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Pelvic Exenteration For Primary and Recurrent Gynecologic Malignancy

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ABSTRACT

Introduction: Pelvic exenteration is often the only curative treatment option for selected locally advanced tumors, and especially for recurrent cancers. The primary aim of this study is to assess the clinical features, types and frequency of operative and postoperative complications of patients who underwent pelvic exenteration operation by our clinic.

Material and Methods: Retrospectively, between 2019 and 2023, 14 patients with primary and recurrent gynecologic tumors who underwent pelvic exenteration were assessed in our clinic.

Findings: All patients treated with anterior, posterior and total exenteration. Mean age was 56 (range, 26-71 years). The most primary tumors were cervical cancer (n=5, 35.7%) and ovarian cancer (n=5, 35.7%). 28.5% of patients received neoadjuvant chemotheraphy before exenteration, 35.7% of patients were treated with primary chemo-radiotheraphy and 3 patients didn't receive preoperative treatment. Urinary diversion was ileum conduit (64.2%). Mean operation time, estimated blood loss and hospital stay were 420 minutes, 2 units and 25 days. There were no intraoperative complications. Total morbidity rate was 28.5%; 7.1% of patients had early complications (<30 days after surgery) whereas 3 patients (21.4%) had late complications. Re-operation was not required in any patients. Disease recurrence occurred in 50% patients. There were no post-operative deaths (<30 days from surgery) nor intra-operative mortality. Eight patients died from recurrent malignancy. In our study survival was not assessed because of the short follow-up time.

Results and conclusion: Pelvic exenteration is the only curative surgical method in locally invasive or recurrent gynecological tumors, with high complication rates and hospital stays.

Keywords: Pelvic exenteration, Recurrence, Gynecologic cancer, Prognosis, Cervical cancer

ÖZET

Giriş: Pelvik ekzenterasyon, seçilmiş lokal ileri ever tümörler ve özellikle tekrarlayan kanserler için genellikle tek küratif tedavi seçeneğidir. Bu çalışmanın primer amacı, kliniğimizde pelvik ekzenterasyon operasyonu geçiren hastaların klinik özelliklerini, tiplerini ve operatif ve postoperatif komplikasyon sıklığını değerlendirmektir.

Gereç ve Yöntem: Kliniğimizde 2019-2023 yılları arasında primer ve nüks jinekolojik tümör nedeniyle pelvik ekzenterasyon yapılan 14 hasta retrospektif olarak değerlendirildi.

Bulgular: Tüm hastalara anterior, posterior ve total ekzenterasyon uygulandı. Ortalama yaş 56 (26-71 yaş arası) idi. Pelvik ekzenterasyonun en sık nedenleri servikal kanser (n=5, %35,7) ve over kanseriydi (n=5, %35,7). Ekzenterasyon öncesi hastaların %28,5'ine neoadjuvan kemoterapi, %35,7'sine primer kemo-radyoterapi ve 3 hastaya preoperatif tedavi verilmemiştir. Üriner diversiyon şekli ileum konduit (%64,2) idi. Ortalama operasyon süresi, tahmini kan kaybı ve hastanede kalış süresi 420 dakika, 2 ünite ve 25 gündü. Hiçbir intraoperatif komplikasyon görülmedi. Toplam morbidite oranı %28,5; hastaların %7,1'inde erken komplikasyon (ameliyattan <30 gün sonra), 3 hastada (%21,4) geç komplikasyon görüldü. Hiçbir hastada reoperasyon gerekmedi. Hastaların %50'sinde nüks gelişti. Postoperatif (ameliyattan <30 gün sonra) veya intraoperative ölüm olmadı. Sekiz hasta maligniteden ötürü vefat etti. Çalışmamızda kısa takip süresi nedeniyle sağkalım değerlendirilemedi.

Sonuç: Lokal invaziv veya nüks jinekolojik tümörler için pelvik ekzenterasyon, yüksek komplikasyon oranları ve hastanede kalış süresi olan, tek küratif cerrahi yöntemdir.

Anahtar Kelimeler: Pelvik ekzenterasyon, Rekürrens, Jinekolojik kanser, Prognoz

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Introduction

Pelvic exenteration (PE) describes a radical surgery involving the en bloc resection of the pelvic organs, including the internal reproductive organs, bladder, and rectosigmoid.[1] Indications include advanced primary or recurrent pelvic malignancies, most commonly centrally recurrent cervical carcinoma, but also other gynecologic tumors and urologic and rectal cancers.[1]

Pelvic exenteration has been used for 60 years to treat cancers of the lower and middle female genital tract in radiated pelvis.[2] PE was first performed by the physician Alexander Brunschwig in 1948 as a palliative, radical surgical procedure for recurrent cervical carcinoma.[3] This demonstrated proof of concept for PE, with a postoperative survival of up to 8 months, and a 23% surgical mortality rate.[3] Since 1948 several developments in perioperative care and surgical technique have improved survival.[1]

PE may consist of complete PE (i.e., total exenteration) or partial PE (i.e., anterior or posterior exenteration), depending on the location and extent of the tumor. Total PE involves resection of the female reproductive organs, lower urinary tract, rectosigmoid colon, anus, and surrounding soft tissues.In anterior exenteration, the rectum and anus are spared from resection, while in posterior exenteration the urinary bladder and urethra are preserved.PE is further classified into supralevator or infralevator (translevator) resection.[1] In supralevator exenteration, pelvic viscera are divided above the pelvic floor muscles preserving the levator ani muscles, anal sphincter, and urogenital diaphragm. In infralevator exenteration these structures are resected.[1]

In highly selected patients with non-metastatic gynecological cancers who present with recurrent or persistent disease after chemoradiotherapy, PE with curative intent has a 5-year survival rate of up to 50%,whereas in patients with recurrent gynecological cancers, the 2-year survival rate is only 25–32%. Survival benefit can only be derived if there is complete surgical clearance of cancerous tissue at surgery through achieving histologically tumor-free margins (i.e. R0 resection).Besides PE with curative intent, PE can also be performed with palliative intent.[10]

The multidisciplinary decision to pursue PE is a balancing act between achieving beneficial outcomes against the risk of surgical complications affecting quality of life, in patients who have often already undergone several prior treatments.[10] PE remains a radical procedure with significant complications (31-92%).[2] To date, post-surgical complications remains as high as 50%, as the previously irradiated surgical field is prone to wound disruption and superinfection after surgery.[2,10] Apart from complications related to any major abdominopelvic surgery, common complications of PE include those of the urinary or bowel reconstruction and pelvic floor flaps; late post-operative complications may also occur, including anastomotic strictures, chronic fistula formations, and tumor recurrence.

Nonetheless, PE remains a challenging procedure requiring a highly skilled interdisciplinary surgical team. It is rarely performed across the world which is mirrored by the mostly small cohort sizes and/ or wide time frame for analysis in the data published up to date. The objective of this study was to review a single-institution experience of PE for patients with primary advanced or recurrent gynecologic malignancy, in terms of patient and surgical characteristics, complications, recurrences.

Material And Methods

Retrospectively, 14 patients underwent PE due to gynecological cancer from May 2019 to March 2023 in Ege University Medical Faculty Gynecology Oncology Clinic. All patients were evaluated with PET-CT ± low abdomen MRI before surgery. Patients underwent 4 total pelvic exenterations, 5 anterior exenterations and 5 posterior exenterations in our clinic.

The inclusion criterion was the patients who had gynecological cancer without other malignancy. In this study, which is based on retrospective data analysis, all clinical information was obtained from hospital clinical records. Patient follow-ups were completely done by our clinic, and the information was obtained from clinical patient records. All the 14 patients were followed until death or when alive until March 2023.

Parameters for analysis were evaluated and categorized in pre-, intra- and postoperative period. Demographic criteria such as age was taken into consideration as well as previous treatment in case of recurring or persistent disease along with neoadjuvant intent and need for adjuvant treatment.

Selection criteria for surgery included: age (younger than 80 years), no gross pelvic side-wall involvement (considered as a macroscopic clearly unresectable infiltration of pelvic wall likely involving the sacral nervous system), no suspect of extra-pelvic disease, willingness to receive blood transfusions if needed and good psychological balance. A biopsy confirming the diagnosis of persistent/recurrent tumor was performed in each patient prior to the definitive procedure.

Surgery always began with an exploratory laparotomy and abdomino-pelvic exploration; any suspicious lesion was submitted for frozen section and if extra-pel-

vic metastatic disease was confirmed the procedure was aborted. Surgical parameters which were evaluated for the study include: type of PE, duration of surgery, total blood loss, number of transfusions, intra-operative complications and length of hospital stay. The operations were performed under the control of a gynecologist oncologist, and some procedures were performed by a general surgeon and a urologist. The procedure was completed in case the intra-operative findings suggested a high probability to obtain clear margins on the surgical specimen.

Patients were admitted to the Intensive Care Unit for at least the first 24 post-operative hours and then transferred to the regular Gynecologic Oncology ward. Morbidity in regard to postoperative complications was assessed.

Computed Tomography (CT), Magnetic Resonance Examination (MRI) and PET-CT were applied to all patients preoperatively, and the operation decision was evaluated in the tumor board with the cooperation of radiation oncologist, medical oncologist, radiology specialist, nuclear medicine specialist and gynecologist oncologist. Complete blood count and biochemistry evaluations were performed before the operation. Pelvic exenteration was not applied to patients with distant metastases, and pelvic exenteration was planned for patients with local recurrence or primary locally invasive disease. Surgery was not recommended for patients with pelvic sidewall involvement in local recurrence.

All intraoperative and postoperative complications were recorded. All histopathological examinations were performed by gyneco-pathologists, and the results were discussed in the tumor board, and adjuvant radiotherapy and chemotherapy were applied if necessary. The patients were followed up in our clinic. After discharge, every 3 months the patients were evaluated with gynecological examination and transvaginal ultrasound, every 6 months whole body tomography and tumor markers, and PET-CT if needed.

Results

The median age of the patients was 56 (range, 26-71 years), and 78.5% of them were over 50 years of age. The primary reason for pelvic exenteration was cervical cancer (n=5, 35.7%) and ovarian cancer (n=5, 35.7%), followed by endometrial cancer (n=3, 21.4%) and uterine leiomyosarcoma (n=1, 7.1%). Histopathologically, 5 patients were diagnosed with ovarian high-grade serous carcinoma, 5 patients with cervical squamous cell carcinoma, 3 patients with endometrioid type endometrial adenocarcinoma, and 1 patient with uterine leiomyosarcoma (Figure 1).

Four (28.5%) patients underwent total pelvic exenterations, 5 (35.7%) anterior exenterations and 5 (35.7%) posterior exenterations. Five of 14 patients (35.7%) who underwent pelvic exenteration received previous treatment and developed recurrence, 3 pa-

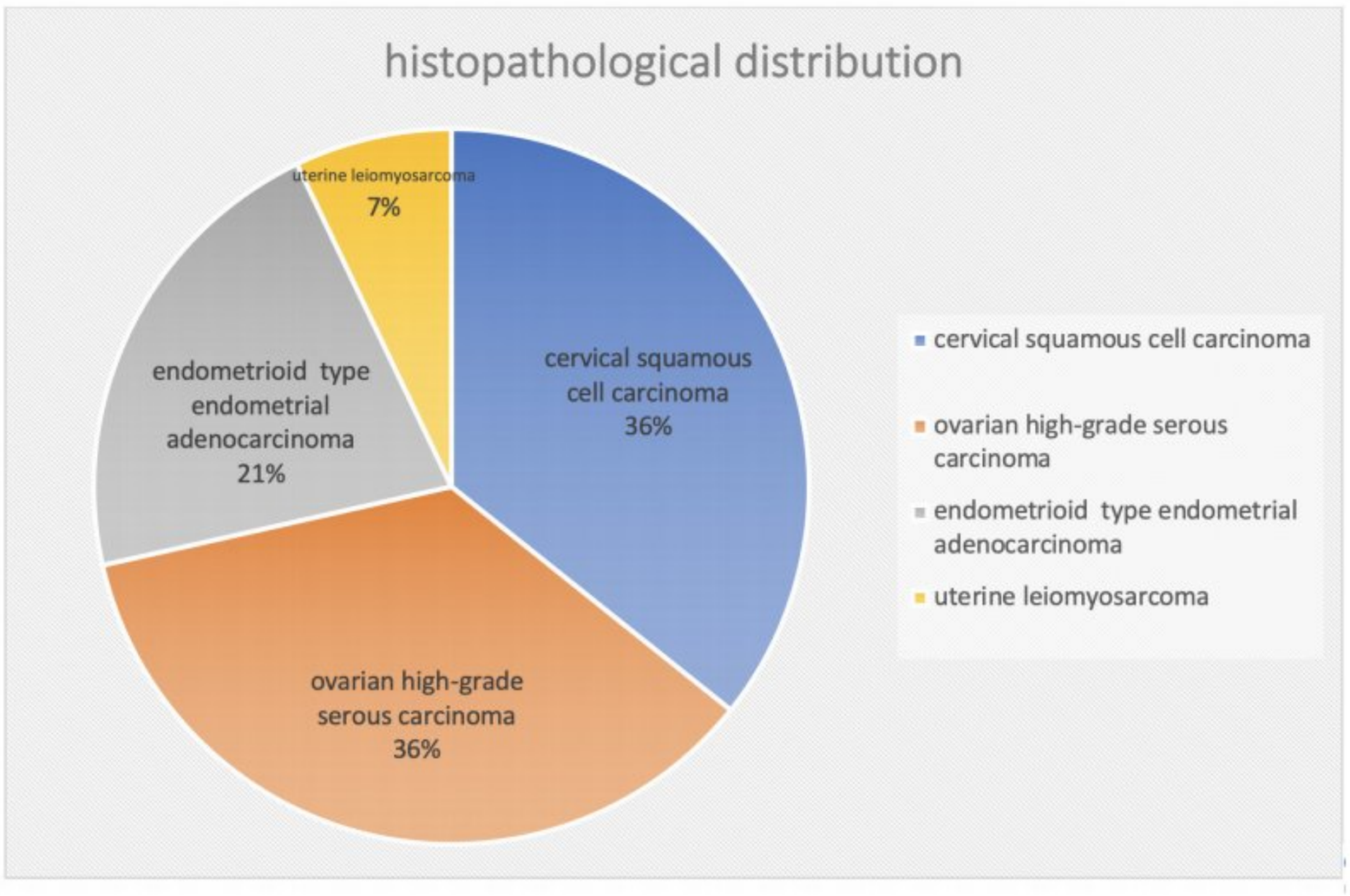

Figure 1: Histopathological distribution of patients who underwent pelvic exenteration

tients (21.4%) underwent pelvic exenteration after neoadjuvant therapy and occurred partial response, 3 patients (21.4%) underwent primary pelvic exenteration, 1 patient (7.1%) were persistent under primary treatment and 2 patients (14.2%) were progressed under primary treatment (Table 1). Four patients (28.5%) received neoadjuvant treatment prior to exenteration who were treated with neoadjuvant chemotherapy due to 2 ovarian cancer, 1 leiomyosarcoma and 1 endometrial cancer and five patients (35.7%) were treated with primary radiotherapy and chemotherapy due to 4 cervical cancer and 1 endometrial cancer.

The patient with synchronous ovarian and endometrial adenocarcinoma was treated with chemotherapy and radiotherapy after neoadjuvant chemotherapy followed by interval debulking surgery. 11 months after the end of the treatment, total pelvic exenteration was performed because of central pelvic recurrence invading the bladder and rectum mucosa. At the 4th month after exenteration, recurrence with vaginal cuff, liver and spleen parenchymal metastasis was detected, and death occurred due to covid-19 pneumonia while treatment was being planned.

Table 1 • Patient and clinical disease characteristics

Characteristics	Number (%)
Age in years	56 (range, 26-71) (78.5%)
Primary site of cancer	
Cervical canser	5 (35.7%)
Endometrial cancer	3 (21.4%)
Leiomyosarcoma	1 (7.1%)
Ovarian cancer	5 (35.7%)
Previous treatment	
None	3 (21.4%)
NACT	3 (21.4%)
Primary CRT	4 (28.5%)
Primary CRT followed by DS	1 (7.1%)
NACT followed by DS and adj CRT	1 (7.1%)
Surgery and adjuvant CRT	1 (7.1%)
Surgery and RT	1 (7.1%)
Indication for exenteration	
Primary treatment	3 (21.4%)
Persistent disease under primary treatment	1 (7.1%)
Progressive disease under primary treatment	2 (14.2%)
Recurrent disease after primary treatment	5 (35.7%)
Partial response after neoadjuvant treatment	3 (21.4%)
Types of pelvic exenteration	
Anterior	5 (35.7%)
Posterior	5 (35.7%)
Total	4 (28.5%)
Cancer	
Primary	9 (64.2%)
Relapse	5 (35.7%)

NACT: Neoadjuvant chemotherapy, CRT: chemo-radiotherapy, DS: debulking surgery RT: radiotherapy

Pelvic exenteration was performed in 5 patients with squamous cell carcinoma. Two patients were stage 2b cervical cancer and received primary chemoradiotherapy. Due to the development of recurrence in one patient and partial response to the treatment in the other patient, total pelvic exenteration was applied to the patient with recurrence and anterior exenteration to the other patient, respectively. According to the pathology results of both patients, there was no need for adjuvant treatment. No recurrence was observed in the 18 and 5-month follow-ups of the patients. One patient with cervical squamous cell carcinoma was diagnosed incidentally after laparoscopic hysterectomy for CIN3 and adjuvant external and internal radiotherapy was applied. One year after the end of the treatment, central recurrence developed in the hysterectomy site, and anterior exenteration and then radiotherapy was applied. Recurrence was detected in the 21-month follow-up of the patient. One of the other 2 cervical cancer cases was stage 3c1 and progressed under primary chemoradiotherapy treatment and because of bladder and rectal invasion detected, underwent salvage total exenteration and then received adjuvant chemotherapy. Death occurred 5 months after the last dose of chemotherapy due to extensive intraperitoneal recurrence. The other 26-year-old case with cervical cancer was accepted as stage 3c and ovarian transposition was performed first, and after it progressed under primary chemoradiotherapy, bladder and rectum invasion were detected, and salvage total exenteration was performed. Pathology-confirmed lymph node involvement was observed in this patient. In first 30 days Whole body tomography was taken at the postoperative 3rd month showed LAP in the paraaortic, mediastinal, supraclavicular area and metastatic nodules in the lung. The patient is still receiving ongoing chemotherapy treatment.

Lung parenchymal metastasis was detected at the time of diagnosis in one of 2 patients who diagnosed with uterine endometrioid adenocarcinoma and after cytoreductive surgery adjuvant chemotherapy and radiotherapy were applied. Five years after the treatment, central pelvic recurrence developed invading the bladder floor and neck, and chemotherapy was given after anterior pelvic exenteration. At the 3rd month after chemotherapy, recurrence of vaginal cuff invading the pubic bone was detected and palliative radiotherapy was applied. The other patient was treated with primary chemotherapy and radiotherapy, since cervix and bladder invasion were present at the time of initial diagnosis. After the cytoreductive surgery, isolated vaginal cuff recurrence was detected 1 year later, and anterior pelvic exenteration was performed due to surgical difficulty because of radiotherapy fibrosis. No residual tumor/recurrence was observed in the 29-month follow-up of the patient.

In 3 of 5 patients diagnosed with ovarian high-grade serous carcinoma, rectal invasion was detected during surgery, posterior exenteration and then chemotherapy was applied. No residual tumor/recurrence was observed in the 23, 27 and 11-month follow-ups of these patients, respectively. In the other 2 patients, diffuse ascites and peritoneal carcinomatosis findings were detected at the time of diagnosis, and posterior exenteration were performed due to rectal invasion after neoadjuvant chemotherapy and received chemotherapy following surgical recovery. No residual tumor/recurrence was observed in the 25-month follow-up in one patient and in the other patient recurrence was occurred in fourth month.

One patient diagnosed with uterine leiomyosarcoma with bladder and lung metastases firstly received neoadjuvant chemotherapy then underwent anterior exenteration and received chemotherapy treatment. Lung parenchyma and thoracolumbar vertebral metastases were detected 5 months after the treatment, and she received radiotherapy and chemotherapy treatment.

An ileal conduit was performed to 9 patients who underwent anterior and total exenteration. In all 5 patients who underwent anterior exenteration, non-continent ileal conduit (bricker diversion) was performed. In two of 4 patients who underwent total exenteration, non-continent ileal conduit (bricker diversion) was performed and in the other two patients continent ileal conduit (ureterosigmoidostomy-hybrid diversion) was performed. In 5 patients who underwent posterior exenteration, one Hartmann colostomy, two transverse end colostomy and two rectosigmoid resection and end-to-end anastomosis were applied. In all 4 patients who underwent total exenteration, rectosigmoid resection and end-to-end anastomosis was performed; besides a protective ileostomy (because of the receiving chemo-radiotherapy) was made in two of them and because of the ureterosigmoidostomy, stoma was formed from the descending colon in the others.

Seven patients (50%) had a recurrence after PE of which three (42.8%) caused by cervical cancer, 2 (28.5%) endometrial cancer, 1 (14.2%) ovarian cancer and 1 (14.2%) leiomyosarcoma. The median interval from the PE to recurrence was 6.4 months (range, 3-21 months). Mortality observed in 8 patients (57.1%) mostly due to cervical (n=2) cancer which was caused by recurrence and endometrial cancer (n=2) which was caused by covid-19 pneumonia and recurrence. In our study, survival was not taken as the main outcome because the patient follow-up period was not very long.

The median operation time was 420 minutes. The average intra-operative blood transfusion requirement was 2 units. The average hospital stay were 25 days. No intraoperative complications composed. Early (< 30 days) and late complications after surgery occurred. Overall morbidity rate was 28.5% among 4 patients underwent pelvic exenteration for both recurrent and locally advanced pelvic malignancies. Prophylactic antibiotic therapy and anticoagulation therapy with fractionated heparin were started in each patient in the postoperative period. Wound infection as early complication developed in 1 patient (7.1%, grade II), and antibiotic agent replacement was required. Grade 3 ureterohydronephrosis as late complication developed in 2 (14.2%, grade IIIa) patients due to ureteroileal anastomotic stenosis after reconstructive surgery in the first month, which was treated with nephrostomy. Both urinary tract infection (7.1%, grade II) and urine leakage from ureter anastomosis (7.1%, grade IIIb) as early complications occurred in one patient. None of the patients developed ileus. No patient needed re-surgery in the first 30 days. No intraoperative or peri-operative (<30 days after surgery) death was observed (Table 2).

Adjuvant treatment was planned due to pathology results and/or recurrence after pelvic exenteration. After pelvic exenteration, chemotherapy and radiotherapy treatment were applied to one (7.1%) patient, radiotherapy only to 3 (21.4%) patients, and chemotherapy only to 8 (57.1%) patients. Radiotherapy was applied to 2 patients due to post-operative bone metastasis. Due to urinary anastomotic leakage after total exenteration in one patient, although chemotherapy was planned for the patient with metastases in the lung, abdomen and mediastinum in her tomography, it has not been started yet. Metastases were detected in the vaginal cuff, liver and spleen after total exenteration in one patient and chemotherapy was planned, but death occurred due to covid-19 pneumonia before chemotherapy had not started. 2 (14.2%) patients did not receive any adjuvant treatment and are being followed up.

Discussion

Pelvic exenteration remains the only potentially curative treatment for selected patients with advanced or persistent/recurrent gynecologic malignancies.[11] Centrally recurrent cervical cancer after radiation is the most common indication for PE. The role of PE for en-

Table 2 • Surgical outcomes and complications*

Surgical outcomes and complications	Number (%)
Lymph node involvement	1 (7.1%)
Recurrence	7 (50%)
Time of recurrence after primary treatment (months)	6.4 (range, 3-21)
Type of urinary tract reconstruction (ileal conduit)	(9)
Types of pelvic exenteration	
Non-continent (bricker diversion)	7 (77.7%)
Continent (Ureterosigmoidostomy-hybrid diversion)	2 (22.2%)
Type of bowel reconstruction (colon diversion)	9
Hartmann colostomy	1 (11.1%)
Rectosigmoid resection + end-to-end anastomosis	2 (22.2%)
Rectosigmoid resection + end-to-end anastomosis + protective ileostomy	2 (22.2%)
Rectosigmoid resection + end-to-end anastomosis + descending colon stoma	2 (22.2%)
Transverse end colostomy	2 (22.2%)
Overall morbidity	
Urine leak from ureter anastomosis (grade IIIb)	1 (7.1%)˚
Uretero-hydronephrosis (needed nephrostomy) (grade IIIa)	2 (14.2%)
Urinary tract infections (grade II)	1 (7.1%)˚
Wound infection	1 (7.1%)
Ileus	-
Thrombo-embolism	-
Fistula due to reconstruction	-

Devam ediyor

Table 2 • Surgical outcomes and complications* (Devamı)

Surgical outcomes and complications	Number (%)
Mean operation time in minutes	420
Transfusion units, median	2
Hospital-stay (days)	25
Intra- and postoperative mortality within 30 days	-
Patients requiring reoperation because of complication to pelvic exenteration	-
Adjuvant therapy	
None	2 (14.2%)
Chemotherapy and radiotherapy	1 (7.1%)
Radiotherapy only	3 (21.4%)
Chemotherapy only	8 (57.1%)
Overall mortality	8 (57.1%)

* Urinary tract infection and urine leak from ureter anastomosis occurred in only one patient.

dometrial and (even more so) for ovarian cancer, is debated because of their tendency to metastasize outside the pelvis and a good sensitivity to chemotherapy of the latter.[12] Anyhow, many studies have included patients with endometrial cancers in their series.[11] Five (41.1%) of the 14 patients included in the study consisted of patients who were operated for cervical cancer, and this rate is less than the current literature rates. Our study confirms that PE should be considered in patients with local recurrence of endometrial and ovarian cancer.

Obesity, advanced age and systemic disease may interdict an extensive surgical effort in direct relation to the severity of these factors.[13] The age of the patient is a relatively important selection criterion, with most of our successful operations being performed in patients 70 years or younger, although occasionally older patients are appropriate candidates.[1] The median age of the patients was 52 years. In most of the studies in the literature, the mean age was over 50, and the median age result in our study is consistent with the literature.[11]

The mainstay for treatment success in terms of locoregional control and long-term survival is resection of the pelvic tumour with clear margins (R0).[2] The techniques for pelvic reconstruction have evolved over the past several decades so as to include continent urinary conduits, primary re-anastomosis of the rectosigmoid colon.[1] The creation of a continent urinary conduit, and functional low colon can be performed with acceptable morbidity and gives the patient the opportunity for a better function of preserved pelvic organs following this extensive extirpative surgery.[1] Many factors influence the choice of urinary diversion from which the patient would benefit most, such as the prior treatment received (surgical, radio- and/or chemotherapy). The ileal conduit, which is applied as a urinary diversion method in our clinic, is accepted as the fastest, easiest and most reliable diversion method. In our cohort, 64.2% of the patients who underwent total and anterior PE received an ileal conduit, which is in accordance with other studies.[11] One Hartmann colostomy, two transverse end colostomy and two rectosigmoid resection and end-to-end anastomosis were applied in patients who underwent posterior exenteration. Gastrointestinal anastomotic leaks up to 40% have been found in the literature in the lower colorectal and anorectal anastomoses performed in this group of patients.[2] However, anastomotic leakage was not encountered in our study, and there was no complication related to the colostomy application in any of the patients who underwent end colostomy.

Although surgery-related mortality is now less than 5%, the rate of severe postoperative complications still exceeds 50%.[2] Therefore, careful preoperative patient evaluation is essential to select only those patients who will benefit from this operation.For this reason, patients should be evaluated with magnetic resonance to detect local spread before the operation, and PET-CT for the possibility of distant metastasis. In the literature, a wide range of complication rates is described, varying from 21.3% to 94.4%.[1,20,21] In our cohort, overall morbidity rate was 28.5% among 4 patients which is compatible with them. No intraoperative complications composed. Early (< 30 days) and late complications after surgery occurred. Pyelonephritis, ureteric obstruction, urinary stones and stomal complications are the most common complications.[22] In our patient group, postoperative urinary obstruction (grade IIIa) developed in 2 (14.2%) patients and nephrostomy was inserted which

is accordant with the literature.[23] Only in one patient, both urinary diversion anastomotic leakage (7.1%, grade IIIb) and urinary infection (7.1%, grade II) were observed in the first postoperative month which were higher in the literature.[2] Complications were observed at lower rates in the literatures.[22] In the study, wound infection (grade II) rate was 7.1% which is consistent with the literatures.[22] The quality of life was not investigated in this study.

Considering the parameters such as operation time, blood transfusion, length of stay in the intensive care unit, length of stay in the hospital, our results seem to be compatible with the results of the literature.[2] We accept it as an expected result considering the average blood transfusion, long operation times and high hospital stay, high comorbidity, high dose radiotherapy, moderate general health status, and ultraradical surgical procedures including organ excision.

It is seen that most of the patients received radiotherapy ± chemotherapy during the primary diagnosis whether or not they were operated. This rate was 78.5% in the whole cohort and 22.4% in patients who had exenteration due to cervical cancer. This may be explained by the fact that the recurrence rate is higher in patients who are started on radiotherapy and chemotherapy treatment for advanced stage compared to early-stage cancers.

After pelvic exenteration, chemotherapy and radiotherapy was applied to one (7.1%) patient, radiotherapy only to 3 (21.4%) patients, and chemotherapy only to 8 (57.1%) patients correlated with the literature.[11,23] Radiotherapy was applied to 2 patients due to post-operative bone metastasis. 2 (14.2%) patients did not receive any adjuvant treatment and are being followed up.

Mortality observed in 8 patients (57.1%) mostly due to cervical (n=2) cancer which was caused by recurrence and endometrial cancer (n=2) which was caused by covid-19 pneumonia and recurrence.

In our study, survival was not taken as the main outcome because the patient follow-up period was not very long. When we look at the literature, it is seen that the survival figures are usually given as 5 years. Due to the small number of studies giving early survival in the literature and the time period they take as a basis to evaluate survival is at least 2 years, a comparison of the literature with the cohort of our clinic could not be made.

Limitations of our study are the monocentric and retrospective character, the relative short follow-up time and the consideration of various tumor entities including different previous therapies and the number of patients is relatively low. However – as well as the limited number of patients suitable for PE - small retrospective studies like this one remain viable in order to understand pelvic exenteration as a last resort intervention for recurrent or advanced gynecologic malignancies with the goal to improve patient outcomes.

Conclusion

Pelvic exenteration is a radical operation, involving en bloc resection of pelvic organs, including reproductive structures, bladder, and rectosigmoid. PE provides about a 50% chance to save patients with cancer of the lower and middle female genital tract that persists, recurs, or originates de novo after pelvic radiotherapy. It is most commonly indicated for the treatment of advanced primary or locally recurrent cancer. A comprehensive evaluation is required in order to exclude unresectable or metastatic disease. The ultimate goal of curative intent PE is to achieve R0 resection, which is the most important factor affecting prognosis. Patients need to be carefully selected and counseled about risks and long-term issues related to the surgery. Although treatment-related mortality has fallen greatly to less than 5%, severe morbidity is still high (>50%). The prognosis of this group of patients is not perfect, survival and recurrence rates still have not reached the desired rates. Therefore, close and meticulous follow-up of patients should be continued.

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