Full Length Article

Pelvic exenteration and composite sacral resection in the surgical treatment of locally recurrent rectal cancer

Wael Gawad [a], **Medhat Khafagy** [a], **Mohamed Gamil** [a], **Ibrahim Fakhr** [a,*],
Moustafa Negm [a], **Nadia Mokhtar** [b], **Mohamed Lotayef** [c], **Osman Mansour** [d]

[a] *Surgical Oncology Department, National Cancer Institute (NCI) – Cairo University, Egypt*
[b] *Pathology Department, National Cancer Institute (NCI) – Cairo University, Egypt*
[c] *Radiation Oncology Department, National Cancer Institute (NCI) – Cairo University, Egypt*
[d] *Medical Oncology Department, National Cancer Institute (NCI) – Cairo University, Egypt*

Abstract   *Background:* The incidence of rectal cancer recurrence after surgery is 5–45%. Extended pelvic resection which entails En-bloc resection of the tumor and adjacent involved organs provides the only true possible curative option for patients with locally recurrent rectal cancer.
Aim: To evaluate the surgical and oncological outcome of such treatment.
Patients and methods: Between 2006 and 2012 a consecutive series of 40 patients with locally recurrent rectal cancer underwent abdominosacral resection (ASR) in 18 patients, total pelvic exenteration with sacral resection in 10 patients and extended pelvic exenteration in 12 patients. Patients with sacral resection were 28, with the level of sacral division at S2–3 interface in 10 patients, at S3–4 in 15 patients and S4–5 in 3 patients.
Results: Forty patients, male to female ratio 1.7:1, median age 45 years (range 25–65 years) underwent extended pelvic resection in the form of pelvic exenteration and abdominosacral resection. Morbidity, re-admission and mortality rates were 55%, 37.5%, and 5%, respectively. Mortality occurred in 2 patients due to perineal flap sepsis and massive myocardial infarction. A R0 and R1 sacral resection were achieved in 62.5% and 37.5%, respectively. The 5-year overall survival rate was 22.6% and the 4-year recurrence free survival was 31.8%.
Conclusion: Extended pelvic resection as pelvic exenteration and sacral resection for locally recurrent rectal cancer are effective procedures with tolerable mortality rate and acceptable outcome. The associated morbidity remains high and deserves vigilant follow up.

* Corresponding author. Address: National Cancer Institute (NCI), Fom-El-Khalig, Cairo 11796, Egypt. Mobile: +20 100 172 0671; fax: +20 223680021.
E-mail address: ibrahim.fakhr@nci.cu.edu.eg (I. Fakhr).

Introduction

Although the introduction of total mesorectal excision (TME) [1] and preoperative radiotherapy [2–5] has reduced the number of local recurrences following surgical resection of rectal cancer, these recurrences still occur in over 10% of cases and remain a major concern [6]. Consequentially, most patients with newly diagnosed local recurrences have already had radiotherapy before the primary operation. Radiotherapeutic options will therefore be reduced in future cases of recurrence [7].

While distant disease is the determining factor for prognosis in most of patients with recurrent rectal cancer, local recurrence will generally affect their quality of life [8,9]. Without treatment, these patients with locally recurrent disease have a median survival of about 8 months [10,11]. This can be explained that the uncontrolled local progression is disastrous for the quality of the remaining life; especially in the absence of life threatening metastases which can mean prolonged suffering. Any treatment that could lead to a remission or stabilization of the relapse might well be worthwhile. This could mean that local cure and even prolonged survival might be within reach for some patients [12].

Aim of this study

The aim of this study is to evaluate the surgical and oncological outcome of extended pelvic resection such as pelvic exenteration and abdominosacral composite resection for recurrent rectal cancer.

Patients and methods

Between the years 2006 and 2012, 40 consecutive patients, presented to the outpatient department, with locally recurrent rectal cancer invading the posterior and/or lateral pelvic walls. Disease resection was done with the intent of cure, so that to insure wide resection margins, pelvic organs were removed, if indicated, up to total pelvic exenteration. Similarly, posteriorly, sacral resection was performed if needed, with resection level ranging from S2–3 to S4–5.

Preoperative evaluation

All patients underwent routine full laboratory blood tests including base line Carcino-Emberyonic Antigen (CEA), digital rectal examination (DRE), and diagnostic colonoscopic or direct biopsy under local anesthesia, for pathological confirmation prior to surgery. Additional routine imaging procedures for local, regional and distant staging were performed including: Transrectal ultrasonography (TRUS), chest CT, abdominopelvic thin-section CT, and MRI with a phased-array coil. PET–CT was carried out in selected cases with equivocal metastatic results or to differentiate between extensive local fibrosis and disease recurrence. Cystoscopy was done for patients with suspicious, clinical or radiological, urinary bladder involvement.

Patients with tumor invading the sacrum proximally to the sacral promontory, or encasing the iliac vessels, or passing through the greater sciatic notch, or circumferentially involving the lateral pelvic wall, or causing bilateral ureteric obstruction were excluded. Similarly, patients with unresectable extra-pelvic disease, or those estimated to be poor surgical candidates, were also eliminated.

Only the cases with tumor recurrences following primary R0 resection, received pre-operative (neoadjuvant) radiotherapy, since all the other cases with primary R1 resection already received prior adjuvant radiotherapy.

Surgical technique [13]

In all cases, the abdominal sacral resection, which requires a combined approach, was used. The abdominal part consists of exploration with careful examination to exclude liver metastases, or signs of extrapelvic spread. Dissection begun at the lower aortoiliac tree and continued along the hypogastric artery and vein and includes the obturator nodes. These node groups are sent separately for pathologic diagnosis (usually permanent section unless large suspicious nodes are encountered). Extensive nodal involvement in the lower pelvis would generally preclude continuing with the resection. However, the finding of easily dissectible, though enlarged, obturator nodes would not preclude resection. Ileal conduit is done whenever involved ureters or bladder, co-existed with resectable pelvic tumor. The divided rectum (usually using the stapler) would be left in the pelvis. Pelvic devascularization is accomplished by dividing after suture ligating the hypogastric artery and vein. Additional branches are bisected and suture ligated if they would lie in the plane of planned resection. The middle sacral artery and veins, if identifiable, are also bisected and ligated. If the ureters are to be preserved, these are dissected free from the pelvic floor and fixed anteriorly to the lateral pelvic wall just below the external iliac artery and vein, which prevents injury during the resection for the posterior approach. The abdomen is closed and the patient is repositioned prone.

A posterior sacral incision is made with one limb curving about the buttock crease and subcutaneous flaps are raised. The sciatic nerve is located by splitting the gluteus maximus muscle in the direction of its fibers (between the ischial tuberosity and the greater trochanter) and is encircled by a penrose drain. The gluteus maximus and medius are dissected from the sacrum and the sacrotuberous and sacrospinous ligaments are incised at their attachments to the ischial tuberosity and ischial spine. The muscles surrounding the sciatic nerve (pyriformis, obturator internus and gemelli) are identified. By inserting a finger underneath the sciatic nerve (medial to it) the surgeon then breaks through the pyriformis muscle and investing endopelvic fascia to assess the level of resection. A laminectomy is performed proximal to the planned level of sacral resection in order to ligate the terminal end of the dural sac (Fig. 1). If it is possible, the proximal sacral roots are identified and an effort is made to preserve them by dissecting them free from the portion to be resected from the sacrum (Fig. 2). After the resection line is determined on both sides of the sacrum, an osteotome is used to cut across the sacrum. For higher resections above S3, the line of resection is taken through the sacroiliac joint. Removed en bloc are the sacrum, pelvic sidewalls, and the tumor, along the attached structures; bladder and retained rectum, if indicated. Hemostasis is obtained after initially packing the wound to obtain temporary control. The defect is irrigated and then reconstructed. The insertions of the gluteus maximus on the greater trochanter are incised allowing the gluteus maximus on each side to be moved medially and to be approxi-