Palliative Pelvic Exenteration: Patient Selection and Results

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Total pelvic exenteration is a radical abdominoperineal operation designed to treat locally extensive pelvic malignancy. In the past, the morbidity and mortality has been such that this procedure was considered justified.

Introduction

Total pelvic exenteration is a radical extirpative procedure designed to treat pelvic malignancy that has invaded more than one of the hollow organs of the genitourinary or gastrointestinal tracts. The early experience with exenterative surgery focused on cervical and rectal cancer [1-5]. The biologic characteristics of these tumors (ie, central pelvic growth in a locally advanced pattern without distant disease) permit the consideration of radical, extensive pelvic surgery. Other extensive or recurrent tumors that may be amenable to exenterative surgery are vaginal squamous- and clear-cell carcinoma; squamous-cell carcinoma of the vulva; endometrial carcinoma; leiomyosarcomas of the vagina, cervix, and uterus; melanoma of the vagina or vulva; and Bartholin gland tumors [6]. Less favorable cancers are ovarian, prostate, and bladder carcinomas, because of their tendency toward widespread hematogenous metastases in the presence of limited primary tumor growth.

Bulky pelvic malignancy is notorious for the production of disabling symptoms. Pain, infection, bleeding, obstruction, and fistula formation are the most serious consequences of uncontrolled local tumor growth. The goal of treatment in the initial widespread application of pelvic exenterative surgery was palliation of these symptoms in patients who had either failed to respond to or were not candidates for conventional therapy [1]. Institutional operative mortality as high as 33% was reported in these early series. Morbidity was also significant, and postoperative recovery was often long and arduous.

Nevertheless, the operation was considered beneficial with regard to relieving symptoms in patients with limited options. As reported by Brunschwig: "Because of the advanced stage of their disease, it is not to be anticipated that many, if any, of these patients will survive for very prolonged periods....On the other hand, of those surviving at this writing, not one has expressed the feeling that they would have preferred to have remained as they were and not to have had the operation [1]."

As more of these procedures were performed and longer follow-up was reported, it became apparent that some carefully selected patients were long-term survivors after pelvic exenteration. Five-year survival rates after radical pelvic surgery for gynecologic malignancy approached 60% [7-10] and were as high as 50% [11-14] for some patients with locally advanced primary colorectal cancer.

Despite favorable results in some patients, the recognized morbidity and mortality associated with exenterative surgery added to the controversy surrounding its use as a palliative procedure, and strict guidelines were established to select those patients who were most likely to benefit from this procedure. These criteria include an exhaustive preoperative and operative evaluation to ensure the absence of extrapelvic spread of disease, as well as to assess pelvic bones, muscles, major nerves, and blood vessels for extent of cancer involvement. An assessment of the patient's underlying physical and psychiatric condition, with consideration of malnutrition, sepsis, obesity, advanced age, or inadequate cardiopulmonary reserve, also should be carried out before the final decision about whether to perform a palliative pelvic exenteration is made [15]. As with many technically demanding procedures, a learning curve has been identified for radical pelvic surgery. The literature following the institutional experience with pelvic exenteration over the past 47 years has demonstrated a dramatic decrease in mortality associated with this surgery. Since the early 1970s, reports of operative mortality of less than 5% have been published, and these types of statistics are becoming more common in the current literature [15-18].

Thus, although the value of radical pelvic surgery for the palliation of symptoms caused by pelvic...
malignancy continues to be a controversial issue [19], several institutions are reporting good results, with improvements in quality of life and reasonable associated operative morbidity and mortality. In this article, we will explore the definition of palliation in the context of radical pelvic surgery and the process of selecting appropriate patients for this type of surgery, as well as the expected results.

Three Definitions of Pelvic Exenteration

Radical pelvic surgery for palliation of local symptoms have been defined in three ways in the literature. The most obvious definition is based on intent. If an operation is embarked upon with the foreknowledge that all of the tumor cannot be removed, the objective of the operation is not cure, but rather palliation of the symptoms of local tumor growth. This definition may include patients with minimal distant metastases associated with uncontrolled local symptoms.

A second use of the term "palliative pelvic exenteration" relates to patients who undergo an operation with curative intent but intraoperatively have either known gross or microscopic disease left behind. This group includes patients who, after extensive operative dissection, are discovered to have invasion of the bony sacrum or pelvic sidewall.

A third definition found in the literature describes patients who have locally recurrent or persistent disease after having failed primary surgical, radiation, or chemotherapy for their pelvic malignancy. This includes patients who have a local recurrence after curative resection of a rectal cancer or recurrent cervical cancer after standard radiation or surgical treatment. These patients then undergo radical pelvic surgery as a form of salvage therapy and are often said to have undergone palliative pelvic exenteration following discovery and evaluation of locoregional pelvic recurrent disease. All three of these definitions will be incorporated in the following discussion on patient selection and results.

Patient Selection

Virtually all patients who present for consideration of palliative pelvic exenteration have local symptoms. In general, asymptomatic tumors identified on screening evaluation are recognized earlier, are smaller, and are more amenable to standard local therapy, and rarely require radical pelvic surgery for initial local control. Most patients with bulky disease present with symptoms of pain often associated with gastrointestinal or urinary obstruction, fistulas, infection, or bleeding. These symptoms can often lead to severe disability and diminished quality of life.

All treatment options, including surgery, radiation therapy, and chemotherapy, must be considered in a multimodality approach. In general, chemotherapy has minimal impact on bulky pelvic disease [20]. It remains a last resort for patients who are not surgical candidates, and can be used alone or in combination with radiotherapy. Patients with severely disabling symptoms, however, rarely benefit from chemotherapy. Chemotherapy also is a difficult option for treating patients with localized pelvic sepsis secondary to complications of pelvic tumor.

In the palliative setting, radiotherapy can be used only in patients who have not been previously treated with pelvic radiation. Most patients with recurrent disease or bulky initial disease will have undergone pelvic radiation in the initial course of treatment. However, in individuals who are eligible for palliative radiation, symptoms of pain, tenesmus, bleeding, and discharge may have an initial favorable response to this treatment. Arnott reported a 75% response rate for the treatment of pain and a 60% response rate for the treatment of pelvic drainage in a select group of patients [21]. The duration of response to palliative radiation is usually quite limited, ranging from 3 to 6 months [22]. An enterocutaneous fistula, on the other hand, is rarely improved by radiotherapy and, indeed, may develop as a side effect of this treatment. In the palliative setting, radiation therapy is most appropriate for patients who have failed other attempts at local control and whose underlying medical condition or disease extent limits their anticipated life expectancy to a few months.

Preoperative Evaluation

Any patient with symptoms of uncontrolled pelvic malignancy who has good performance status should be considered for pelvic exenteration. A careful preoperative evaluation [6,20] can define whether the procedure will be performed with curative or palliative intent. This evaluation begins with a thorough history and physical examination.

History--It is important to remember that patients with no or with minimal symptoms will not be palliated by radical surgery if their disease is otherwise incurable. Therefore, the degree of disability must be established early so as to guide the aggressiveness of any diagnostic or therapeutic intervention. The type of symptoms, with particular reference to lower extremity swelling, nerve root pain, genitourinary complaints (suggestive of bladder, prostate, or gynecologic involvement), pelvic
pain, or gastrointestinal symptoms consistent with partial obstruction, are all significant. In addition, a review of other systems that may be involved by metastatic disease is performed.

Physical examination not only defines the extent of pelvic disease but also includes a search for other sites of involvement, including adenopathy in the neck, axilla, groin, or subcutaneous nodules. Any positive findings must be investigated further. In addition, a baseline medical condition is established to determine the underlying risk for major surgery.

Laboratory evaluation is conducted appropriate to the underlying tumor histology. At a minimum, a complete blood count, assessment of renal and hepatic function, and measurement of applicable tumor markers are performed.

Radiologic studies begin with plain films of the chest to search for evidence of metastatic disease and plain films of the pelvis to evaluate tumor involvement of the bony structures. A bone scan also is recommended, particularly if there are any symptoms referable to bone metastases. Computed tomographic scanning of the chest, abdomen, and pelvis can provide evidence of extrapelvic spread. Pulmonary and hepatic lesions may need to be biopsied by fine-needle aspiration. Evaluation of the pelvic tumor by CT scan is useful for identifying invasion of adjacent organs or the bony pelvic girdle (with CT bone windows). However, the usefulness of CT in assessing lymph node involvement is limited. Previous radiation therapy can also obscure tissue planes and may complicate the assessment of tumor invasion or post-radiation fibrosis.

Serial CT scanning, if available, is often helpful in differentiating fibrosis, which usually remains stable or decreases in size, from recurrent tumor, which usually grows and becomes less well-defined over time. Fine-needle aspiration (FNA) can provide useful information for making this distinction if positive, but sampling errors make it difficult to obtain reliable specimens [20].

**MRI**—The role of MRI has also been evaluated in the assessment of resectability in patients with pelvic malignancy. In a report by Popovich et al, the overall accuracy of MRI in determining eligibility for exenteration was 83%, with a positive predictive value of 56% and a negative predictive value of 100% [23]. The overall accuracy of MRI in determining pelvic sidewall involvement was 81%, with 4 of 23 patients having false-positive findings. For the evaluation of lymph node involvement, overall accuracy was 95%, with no false-positive findings; however, only 3 of the 23 patients were noted to have lymphadenopathy, and there was one false-negative scan. The overall accuracy of MRI in determining contiguous adjacent organ involvement (bladder and rectum) was 81% to 85%.

**Other Diagnostic Procedures**—Bowel contrast studies, including upper gastrointestinal series with small bowel follow-through and barium enema, are warranted, particularly if there are recurrent bowel symptoms. Because the terminal ileum or a portion of the colon may be utilized in urinary reconstruction, it is important to evaluate their patency. Other studies that may be of value in selected patients include ultrasound, lymphangiography, intravenous pyelography, and endoluminal ultrasound.

Examination under anesthesia often provides useful information about the size of the pelvic mass and fixation to the pelvic sidewall or adjacent organs. Post-radiation fibrosis and focal inflammation, however, can cause scarring and immobility, limiting an accurate determination of the extent of disease. An apparently fixed mass in this setting does not necessarily preclude exploratory laparotomy.

Cystoscopy evaluates direct bladder invasion. Proctosigmoidoscopy can determine rectal invasion from nongastrointestinal malignancy or evaluate the extent of a rectal tumor and provide biopsy material. 

**Exploratory Laparotomy**—The final, ultimate diagnostic procedure is exploratory laparotomy. During this procedure, all of the previously gathered information is confirmed, and direct examination of the abdominal cavity identifies any peritoneal, hepatic, bowel, or lymphatic deposits not previously uncovered during the metastatic evaluation. Even when it appears at this point that the tumor is confined entirely to the pelvis and is resectable, and an operation is embarked upon with curative intent, on occasion as the dissection proceeds along the pelvic sidewall or sacrum, tumor extension is identified that cannot be removed. At this juncture, the operation can proceed but the objective is palliation.

**Patient Selection for Palliative Exenteration**

The selection of patients for pelvic exenteration with palliative intent is less precise. The considerable risks of the operation must be balanced against the severity of symptoms, the patient’s physical and emotional ability to tolerate an operation, the extent of extrapelvic disease, and the anticipated life-expectancy.

Relative contraindications to palliative pelvic exenteration include involvement of major peripheral nerves (as evidenced by sciatic or nerve root pain), direct invasion of the common iliac vessels, and
bony invasion of the pelvic sidewall or sacrum that would result in gross tumor left at the margins. Patients whose tumors have progressed to this extent rarely derive any benefit from radical pelvic surgery.

The degree of extrapelvic disease must also be evaluated. If the tumor involves more than a very few implants or a few retroperitoneal lymph nodes, the procedure should be abandoned, as disease progression will probably outpace recovery from the operation, and the patient may very well die of the disease before experiencing any significant improvement in quality of life.

In summary, patients best suited for palliative pelvic exenterative surgery are otherwise medically fit individuals with severe discomfort and disability accompanying a local tumor growth that can be removed grossly, leaving behind only microscopic pelvic disease and, perhaps, minimal extrapelvic disease.

Results

The major deterrent to the performance of pelvic exenteration, whether curative or palliative, has been the reported high rates of morbidity and mortality.

Operative Mortality and Morbidity

Several institutions have reported a trend toward an improvement in these results. For example, 30-day operative mortality in Bricker’s series [24] fell from 13.4% to 1.8% over a 15-year period, and Symmonds et al [8] observed a decline in mortality from 13% to 3% over a 20-year experience. Kraybill [25] et al reported similar improvements in operative mortality. These improved results are seen whether the pelvic exenteration is curative or palliative.

The operative morbidity of pelvic exenteration, on the other hand, has remained high and varies widely, ranging from 13% to 77% [17]. The average number of complications after either curative or palliative resection ranges from 1.5 to 2.3 per patient [20]. In addition, rates of complications requiring reoperation can be as high as 65% to 75%. The number of reported complications depends on the criteria used to define major and minor complications, as well as the proportion of total pelvic exenterations performed vs other modifications, including anterior and posterior exenterations.

Obviously, procedures that entail the removal of fewer organs and require less reconstruction tend to have fewer complications.

Complications generally arise from two main sources: the urinary conduit and management of the pelvic dead space. Urinary conduit leak, gastrointestinal or urinary fistula formation, pelvic hemorrhage, pelvic abscess, and gastrointestinal or urinary obstruction are common causes of postoperative morbidity. The use of nonirradiated bowel for the urinary conduit has diminished the incidence of urinary reconstruction-related complications. Placement of well-vascularized tissue-ie, omentum, mobilized muscle flaps, or the urinary conduit itself [16,26]-to fill the resected pelvis has helped decrease complications from the large pelvic dead space.

Symptomatic Relief

The real benefits of the operation in terms of symptomatic relief, however, can be considerable.

Fox Chase Cancer Center Study--A study from Fox Chase Cancer Center explored this issue in an attempt to quantify the improvement in quality of life experienced by patients undergoing palliative pelvic exenteration [18]. This series reviewed 35 patients with previously treated cancers who underwent palliative pelvic exenteration for alleviation of pelvic symptoms. Most of the tumors were colorectal, although urinary and gynecologic tumors were also represented. The median interval from initial treatment to the onset of symptoms requiring consideration for pelvic exenteration was 12 months. Approximately two-thirds of patients received additional treatment with chemotherapy or radiation therapy, as well as additional surgery, prior to undergoing pelvic exenteration.

This analysis included patients who fit all three definitions of palliative pelvic exenteration. The impact of the disease on the patients’ lives was substantial, with 60% experiencing a moderate or greater impairment in their quality of life. The indications for exenteration were pain, bleeding, fistulas, and obstruction, in addition to progression of disease despite nonsurgical therapy. Of 34 patients with cancer, 3 (9%) were operated on initially with palliative intent. Of the remaining 31 patients, 58% were rendered clinically free of tumor by the procedure (curative intent in the face of recurrent disease). One patient was left with grossly positive margins, and ten patients (29%) had histologically positive microscopic margins. Operative mortality was 3% (one patient), and postoperative morbidity was 47%.

Postoperatively, of 33 evaluable patients, 29 (88%) experienced an improvement in quality of life, which, in 18 patients (55%) was rated as substantial. Four patients had either no improvement or a deterioration in their quality of life. For those who experienced a substantial improvement, the
primary benefit derived from control of pain and local problems, such as bleeding or fistulas. For those reporting no improvement, inadequate pain control was the major complaint.

**University of Toronto Experience**--The experience at the University of Toronto was similar, in that out of 43 symptomatic patients, 70% achieved significant pain relief [27]. This was quantified as complete pain relief requiring no analgesics or partial pain relief requiring the use of mild analgesics once or twice a week. This report included 25 patients who underwent exenterative surgery with curative intent. Among those whose operation was considered palliative, 67% (10/15) of the patients who left the hospital reported partial or complete pain relief. Five patients in the palliative group died during the postoperative period.

**Other Reports**--There have been other reports in the literature documenting similar results of pelvic exenteration in selected patients. Wanebo et al described a survey of patients who had undergone abdominal sacral resection, which indicated that 9 out of 10 patients experienced an improvement in their quality of life and relief from tumor-associated pain [28]. Deckers et al reported complete amelioration of symptoms in all eight patients who underwent pelvic exenteration with palliative intent [15]. This relief was prompt and long lasting (Table 1).

**Impact on Survival**
Predicting whether or not palliative pelvic exenteration lengthens survival is problematic based on current information. As a prospective, randomized study has not been performed, only comparisons of retrospective studies are available to infer the impact of therapy on life extension.

The natural history of untreated recurrent pelvic colorectal carcinoma is dismal. Several studies report 5-year survival rates of 1% to 3% after the identification of recurrent tumor. Other series indicate a median survival of 8 months, even if the tumor is partly resected [29]. Untreated gynecologic cancer has a similar poor prognosis.

The value of pelvic exenteration has long been based on its ability to alter this natural history. In appropriately selected patients with gynecologic malignancy undergoing exenteration with curative intent, 5-year survival rates of 30% to 50% have been reported. The results in colorectal cancer have been less satisfying, but even the reported 20% to 30% 5-year survival rates are an improvement over the expected outcome of untreated disease [30].

In those series reporting survival statistics for patients undergoing palliative pelvic exenteration, no improvements in survival have been noted. In colorectal cancer, Lindsey et al reported a 10-month median survival and no 5-year survivors [31]. Wanebo et al published similar statistics, with an 8.5-month median survival and, again, no 5-year survivors [32]. These results parallel those of Yeung et al [27], who reported a median survival of 10 months, and Moriya and Hojo [33], who achieved a 14-month median survival.

One can surmise that a palliative procedure would not necessarily have an impact on overall survival, and certainly, patient selection criteria may be more important to survival outcome in these limited clinical experiences. Indeed, in the Fox Chase Cancer Center experience, survival did not differ significantly between patients free of disease after exenteration and those with known minimal residual disease [18]. Therefore, meaningful end points to consider when reviewing a series of patients undergoing palliative exenterative surgery should relate to quality-of-life issues rather than survival. Any survival advantage afforded by this procedure may not be evaluable, since comparison to nonsurgically treated patients is both impractical and unreliable.

**Conclusions**
Pelvic exenteration is a technically challenging operation associated with significant morbidity and mortality. As institutional experience with this procedure has increased, mortality has diminished significantly, allowing its broader application in ameliorating intractable pelvic symptoms of cancer. Radical pelvic surgery can provide dramatic, durable palliation of the debilitating symptoms often associated with uncontrolled pelvic malignancy. Palliative pelvic exenteration should at least be considered in all patients with advanced malignancy confined to the pelvis who are acceptable candidates for surgery.

**References:**

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