The role of pelvic exenteration for treatment of pelvic malignancy - a nine-year experience

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Summary

Pelvic exenteration offers the last chance for some women with gynecological and rectal malignancy.

A series of 23 patients who underwent pelvic exenteration for local advanced gynecological and rectal malignancies between 1996 and 2004 were retrospectively reviewed.

The exenteration was performed because of vulvar cancer in 14 patients and other pelvic malignancies in nine cases: rectal cancer in four cases, in three cases cervical cancer, in one case ovarian cancer and in one case uterine sarcoma.

Nine patients developed major complications of the operative field involving the urinary tract or the wound. Early complications included massive bleeding from the sacral plexus in two cases (one patient died during surgery), acute respiratory distress syndrome (ARDS) in one case and thrombophlebitis in one case. Urinary incontinence was observed in two women as a late complication. Only one patient had a complication connected with the gastrointestinal tract.

Twenty-two patients were followed-up. In the group of patients with vulvar cancer five women died after 4-29 months because of recurrence of disease. The nine surviving patients are still being followed-up and are without disease; survival time ranges from 6-74 months. In the group of patients with other malignancies four women died.

Key words: Complications; Pelvic exenteration; Gynaecological cancer; Rectal cancer; Vulvar cancer.

Introduction

Pelvic exenteration has become a method of treatment in cases of recurrence or locally advanced gynecological tumors ever since it was first described and performed by Brunschwig in 1948 in patients with advanced cervical cancer. Primarily this operation has been used as salvage therapy for patients with recurrence in the central pelvis who failed radiation therapy or patients with early-stage disease who failed primary surgical or combined treatment [1-3].

The operation is carried out at the site of extensive pelvic tumors, cervical cancer, vulvar cancer, and vaginal, ovarian, rectal or bladder cancer which can not be removed by standard radical gynecological surgery techniques [2, 3].

Despite significant advances in radiation oncology and chemotherapy pelvic exenteration remains an important part of the armamentarium of the gynecologic oncologist. Total pelvic exenteration (TPE) may be the only hope for women who have failed more non-conservative therapy [4]. PE remains the primary and occasionally the only treatment for the control of advanced pelvic malignancy. An understanding of post-exenteration morbidity and complications is necessary [5].

Aim of the study

The aim of this study was to assess our nine-year experience in pelvic exenteration procedures both in the vulvar cancer group and other malignancy groups. We have used this procedure for recurrent gynecological and rectal malignancies but mainly for primary vulvar tumors in suitable patients.

Material and Methods

The 19 patients with gynecological malignancies and four with rectal cancer underwent pelvic exenteration at the Department of Gynecology, Medical University of Gdansk, Poland during the period 1996 to 2004.

Exenteration was performed because of vulvar cancer in 14 patients (61%), rectal cancer in four cases (17.3%), in two cases cervical cancer (8.7%), in one case ovarian cancer (4.3%) and in one with uterine sarcoma (4.3%).

Pelvic exenteration was performed in four cases (17.3%) of women with rectal cancer because we are the one center in Poland where such procedures are performed.

The clinical and pathological records were reviewed to determine the primary disease, previous treatment, type of pelvic exenteration, postoperative morbidity and mortality, complications after surgery and follow-up evaluation. The patients were followed from the time of operation to November 2004 (range 4 to 74 months).

Primary malignancies included advanced carcinoma of the vulva in 12 patients, rectal cancer in three cases, and cervical cancer in one case. Recurrent tumors included carcinoma of cervical cancer in two cases, vulvar cancer in two cases, ovarian cancer in one case, uterine sarcoma in one case, and rectal cancer in one case.

Surgery was performed by a team of gynecological surgeons and in cases requiring urinary diversion, performed together with a team of urologists. All patients were operated on under mixed anesthesia consisting of conduction anesthesia (spinal or epidural) and general anesthesia. Closure of the empty pelvic cavity was achieved by mobilization of the omentum from the left side of the sigmoid colon or by reperitonization using mobilized caecum.

Revised manuscript accepted for publication March 7, 2005

Table 1. — *Characteristics of patients with vulvar cancer.*

Case no.	Age	Year of operation	Days of hospital	Histology	Invasion site	Method	Blood trasfusion (ml)	Operating time	Complications	Survival in months
1	59	1996	48	SCC	rectum	PPE	240	4h	wd	29
2	48	1996	14	SCC	–	PPE	800	5h15	-	33*
3	62	1998	35	SCC	vulva lymphnodes	PPE	600	5h30	urinary infection, wd	79*
4	77	1998	28	SCC	–	PPE	900	6h	–	11
5	65	2000	54	SCC	anus, urethra	PPE	1500	6h20	urinary infection, wd	19
6	34	2000	49	SCC	lymphnodes	TPE	1200	5h30	ARDS, wd	48*
7	52	2000	16	SCC	–	PPE	300	5h 30	urinary incontinence	46*
8	43	2002	28	SCC	–	PPE	1560	5h50	–	33*
9	64	2002	28	SCC	–	PPE	900	7h	–	22
10	63	2002	42	SCC	colon, vagina, clitoridis, lymphnodes	TPE	1420	7h30	thrombo-phlebitis, wd	4
11	53	2002	25	SCC	–	PPE	1100	6h	urinary infection, wd	5
12	44	2002	41	SCC	vagina	PPE	1500	7h30	ureter damage, wd	22*
13	57	2003	28	SCC	vagina, colon, lymphnodes	PPE	3580	7h	massive bleeding	18*
14	74	2004	66	SCC	vagina	PPE	500	5h30	wd, urinary incontinence	6*
Mean	56,7		36				1150	6h		

PPE: posterior pelvic exenteration; TPE: total pelvic exenteration; wd: wound dehiscence; SCC: squamous cell carcinoma; *: still being observed.

Table 2. — *Characteristics of patients with other malignances.*

Case no.	Age	Year of operation	Disease	Days of hospital	Histology	Invasion site	Preoperative chth/rtx	Method	Blood trasfusion (ml)	Operating time	Complications	Survival in months
1	37	1998	rectal cancer	15	adenocar-cinoma	ovaries, liver, colon, vagina, lymph nodes	chth	PPE	600	4 h 15 min	–	15
2	64	2002	rectal cancer	14	adenocar-cinoma	–	–	PPE	300	5 h 15 min	–	26*
3	34	2003	rectal cancer	8	adenocar-cinoma	vagina	–	PPE	280	6 h 20 min	–	13*
4	82	2004	rectal cancer	16	adenocar-cinoma	–	–	PPE	950	5 h 30 min	–	11*
5	62	2002	cervival cancer	16	SCC	vagina, colon	rtx	PPE	500	6h	–	11
6	34	2003	cervical cancer	24	SCC	–	–	APE	1285	8h	acute renal failure	13*
7	53	2004	cervical cancer	10	SCC	vagina, urether, vesical urinary	rtx	APE	1200	6 h 50 min	pulmonary embolism	0.5
8	50	1999	ovarian	23	adenocarcinoma	colon	chth	PPE	1200	6 h 45 min	–	29
9	44	*2000*	uterine sarcoma	–	*leiomyosar-coma*	–	rtx, chth	PPE	1800	(4 h 35 min)	massive bleeding	died during surgery
Mean	51			16					900	6 h 7 min		

PPE: posterior pelvic exenteration; APE: anterior pelvic exenteration; wd: wound dehiscence; SCC: squamous cell carcinoma; *: still being observed.

Results

Tables 1 and 2 summarize the clinical characteristics of the patients with vulvar cancer and other malignancies.

Vulvar cancer group (Table 1)

Pelvic exenteration was performed in 12 patients (85.7%) with primary advanced vulvar cancer and in two patients (14.3%) with recurrent vulvar cancer.

The most often performed exenteration in patients with vulvar cancer was posterior pelvic exenteration in 12 cases, and total pelvic exenteration in two cases. The mean age at diagnosis was 56.7 years (range 34-77 years).

The estimated blood transfusion due to operation ranged from 240 ml to 3580 ml with a mean of 1150 ml. The operating time ranged from four hours to seven and a half hours with a mean of six hours. Patients stayed in hospital from 14 to 66 days after surgery with a mean 36 days.

The overall complication rate after pelvic exenteration was 71.4% in ten of the 14 patients. On eight occasions (57%) it was wound dehiscence, on three (21.4%) it was urinary infection and in one case each (7.1%) it was: ARDS, thrombophlebitis, and urether damage.

There was a massive bleeding from the sacral plexus in one patient during posterior pelvic exenteration (PPE).

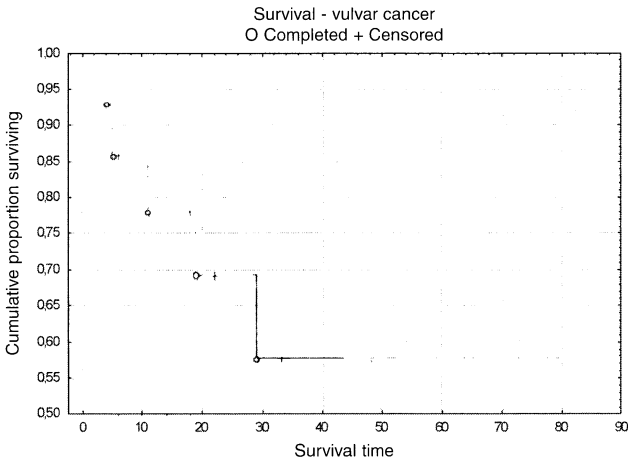

Figure 1. — Kaplan-Meier survival analysis for vulvar patients.
*Kaplan-Meier plot.
*Kaplan-Meier product-limit method of survival analysis for patients with other malignancies:
– 25% of patients die within 11 months
– 75% of patients live longer than 29.0 months.

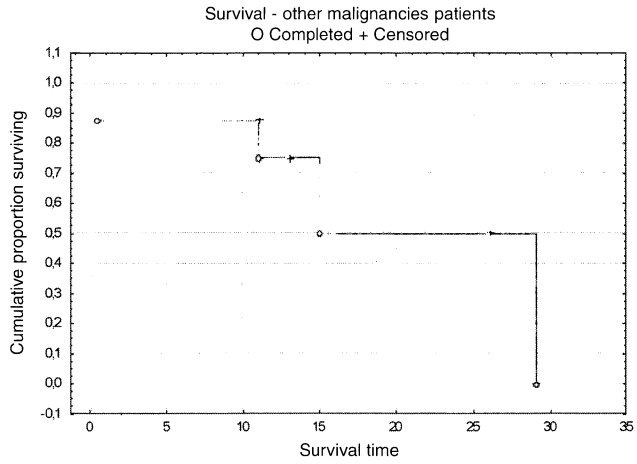

Figure 2. — Kaplan-Meier survival analysis for patients with other malignancies.
*Kaplan-Meier plot.
*Kaplan-Meier product-limit method of survival analysis for patients with other malignancies:
– 25% of patients die within 11 months
– 50% of patients die within 15 months
– 25% of patients live longer than 22 months.

The anatomic origin of the hemorrhage was the presacral venous plexus. An attempt was made at hemostasis. Disseminated intravascular coagulation (DIC) occurred and the hemorrhage was massive and prolonged. Because of the continuing bleeding and the poor general state of the patient after the attempt at hemostasis, five large laparotomy sponges were left packed in the abdomen-pelvis, covering the pelvis and the iliac and sacral vessels under pressure. The packing was successful and the sponges were removed after 24 hours.

Late complications appeared as urinary incontinence in two patients after PPE.

Because of huge hydronephrosis and chronic renal failure in one patient one year after PPE unilateral nephrostomy was performed for four months.

In the group of patients with vulvar cancer six women (42.8%) died after four to 29 months (average 15 months of survival) because of recurrence of the disease. The eight surviving patients (57.2%) are still being followed-up and are without disease; survival time has been from six to 79 months (Figure 1).

Other gynecological and rectal malignancies (Table 2)

Pelvic exentertion was performed in four patients with primary cancer (rectal cancer in 3 cases and cervical cancer in 1 case). Recurrent tumors included carcinoma of cervical cancer in two cases, ovarian cancer in one case, uterine sarcoma in one case, and rectal cancer in one case.

The mean age at diagnosis was 51 years (range: 34-82 years).

The operating time ranged from four hours and 15 minutes to eight hours with a mean of six hours and seven minutes. The estimated blood transfusion ranged from 280 to 1800 ml, with a mean of 900 ml. Patients stayed in hospital from eight to 24 days after operation with a mean of 16 days.

The patient with uterine sarcoma died during posterior exenteration because of massive bleeding from the sacral vessels.

There was only one early complication in a patient with cervical cancer - acute renal failure. Two days after surgery for anterior pelvic exenteration (APE) a gradual increase began in the parameters of renal failure and on the eighth day there was considerable worsening. Acute renal failure was confirmed. Enforced diuresis was implemented, supplying furosemide, and the metabolic acidity was compensated for by NaHCO. Four to five litres of liquids daily were ordered. Antibiotic therapy and antimycotic drugs were administered. In the postoperative period the patient remained in the Intensive Care Department under the care of a team consisting of an internist, nephrologist, anesthetist, gynecologist and urologist. Gradual normalization of the parameters of renal failure was attained on the 12th day.

One patient with recurrent cervical cancer died two weeks after surgery because of a pulmonary embolism after APE.

In our material there was only one case of gastrointestinal complications in a patient with cervical cancer during APE. During this operation it was impossible to implant the ureters into the ileum by the Bricker method during surgery because a lack of blood supply in the isolated intestinal loop was confirmed, and uretero-ureterocutaneostomia was performed.

In the group of patients with rectal cancer and other

malignancies four women died two weeks to 29 months after surgery. Four women are still being followed-up and are alive without disease (Figure 2).

Discussion

Pelvic exenteration is the treatment of choice for the control of locally advanced recurrent gynecological malignancies unresponsive to therapy. It remains the primary and occasionally the only treatment for the control of advanced pelvic malignancy and an understanding of post-exenteration morbidity and complications is necessary [5].

Most often candidates are those with recurrence in the central pelvis who have failed radiation therapy or those with early stage disease who have failed primary surgical or combined treatment. In our study PE was the first treatment for 18 patients (78%).

Primary radiation therapy or surgery combined with radiotherapy has been the standard treatment for years in patients with advanced cancer. Despite some changes in radiation techniques, cure rates for advanced stages of cancer remain disappointing. Radiation complications in those patients can also be severe so total pelvic exenteration (TPE) should no longer be reserved for salvage therapy and should perhaps be compared with chemoradiotherapy as first-line treatment [6].

Pelvic exenteration should be carried out only when extremely advisedly owing to the extensive and drastic nature of the procedure. If the operation is completed satisfactorily it frees patients from the potential discomfort caused by aggressive tumor. To a certain extent it can equally reduce the problem of pain control in the pelvic area [2, 7].

The most serious and common complications after exenteration are: acute enteric complications (may exceed 20%), enteric obstruction, fistulization, pelvic infection, sepsis, wound infection and pyelonephritis [2, 8, 9]. Described acute renal failure is a rare complication after pelvic exenteration.

In patients with vulvar carcinoma inguinal lymphadenectomy performed together with pelvic exenteration increased the total incidence of complications. Necrosis of the skin over inguinal areas and the symphisis pubis is the commonest complication which is present in 75% of cases [10].

There was no case of fistulisation among the patients after PE which is probably attributable to the same preoperative conditions as above.

The operations in patients with advanced vulvar cancer are connected with extensive blood transfusions during operation because vulvectomy and lymphadenectomy are additionally performed. More often wound dehiscence is observed in these patients (in our group in 57%) so patients stay in the hospital longer.

Patients with another type of cancer have less blood loss during surgery (900 ml vs 1150 ml), shorter hospitalization after operation (16 days vs 35 days) but a longer operating time (6 h vs 6 h and 7 min) which is because operations are performed on women after previous surgery or radiotherapy or chemotherapy.

The long operative time and huge blood loss associated with exenteration increase the risk of wound infection which may adversely affect anastomosis site healing. Concomitant transfusion requirements and the entry of contaminated viscera – vagina, urethra, rectum – are inherent to the operation. Most patients who undergo the procedure have advanced cancer and have had high-dose radiation to the operative field. This compromises healing ability and makes the procedure even more dangerous [2].

The dose of previous radiation therapy (higher than 4000 cGy) is the most important risk factor for major surgical complications. The incidence of postoperative urinary or gastrointestinal complications is significantly higher in previously irradiated gynecological patients [2, 11-14].

According to Averette *et al.* an operative mortality of 40% was associated with surgical correction of the fistula; 93% of these patients had received previous radiation therapy. The fistulized loop of bowel was found attached to the pelvic floor at reoperation [15].

The type of urinary diversion is significantly related to the development of complications.

A modified Indiana pouch and transverse colon for the reservoir are reported to have a lower incidence of complications than the sigmoid colon or Kock pouch [13, 16-18].

Urinary fistulae and obstruction following pelvic exenteration are frequent and life-threatening complications. They increase the mortality and morbidity rates of large exereses performed during pelvic exenteration for gynecological cancer. Major early urinary complications are significantly increased in patients who have received previous pelvic radiation therapy and in patients who have had an intestinal conduit for urinary diversion [13].

After pelvic exenteration patients are at high risk for the development of cardiac complications, adult respiratory distress syndrome and pulmonary emboli [9, 19].

Pelvic exenteration is a demanding, yet potentially curative, operation for patients with advanced pelvic cancer. The majority will present with recurrence after prior surgery and radiotherapy. After exenteration, 5-year survival is 40% to 60% in patients with gynecologic cancer as compared to 25% to 40% for patients with colorectal cancer [8].

Survival rate in the case of patients with recurrence depends on the size and localization of malignancy. Postoperative prognosis can also be dependent on the result of the histopathological examination. Squamous cell carcinoma (SCC) appeared to be better than other tumors [1, 20].

PE is a high-morbidity procedure. The major complications correlate with preoperative pelvic radiation therapy and previous pelvic surgery [3, 11]. However good postoperative nutrition (hyperalimentation), antibiotics, antithrombotic therapy, adequate stenting of the anastomosis site, use of tissue less affected by radiation (such as transverse colon, jejunum) and the creation of a

continent reservoir can decrease the incidence of complications and improve quality of life after this radical procedure [5].

The recent application of intraoperative radiotherapy or postoperative high-dose brachytherapy for patients with more advanced pelvic disease, which may include sidewall involvement, expand the standard indications for exenteration.

There was no case of fistulization in our patients. This can be attributed to the majority of patients presenting primary tumors that had not undergone primary conditions/radiation and also reperitonization at closure of the pelvic cavity to prevent small bowel prolapse.

Conclusion

Pelvic exenteration offers the last chance for some women with gynecological malignancy.

References

[1] Numa F., Ogata H., Suminami Y. *et al.*: "Pelvic exenteration for the treatment of gynecological malignancies". *Arch. Gynecol. Obstet.*, 1997, *259,* 133.
[2] Franchi M., Donadello N.: "Pelvic exenteration in gynecological oncology. Review". *Eur. J. Gynecol. Oncol.*, 1994, *15,* 469.
[3] Rutledge F.N., Smith J.P., Wharton J.T., O'Quinn A.G.: "Pelvic exenteration: analysis of 296 patients". *Am. J. Obstet. Gynecol.*, 1977, *129,* 881.
[4] Wheeless C.R. Jr.: "Recent advances in surgical reconstruction of the gynecologic cancer patient". *Curr. Opin. Obstet. Gynecol.*, 1992, *4,* 91.
[5] Chang H.K., Lo K., Chiang H.S.: "Complication of urinary diversion after pelvic exenteration for gynecological malignancy". *Int. Urogynecol. J.*, 2000, *11,* 368.
[6] Bramhall S.R., Harrison J.D., Burton A. *et al.*: "Phase II trail of radical surgery for locally advanced pelvic neoplasia". *Br. J. Surg.*, 1999, *86,* 805.
[7] Saunders N.: "Pelvic exenteration: by whom and for whom?". *Lancet,* 1995, *345,* 5.
[8] Crowe P.J., Temple W.J., Lopez M.J., Ketcham A.S.: "Pelvic exenteration for advanced pelvic malignancy". *Semin. Surg. Oncol.*, 1999, *17,* 152.
[9] Hector R.C., Alfonso T., Mario D.L.G. *et al.*: "Pelvic exenteration for carcinoma of the cervix: analysis of 252 cases". *J. Surg. Oncol.*, 1988, *38,* 121.
[10] Thorntorn W.N., Flanagan W.C.: "Pelvic exenteration in the treatment of the advanced malignancy of vulva". *Am. J. Obstet. Gynecol.*, 1973, *117,* 774.
[11] Kiselow M., Butcher H.R. Jr., Bricker E.M.: "Results of the radical surgical treatment of advanced pelvic cancer: a fifteen-year study". *Ann. Surg.*, 1967, *166,* 428.
[12] Shingleton H.M., Soong S.J., Gelder M.S., Hatch K.D., Baker V.V., Austin J.M. Jr.: "Clinical and histopathologic factors predicting recurrence and survival after pelvic exenteration for cancer of the cervix". *Obstet. Gynecol.*, 1989, *73,* 1027.
[13] Bladou F., Houvenaeghel G., Delpero J.R. *et al.*: "Incidence and management of major urinary complications after pelvic exenteration for gynaecological malignancies". *J. Surg. Oncol.*, 1995, *58,* 91.
[14] Lopez M.J., Luna-Perez P.: "Composite pelvic exenteration: is it worthwhile?". *Ann. Surg. Oncol.*, 2004, *11,* 27.
[15] Averette H.E., Lichtinger M., Sevin B.U. *et al.*: "Pelvic exenteration: a 15 year experience in a general metropolitan hospital". *Am. J. Obstet. Gynecol.*, 1984, *150,* 179.
[16] Ehrlich R.M.: "An improved method of creating an ileal conduit: the importance of a better vascular supply". *J. Urol.*, 1973, *109,* 993.
[17] Hatano T., Hayakawa M., Koyama Y., Sugaya K., Miyazato T., Ogawa Y.: "An alternative procedure for the creation of an ileal conduit in patients undergoing pelvic exenteration: dextrotransmesenteric location". *World J. Urol.*, 1998, *16,* 410.
[18] Penalver M.A., Bejany D.C., Averette H.E. *et al.*: "Continent urinary diversion in gynaecological oncology". *Gynecol. Oncol.*, 1989, *34,* 274.
[19] Shepherd J.H., Ngan H.Y.S., Neven P. *et al.*: "Multivariate analysis of factor affecting survival in pelvic exenteration". *Int. J. Gynecol. Cancer,* 1994, *4,* 361.
[20] Morley G.W.: "Pelvic exenteration, University of Michigan: 100 patients at 5 years". *Obstet. Gynecol.*, 1989, *74,* 934.

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