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Pelvic Exenteration Study: Characteristics and Outcomes of Patients Undergoing Pelvic Exenteration for Recurrent Gynecological Malignancy

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Abstract

Pelvic exenteration is a surgical procedure that requires an en-bloc excision of lower abdominopelvic structures. Although pelvic exenteration is associated with a high level of morbidity and considerable complications may be observed in more than 50% of patients undergoing surgery. Currently, it is the most viable option leading to a cure.

Patients who underwent PE between 1/2007 - 6/2016 in the Saskatoon Health Region were retrospectively reviewed. All patients were in the Saskatoon Health Region. Data related to patients' demography, diagnosis, treatment, type of pelvic exenteration, complications, and outcomes were recorded. A total of 24 women underwent pelvic exenteration; out of 24, 18 had pelvic exenteration with curative intent, and six women chose pelvic exenteration for palliation. Of those 4 (16.7%) had cervical cancer, 7 (29.2%) vulvar cancer, 1 (4.2%) vaginal cancer, 1 ovarian cancer (4.2 %), and 11 (45.8%) had recurrent endometrial cancer. Sixteen patients underwent a total, 5 anterior and 2 posterior pelvic exenterations. Postoperative complications were experienced by 22 patients (91.7%), where 50% were early complications, and 41.7% were late complications. The most common early and late complication was wound infection, which was noticed in 4 (16.7%) and 3 (12.5%) patients. Overall five-year survival rate was 54%. The majority of women had exenteration performed for recurrent endometrial cancer. Postoperative complications, both short and long-term, were common for patients undergoing pelvic exenteration. Half of the women lived five years or longer, making it a viable option to consider in selected patients.

Keywords: Gynecological cancer; Pelvic exenteration; Wound infection; Recurrence

Introduction

Pelvic exenteration is an ultraradical surgical procedure that requires an en-bloc removal of some or all pelvic structures. Gynecologic pelvic exenteration can be subdivided into anterior (gynecologic structures and the bladder), posterior (gynecologic structures, sigmoid colon, and rectum), or complete (gynecologic structures, bladder, sigmoid colon, and rectum). In recurrent vulvar cancer cases, pelvic exenteration includes resection of the perineum (including the vulva and usually the anus). The radicality of this procedure necessitates either urinary diversion (anterior exenteration), colonic diversion (posterior exenteration), or both (complete exenteration).

The major indication for pelvic exenteration is a recurrent malignant pelvic tumor that has not metastasized outside the pelvis. It may also be considered for primary locally advanced pelvic cancer. Contraindications to pelvic exenteration include disease extension to the pelvic sidewall or pelvic floor muscles in selected cases. Disease metastasis outside of the pelvis is also usually a contraindication. Gynecologic pelvic exenteration has been most commonly used for recurrent cervical cancer. It may also be used for recurrent vulvar, vaginal, and endometrial cancer. Occasionally it can be used for recurrent ovarian cancer, and pelvic sarcoma. The principal aim of this is to cure the patient. Occasionally pelvic exenteration is used to palliate patients with radiation necrosis, fistulas, or severe tumor-related pain [1,2]. In the latter situation, the presence of distant metastases does not necessarily exclude surgery.

Pelvic exenteration being a radical procedure may result in a significant number of complications (31-92%) and a five-year

survival rate of about 50% in cancer patients, including patients with vulvar, cervical, or vaginal cancer [1,4]. Long term survival is associated with significant physical and psychological disabilities [5]. Pelvic exenteration should only be used when the surgery benefits outweigh the significant risk of morbidity and mortality. Patient selection must be meticulous and balance these goals.

This study aims to describe the characteristics and outcomes of patients in the Saskatoon Health Region (SHR) who underwent pelvic exenteration for recurrent gynecological malignancy.

Materials and Methods

Ethical Approval

The study was carried out at the University of Saskatchewan's Department of Obstetrics and Gynecology. The medical records of all patients undergoing pelvic exenteration in the Saskatoon Health Region between January 2007 and July 2016 were reviewed [6].

Research Design/Data Collection

Data were collected retrospectively. Data from patients' chart reviews were examined. All patients who had pelvic exenteration surgery for recurrent endometrial, cervical, vulvar, or vaginal cancer at this centre from January 2007 to July 2016 were reviewed.

The following data were collected: diagnosis, age, patients' body mass index (BMI), medical comorbidities, ASA score, and initial oncologic treatment (radiotherapy, chemotherapy, or surgery).

Surgical variables included the type of pelvic exenteration, type of urinary diversion, duration of surgery, estimated blood loss, units of red blood cells transfused, early (within 30 days), and late (after 30 days) postoperative complications. The recorded duration of hospital stay included the number of days spent in the ICU. Charts were excluded if there was more than 10% missing data.

Statistical Analysis

Data were analyzed using IBM SPSS, Statistical version 26.0.0.0. Basic descriptive statistics were used to describe patient's demographics. Non – parametric statistics were used to compare non – continuous variables such as the need for transfusion (yes or no), and parametric statistics were used to compare continuous variable outcomes such as operative time and hospital stay duration. Overall survival was calculated using Kaplan-Meier analysis [7-9].

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Results

Study Population

From January 2007 to July 2016, 30 patients with recurrent endometrial, cervical, vulvar, or vaginal cancer underwent pelvic exenteration. Six patients were excluded because of insufficient data. Patients undergoing pelvic exenteration had an average age of 69 years (range, 35 to 96 years), and an average BMI of 35.4, and comorbidity was high – 91.7%, (22/24) patients had at least comorbidity. Common comorbidities included hypertension, hypothyroidism, COPD, asthma, and gout [10]. The type of initial treatment was surgery in 79.1% (19/24), chemotherapy in 4.2% (1/24), chemotherapy and radiation in 16.6% (4/24). Local disease recurrence was observed in 70.8% (17/24) of patients, while 29.2% (7/24) had a distant recurrence of the disease. Clinical and demographic data are shown in (Tables 1and 2) shows the clinical and demographic data of 18 patients with curative intent.

Baseline Characteristics	Median
Age (years), mean (SD)	69.0 (13.5)
BMI (kg/m2), median [IQR]	35.4 [23.7-40.8]
Unknown	1
Number of Comorbidities, n (%)	
0	2 (8.3)
1	6 (25.0)
2	7 (29.2)
3	4 (16.7)
4	3 (12.5)
5	2 (8.3)
Initial Treatment, n (%)	
Surgery	19 (79.1)
Chemotherapy	1 (4.2)
Chemotherapy and Radiation	4 (16.6)
Adjuvant Radiation Type, n (%)	
None	5 (20.8)
EBRT	15 (62.5)
BRACHY	1 (4.2)
EBRT & BRACHY	3 (12.5)
Chemotherapy Type, n (%)	
None	10 (41.7)

Neoadjuvant	9 (37.5)
Adjuvant	1 (4.7)
Palliative	4 (16.7)
Recurrence Type, n (%)	
Local Mass	10 (41.7)
Local Bleeding	5 (20.8)
Distant	2 (8.3)
None	7 (29.2)
Progression-Free Interval, median [IQR]	27 [5-46.5]
Unknown	6
Indication for Pelvic exenteration	
Recurrent endometrial cancer	11 (45.8)
Vulvar cancer	7 (29.2)
Cervical cancer	4 (16.7)
Vaginal cancer	1 (4.2)
Ovarian cancer	1 (4.2)

Table 1: Patients' characteristics (n=24).

	N=18
Age (years), mean (SD)	70.2 (15.0)
BMI (kg/m2), median [IQR]	35.4 [24.2-42.3]
Unknown	1
Number of Comorbidities, n (%)	
0	1 (5.6)
1	6 (33.3)
2	4 (22.2)
3	2 (11.1)
4	3 (16.7)
5	2 (11.1)
Initial Treatment, n (%)	
Surgery	15 (83.3)
Chemotherapy and Radiation	3 (16.7)
Adjuvant Radiation Type, n (%)	
None	3 (16.6)
EBRT	12 (66.8)
EBRT& BRACHY	3 (16.6)
Chemotherapy Type, n (%)	
None	8 (44.4)
Neoadjuvant	6 (33.3)
Palliative	4 (22.2)
Recurrence Type, n (%)	
Local Mass	6 (54.5)
Local Bleeding	3 (27.3)
Distant	2 (18.2)
Progression-Free Interval, median [IQR]	30 [12.5-47]
Unknown	5
Indication for Pelvic exenteration	
Recurrent endometrial cancer	10 (55.5)
Vulvar cancer	5 (27.8)
Cervical cancer	2 (11.1)
Ovarian cancer	1 (5.6)

Table 2: Patients' characteristics Curative intent (n=18).

Pathology

Twelve cancers were adenocarcinoma (50%); 10 were squamous cell carcinoma (41.7%): five vulvar, four cervical, one vulvovaginal, one ovarian, one cancer was serous carcinoma, and one was leiomyosarcoma (4.2%).

Surgical Outcomes

Surgery characteristics are recorded in (Table 3). Complete, anterior, and posterior pelvic exenteration constituted 71%, 21%, and 8% of cases, accordingly. Supralevator and infralevator pelvic exenteration constituted 54% and 46 % of cases. The median estimated blood loss was 1000 ml (range 625 to 1650 ml). Total blood transfusion was performed in 75% of patients, while 25% of patients did not require a blood transfusion. Intraoperative red blood cell units were given to 29.2% of patients, and the median number of red blood cell units given was three. Postoperative red blood cell units were given to 62.5% (15) of patients, and the median number of red blood cell units was 2 . The median duration of surgery was 7 hours and 26 minutes. Where possible, the duration of hospital stay was determined for each patient. This was not, however, possible for all patients. Based on the available data, the average length of stay for patients undergoing pelvic exenteration was 22.9 days (range, 5 to 60 days), and the average stay in the intensive care unit (ICU) was one day.

	N=24
Exenteration Type, n (%)	
Complete	17 (71%)
Anterior	5 (21%)
Posterior	2 (8%)
Supralevator	13 (54%)
Infralevator	11 (46%)
Estimated Blood Loss (ml), median [IQR]	1000 [625-1650]
Unknown	4
Number of Transfusions, n (%)	
0	6 (25.0)
1	4 (16.7)
2	6 (25.0)
≥3	8 (33.3)

Table 3: Procedures and surgery characteristics.

Complications

Immediate and delayed postoperative time complications are presented in (Table 4).

Immediate (early) postoperative complications, defined as complications that occurred within 30 days after surgery, were observed in 12 (50%) patients. The most common early complication was a wound that was noticed in 4 (16.7%) patients. Other early complications were seen in 8 (33.3%) patients: 2 fistulas, 3 renal failure, and 3 septicemias. Delayed (late) postoperative complications, defined as complications that appear after 30 days of surgery, occurred in 10 (41.7%) of patients. Common late complications included 3 (12.5%) wounds, 2 fistulas (8.3%), 2 conduits (8.3%), and 3 (12.5%) others.

	N=24
Immediate Complications, n (%)	
None	12 (50.0)
Fistula	2 (8.3)
Renal	3 (12.5)
Septicemia	3 (12.5)
Wound	4 (16.7)
Delayed Complications, n (%)	
None	14 (58.4)
Abscess	1 (4.2)
Conduit stenosis	2 (8.3)
Fistula	2 (8.3)
Pain	1 (4.2)
Renal	1 (4.2)
Wound	3 (12.5)

Table 4: Postoperative Complications.

Patient's Survival

During the follow-up, five patients were lost; therefore, the survival rate was assessed from 19 patients. Mean Survival Time in Months (95% CI) = 74.6 (95% CI 45.8, 103.4). Median Survival Time in Months (95% CI) = 78.4 (95% CI 36.4, 120.4). Overall five-year survival rate was 54%. At the last observation, the patient with recurrent endometrial cancer was alive without evidence of the disease after 70 months after pelvic exenteration (Figure 1) (Figure 2).

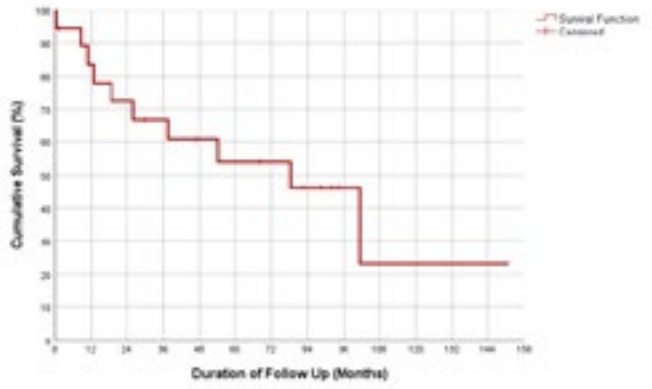

Figure 1: Kaplan-Meier Curve for Cumulative Survival N=19 Patients (10 Deaths, 9 Censored).

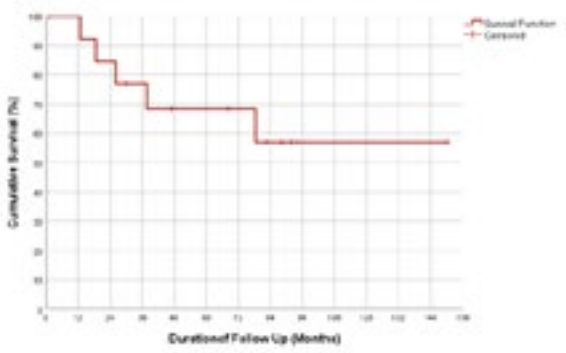

Figure 2: Kaplan-Meier Curve for Cumulative Survival N=14 Patients (5 Deaths, 9 Censored).

Discussion

In the case of central recurrent gynecological malignant tumors, pelvic exenteration is the most radical and the only optimal surgical treatment. This procedure is performed as a means of cure for locally advanced and recurrent pelvic diseases, including gynecological malignancies (cervical, endometrial, vaginal, and vulvar tumors) [11-15]. In this single-center study, patients who underwent pelvic exenteration over a period of nine years were systematically examined, and varying outcomes were identified.

Our data shows total pelvic exenteration and supralevator to be the most frequently performed subtype of pelvic exenteration, and it was associated with the stage of the disease and recurrence severity due to more advanced disease at the diagnosis. The ileal conduit was the only type of urinary diversion performed in these patients. One patient with recurrent endometrial cancer with infralevator total exenteration had vaginal reconstruction, and one patient with vulvar cancer with infralevator total exenteration had vulvar reconstruction done.

Compared to the literature, we observed a considerable difference in pelvic exenteration indications in our study. Uterine (endometrial) cancer was the most common indication for pelvic exenteration in this study (45.8%), followed by vulvar cancer (29.2%), cervical cancer (16.7%), vaginal cancer (4.2%), and ovarian cancer (4.2%). However, in previous studies, cervical cancer represented the vast majority; cervical cancer (35.7-59.5%), while endometrial cancer represented less than 50% (13-30%) [2,16-18]. The five-year survival rate in our study is 54%, and morbidity is 46%. This data is similar to previously published reports [8].

Previous studies have shown survival rates and morbidity outcomes of approximately 41 and 70%, respectively. [2,8,16-18]. In the literature, postoperative mortality after pelvic exenteration has been described as less than 5% (from 0.7 to 3%); nevertheless, the mortality rate ranged from 21.3 to 67%. [19,20]. In our study, the mortality rate among patients within 30 days was 0%. A higher rate of complications was observed both with early complications (50%) within 30 days after pelvic exenteration and in case of late complications (41.7%) more than 30 days after this surgery.

Most studies reported that wound, urinary tract infections, and massive bleeding from sacral plexus as common early complications [21,22]. The majority of late complications were pyelonephritis, sepsis, ureteral stricture, or renal failure [2,22]. Several different reasons, including patient's age, body mass index, duration of operation, and massive internal organ handling, were common to cause wound formation and urinary tract infection. In our study, the most common early complication was wound infection, and it was found in 16.7% of patients. The common late complications were also wound infection and fistula, and it was in 12.5% and 8.3% of patients, respectively.

We recognize that the retrospective nature of the study poses a limitation and where data were only based on the patients charts review. Charting limited the ability to characterize all patients accurately. All results are based on the available data.

Overall, our research on the use of pelvic exenteration as a cure for gynecological malignancies for ten years is similar to and adds to previous studies conducted in other institutions. This study is a retrospective study with a comparable sample size to other reviews of this kind; however, retrospective studies are limited in general due to not enough sample size to detect rare results [23].

The lack of quality of life analysis is the major shortage of the present study; however, we have not planned to collect the outcomes for quality of life while collecting data. When seen during follow-up, women were able to cope with day-to-day life without major difficulty and were managing very well. Quality of life is important for patients with recurrent or advanced gynecological malignancies and their relatives as survival rates. This is due to the fact that pelvic exenteration has a substantial impact on the physiological and mental characteristics of patients, their self-esteem, and sexuality, even though this procedure increases the survival time [2,24]. Another limitation of this study is the retrospective nature of the study; the small number of patients included the limited follow-up and heterogeneity of the diagnosis for which pelvic exenteration was performed. These biases limited further statistical analysis, and the results must be viewed with caution. However, the vast majority of the studies on this procedure are also retrospective; therefore, multicentre prospective studies with a large number of patients are necessary [2].

Conclusion

In summary, pelvic exenteration results in significant progression-free and long-term survival in selected patients when performed with curative intent for recurrent gynecological malignancies; nevertheless, postoperative complications are still common.

Overall, pelvic exenteration was historically considered a devastating procedure associated with high postoperative complications and mortality rates. However, over time, surgical methods and energy devices have improved, as well as postoperative care and patient management; thus, the number of postoperative complications and mortality has decreased. Multicentre prospective studies with a large number of patients, particularly assessing the patient's quality of life, are required.

Conflict of Interests: There are no conflicts of interest to disclose.

Author's Contributions

M.K. wrote original draft, C.G. reviewed and edited original draft, E.K. collected data, AA. conceptualized the idea, curated data, supervised writing process.

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