

# Pelvic exenteration for locally advanced primary and recurrent pelvic neoplasm: a series of 54 resectable cases

A exenteração pélvica para o tratamento da neoplasia pélvica localmente avançada e recorrente: experiência de 54 casos operados

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## ABSTRACT

**Objective:** To report on a series of 54 patients with pelvic neoplasms submitted to curative pelvic exenteration at a tertiary hospital and describe the results (morbidity, mortality, and long-term survival).

**Methods:** The complete data of 54 patients submitted to pelvic exenteration between 1999 and 2007 were evaluated. Sixteen men and 38 women with a mean age of 65 years and median age of 66 years (36 to 77) were studied. Surgical procedures included total pelvic exenteration (n = 26), anterior pelvic exenteration (n = 5), and posterior pelvic exenteration (n = 23). **Results:** The mean operative time was 402 minutes (280 to 585). The average volume of intraoperative bleeding was 2,013 ml (300 to 5,800). Postoperative mortality was 5% (n = 3). The overall morbidity rate was 46% (n = 25). Histological evaluation demonstrated that 47 resections were R0 (87%) while seven were R1 (13%). The overall survival rate in five years was 23.5% (n = 12). **Conclusions:** Despite its aggressive nature and high morbidity, pelvic exenteration is still justified in locally advanced pelvic neoplasms or even in isolated pelvic recurrence, since it affords a greater long-term control of the neoplasm.

**Keywords:** Pelvic exenteration; Rectal neoplasms; Genital neoplasms, female/mortality; Morbidity

## RESUMO

**Objetivo:** Relatar uma série de 54 pacientes com neoplasias pélvicas submetidos à exenteração pélvica curativa em um hospital terciário e descrever seus resultados (morbidade, mortalidade e sobrevida em longo prazo). **Métodos:** Os dados completos de 54 pacientes submetidos à exenteração pélvica entre 1999 e 2007 foram avaliados. Foram estudados 16 homens e 38 mulheres com média de idade de 65 anos e mediana de 66 anos (36 a 77). Os procedimentos cirúrgicos incluíram: exenteração pélvica total (n = 26), exenteração pélvica anterior (n = 5) e exenteração pélvica posterior (n = 23).

**Resultados:** A média de tempo cirúrgico foi de 402 minutos (280 a 585). A média de sangramento intra-operatório foi de 2.013 ml (300 a 5.800). A mortalidade pós-operatória foi de 5% (n = 3). A taxa de morbidade global foi de 46% (n = 25). A avaliação histológica demonstrou que 47 ressecções foram R0 (87%) enquanto sete foram R1 (13%). A sobrevida global em cinco anos foi de 23,5% (n = 12).

**Conclusões:** Apesar de sua natureza agressiva e alta morbidade, a exenteração pélvica permanece justificada na neoplasia pélvica localmente avançada ou mesmo na recidiva pélvica isolada, pois pode conferir maior controle da neoplasia em longo prazo.

**Descritores:** Exenteração pélvica; Neoplasias retais; Neoplasias dos genitais femininos/mortalidade; Morbidade

## INTRODUCTION

Pelvic exenteration is an ultra-radical surgical procedure first described in 1948 by Brunschwig, who made an account of a multivisceral pelvic resection for the treatment of advanced pelvic neoplasm. This operation consists of the removal of all pelvic organs including not only the uterus, ovaries, and vagina, but also the distal ureters, bladder, and rectosigmoid<sup>(1)</sup>. After exenteration comes the reconstruction phase that, in Brunschwig's days, was performed by a terminal cutaneous ureterosigmoidostomy. In the first 22 cases reported, this author presented a postoperative mortality rate of 23%, and in the surviving population, the long-term follow-up was not described. The present author considered this procedure *a priori* as a palliative, rarely used at that time due to its prohibitively high morbidity and mortality rates. However, during the subsequent 20 years, with a significant improvement of the operative

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technique and a better definition of its indications, this type of operation reappeared<sup>(2)</sup>.

One of the admirable advances related to this type of surgery was the urinary reconstruction technique, which at the time led to high rates of morbidity. Bricker et al.<sup>(3,4)</sup> described a new technique consisting of the use of an ileal segment to prepare a cutaneous ureteroileostomy. This reconstruction significantly decreased the metabolic and infectious complications of the cutaneous ureterosigmoidostomy previously recommended by Brunschwig. These authors published a series of 312 patients with advanced pelvic cancer, which included not only patients with advanced cervical cancer, but also with advanced pelvic tumors such as of the rectosigmoid, uterus, vagina, bladder, vulva and ovaries. From 1950 to 1965, the surgical mortality index dropped from 13.8 to 1.8%, with 7.8% mortality specific for post-radiotherapy uterine cervical cancer. The overall mortality for this entire series was 10%<sup>(3-5)</sup>.

Pelvic exenteration can be classified as anterior, posterior, and total. In anterior exenteration, monoblock resection is performed of the female genital organs along with those of the lower urinary tract (distal ureters and bladder). This operation has its greatest indication in locally advanced or recurrent pelvic neoplasms involving, exclusively, the lower urinary tract (bladder and ureters) and female genital tract (uterus and vagina). In posterior exenteration, monoblock resection is made of the female genital organs along with the rectosigmoid, and its greatest indication is in locally advanced or recurrent pelvic neoplasms involving exclusively the female genital tract and the rectosigmoid. Finally, when the neoplasm involves both the urinary and genital tracts (female or male) besides the rectum, monoblock resection of all these structures is called total pelvic exenteration. This operation is subdivided into supralelevator or infralevator as to preservation, or not, of the sphincter apparatus. In the supralelevator exenteration, the pelvic floor is preserved, while in the infralevator technique, the entire sphincter apparatus is resected along with the inferior portion of the vagina, vulva, or perineum including the anus and urethra. Supralelevator exenteration has its greatest indication in pelvic tumors that do not involve the pelvic floor, and may, therefore, be associated with higher rates of sphincter preservation. On the other hand, infralevator exenteration is habitually reserved for cases in which these structures are involved or for cases of voluminous pelvic tumors that preclude an exclusively abdominal approach<sup>(8-9)</sup>.

Pelvic exenteration has been indicated for the treatment of different pelvic neoplasms, both primary and persistent, or those that rarely occur. Although historically described for the management of advanced uterine cervix cancer, this operation has been

recommended for treating different locally advanced tumors, such as those of the rectum, endometrium, vagina, vulva, or even the urinary bladder. In special situations, it may also be indicated for the treatment of ovarian cancer, for isolated pelvic recurrence of cancer of the rectum, or exceptionally for the correction of complex post-radiotherapy fistulas<sup>(10-14)</sup>.

The objective of the present study was to evaluate the short and long-term results of potentially curative pelvic exenteration for the treatment of locally advanced and recurrent pelvic neoplasms (isolated pelvic recurrences). In this way, the authors conducted a retrospective analysis of all cases of (curative) pelvic exenteration performed exclusively at the General Surgery and Oncosurgery Service, Hospital do Servidor Público Estadual de São Paulo "Francisco Morato de Oliveira" (HSPE-FMO). The type of exenteration, mortality, morbidity, mode of recurrence, and long-term survival were evaluated.

## METHODS

Fifty-four cases of locally advanced and recurrent pelvic neoplasms (isolated pelvic recurrence) treated by pelvic exenteration were studied. All patients were selected by means of the Institutional Cancer Register of HSPE-FMO, during the period between January 1999 and June 2007. All patients of the present study were operated exclusively by the General Surgery and Oncosurgery Service of this hospital.

Of the 54 patients studied, 16 were male and 38 were female. Age varied from 36 to 77 years, with a mean age of 65 years and a median age of 66 years. As to ethnicity, 45 patients were Caucasian, while 8 were Black and one was Yellow. As to classification by the American Society of Anesthesiologists (ASA), the following distribution was determined: 38 were ASA I, 11 were ASA II, and three were ASA III. Two patients were not classified. Thirty-eight individuals had locally advanced primary tumors, while 16 had recurring or persistent tumors. Most were symptomatic (88%) regarding the neoplasm. All were diagnosed by clinical, radiological, and histological examination. Demographic, clinical, and histological characteristics are shown on Table 1. In this series, only the patients submitted to some type of standardized pelvic exenteration were considered for study. All were submitted to biopsy of the lesion, computed tomography of the abdomen-pelvis, and plain chest X-rays for staging. Additionally, the serum levels of CEA, CA 19-9, and CA 125 were dosed. Ten underwent magnetic resonance of the abdomen and five were further submitted to anorectal ultrasonography. Only the potentially curative resections (R0) were considered in this sample.

**Table 1.** Demographic and clinical characteristics of patients submitted to pelvic exenteration

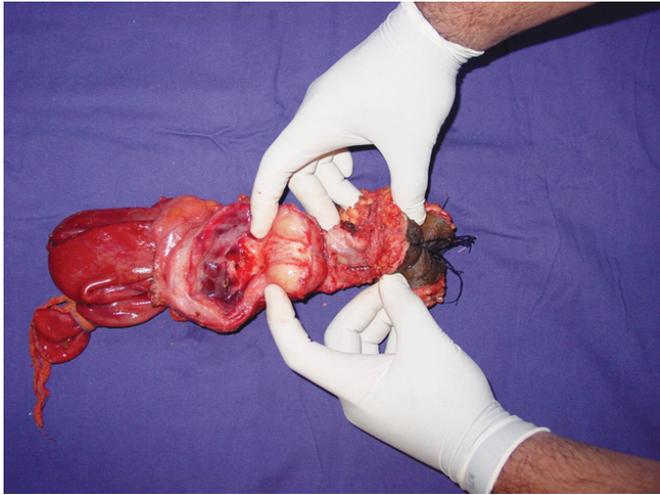
<b>Tumor type (n = 54)</b>	
Locally advanced primary	38
Isolated pelvic recurrence	16
<b>Origin of locally advanced primary (n = 38)</b>	
Rectum	15
Ovary	19
Endometrium	2
Bladder	1
Urethra	1
<b>Origin of isolated pelvic recurrence (n = 16)</b>	
Rectum	12
Cervix	4
<b>Symptoms (n = 48)</b>	
Pelvic pain	27
Constipation	20
Palpable mass	16
Bleeding	14
Urinary complaints	10
Rectovaginal or rectovesical fistula	5
<b>Histological type (n = 54)</b>	
Adenocarcinoma	47
Epidermoid carcinoma	4
Sarcoma	3
<b>Histological grade (n = 54)</b>	
Grade I	21
Grade II	20
Grade III	13

The entire total pelvic exenteration (TPE) was performed as per the technique of Moryia, Akasu, Fujita and Yamamoto<sup>(12)</sup>, previously described in a study carried out at our Service<sup>(9,11)</sup>. The technical principles followed were: extended lymphadenectomy with high ligature of the inferior mesenteric artery, and for cases of tumors below the peritoneal deflection, bilateral lymph node dissection along the external iliac vessels including the obturator fossa was used. Additionally, complete monoblock removal of all pelvic structures, such as rectum, bladder, and urethra below the iliac vessel bifurcation, internal genital organs, and bilateral internal iliac vessels. For female patients with tumors which exclusively compromised the genital tract and the lower urinary tract, an anterior exenteration was performed (resection of the bladder and distal urethra amplified with a radical monoblock hysterectomy associated with pelvic lymphadenectomy). On the other hand, for female patients with tumors that compromised exclusively the rectum and genital tract, posterior pelvic exenteration was performed (anterior extended resection of the rectosigmoid with radical monoblock hysterectomy associated with pelvic lymphadenectomy). Finally, only in cases of ovarian

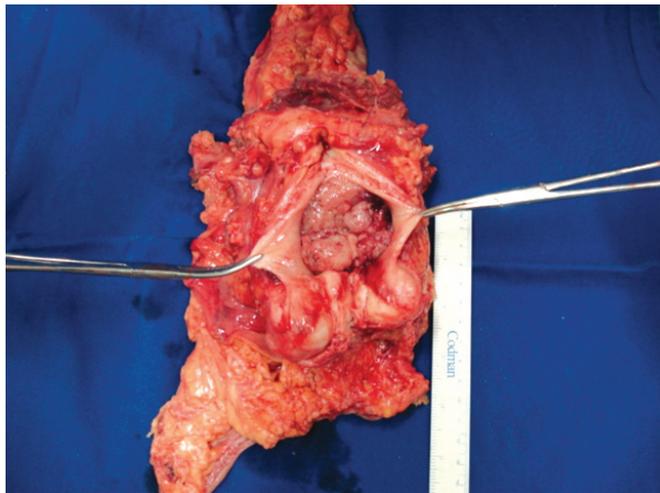
tumors with invasion of the rectovaginal cul-de-sac (cul-de-sac tumor) did the posterior exenteration follow the technical standardization described by Eisenkop, Nalick and Teng<sup>(13)</sup>. In cases of ovarian cancer (n = 17), besides pelvic lymphadenectomy, the retroperitoneal (para-aortic) lymphadenectomy was also performed below the renal vessels associated with an optimal cytoreduction operation (less than 1 cm of residual disease).

As to the type of pelvic exenteration, the following distribution was determined: total pelvic exenteration (n = 26), posterior pelvic exenteration (n = 23), and anterior pelvic exenteration (n = 5). As to total exenterations performed, this was the distribution: infralevator in 16 patients (Figure 1) and supralevator in ten patients (Figures 2 and 3). In four patients, this resection was also associated with partial sacrectomy. In parallel, posterior exenterations showed the following distribution: modified posterior exenteration (n = 17), classic posterior exenteration (n = 4), and classic posterior exenteration associated with partial cystectomy and urethrectomy (n = 2). There was sphincter preservation in 24 patients (49%), most of them were posterior exenterations (n = 21). As to the type of urinary derivation, the following reconstructions were performed: cutaneous ureteroileostomy as per Bricker in 31 patients and ureteroneocystostomy as per Boari in two patients. Only patients with ovarian cancer underwent other operations besides the exenteration, which were part of the optimal debulking process. This group included hemicolectomy (n = 5), enterectomy (n = 5), splenectomy (n = 2), apendicectomy (n = 2), diaphragm striping (n = 2), and partial hepatectomy (n = 1). Operative time varied from 280 to 485 minutes with a median duration of 402 minutes. Forty patients were transfused (74%), and intraoperative bleeding varied from 300 to 5,800 ml with an average of 2,013 ml. Mean hospitalization time was 19 days, varying from seven to 45 days. As to multidisciplinary treatment, neo-adjuvant treatment was used in 27 patients and adjuvant treatment in 28. Six received exclusively surgical treatment (Table 2).

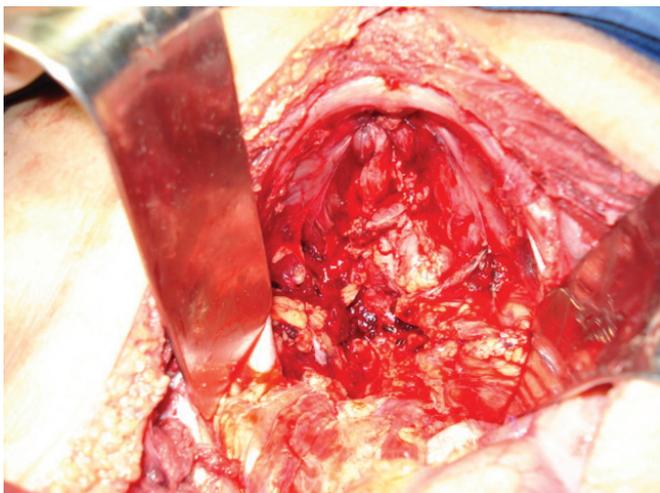
After surgical treatment, all were followed at three-month intervals (up to two years), six-month intervals (between two and five years), and finally every 12 months (after five years). At each follow-up visit, besides the complete physical examination, CEA, CA 125, and CA 19-9 were dosed and total ultrasonography of the abdomen, computed tomography of the abdomen-pelvis, and plain X-rays of the chest were made. A colonoscopy was also performed once a year as of the first year after surgery, for the patients with rectal neoplasms. Tumor recurrence was considered only in cases of unequivocal radiological documentation, if possible with histological confirmation.



**Figure 1.** Surgical specimen – Infralevator exenteration due to rectum cancer T4 (note tumor with invasion of the vesical trigone and sacrum – bladder, prostate open anterior and longitudinally)



**Figure 2.** Surgical specimen – supralevator exenteration due to rectum cancer T4 (note vegetating lesion invading the vesical trigone – bladder, prostate open anterior and longitudinally)



**Figure 3.** Aspect of the pelvis after supralevator exenteration

**Table 2.** Characteristics of surgeries and multidisciplinary treatment

Operative time (mean/minutes)	402 (280-585)
Intraoperative bleeding (mean/ml)	2,013 (300-5,800)
Length of hospital stay (mean/days)	19 (7-28)
<b>Type of exenteration</b>	
Total	26
Infralevator	16
Supralevator	10
Anterior	5
Posterior	23
<b>Type of urinary reconstruction</b>	
Bricker	31
Boari	2
<b>Multidisciplinary treatment</b>	
Neo-adjuvant	27
Radiation therapy + neo-adjuvant chemotherapy	28
None	6

**RESULTS**

Three patients died during the early postoperative period (up to 30 days), which led to an overall mortality rate of 5.55%. Cases of death are shown on Table 3. Twenty-five patients experienced postoperative complications, with an overall morbidity of 46%. There were ten significant complications, all treated surgically (rate of reintervention of 18.5%). The main complications were infectious, such as intracavitary abscesses (n = 8); the most commonly observed were pelvic abscesses (n = 6) and fistulas (n = 5). The fistula from the colonoanastomosis was the most common, with two cases (8%), followed by fistulas of the small intestine, urinary tract (ureteroileostomy as per Bricker), and rectovaginal, all with one case each. Postoperative complications are shown on Table 4.

**Table 3.** Characteristics of cases of death

Case	Age	Neo-adjuvant treatment	Type of surgery	Intraoperative bleeding	Cause of death
1	65	Radiation therapy	Total infralevator pelvic exenteration + sacrectomy	4,800 ml	Pulmonary embolism
2	70	Radiation therapy + chemotherapy	Total infralevator pelvic exenteration	4,000 ml	Anastomotic fistula + pelvic abscess
3	67	Chemotherapy	Total supralevator pelvic exenteration	4,500 ml	Anastomotic fistula + pelvic abscess

Forty-seven resections were R0 (microscopically free margins) in the histological evaluation of the surgical specimen (87%), while seven (13%) were R1 (microscopically compromised margins). Of the seven microscopically compromised patients, four were primary

**Table 4.** Complications

Morbidity	46% (n = 25)
<b>Complications</b>	
Intracavitary abscess	8
Fistula	5
UTI	3
BCP	3
DVT/PE	3
Prolonged ileus	2
Acute renal failure	1
<b>Re-operation</b>	<b>18% (n = 10)</b>
<b>Mortality</b>	<b>5.55% (n = 3)</b>

UTI: urinary tract infection; BCP: bronchopneumonia; DVT: deep venous thrombosis; PE: pulmonary embolism

tumors of the ovaries while three resulted from isolated pelvic recurrence due to cancer of the rectum. The median number of lymph nodes dissected was 28, varying from 17 to 45. There was lymph node involvement in 18 patients (34%). Nine patients with cancer of the rectum (four primary and five recurring) and nine with ovarian cancer showed lymph node involvement. Proportionally, patients with ovarian cancer more often presented with affected lymph nodes (47 versus 33%) than did the others. The mean number of affected lymph nodes was three, and there was no difference as to the type of tumor.

The most frequently involved basin was pelvic (iliac-obturator) with nine patients, followed by the perirectal basin (mesorectum) with five, and the retroperitoneal (para-aortic) basin with four patients. Only in cases of ovarian cancer there was involvement of the retroperitoneal basin.

As to preoperative symptoms, only seven patients did not reach total control after the surgical procedure. All were due to pelvic pain (one due to cancer of the rectum, three due to isolated pelvic recurrence, and three due to ovarian cancer), and these patients continued to use analgesics to control pain, although at lower doses and frequencies. All other patients returned to their daily activities with total control of their symptoms after the surgical procedure. The rate of success of symptom control was 87% (n = 47).

Mean overall survival was 37 months. Overall five-year survival was 23.5% (n = 12). Only patients with locally advanced tumors of the rectum (n = 5), endometrium (n = 2), and bladder (n = 1), or with isolated pelvic recurrence due to uterine cervix tumor (n = 4) reached a survival of five years or more. In this subgroup, survival was proportionally greater (mean of 47 months) than in the subgroup with ovarian cancer (mean of 40 months) and the subgroup of isolated pelvic recurrences due to rectal cancer (mean of 26 months). The five-year survival rate for patients with no lymph node involvement was 33% regardless of the origin. In this group, 12 had a survival greater than five years (maximal survival was 80 months). Conversely,

no patient with lymph node involvement survived for five years (survival between 13 and 38 months). Mean survival of the group with no lymph node involvement was 43 months, while for those with lymph node involvement it was only 23 months. These results are shown on Table 5.

**Table 5.** Characteristics of follow-up and survival

Overall five-year survival	23.5%
Five-year survival/negative lymph node	33%
Five-year survival/positive lymph node	0%

Twenty-five patients experienced some kind of recurrence (50%). As to the type of tumor, isolated pelvic recurrence due to rectal cancer presented most recurrences (66.7%), proportionally, followed by ovarian cancer (63%) and by locally advanced rectal cancer (33.3%). In patients with isolated pelvic recurrence of uterine cervix cancer, as well as in other locally advanced primary cancer cases, no recurrence was noted. As to location of recurrences, the distribution was peritoneum (n = 11), pelvis (n = 11), liver (n = 5), and lungs (n = 1). The disease-free interval varied from 9 to 30 months, with a mean of 20 months. Survival after recurrence varied from 3 to 18 months, with a mean of nine months. All patients with lymph node involvement showed some kind of recurrence and died due to the disease. On the other hand, of the 36 with no lymph node involvement, only two (both due to locally advanced T4 primary tumor of the rectum) experienced recurrences (one patient in the liver and one patient in the liver and peritoneum) during a period that varied between 20 and 30 months. One patient with hepatic and peritoneal recurrence lived until the 20-month follow-up (end of the study), while the other with exclusively hepatic recurrence died from the disease at 36 months of follow-up (having undergone a rescue hepatectomy 18 months after exenteration). These numbers are demonstrated on Table 6.

**Table 6.** Characteristics of recurrences

Recurrence	n = 25 (50%)
Peritoneal	11
Pelvis	11
Liver	5
Lungs	1
Multiple	5
<b>Mean disease-free interval (months)</b>	<b>20 (9-30)</b>
<b>Mean survival/recurrence (months)</b>	<b>9 (3-18)</b>

## DISCUSSION

In its early phases, pelvic exenteration displayed a prohibitive mortality rate of about 20% with low rates of long-term survival. With advancement of the operative technique, improvement of both intra

and postoperative support measures, and a better selection of patients there was a growing decrease in postoperative mortality and consequent prolongation of patient survival. At present, mortality from this operation is around 5%, while the five-year survival of patients submitted to R0 resection varies from 35 to 70% depending on the type of tumor treated<sup>(14-30)</sup>. Mortality of the present series is within parameters most recently published in literature. Nevertheless, a simple comparison of these rates may lead to error, since, considering its restricted indication, few facilities have performed this type of surgery on a large scale, and its indications vary within different institutions. Pelvic exenteration, even at specialized centers, involves intensive and exhaustive training of the surgical team. Knowledge of the complex reconstructions both of the digestive tract (low anastomoses and pouches) and of the urinary tract (anastomoses, derivations, and urinary reservoirs) has been fundamental for its success. Operative time is generally extensive and usually associated with large-scale hemorrhage, whether during the operation or even postoperatively, frequently requiring blood transfusions. Therefore, only highly selected individuals who are in favorable clinical conditions (healthy) and truly have a possibility for cure should be selected for such operation. A review of literature on 932 patients submitted to pelvic exenteration demonstrated that this operation has been prohibitive for individuals with limiting associated diseases. Emotional stability and a positive attitude are essential, in addition to good family support. Although obesity and advanced age have been considered relative contraindications for the procedure, other clinical situations such as arterial vascular invasion, bilateral urethral involvement, invasion of bone structures (pelvic wall and lumbar spine) and nervous structures (sciatic nerve, sacral structures), or even lymph node metastases or at a distance have been considered absolute contraindications for this type of operation<sup>(6-7)</sup>.

Despite the fact of a decrease in mortality due to the progress of technical and support measures, morbidity of pelvic exenteration is still high. These indices varied widely according to the type of exenteration and level of experience of the facility. Recent studies have shown morbidity between 20 and 70% in the different series, with a mean of around 50% at the largest institutions<sup>(8-30)</sup>. The morbidity observed in our cases, even though stemming from a general training hospital, is within foreseen values. This inclusive morbidity is lower than that reported in prior studies of large centers specialized in oncology<sup>(17,21)</sup>. Among the main complications reported, anastomotic dehiscence of both the digestive and urinary tract, and infections

(intracavitary abscesses, urinary tract infection, and pneumonias) were the most commonly noted. In the present study, this type of complication was the most frequently noted as well. In this series, as was reported by other authors, the most significant complications, such as intracavitary abscesses due to both coloanal and small intestine fistulas were treated by surgical intervention. Even though it remains as the adopted procedure at our facility, the use of protective ostomy in low anastomoses or in patients with dehiscence of the anastomosis who underwent radiation may occur even in this situation, culminating in a pelvic abscess. In the present series, the percentage of anastomotic fistulas was low and similar to that found by other authors who report rates of 0 to 14%<sup>(24)</sup>. It is pertinent to reiterate that the fistulas occurred in extreme cases, in which the patients experienced the greatest intraoperative hemorrhages of this series (> 4,000 ml). As has been previously reported, hemodynamic instability and the large number of transfusions may be associated with a higher risk of anastomotic fistulas<sup>(25)</sup>. More rarely, circulatory complications such as thromboembolism or even acute myocardial infarct have also been reported. As was observed in the present study, although the morbidity of the exenteration is elevated and reflects an increase in hospitalization time and treatment costs, the rate of reintervention has remained relatively low<sup>(24-25)</sup>.

Regarding the high morbidity and a significant mortality, exenteration may lead to prolonged long-term survival in selected patients. In this study, it was possible to observe that survival was different according to the specific type of tumor treated. Even though no specific test was carried out, a greater survival was noted in locally advanced rectal cancer (47 months), a datum similar to that previously described by other authors in which the five-year survival in this select subgroup of patients reached 60%<sup>(11,12,17,21)</sup>. A different panorama has been observed in isolated pelvic recurrences due to rectal cancer, in which exenteration has a much more palliative than curative nature. Survival in this subgroup was the lowest reached, with a mean of 26 months. None of the patients from this subgroup survived more than five years, a finding similar to that described by other authors who have reported five-year survival rates that vary from 0 to 23% for patients in this situation submitted to a R0 resection<sup>(11,21-23)</sup>. On the other hand, for central recurrence of uterine cervical carcinoma and other locally advanced neoplasms of the genital tract, except ovarian cancer, exenteration may prolong long-term survival. Even though our set of cases regarding this subgroup is small, all patients survived more than five years and without recurrences, a result similar to that reported by De Wilt et al.<sup>(14)</sup>, in which up to 50%

of patients with gynecological tumors survived for more than five years when submitted to this operation.

Pelvic exenteration for the treatment of advanced epithelial ovarian cancer, although abandoned in the past due to the high morbidity and high rates of recurrence, especially due to its non-favorable biology (early transcoelomic dissemination) has reappeared more recently. Although this operation should be considered with caution, and be indicated only in highly selected cases, it has an important role when cytoreduction is optimal (less than 1 cm of residual disease or more recently, microscopic disease). Historically, optimal debulking has been considered one of the most important prognostic factors both of disease-free survival and of global survival of patients with epithelial ovarian cancer in advanced stages<sup>(25)</sup>. However, in order to obtain optimal cytoreduction in cases of extensive pelvic disease that invariably compromises structures adjacent to the female genital tract, it is necessary, in the large majority of patients, to perform a monoblock resection of the rectosigmoid or even a partial or total resection of the lower urinary tract. According to different authors, monoblock rectosigmoidectomy was performed in 16 to 58% of patients with advanced stage III-IV ovarian cancer<sup>(25-30)</sup>. By using the technique described as modified posterior pelvic exenteration, Eisenkop, Nalick and Teng<sup>(13)</sup> obtained optimal debulking (with no residual macroscopic disease) in the pelvis in 18 of 47 (38.8%) patients with advanced ovarian cancer. After a median follow-up time of 13.3 months, in 15 (40.5%) of the primarily operated patients no pelvic recurrence was observed. In extending his initial study, Eisenkop et al.<sup>(26)</sup> evaluated 163 patients with advanced ovarian cancer and were able to perform successfully the modified posterior pelvic exenteration with low rectal anastomosis in 85 patients (52.1%). In 139 of these 163 patients (85.35%), the entire tumoral implant visible macroscopically was removed. Benedetti-Panici et al.<sup>(27)</sup>, in describing the retroperitoneal approach for the treatment of ovarian cancer performed in 66 of 147 patients with advanced neoplasms (45%), colorectal resection was necessary in 14 of 66 patients (21%). With this approach, these authors were also able to reach optimal debulking (less than 5 mm of the largest residual tumoral implant) in 60 patients (91%). These studies demonstrated the important role of multivisceral pelvic resections (exenteration) in obtaining optimal debulking in patients with advanced ovarian cancer, with the objective of prolonging survival. In the present study, it was also possible to observe that pelvic exenteration afforded optimal debulking in all patients, and in most, the macroscopic disease was not noted at the end of the operation (78%

surgery with no macroscopic residue). Nevertheless, as was true for those authors, our point of view is that this operation remains justified only when the entire tumor volume, both of the pelvis and of the upper abdomen, may be totally reduced to less than 1 cm of residual disease. Even so, this conduct may lead to considerable morbidity and significant mortality. The morbidity in this subgroup of patients was similar to that described in literature<sup>(25-30)</sup>. In our region, few specific series of exenteration for advanced pelvic cancer were described. Particularly for advanced ovarian cancer, we found no study similar (that includes a large number of patients) as to treatment with curative intention using multivisceral pelvic resections (exenteration) as a part of the optimal debulking strategy. In the present series, the rate of optimal debulking was 56.66%, similar to the results published most recently by other authors, which varied between 50 and 75%<sup>(25-30)</sup>. In our study, when overall survival of patients submitted to optimal debulking was compared to those not submitted to this technique (exclusive chemotherapy, suboptimal debulking, palliative treatment), it was greater with a mean of 40 months (median of 42 months) *versus* 13 months in the palliative group (optimal debulking and/or chemotherapy). Overall survival in three years was 77 *versus* 0%, but disease-free survival was 44%, i.e., recurrence was high especially in the peritoneum or pelvis. On the other hand, there were no survivors in five years, even in the group submitted to optimal debulking. Our results are similar to those observed by Buttarelli et al.<sup>(24)</sup> who noted a median survival of 36.6 months. More recently, Park et al.<sup>(30)</sup> also observed 30 months of median survival for patients submitted to optimal debulking with associated pelvic exenteration. These authors also observed that the three-years survival was 82.03% for this group compared to 66.63% in patients submitted to suboptimal debulking ( $p = 0.04$ ). Therefore, these findings support the use of extensive pelvic surgery, such as exenteration, as a part of the treatment of advanced ovarian cancer when optimal debulking is possible. Despite being the exception and not the rule, besides affording prolonged survival, it may also improve the debilitating symptoms of advanced ovarian cancer such as constipation, tenesmus, or even pelvic pain, thus furnishing better quality of life.

Survival of patients submitted to pelvic exenteration depends on different prognostic factors; among them, the most commonly reported are the presence of affected lymph nodes and a positive resection margin (R1 or R2). When present, these factors were associated with short survival with a negative impact regardless of the tumor treated<sup>(11,16,18)</sup>. Even though no specific statistical test was used in the present sample, all patients who had

lymph node or positive margin involvement died from recurrence within a short time. On the other hand, 12 of 36 patients with no lymph node involvement survived for more than 60 months.

The great majority of advanced pelvic tumors condemns patient to intense and debilitating suffering, and negatively influences their quality of life. Pelvic exenteration promotes an effective control of most of these symptoms. Both fistulas (rectovaginal or rectovesical) and bleeding (vaginal or rectal) are the symptoms most frequently controlled by the operation. In this study, there was a considerable improvement of symptoms relative to the preoperative condition. Even though no specific questionnaire was used to evaluate quality of life, the absolute majority of these patients returned to their daily routines, with none of the incapacitating symptoms noted during the preoperative period. Control of the pain was possible for the majority of patients, but 11 patients experienced pelvic recurrences (21.5%); therefore, it cannot be concluded that long-term pain relief may be obtained by this operation. Even though no questionnaire was prepared on quality of life in this study, a temporary improvement of symptoms was noted in most patients submitted to exenteration.

Similar to Butarelli et al.<sup>(24)</sup>, anal continence was possible to achieve in all patients submitted to the coloanal anastomosis, thus improving their quality of life. All patients returned to their daily activities. Preoperative symptoms were well controlled in 87% of patients, positively influencing their quality of life.

## CONCLUSIONS

Pelvic exenteration for the treatment of pelvic neoplasms is a procedure to be used as an exception for specific occasions in highly selected individuals. In our region, it displays considerable mortality and a high rate of morbidity. In parallel, this operation may offer long-term control of pelvic neoplasms. It produces better results in locally advanced tumors of the rectum and in gynecological tumors of non-ovarian etiology. Additionally, it may offer better quality of life to patients who frequently present with debilitating symptoms that are difficult to manage clinically.

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