

Surgical complications and survival after pelvic exenteration: our experience following 60 procedures

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Summary

Purpose of Investigation: Analyse the results of pelvic exenteration for pelvic malignancies in a tertiary referral center. **Materials and methods:** Between 2011 and 2018, 60 patients underwent a pelvic exenteration. The indications were cervical (44 patients), vaginal (4), recurrent ovarian (6), endometrial (2), vulval (2), recurrent sigmoid colon (1), and bladder cancer (1). **Results:** Out of the 60 exenterations, 31 were total, 21 anterior, and 8 posterior. A Bricker non-continent ileal or sigmoid urinary conduit was performed in 51 out of 52 anterior and total exenterations. Early complications occurred in 34 patients of whom four perioperative deaths (6.6 %). Among the 60 patients, at this moment, 33 are alive, 25 are dead, and two are lost to follow-up. **Conclusion:** Pelvic exenteration for recurrent or advanced pelvic malignancies can be associated with long-term survival and even cure without high perioperative mortality in properly selected patients. However, postoperative complications can be lethal.

Key words: Complications; Pelvic exenteration; Survival.

Introduction

After initially published by Alexander Brunschwig in 1948 [1] with a palliative intent and described as “the most radical surgical attack against the pelvic cancer”, the pelvic exenteration became an ultimate, salvage therapy for patients with advanced or recurrent pelvic cancers. Overtime exenteration became recognized as having curative potential. Because of substantial improvements in operative and reconstructive techniques, the mortality and morbidity rates of pelvic exenteration have decreased and its survival rate is continuously increasing. Nonetheless, it is considered an extremely difficult and demanding procedure for both surgeon and anaesthesiologist, with an intra- and perioperative mortality between 0% and 9% [2-16], but if successful, for those patients without other alternative curative option, the five-year survival rate ranges between 20% and 60% [2-16]. The improvements to this technique have enhanced the results and patients’ quality of life. Thus the role of pelvic exenteration has been reconsidered in recent years.

The main indications are the central pelvic recurrences after gynaecologic, urologic or rectal cancers. In later years, the indications have expanded to include also lateral recurrences involving the pelvic side wall when resection with clear margins is achievable, making it possible to offer salvage therapy to selected patients previously regarded to be incurable [17]. Occasionally, pelvic exenteration is performed as primary treatment for advanced pelvic malignancies with the intent of excising the malignancy en bloc

[18], as well as for palliation in patients with severe symptoms, like intense pelvic pain, bleeding difficult to control, fistulas or grossly changes of local anatomy, where no other treatment options exist.

Pelvic exenterations may be total (removal of urinary bladder, rectum, vagina, tumour), anterior (urinary bladder, vagina, tumor) or posterior (rectum, vagina, tumor). In all three situations, it is mandatory to remove the uterus and the adnexae, if not previously removed. An anterior exenteration generates the need for a urinary diversion, which can be incontinent or continent. The procedure can be classified also as supraleatory, infraleatory or infraleatory with vulvectomy [19] depending on the resection lines in relation to the levator ani muscles. An infraleatory excision including the removal of the anal canal requires a permanent colostomy, and a total colectomy requires the creation of a neo-vagina for the patients who desire to maintain their sexual function [20].

The objective of this study was to review our pelvic exenteration initial experience for patients with gynaecologic cancers, in terms of patient selection, indications, surgical technique, and complications.

Materials and Methods

Between November 2011 and March 2018, 60 patients were submitted for a pelvic exenteration in two hospitals: First Clinic

of Obstetrics and Gynaecology, University of Medicine and Pharmacy of Târgu-Mureş, and “St. Constantin” Hospital, Braşov, Romania. A detailed informed consent was obtained for each patient before surgery, and during the first follow-up, a second written consent was obtained to analyse the survival data. In all cases when, during the procedure, a complete resection was considered impossible with macroscopically no residual tumour (R0), the surgery was abandoned, even when complete tumour resection was assessed as possible after preoperative imaging. This procedure was initially considered feasible in 68 patients, but it succeeded only in 60. The surgical procedure was abandoned in eight patients because of sidewall involvement with extension to the bony structure, or tumour involving the neurovascular structures of the sciatic foramen (especially the first sacral plexus root), or for multiple metastases in the omentum and peritoneum, not described in the preoperative imaging work-up.

Patients' age ranged between 36 and 73 (median 54.3) years. All procedures were considered with a curative intent. The preoperative assessment included mandatory a transrectal ultrasonography and a CT scan or MRI, for exclusion of extrapelvic disease and evaluation of operability. If the CT or MRI scan showed no evidence of distant or lombo-aortic metastasis, no intra-abdominal metastases were found during the operation, and clear margins were pathologically confirmed, the exenteration was considered curative. Cystoscopy and rectoscopy were often, but not routinely performed before a pelvic exenteration. The present authors did not consider it mandatory to obtain a histopathologic confirmation of all recurrences or persistent cervical cancers when the clinical or imaging were doubtful. All patients with cervical or vaginal cancer Stage IVa (with vesico-vaginal fistula or bladder mucosa involvement and unilateral hydronephrosis) decided for primary anterior exenteration as treatment and refused radiochemotherapy, when they asked for the treatment options. Also, in all patients with pelvic advanced or recurrent ovarian cancer, the authors considered as posterior exenteration en-bloc removal of the tumours together with the recto-sigmoid junction and the pouch of Douglas, +/- uterus and adnexae, the procedure necessitating a retroperitoneal and pelvic side-wall dissection, +/- resection of the distal ureter, and vesico-ureteral re-anastomosis, when necessary.

Complications were divided as early (< 30 days) or late (> 30 days). For each patient, only the highest complication was recorded when a complication clearly occurred as a consequence prior to a complication of a lower grade.

Results

The indications for our series of 60 pelvic exenterations were recurrent (for 33 patients) or Stage IVa (11 cases) cervical cancer, Stage IVa vaginal cancer (four cases), Stage IVa endometrial cancer (two cases), Stage IIIB bladder cancer (one case), recurrent vulva cancer (two cases) or sigmoid colon cancer (one case), and recurrent ovarian cancer (in 6 patients). Two patients with vaginal cancer were treated for more than five years before with surgery and radiotherapy for cervical cancer.

Out of the 60 exenterations, 31 (51.6 %) were total, 21 anterior (35.0 %), and seven (13.3%) posterior. In 51 out of 52 anterior and total exenterations, a Bricker [21] non-continent urinary conduit was performed, tailored from ileum (in 38 patients) or sigmoid colon (in 13), because the present authors considered it technically easier and with less compli-

cations. In 45 patients, the ileo-ureteral anastomosis was made separately for both ureters, and in six through a common ureteral plate (Wallace technique), depending of ureters diameter and vascularization. A continent orthotopic Budapest pouch [22] was performed after an anterior exenteration. All ureteral-bowel anastomoses were calibrated on “double J” ureteral stents. Out of 39 cases in which it has been performed a total or posterior exenteration, 33 patients required a definitive end-colostomy, and six a low rectal anastomosis (performed by manually suturing in three and by circular stapler in other three).

With respect to levator ani muscle, in order to obtain oncologic free margins, a supralelevatorian exenteration was performed in 38 (63.3 %) cases, an infralelevatorian in 11 (18.3%), and an infralelevatorian with vulvectomy in 11 (18.3%), depending on the caudal, inferior involvement of the vulva, vagina, urethra or rectum. When not previously performed, locoregional lymphadenectomy was performed. In case of neoplastic side wall involvement, also in order to obtain free margins, a laterally extended parametrectomy (LEP) [23, 24] or a dissection of its component, including the obturator, pubococcygeal, and/or ileococcygeal muscles, was performed in ten (16.6%) patients. Furthermore, the omental flap was used in 44 (73.3%) cases and a synthetic mesh in one to provide much better pelvic filling and vascularization into the denudated pelvis to limit the specific morbidity. In one patient who suffered a total infralelevatorian exenteration with vulvectomy for a recurrent vulva cancer, a vertical rectus abdominis muscle (VRAM) flap was used to cover a large perineal defect. The mean operative time was 343 (range 240 and 450) minutes.

In 52 (86.6%) patients, a pathological complete removal of the tumour was achieved, but eight (13.4%) patients had microscopic positive margins, and all underwent adjuvant chemotherapy. Twelve (20.0%) patients were positive for pelvic lymph node metastases.

All the patients received postoperative monitoring in intensive care and required pre-, intra- or postoperatively blood and plasma transfusion, antithrombotic prophylaxis, total parenteral nutrition, intravenous albumin, and prophylactic antibiotic treatment.

In the present series, the authors did not experience intraoperative death. Postoperative complications were divided according to Dindo-Clavien classification [25]. As early complications, the author experienced four (6.6%) grade V complications – deaths before 30th postoperative day. A young 36-year-old woman, para 3, referred to the hospital in a general poor condition, with a subocclusion syndrome caused by a large cervical tumour invading the rectal wall and compressing the rectal lumen against the sacrum, developed in the 4th postoperative day a caecum perforation with general peritonitis, which was fatal, despite re-operation and intensive care support. The second death was registered in a 67-year-old patient with a myocardial infarction 12 months before the surgery, with a sur-

Table 1. — *Oncologic indications, type of exenteration, early and late complications and survival after pelvic exenteration.*

Age	36-73 (average 54.3) years	
Type of pelvic cancer	Cervix: Recurrent or persistent	33
	Stage IVA	11
	Vagina: Stage IV A	4
	Ovary: Recurrent	6
	Endometrium Stage IV A	2
	Vulva: Recurrent	2
	Bladder: Stage III B	1
	Sigmoid colon: Recurrent	1
Type of exenteration	Total	31 (51.6%)
	Anterior	21 (35.0%)
	Posterior	8 (13.3%)
Type of exenteration (in respect to levator ani muscle)	Supraevatorian	38 (63.3%)
	Infralevatorian	11 (18.3%)
	Infralevatorian with vulvectomy	11 (18.3%)
Complications	Early	26 (43.3 %)
	Grade V Dindo-Clavien	4 (6.6 %)
	Grade IV Dindo-Clavien	3 (5.0 %)
	Grade IIIb Dindo-Clavien	12 (20.0%)
	Late	4 (6.6%)
Patients' status	Alive, no evidence of disease	32 (53.3%)
	Alive, with disease	1 (1.6 %)
	Dead of disease	24 (40.0 %)
	Dead, non-oncologic cause	1 (1.6 %)
	Lost to follow-up	2 (3.3 %)

gical uneventful recovery, who developed suddenly in the 10th postoperative day an acute pulmonary edema with cardiac failure. The third patient deceased had suffered from a pulmonary embolism, in the 16th postoperative day, after she was left home. The fourth patient died of sepsis caused by an anastomotic ileal fistula in a heavily pre-irradiated woman, who was twice re-operated. Grade IV Dindo-Clavien complications were encountered in three patients (5.0%) – acute renal failure, resolved by dialysis. Twelve (20.0%) patients necessitated re-operations - grade IIIb Dindo-Clavien complications: seven digestive fistulas, three of them necessitating more re-operations, two bowel occlusions, and one blocked evisceration. Grade I and II Dindo-Clavien complications were considered minor and have included an urinary conduit leakage which resolved spontaneously, six pelvic abscesses drained through the perineum, one peri-stoma abscess, and some cases with prolonged paralytic ileus, were resolved by drug therapy.

Late complications were encountered in four (6.6%) patients, most severe consisting in a stenosis of the uretero-ileum anastomosis, which underwent finally a unilateral permanent nephrostomy, a urostomy stenosis, and two colostomy stenosis, both necessitating minor surgeries.

Among the 60 patients, at this moment, 32 are alive with no evidence of disease, one is alive with recurred disease, 24 are dead because of the disease, one for other non-oncologic cause, and two are lost to follow-up. These data are not conclusive for survival, because the follow up period is short for some of the patients. All these data are summa-

rized in Table 1.

Discussion

Analysing the results of pelvic exenteration series, it must be kept in mind that this procedure remains the only option and the only potentially curative treatment for these patients with recurrent or advanced pelvic malignancy. Even when there exists a tendency to push forward the indications, the medical and surgical-oncologic contraindications must be respected. Nonetheless, considerable differences exist regarding indications and contraindications for exenteration within and between countries.

The mainstay for treatment success in terms of locoregional control and long-term survival is resection of the pelvic tumour with clear margins, because margin status appears to be the factor most consistently associated with prognosis [17, 22, 26, 27]. In the present series, the procedure was abandoned in eight patients when complete tumour removal was considered impossible. Also, the authors achieved free resection margins only in 52 (86.6%) patients. The weak point in the majority of cases with positive microscopic margins in the present series was the inferior-caudal resection line (vagina, urethra, rectum). For this reason, the authors consider it important to push downwards the resection line as necessary, because of the lack of significant changes in patients' quality of life regarding a supra- or infralevatorian exenteration. In last years, they have performed more infralevatorian exenterations com-

pared to earlier period, and they have succeeded with a higher percentage of free margins.

Pelvic sidewall involvement was previously considered a contraindication for exenterations with curative intent [17, 27], but since then, studies have shown equal results as for central recurrences when a complete resection can be performed [28, 29]. However, resections including pelvic side wall are technically demanding and may be associated with increased risks. Patients considered for exenterations with curative intent should be properly selected based on thorough clinical and imaging assessment to minimize the risk of performing resections with involved margins or to abandon the procedure based on intraoperative findings.

Perioperative mortality in more recent studies ranges between 0% and 9% [2-17, 20]. In the present series, there were four deaths in the first 30 days after surgery in 59 patients - a quite high perioperative mortality of 6.6 %; nonetheless two of the four perioperative deaths were caused by cardiovascular reasons. The present department is the first gynaecological one in Romania, a country with an extremely high incidence of cervical cancer, to perform such hyper-radical procedures. The results are more encouraging compared to an initially reported 15 cases [30]; probably due to the fact of acquiring more experience in terms of surgery, but also in postoperative intensive care support; in all the steps already mentioned, the morbidity and mortality related to pelvic exenteration will decrease and the survival will be even better.

Introducing exenteration is paramount for a group of cases. It is a complicated procedure, requires special training, surgical devices (as staplers, vessel sealing devices, etc), and special postoperative care. Introducing this procedure has a learning curve, and thus an initial relative risk. It seems that this experience (with acceptable morbidity and mortality rate) might encourage other services to start using exenterative procedures. An international experience is definitely required in teaching and learning complicated and infrequent surgical procedures. Aiming to obtain maximum results in terms of patients' cure and survival, clear protocols must be established for all the steps to be followed in the management of such a case: patient selection, preoperative assessment, surgical procedure, intensive care support, and recovery period.

Increasing attention must be focused on the issue of quality of life in patients who have experienced a pelvic exenteration. A higher number of ostomies, the creation of a definitive colostomy or a non-continent urinary reservoir could affect the quality of life [31]. The team must always consider a midway between quality of life and the safety of the patient and to avoid more risky procedures like the creation of continent reservoirs, unnecessary digestive anastomosis, and to choose the safest technique for a patient with an advanced or recurrent cancer, heavily treated before with radiation of chemotherapy.

The major limitations of this report are the retrospective

nature of the study, the small number of patients included, the limited follow-up period, and the heterogeneity of diagnoses for which the exenterations were performed. These drawbacks restricted a statistical analysis, and major conclusions should be drawn with cause.

Overall, pelvic exenteration for recurrent or advanced pelvic malignancies can be associated with long-term survival and even cure without high perioperative mortality in properly selected patients [32]. New devices, such as the harmonic scalpel, new vessel sealants, and mechanical staplers have diminished the operative time dramatically, increasing the safety of the vascular ligatures at the same time. Complete surgical resection with negative margins is associated with sustained survival and should be the goal of surgery. An international experience is needed in teaching and learning complicated and infrequent surgical procedures.

In conclusion, pelvic exenteration for recurrent or advanced pelvic malignancies can be associated with long-term survival and even cure without high perioperative mortality in properly selected patients. However, postoperative complications are common and can be lethal.

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