

Clinical Science

Reconstruction of total pelvic exenteration defects with rectus abdominus myocutaneous flaps versus primary closure

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Abstract

BACKGROUND: Total pelvic exenteration (TPE) is reserved for patients with locally invasive and recurrent pelvic malignancies. Complications such as wound infections, dehiscence, hernias, abscesses, and fistulas are common after this procedure. The purpose of this study was to determine whether tissue transfer to the pelvis after TPE decreases wound complications.

METHODS: Fifty-three patients who underwent TPE between 2004 and 2010 were reviewed. Two groups were identified, those who underwent pelvic reconstruction with a vertical rectus abdominus myocutaneous flap (n = 17) and those who underwent primary closure (n = 36). Demographics, clinicopathologic characteristics, and outcomes were compared.

RESULTS: The 2 groups were similar in demographics and histopathologic characteristics. Preoperative and surgical factors including comorbidities, nutrition, radiation, surgical times, blood loss, length of stay, and complications were similar between the groups. Of the 17 patients undergoing vertical rectus abdominus myocutaneous flap placement, complications were seen in 11 patients (65%), with most of them stemming from flap dehiscence (n = 7).

CONCLUSIONS: In our study, the transfer of tissue into the pelvis did not increase surgical times, blood loss, length of stay, or wound complications.

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Total pelvic exenteration (TPE) is a radical surgery that has been applied to the treatment of varying pelvic malignancies. Most often performed for gynecologic malignancies, its use has been documented in colorectal and urologic malignancies.^{1,2} This surgery also is used for recurrences of disease and complications secondary to radiation therapy. Since its description by Brunschwig³ in 1948, advancements in anesthesia, surgical technology, and perioperative care have decreased the mortality associated with TPE, but morbidity rates remain persistently high. The morbidity of this procedure stems from the normal physiological response to a prolonged surgery, as well as from patients' previous therapies, nutritional status, and extent of resection.

TPE is a consideration for patients with locally advanced disease with a potential for cure, metastatic disease with pelvic symptomatology, and nonhealing wounds causing significant morbidity and affecting quality of life. With this in mind, the goal of a TPE is to attempt to cure when the disease is localized to the pelvis and to palliate in all the other cases when other therapies have failed. Despite this aggressive therapy, the 5-year survival rates after total pelvic exenteration for primary disease range from 30% to 77%^{1,4-11} and for recurrent disease range from 6% to 31%.^{1,6,7,12,13} In addition to poor overall survival, morbidity rates have been as high as 78% in some series.^{1,4-6,8,10,11,13-18}

The treatment effect of therapies directed toward cure or palliation of pelvic carcinomas is many times toxic and can cause multiple complications. The example of radiation therapy to the pelvis shows this balance. Radiation therapy is helpful for local control of many of the pelvic carcinomas, whether preoperatively, intraoperatively, or postoperatively. However, adverse effects on healing can cause significant morbidity for patients.^{15,19} Jakowatz et al¹⁵ found that patients receiving pelvic radiation before exenteration had a significantly higher complication rate (67%) compared with those who did not receive radiation (26%). Colorectal, plastic surgical, and gynecologic literature have shown that use of myocutaneous flaps can provide well-vascularized, non-irradiated, healthy tissue to aid in the closure of the perineum after radiation and surgical resection.²⁰⁻³² The data have focused mainly on less radical surgeries that create smaller defects, such as abdominoperineal resections (APR) and vaginal resections.^{21-25,27-32} However, few reports discuss the role of myocutaneous flaps for larger multivisceral resections.^{20,26-28} This study specifically compares patients undergoing total pelvic exenteration with myocutaneous flap reconstruction with patients undergoing total pelvic exenteration with primary closure (PC). The purpose of this study was to review our institution's experience with the use of vertical rectus abdominus myocutaneous (VRAM) flaps in conjunction with TPE to determine if its use decreased wound complications when compared with primary closure.

Methods

Between January 2004 and August 2010, there were 53 patients who underwent TPE at our institution for advanced primary, recurrent, or suspected pelvic malignancies. Complete information and long-term follow-up evaluation were available for all patients. After obtaining permission from The Ohio State University Institutional Review Board, we retrospectively reviewed the medical records of these patients.

Demographics, perioperative events, and outcomes were compared between the TPE patients undergoing reconstruction with a VRAM flap and those undergoing stan-

dard PC. Selection of patients for the VRAM group was based on the absence of bilateral abdominal wall violation from the placement of previous ostomies and the presence of patent inferior epigastric vessels on preoperative evaluation. Demographic data included age, sex, and comorbidities. Significant comorbidities included factors that affected healing such as diabetes mellitus (DM), peripheral vascular disease, hypertension, chronic obstructive pulmonary disorder, chronic corticosteroid use, and presence of renal insufficiency.

Preoperative factors such as previous chemotherapy, presence of fistulas, albumin levels, and radiation therapy were included in the analysis. Overall morbidity was defined as complications related to wound infection, wound dehiscence, abscess formation, enteric fistulas, deep venous thrombosis, urinary tract infection, small-bowel obstruction, and ventral hernia formation. Outcomes data focused on surgical times, length of stay, morbidity, and mortality. Surgical and pathology reports were reviewed to analyze surgical times and blood loss, and to confirm pathologic diagnosis.

Descriptive statistics were calculated to summarize the data. Comparisons of continuous variables were made by the Student *t* test for paired groups and a nonparametric alternative (Wilcoxon rank-sum test) for data not distributed normally. For discrete data, contingency table analysis (chi-square and the Fisher exact test) was used when appropriate. Statistical significance was accepted at a *P* value of less than .05 and analysis was performed with SPSS statistics 17.0 (SPSS, Inc, Chicago, IL).

Techniques

All patients underwent a preoperative computed axial tomography with intravenous contrast to verify the patency of the inferior epigastric vessels. Preoperative marking identified the area of planned VRAM flap harvest and confirmed the location of ostomy placement on the contralateral rectus abdominus muscle.

After TPE was performed, fecal and urinary diversion was performed via the construction of a double-barreled wet colostomy^{33,34} or an ileal conduit.³⁵ The vertical rectus abdominus myocutaneous flap then was raised. A rectangular skin paddle was centered over the rectus muscle in a vertical fashion, generally measuring 15 to 20 cm in length and 5 to 8 cm in width. The skin and subcutaneous tissues were dissected to the level of the anterior rectus sheath. The subcutaneous tissues then were dissected away from the fascia until the medial and lateral rows of perforating vessels entering the deep surface of the skin paddle were identified. Fascial preservation was the preferred method and entailed sacrificing the less dominant row of perforators. Such methodology allowed for lower tension closure of the anterior rectus fascia after the flap was harvested. The fascia then was divided and the rectus muscle was divided

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