Published in final edited form as:

Gynecol Oncol. 2011 July ; 122(1): 14–18. doi:10.1016/j.ygyno.2011.03.003.

Pelvic exenteration in gynecologic oncology: A single institution study over 20 years

T. Benn^{a,*}, R.A. Brooks^{a,b}, Q. Zhang^a, M.A. Powell^a, P.H. Thaker^a, D.G. Mutch^a, and I Zigelboim^a

^aDepartment of Obstetrics and Gynecology, Division of Gynecologic Oncology, Washington University School of Medicine and Siteman Cancer Center, St. Louis, MO 63110, USA

^bDepartment of Obstetrics, Gynecology, and Reproductive Sciences, Division of Gynecologic Oncology, University of California San Francisco and Helen Diller Family Comprehensive Cancer Center, San Francisco, CA 94115, USA

Abstract

Objective—The profile of women with gynecologic malignancies treated with pelvic exenteration has changed since the initial description of this procedure. We sought to evaluate our experience with pelvic exenteration over the last 20 years.

Methods—Patients who underwent anterior, posterior, or total pelvic exenteration for vulvar, vaginal, and cervical cancer at Barnes-Jewish Hospital between January 1, 1990 and August 1, 2009 were identified through hospital databases. Patient characteristics, the indications for the procedure, procedural modifications, and patient outcomes were retrospectively assessed. Categorical variables were analyzed with chi-square method, and survival data was analyzed using the Kaplan-Meier method and log rank test.

Results—Fifty-four patients were identified who had pelvic exenteration for cervical, vaginal, or vulvar cancer. Recurrent cervical cancer was the most common procedural indication. One year overall survival from pelvic exenteration for the entire cohort was 64%, with 44% of patients still living at 2 years and 34% at 50 months. Younger age was associated with improved overall survival after exenteration ($p = 0.01$). Negative margin status was associated with a longer disease-free survival ($p = 0.014$). Nodal status at the time of exenteration was not associated with time to recurrence or progression, site of recurrence, type of post-operative treatment, early or late complications, or survival.

Conclusions—Despite advances in imaging and increased radical techniques, outcomes and complications after total pelvic exenteration in this cohort are similar to those described historically. Pelvic exenteration results in sustained survival in select patients, especially those that are young with recurrent disease and pathologically negative margins.

*Corresponding author at; Obstetrics and Gynecology Resident, 4911 Barnes Jewish Hospital Plaza, Box 8064, Saint Louis, MO 63110, USA. Fax: +1 314 362 2893. ; Email: bennt@wudosis.wustl.edu (T. Benn).

Conflict of interest statement

The authors declare no conflict of interest.

Keywords

Pelvic exenteration; Retrospective single institution review

Introduction

Pelvic exenteration as originally described has historically been performed for recurrent gynecologic malignancies limited to the pelvis, specifically for recurrent cervical cancer. This radical procedure involves en bloc resection of the uterus, cervix, vagina, adnexa, lower urinary tract, and rectosigmoid colon depending on the extent of the disease. Although variations exist, a urinary conduit and an end colostomy are commonly created after total exenterative procedures. Even though this procedure is potentially curative, it comes with significant risks, associated morbidity and impact on quality of life. Procedure-related mortality is approximately 3–5%, and morbidity is also high with complication rates approaching 60% [1–12].

Since its first description by Brunschwig in 1948, the procedure has undergone modifications and indications have changed [13,14]. Advances such as laparoscopic evaluation for feasibility and even laparoscopic exenterations have been described [6,15–17]. The obesity epidemic and an aging population may influence both who is a candidate for a pelvic exenteration as well as surgical and survival outcomes [3,4,18–21]. Factors such as tumor size, nodal involvement, sidewall fixation, and margin status that have previously caused surgeons to abort exenterative procedures are now being challenged in some institutions due to suspicions that survival may still be improved even with the presence of these adverse prognostic factors [2,4–6,9,18,20,22,23]. Additionally, advances in bioavailable grafts and novel surgical techniques have allowed for refinements in vaginal and abdominal reconstruction [11,12,14,24–28].

The purpose of this study was to evaluate the profile, indications, procedures, and outcomes in women with vaginal, vulvar, and cervical cancer treated with pelvic exenteration at our institution over the last 20 years.

Materials and methods

A retrospective chart review was performed of all patients who underwent anterior, posterior, or total pelvic exenteration at Barnes-Jewish Hospital from January 1, 1990 through August 1, 2009. The specific exenterative and reconstructive techniques varied according to specific indication, disease extent, resulting defect, interest in subsequent sexual function and attending gynecologic oncologist's preference. In general, our policy is to perform the procedure via a generous midline laparotomy. The peritoneal cavity and retroperitoneal spaces are thoroughly explored and biopsies taken and sent for frozen section as indicated. The retroperitoneal spaces are opened and developed all the way down to the pelvic floor. The exenterative phase is conducted with the goal of producing clear pathologic margins. Complete mobilization of the sigmoid colon and/or ureters is undertaken. The colon and/or ureters are divided and the surgical specimen encompassing the (a) bladder, vagina and (when present) the uterus, cervix and adnexae (anterior exenteration); (b) rectosigmoid

colon, vagina and (when present) the uterus, cervix and adnexae (posterior exenteration); or (c) all of the above (total exenteration) are mobilized en-bloc by securing the vascular supply and suspensory attachments. This is done using sharp and blunt dissection, clamp-cut-tie sequence, or more often an electrosurgical device. A perineal approach with resection of the external genitalia and/or anus is undertaken (infralevator resection) as indicated by disease extent. The type of urinary diversion and vaginal and/or perineal reconstruction was individualized. These techniques have all been previously reported elsewhere [25,29,30].

Eighty-three patients were identified through hospital databases. Cases were excluded if they were performed for endometrial, ovarian, or rectal carcinoma or other indication leaving 54 patients for analysis. Patients were also excluded if attempts at an exenteration were aborted for unresectability. Inpatient and outpatient records including clinic notes, operative reports, pathology reports, and hospitalization notes were reviewed for primary tumor characteristics, treatment history, procedure details, complications, and outcomes. Early complications were defined as those occurring within 30 days of the exenteration. Late complications were defined thereafter up to 1 year. Complications were classified as gastrointestinal, urinary, wound-related, re-operation, or other.

Categorical variables were analyzed using Chi-square tests. The primary outcomes of interest included overall survival, disease-specific survival, and disease-free survival. Survival probabilities were estimated with Kaplan–Meier method, and the covariates that potentially affect survival were examined with log rank tests. Significance was set at a p -value of 0.05 and all tests were two-sided. All statistical analyses were performed using SAS 9.1, SAS institute Inc., Cary, NC.

Results

Fifty-four patients underwent pelvic exenteration for cervical, vaginal or vulvar carcinoma. Patient and disease characteristics are presented in Table 1. The median age at cancer diagnosis was 48 years (range 24–83) and median age at the time of exenteration was 61 years (range 27–83). Fifty-seven percent of patients presented with symptoms at time of initial cancer diagnosis. The most common symptoms reported were vaginal bleeding (33%), pain (9%), and weight loss (2%). Forty-three percent of the patients did not have data available regarding symptoms at initial presentation nor did the majority at the time of recurrence. Seventeen patients (34%) had primary radiation treatment only, while 13 (26%) had chemotherapy and radiation, 11 (22%) had surgery followed by radiation, and 6 (12%) had surgery, chemotherapy and radiation. Only seven patients (13%) had surgery or chemotherapy alone or combined surgery and chemotherapy.

Reflecting changes in technology, pre-operative imaging was largely done with PET and CT. Thirty-three percent of patients had PET/CT while 23% had CT alone. There were also 29% of patients who were evaluated first with CT and then with PET or PET/CT.

The majority of patients had recurrent cervical cancer (74%) and one patient had persistent cervical cancer. Seventeen percent had vulvar cancer and 9% had vaginal cancer. Most patients had exenteration for treatment of recurrent cancer (91%). Median time from original

diagnosis to recurrence was 32 months (range 2–456). Ninety-one percent of cancers recurred at the vaginal cuff. One patient had two stable, indeterminate pulmonary nodules which were followed with CT as well as PET for 4 years before recurrence at the vaginal cuff and exenteration in 2008.

As cited in Table 2, total pelvic exenteration (67%) was the most common procedure followed by anterior (24%) and posterior (9%) exenteration. Sixty-five percent of the patients with cervical cancer underwent a total pelvic exenteration versus 33% of patients with vulvar cancer and 60% of patients with vaginal cancer. As demonstrated in Table 3, of the 45 patients who had lymph node dissections, 7 (16%) had positive lymph nodes at the time of exenteration, including pelvic (6) and inguinal lymph nodes (1). Four of these patients had negative lymph nodes on intraoperative frozen section, but positive lymph nodes on the final pathology. Two patients had positive lymph nodes on the intraoperative frozen sections, and the exenteration was completed for local control and palliative intent. Seven patients (13%) had positive margins at the time of procedure, and 15 (28%) had close margins (within 0.1–1 cm). Two of the patients with positive lymph nodes had a positive node on preoperative PET scan. They had one lymph node positive in the pelvis with disease also limited to the pelvis. Of the patients who had positive margins, there were two patients who had questionable positive lymph nodes on preoperative PET scan. The other patients with positive margins did not have findings on preoperative PET scan that made surgeons suspicious that they would not be able to resect all of the disease.

There were few patients who received adjuvant treatment. There was one (2%) patient who had chemotherapy for close margins and a positive lymph node in the pelvis, four (7%) patients who had radiation (three for close margins and one for close margins and positive lymph nodes in the pelvis), and three (5%) patients who had chemotherapy and radiation (two for positive lymph nodes in the pelvis and one for close margins).

We identified 27 patients (50%) with early complications. General early complications ranged from myocardial ischemia (2) and atrial fibrillation (2) to urinary tract infection (4), bacteremia (6), pneumonia (5), deep venous thrombosis (6), abscess (5), or reintubation for respiratory distress (3). Early complications of the gastrointestinal tract were either an ileus (6) or small bowel obstruction (3). There was one patient who had ureteral obstruction which was managed with stenting.

Sixty-one percent of the patients had late complications

The most common late gastrointestinal complications were clostridium difficile (5) and small bowel obstruction (15), while other patients had general complications, such as nine patients with pelvic abscess and six patients with bacteremia. The most common late urinary tract complications were pyelonephritis (9) and ureteral obstruction (11) which were managed with percutaneous nephrostomy tubes or stenting. In addition, there were 15 patients (28%) who had wound breakdown at the abdominal incision, ostomy site, vaginal cuff or neovagina. There were also other rare but significant late complications, such as prolapsed stoma (1), ileoconduit breakdown (1), ileoconduit stricture (2), and rectovaginal or enterocutaneous fistulas (4). These complications were managed with surgery except for the enterocutaneous fistula was managed expectantly.

Prognostic pathologic features and survival outcomes are presented in Table 3 and Figs. 1 and 2. The median follow-up time was 12.5 months for the entire cohort (range 0–158 months, SD 30). With a median survival of 29 months (95% CI 12–42 months), 1 year overall survival from pelvic exenteration for the entire cohort was 64%, with 44% of patients still living at 2 years and 34% at 50 months. Younger age was associated with improved overall survival after pelvic exenteration ($p = 0.01$). Patients who were treated for recurrent disease had better overall and disease-free survival ($p = 0.0003$, $p = 0.048$) than those treated for primary or persistent disease. Patients who did not have early complications had longer disease-free survival ($p = 0.03$). Negative margin status was associated with a longer disease-free survival ($p = 0.01$) but not with overall survival. Overall survival was also associated with site of cancer with better survival for patients who had cervical cancer versus vaginal or vulvar cancer ($p = 0.0005$). Nodal status at the time of exenteration was not associated with time to recurrence or progression, site of recurrence, type of post-operative treatment, early or late complications, or survival. Also, race, BMI, ASA, site of recurrence and late complications were not associated with overall survival.

Discussion

Changes have occurred in the profile of patients who undergo exenteration [13,14,18]. Technologies such as PET scan, laparoscopic evaluation, and fine needle aspiration have enabled physicians to more accurately assess the extent of disease preoperatively, refining candidates for exenteration. In this study, the majority of patients had evaluation with CT or PET/CT. An important advancement in preoperative imaging, PET has been shown to have a sensitivity of 100% and specificity of 73% in diagnosis of metastasis prior to exenteration in patients with recurrent cervical or vaginal cancers [7,31]. With improvements like better tools for preoperative assessments, gynecologic oncologists are better equipped to find the most eligible patients without distant metastasis and most likely to benefit from the procedure.

Although exenteration was originally described for the treatment of centrally recurrent cervical cancer, good outcomes have been demonstrated for other pelvic disease sites [9,13,18,32]. However, this study focused on the more traditional use of exenteration, and in our cohort overall survival was better for patients with cervical cancer compared to vaginal or vulvar cancer ($p = 0.0005$), though there was no association found between site of cancer with disease-free or disease-specific survival. Also, patients with recurrent disease had longer overall survival than patients with persistent or primary cancer ($p = 0.0003$).

Overall, the median survival time was 29 months with a 1 year overall survival from pelvic exenteration for the entire cohort of 64%. There were 44% living at 2 years, 34% at 50 months, and 22% at 100 months. This is comparable to other studies which found median 5 year survival times ranging from 30% to 60% [2,3,5,6,8–12,18,23,32]. Various aspects of patient characteristics and preoperative, operative and postoperative variables have been investigated to help select the most appropriate patients for this procedure. Even though the data is variable, many studies have cited characteristics, such as tumor size, nodal status, pelvic sidewall involvement, margin status, histology, and time from primary diagnosis to exenteration as affecting survival [4–6,9,10,20,23]. The data has been mixed as to whether

BMI and age influence survival [3,4,9,18]. In our patient population, younger patients had prolonged overall survival, but survival was not associated with BMI, ASA, or race. This finding should not preclude clinical assessment of the individual patient as a woman over the age of 70 may still be a suitable candidate for surgery if her overall health is good.

Fotopoulou et al. found that complete tumor resection was associated with higher overall and progression free survival [6]. Similarly, Rutledge and McGuffee found that some long term survival can be achieved even with positive lymph nodes, if completely resected. In patients with positive lymph nodes, 36% were still living at 3 years and 26% at 5 years compared to patients with negative lymph nodes who had 64% living at 3 years and 58% living at 5 years [20]. In this study, negative margin status was associated with a longer disease-free survival ($p = 0.01$), but not with disease-specific or overall survival. In addition, lymph node status was not related to survival. However, our study was likely underpowered to identify survival differences as they relate to lymph node status or clear margins.

The complication rate in our cohort was 50% for early complications and 61% for late complications. This is similar to the 30 to 60% complication rate reported in the literature [2,4–6,8–12,22,27]. Even though more extensive surgeries may be associated with longer operative times and greater risk of complications, such as infection and anastomotic leak, no relationship between complication rate and overall survival was found in this study or other similar studies [22]. Therefore, the individual patient benefit likely warrants the risks. In fact, these procedures offer patients a better quality of life and better function of preserved organs [11,12,18,21].

Overall, our experiences with this procedure for gynecologic malignancies over almost 20 years were similar to that described at other institutions [2,5,6,9–12,18,23,27,28,32]. This study is a retrospective study with a comparable sample size to other studies of this kind, but in general retrospective studies may not allow a large enough sample size to detect more rare findings. Unfortunately, it also suffers from institutional bias as this study spanned 20 years and there were many surgeons involved in the procedures.

Though many patients in our cohort experienced favorable outcomes, despite technological advances and shifts in the pelvic exenteration candidate, no marked differences in outcomes have been established. Based on our study, the best candidates for pelvic exenteration are patients who are younger and have recurrent cervical cancer. Advances in imaging and minimally invasive surgery may allow for further refinement of the ideal pelvic exenteration candidate. Previous characteristics that had made someone an unsuitable candidate for a pelvic exenteration have been called into question, but it remains that there is a high morbidity and complication rate associated with this procedure. Importantly, having negative margins was associated with longer disease-free survival, but margin and lymph node status were not associated with overall or disease-specific survival. This status was also not associated with time to recurrence or progression, site of recurrence, type of post-operative treatment, or early or late complications. Therefore, a survival benefit may still be present when pelvic exenteration is performed with positive margins or lymph nodes, and several long-term survivors existed with these characteristics in our cohort. While further study may

still be beneficial, it is imperative to take many factors, both clinical and radiologic, into account when assessing a patient for pelvic exenteration.

Acknowledgments

The authors wish to acknowledge the support of the Biostatistics Core, Siteman Comprehensive Cancer Center and NCI Cancer Center Support Grant P30 CA091842.

References

1. Hatch, KD.; Berek, JS. Pelvic exenteration. In: Berek, JS.; Hacker, NF., editors. *Practical Gynecologic Oncology*. 4th. Philadelphia: Lippincott Williams and Wilkins; 2005. p. 801-816.
2. Rutledge FN, Smith JP, Wharton JT, Quinn AG. Pelvic exenteration: analysis of 296 patients. *Am J Obstet Gynecol*. 1977; 129(8):881–892. [PubMed: 930972]
3. Matthews CM, Morris M, Burke TW, Gershenson DM, Wharton JT, Rutledge FN. Pelvic exenteration in the elderly patient. *Obstet Gynecol*. 1992; 79(5):773–777. [PubMed: 1565364]
4. Shingleton HM, Seng-Jaw S, Gelder MS, Hatch KD, Baker VV, Austin JM. Clinical and histopathologic factors predicting recurrence and survival after pelvic exenteration for cancer of the cervix. *Obstet Gynecol*. 1989; 73(6):1027–1034. [PubMed: 2726106]
5. Morley GW, Hopkins MP, Lindenauer SM, Roberts JA. Pelvic exenteration, University of Michigan: 100 patients at 5 years. *Obstet Gynecol*. 1989; 74(6):934–942. [PubMed: 2586960]
6. Fotopoulou C, Neumann U, Kraetschell R, Schefold JC, Weidemann H, Lichtenegger W, et al. Long-term clinical outcome of pelvic exenteration in patients with advanced gynecological malignancies. *J Surg Oncol*. 2010; 101:507–512. [PubMed: 20401918]
7. Marnitz S, Dowdy S, Lanowska M, Schneider A, Podratz K, Kohler C. Exenterations 60 years after first description: Results of a survey among US and German gynecologic oncology centers. *Int J Gynecol Cancer*. 2009; 19(5):974–977. [PubMed: 19574795]
8. Pawlik TM, Skibber JM, Miguel AR. Pelvic exenteration for advanced pelvic malignancies. *Ann Surg Oncol*. 2005; 13(5):612–623. [PubMed: 16538402]
9. Maggioni A, Roviglione G, Landoni F, Zanagnolo V, Peiretti M, Colombo N, et al. Pelvic exenteration: ten-year experience at the European Institute of Oncology in Milan. *Gynecol Oncol*. 2009; 114:64–68. [PubMed: 19411097]
10. Sharma S, Odunsi K, Driscoll D, Lele S. Pelvic Exenterations for gynecological malignancies: twenty-year experience at Roswell Park Cancer Institute. *Int J Gynecol Cancer*. 2005; 15:475–482. [PubMed: 15882172]
11. Goldberg GL, Sukumvanich P, Einstein MH, Smith HO, Anderson PS, Fields AL. Total pelvic exenteration: the Albert Einstein College of Medicine/Montefiore Medical Center Experience (1987–2003). *Gynecol Oncol*. 2006; 10:261–268. [PubMed: 16426668]
12. Averette HE, Lichtinger M, Sevin BU, Girtanner RE. Pelvic exenteration: a 15 year experience in a general metropolitan hospital. *Am J Obstet Gynecol*. 1934; 150(2):179–184. [PubMed: 6476039]
13. Lambrou NC, Pearson M, Averette HE. Pelvic exenteration of gynecologic malignancy: indications, and technical and reconstructive considerations. *Surg Oncol Clin N Am*. 2005; 14:289–300. [PubMed: 15817240]
14. Brunschwig A. Complete excision of pelvic viscera for advanced carcinoma. *Cancer*. 1948; 1:177–183. [PubMed: 18875031]
15. Cho JE, Liu C, Gossner G, Nezhat FR. Laparoscopy and Gynecologic Oncology. *Clin Obstet Gynecol*. 2009; 52(3):313–326. [PubMed: 19661747]
16. Lim PC. Robotic assisted total pelvic exenteration: a case report. *Gynecol Oncol*. 2009; 115:310–311. [PubMed: 19628275]
17. Barber H. Relative prognostic significance of preoperative and operative findings in pelvic exenteration. *Surg Clin North Am*. 1969; 49(2):431–447. [PubMed: 4886910]

18. Berek JS, Howe C, Lagasse LD, Hacker NF. Pelvic exenteration for recurrent gynecologic malignancy: survival and morbidity analysis of the 45-year experience at UCLA. *Gynecol Oncol.* 2005; 99:153–159. [PubMed: 16054678]
19. Schneider A, Kohler C, Erdemoglu E. Current developments for pelvic exenteration in gynecologic oncology. *Curr Opin Obstet Gynecol.* 2009; 21:4–9. [PubMed: 19124997]
20. Rutledge FN, McGuffee VB. Pelvic exenteration: prognostic significance of regional lymph node metastasis. *Gynecol Oncol.* 1987; 26:347–380.
21. Roos EJ, Graeff AD, van Eijkeren MA, Boon TA, Heintz APM. Quality of life after pelvic exenteration. *Gynecol Oncol.* 2004; 93:610–614. [PubMed: 15196852]
22. Jurado M, Bazan A, Elejabaitia J, Paloma V, Martinez-Monge R, Alacazar JL. Primary vaginal and pelvic floor reconstruction at the time of pelvic exenteration: a study of morbidity. *Gynecol Oncol.* 2000; 77:293–297. [PubMed: 10785481]
23. Lawhead RA, Clark DGC, Smith DH, Pierce VK, Lewis JL. Pelvic exenteration for recurrent or persistent gynecologic malignancies: a 10-year review of the Memorial Sloan-Kettering Cancer Center experience (1972–1981). *Gynecol Oncol.* 1989; 33:279–282. [PubMed: 2722049]
24. Hockel M, Dornhofer N. Vulvovaginal reconstruction for neoplastic disease. *Lancet Oncol.* 2008; 9:559–568. [PubMed: 18510987]
25. Sood AK, Cooper BC, Sorosky JI, Ramirez PT, Levenback C. Novel Modification of the vertical rectus abdominis myocutaneous flap for neovagina creation. *Obstet Gynecol.* 2005; 105(3):514–518. [PubMed: 15738017]
26. Penalver MA, Bejany DE, Averette HE, Donato DM, Sevin BU, Suarez G. Continent urinary diversion in gynecologic oncology. *Gynecol Oncol.* 1989; 34:274–288. [PubMed: 2767518]
27. Miller B, Morris M, Gershenson DM, Levenback CL, Burke TW. Intestinal fistulae formation following pelvic exenteration: a review of the University of Texas M.D. Anderson Cancer Center Experience, 1957–1990. *Gynecol Oncol.* 1995; 56:207–210. [PubMed: 7896187]
28. Salom EM, Mendez LE, Schey D, Lambrou N, Kassira N, Gomez-Marin O, et al. Continent ileocolonic urinary reservoir (Miami pouch): the University of Miami experience over 15 years. *Am J Obstet Gynecol.* 2004; 190:994–1003. [PubMed: 15118628]
29. Bricker EM. Bladder substitution after pelvic evisceration. *Surg Clin North Am.* 1950; 30:510–520.
30. Penalver MA, Bejany D, Donato DM, Sevin BU, Averette HE. Functional characteristics and follow-up of the continent ileal colonic urinary reservoir: Miami pouch. *Cancer.* 1993; 71:1667–1672. [PubMed: 8431904]
31. Husain A, Akhurst T, Larson S, Alektiar K, Barakat RR, Chi DS. A prospective study of the accuracy of fluorodeoxyglucose positron emission tomography in identifying sites of metastasis prior to pelvic exenteration. *Gynecol Oncol.* 2007; 106:177–180. [PubMed: 17477959]
32. Caceres A, Mourton SM, Bochner BH, Gerst SR, Liu L, Alektiar KM, et al. Extended pelvic resections for recurrent uterine and cervical cancer: out-of-the-box surgery. *Int J Gynecol Cancer.* 2008; 18:1139–1144. [PubMed: 18053063]

Fig. 1.
Overall survival for the entire cohort.

Fig. 2.
Disease-free survival for the entire cohort.

Table 1

Patient characteristics.

	Median	Range/percent
Median age at diagnosis	48	24–83
Race (White)	47	87%
Race (non-White)	7	13%
Median BMI	24	13–45
Median ASA	2	1–3
Primary tumor site		
Cervix	40	74%
Vulva	9	17%
Vagina	5	9%
Indication for exenteration		
Primary treatment	4	7%
Recurrent disease	49	91%
Persistent disease	1	2%
Histology		
Squamous cell	40	83%
Adenocarcinoma	4	8%
Melanoma	4	8%
Unknown	6	11%

Table 2**Surgical data.**

	Value
	<i>n</i> (%)
Median age at exenteration (range)	61 (27–83)
Exent type	
Anterior	13 (25%)
Posterior	5 (10%)
Total	36 (67%)
Vaginal reconstruction	
None	35 (65%)
VRAM	13 (24%)
Alloderm	6 (11%)
Urinary procedures	
Ileoconduit	45 (83%)
Continence conduit	5 (9%)
Bladder reconstruction	1 (2%)
None	3 (5%)
GI procedures	
RSR with RA	7 (13%)
End colostomy	34 (63%)
None	13 (24%)
Operative factors	
Number of patients with any lymph nodes dissected	45 (83%)
Pelvic	42 (78%)
Para-aortic	30 (57%)
Inguinal	3 (6%)
Median EBL in mL (range)	1000 (100–8000)
Median number of intraoperative packed RBC	2 (0–16)
Median number of packed RBC for hospitalization	3 (0–20)
Hospital stay in days (range)	10 (4–55)
Wound breakdown	15 (28%)

Table 3

Prognostic factors and outcomes after pelvic exenteration.

	Value
	<i>n</i> (%)
Number of people with positive lymph nodes	
Pelvic	6 (14%)
Inguinal	1 (33%)
Para-aortic	0
Margin status at PE	
Positive	7 (13%)
Close (0.1–1 cm)	15 (28%)
Negative	32 (59%)
Site of recurrence post PE	
None	25 (51%)
Vaginal cuff	2 (4%)
Pelvis	8 (15%)
Abdomen	6 (12%)
Distant	5 (10%)
Unknown	8 (15%)
Median time PE to recurrence in months (range)	7 (0–33)
Disease status at last follow up	
NED	21 (39%)
Alive with disease	26 (48%)
Dead of disease	3 (6%)
Dead of other	4 (7%)