality, seen in conjunction with these procedures, it is generally accepted that fixation of the tumor to the pelvic side wall is a contraindication to PE [8]. The poor survival reported by many case series points to the need for histopathologic review, improved patient surveillance, and personalized chemoradiotherapy algorithms [8,12].

The optimal imaging modality when considering PE is positron emission tomography/computed tomography (PET/CT). While magnetic resonance imaging and stand-alone CT have demonstrated utility in mapping the pelvic tumor burden, PET/CT's ability to identify recurrent disease in patients with gynecologic malignancies and distinguish persistent or recurrent tumors from those induced by post-PE radiotherapy renders it superior [13]. Currently, PET imaging units are not available in Trinidad and Tobago or most developing countries, limiting a surgical teams' ability to assess tumor characteristics and determine patients' eligibility for PE. Accurate evaluation is critical for optimal patient selection. Numerous studies have posited that careful selection of PE candidates may increase 5-year survival rates and patients' quality of life [14–16].

Given the high risk of operative-associated morbidity, special attention to a holistic approach to postoperative management should be considered in settings like Trinidad and Tobago where many patients self-identify as being religious. It has been reported that enhanced recovery from surgery and better pain management is among the benefits enjoyed by patients receiving postoperative compassionate support that serves the whole person: physical, emotional, social, and spiritual [17]. Furthermore, the Joint Commission on Accreditation of Healthcare Organizations suggests that pastoral care and other spiritual services are an integral part of health care and that hospitals should provide pastoral care and other spiritual services for patients who request them as part of the recovery process [18].

Many patients struggle with psychological, social, and sexual adjustments after undergoing PE [19]. To ameliorate this impact, hospitals should consider offering the personalized service of a

“care coach”. Ideally, this position would be held by a nurse with specialties in psychiatry and oncology. Responsibilities could include: inpatient and outpatient patient and family counselling and education, proper stoma bag care, ensuring adequate home preparations prior to discharge, scheduling follow-up clinic visits, and arranging social work appointments. Additionally, patient navigators should be available to support the timely movement of PE patients through the health care system [20]. Integrating these services into a multi-disciplinary approach to PE clinical case management should contribute to lowered morbidity and improved survival rates.

5. Conclusion

While the number of cases in our series limits survival statistics assessment, we demonstrated that PEs can be performed safely in a developing country with minimal complications. We believe that increased surgical capacity, a multidisciplinary surgical board, rigorous patient selection, support services, thorough post-operative management and overall technical capacity are necessary if these operations are to become routine options in developing countries.

Conflict of interest

None.

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Ethical approval

Ethical approval was not required since patient is de-identified.

Consent

Consent provided.

Authors contribution

The operations were carried out by Ravi Maharaj and Dave Harnanan. Pathology services were performed by Meenakshi Akhilesh, A.V.C. Rao, and Wayne Mohammed. The radiological imaging studies were reported and managed by Maurice Fortuné. Vandana Sookdeo assisted in critical discussions. Wayne A. Warner wrote the manuscript. All authors approved the final version.

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