

Acute renal failure after anterior pelvic exenteration: a case report and review of the literature

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Summary

This is a report of a case of advanced cervical carcinoma in a 34-year-old woman treated with anterior pelvic exenteration at the Department of Gynecology of the Medical University in Gdańsk. Despite annual gynecological check-ups, the patient presented with profuse bleeding from the genital tract. IVa cervical carcinoma according to the International Federation of Gynecology and Obstetrics (FIGO) staging was diagnosed. A vesicovaginal fistula was confirmed. In the postoperative period acute renal failure occurred. Twenty-four days after the operation when normal renal parameters had been restored, the patient was transferred to the Department of Radiotherapy for supplementary treatment.

Pelvic exenteration offers the last chance for some women with gynecological malignancy and can provide a good chance of long-term survival in carefully selected patients with gynecological cancer.

Key words: Cervical cancer; Acute renal failure; Pelvic exenteration.

Introduction

Acute renal failure complicates the clinical course of as many as 5% of all hospital inpatients [1, 2]. Critically ill and injured patients are disproportionately at risk and mortality in this population exceeds 50% [3, 4]. Thus considerable efforts have been made to develop techniques to prevent acute renal failure or to facilitate its recovery. Unfortunately, preventing the development of acute renal failure in populations-at-risk is difficult.

Pelvic exenteration is a demanding, yet potentially curative operation, for patients with advanced cervical cancer. The majority will present with recurrence after prior surgery and radiotherapy. After exenteration, 5-year survival is 40-60% in patients with gynecologic cancer [5-7].

Cervical carcinoma occupies second place in Poland after breast carcinoma as far as the frequency of cases of malign tumors is concerned. High mortality rates persist despite the decreasing, although still high, incidence. The increased incidence among younger women is worthy of attention, as is the diagnosis of the disease at late stages of advancement.

Pelvic exenteration is the preferred method of treatment in recurrent cases or where there are locally advanced gynecological neoplasms without distant metastases [7-9].

Pelvic exenteration offers the last chance of cure for some women with gynecological malignancy [5-8, 10, 11].

Case Report

The patient, J.T., 34 years old, nullipara, first menstruation at the age of 13, regular menstrual cycles lasting 28 days, was admitted to the clinic because of profuse bleeding from the genital tract. She had regularly undergone gynecological check-ups, most recently in May 2003, and also a cytological check-up: II group according to Papanicolaou. For some seven months the patient had been suffering from vesical tenesmus and her periods became painful and more profuse. Gynecological examination confirmed a crater-like defect in the vaginal part of the uterine cervix embracing the fornix and the upper third of the vagina, from which urine flowed in a stream.

The pathomorphologist examined the specimens taken from the lesions in the fornix and recognised non-cornifying squamous cell carcinoma.

Preoperative urography revealed features of chronic right-sided obstructive uropathy. The left kidney commenced excretion of the contrast urine at the right time. The calyceal-pelvic system (CPS) of the left kidney and the left ureter did not dilate, while the flow of the contrast urine to the urinary bladder was not impaired. The right kidney did not commence excretion of the contrast urine because of reflux difficulty. There was a visible uneven outline of the urinary bladder wall in the area of the right ureter. Ultrasound examination revealed the CPS of the right kidney dilated hydronephrotically: pelvis 32 x 22 mm, I order calyces to 26 mm, II order to 15 mm, parenchyma of reduced width to 7.5 mm. The right ureter was dilated to 16 mm parapelvically near the opening of the bladder, where the passage of infiltration from the thickened and dilated cervix to the wall of the bladder (thickness 10 mm) and the opening of the right ureter could be seen. The left kidney was without changes on ultrasound examination.

In order to evaluate right kidney function and to relieve the pressure a pyelodermal junction (nephrostomia) was performed. From this about 400 ml of urine on average was obtained daily.

Because of the extensive neoplastic process the patient was qualified for anterior exenteration. During the operation the gynecological-urological team confirmed: the

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body of the uterus was of normal size, anteflexed, appendages unchanged, infiltration in the region of the internal opening of the uterine cervix embracing the anterior crease and the wall of the urinary bladder, infiltration of the ureters in the pre-bladder fragment and passage of the neoplastic process in the direction of the rectum. The paraaortal lymph nodes were unexamined. The external and occlusive pelvic lymph nodes were removed from both sides. The urinary bladder was dissected, detached from the urethra and the dissected ureters were severed on both sides. The uterus and the appendages, the parametria, 6 cm of the vagina and the urinary bladder were removed in one block. The rectum was cut away from the posterior wall of the vagina, and an area of the rectum was dissected without damaging the intestinal lumen. The urinary catheter was left in the urethra as a drain and 50 cm of the ileum was dissected 15 cm from the Bachin valve. The intestine was anastomosed end-to-end. The ureters were mobilised and joined in the end fragment. As it was impossible to implant the ureters into the ileum by the Bricker method during the operation (lack of blood supply to the isolated intestinal loop was confirmed) uretero-cutaneostomy was performed. During the course of cutting away the urinary bladder hemorrhaging occurred and the patient lost 750 ml of blood and pressure fell to RR 70/40. A Dobutrex infusion was attached. After five minutes pressure returned to normal values. The patient was given 900 ml of erythrocyte concentrate.

Histopathological examination of the preparation revealed squamous cell carcinoma of the uterine cervix infiltrating into the uterine body, neoplastic infiltration embracing 4 cm of the vaginal wall, the rectum and the urinary bladder, as well as neoplastic metastases to the occlusive lymph nodes on the left side and to the external pelvic lymph nodes on the right.

In the postoperative period the patient remained under the strict control of a team consisting of an internist, nephrologist, anesthetist, gynecologist and a urologist. Two days after the operation a gradual increase began in the parameters of renal failure and on the eighth day there was considerable worsening (Table 1). Acute renal failure was confirmed.

Detailed observation was conducted as to the amount of urine excreted from the urostomy and the urethra. Enforced diuresis was implemented, supplying 40 mg of furosemide, and the metabolic acidity was compensated by 60 ml of NaHCO daily for three days. Four-five litres of liquids daily were ordered. Antibiotic therapy and antimycotic drugs were administered.

The supply of liquids was limited to the amount constituting the volume of urine excreted plus the amount equal to the loss of fluids by other routes plus 500 ml. The supply of sodium was limited to the absolute minimum.

Gasometry was controlled. On the eighth day after the operation the results were: pH 7.4, pCO₂ 26.2 mmHg, pO₂ 58.6 mmHg, BE -6.7. On the 12th day normal parameters were obtained.

The concentrations of uric acid, calcium, phosphorus and sodium in the plasma showed normal values during the presence of symptoms of acute renal failure. In numerous bacteriological tests on the urine from the ureteral catheter and nephrostomy, no pathogenic bacteria were cultivated during hospitalisation.

Gradual normalization of the parameters of renal failure was attained on the 12th day. 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 a urologist.

On the 24th day after the operation the patient was transferred in generally good condition to the Department of Radiotherapy of the Medical University for further supplementary treatment.

Discussion

Over 50% of all cases of acute renal failure are connected with trauma or an operation. In some 40% of cases it is the result of causes pertaining to internal medicine. Some 10%, however, are caused by disorders during pregnancy, parturition or puerperium.

The most common cause of acute renal failure is renal ischemia caused by a decrease in the amount of blood in circulation. The degree of renal damage and the development of organic changes within the kidneys, most often acute necrosis of the renal tubules, depend on the duration of this renal ischemia and on the possibility of its reversal.

The probable cause of acute renal failure in the postoperative course in the patient was a fall in blood pressure during the operation together with earlier interstitial damage to the kidneys. A further cause that cannot be ruled out is the toxic influence of the uropolin applied in urographic tests carried out during the earlier interstitial damage to the kidneys [1-4].

Acute prolapse of the functioning of the kidneys leads to the development of many systemic disorders. They concern mainly the water-electrolyte equilibrium (overhydration, hyperpotassemia) and protein metabolism (hyperazotemia). In longer-lasting acute renal failure other metabolic disorders can also develop, affecting carbohydrate and lipid equilibrium, as well as hormonal disturbances. Recognition of the initial phase of acute renal failure is of enormous significance, since the initiation of procedures leading to the elimination of the causes of this syndrome can prevent its passage into the fixed (renal) phase.

The average mortality rate in patients with acute renal

Table 1. — *Biochemical parameters of acute renal failure.*

	2 nd day	4 th day	6 th day	8 th day	10 th day	12 th day	24 th day
Urea g/dl	52	72	94	102	35	11	15
Creatinine mg/dl	3.2	5.2	6.3	7.6	2.6	0.8	0.9
BUN mg/dl	24.2	33.4	44	47.8	16.4	5	7
Total protein g/dl	4.4	4.4	4.4	5	4.6	5.1	7.1
K ⁺ mmol/l	3.8	4.1	5.1	5.3	3.7	4.6	4.7
Hemoglobin g/l	88	83	90	92	93	95	109

failure is 35-60%. The highest mortality is among patients with acute renal failure as a result of multi-organ damage or operations (50-80%), while the best prognosis is in patients with acute renal failure as a result of complications during pregnancy or parturition (15-20%) [1-4]. The main causes of mortality in cases of acute renal failure outside the course of basic illness are the other complications which appear: septicemia, hemorrhaging and disturbances in the water-electrolyte equilibrium.

Physiologic age and absence of co-morbidities appear to be more important when selecting patients for exenteration than chronological age. Careful preoperative staging, including either computed tomography (CT) scan or magnetic resonance imaging (MRI), will usually identify patients with distant metastases, extrapelvic nodal disease, or disease involving the pelvic sidewall (which generally precludes surgery). The recent application of intraoperative radiotherapy or postoperative high-dose brachytherapy for patients with more advanced pelvic disease, which may include sidewall involvement, may expand the standard indications for exenteration. However, the intent of this procedure, with or without radiotherapy, should be resection of all the tumor with the aim of cure since the place of palliative exenteration is controversial at best [11].

Carcinoma of the uterine cervix is the most frequent indication for anterior pelvic exenteration [3]. This operation consists of radical excision of the uterus and appendages, pelvic lymph nodes, vagina and the urinary bladder. Urinary diversion takes place through the formation of an intestinal-cutaneous uterostomy with the use of a small intestinal loop or through the creation of a urinary bladder from the rectal-sigmoid flexure [7, 8].

Qualification for anterior exenteration ought to be conducted extremely thoroughly on account of the extensive and drastic nature of the operation, which is performed in cases of advanced carcinoma of the uterine cervix or in patients with confirmed neoplastic recurrence in the area of the small pelvis. This procedure is also conducted in patients who, after radiotherapy treatment for uterine cervix carcinoma, exhibit post-radiation rectal-vaginal and cysto-vaginal fistulae and in whom remedial operations have not brought satisfactory results [5, 6, 12].

Contraindications for exenteration include: distant neoplastic metastases, occupation of the walls of the small pelvis by a neoplastic process and retroperitoneal changes.

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

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 cancers. Major early urinary complications are significantly increased in patients who have received pre-

vious pelvic radiation therapy and in patients who have had an intestinal conduit for urinary diversion [13].

Late complications are associated with urinary diversion. They may include stenosis, chronic or recurrent pyelonephritis, prolapsed stoma, incontinent or obstructed reservoir and calculus in a reservoir [13, 14].

After pelvic exenteration patients are at high risk for development of cardiac complications, adult respiratory distress syndrome and pulmonary emboli [7, 10].

Pelvic exenteration can provide a good chance of long-term survival in carefully selected patients but the role of palliative exenteration in patients with nonresectable disease is still controversial [5]. New approaches such as intraoperative radiotherapy or combined operative radiotherapy should be considered.

The overall cumulative 5-year rate survival is reported to be about 32% [5-7, 16]; 68.6% for the primary group and 16.7% for the recurrent group [6]. The %-year survival rate was 51.3% for the patients who had surgical margins free of disease whereas it was 0% in the patients who had positive surgical margins [6].

Cumulative 5-year survival has been significantly related to the presence of metastatic disease to the regional lymph nodes (8% 3-year and 0% 5-year survival), time interval from primary diagnosis to exenteration (within 1 year 44%, 1-10 years 60%, and over 10 years 95%), and cell type (squamous cell 68%, sarcoma 62%, and adenocarcinoma 26%) [16].

Patients with squamous cell carcinoma of the cervix had a cumulative 5-year survival of 73%, compared with nine patients with adenocarcinoma of the cervix, who had a 22% 5-year survival. No significant difference in survival existed for the type of exenteration, original stage of squamous cell cervical carcinoma, size of recurrent squamous cell lesion, or age of the patient [6, 15, 16].

The aim of this radical treatment of operating on advanced states of uterine cervix carcinoma is to remove in their entirety the tissues that have been neoplastically changed, which gives the chance of a cure and also a definition of the real stage of advancement of the disease and thus supplementary treatment or a halt to further therapeutic procedures.

Anterior exenteration in patients with advanced carcinoma of the uterine cervix creates a chance for prolonged life and considerably increased quality of life [5, 6, 17].

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 stage cancer remain disappointing. Radiation complications in those patients can also be severe so total pelvic exenteration should no longer be reserved for salvage therapy and should perhaps be compared with chemoradiotherapy as first-line treatment [17, 18].

Operations of exenteration of the small pelvis are the most extensive operations undertaken by gynecologists. Exenteration is currently a multi-specialist operation requiring the services of gynecologists and urologists in cases of advanced neoplasms in the female genital tract.

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