Patterns of Recurrence Following Pelvic Exenteration and External Radiotherapy for Locally Advanced Primary Rectal Adenocarcinoma

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Background: Local recurrence remains the main site of failure after pelvic exenteration for locally advanced primary rectal adenocarcinoma. This is a report on the patterns of recurrence in a group of such patients treated with pelvic exenteration and radiotherapy.

Methods: Between 1980 and 1992, we treated 49 patients. Thirty-one received preoperative radiotherapy (pre-RT), 4,500 cGy. Six weeks later, we performed posterior pelvic exenteration (PPE) in 21 patients, and total pelvic exenteration (TPE) in 10. Nine patients received postoperative radiotherapy (post-RT), 5,000 cGy after a PPE. Nine patients had surgery only, PPE (n = 7) and TPE (n = 2).

Results: Surgical mortality occurred in 16% of those patients who received pre-RT. The median follow-up was 52 months. Recurrences occurred in 23% of those patients who received pre-RT (local, one; local/distant, one; distant, four); in 88% of those patients treated with surgery only (local/distant, four; distant, four); and in 11% of those treated with post-RT (distant, one). The 5-year survival for patients who received radiotherapy was 66 versus 44% for those treated with surgery only.

Conclusion: Local control of locally advanced primary rectal adenocarcinoma requiring a pelvic exenteration is improved by the addition of radiotherapy. When recurrences do occur they are predominantly at extrapelvic sites.

Key Words: Pelvic exenteration—Rectal adenocarcinoma—Radiotherapy.
MATERIAL AND METHODS

Between January 1980 and May 1992, we treated 49 patients with clinically locally advanced stages and histologically proven diagnosis of primary rectal adenocarcinoma. Surgery, when performed, was with a curative intent. Curative intent implied healthy margins as determined by the surgeon and documented by the pathologist with no residual microscopic disease. All patients with extrapelvic disease were excluded from the study.

The rectum was defined as the portion of the large bowel between 0–15 cm from the anal verge, established by rigid rectoscopy, with the patient in jackknife position. Pretreatment evaluation included complete blood cell count, chemistry profile, determination of carcinoembryonic antigen, chest radiograph, intravenous pyelography, hepatic ultrasound or liver scan and computed tomography (CT) scan of the abdomen and pelvis since January 1989, and barium enema and/or full or partial colonoscopy, depending on the degree of tumor obstruction.

Patients with clinically diagnosed deeply ulcerated tumors with evidence of full-thickness penetration of the wall, tethered or fixed to a sidewall of the pelvis and/or adherent to neighboring pelvic viscerae, as determined by the examination by a surgeon and a radiotherapist, received pre-RT at doses of 45 Gy; 180 cGy were administered in 20 sessions with a cobalt-60 or 8 MeV lineal accelerator machine. The radiation treatment included two parallel opposing anterior and posterior fields, the superior margin was chosen at the midpoint of the body of L5, the inferior margin to an imaginary point 2 cm below the anal verge, and the lateral margins were marked 1 cm lateral to the medial aspect of the ileum. The surgical procedure was scheduled to occur at ~4–6 weeks after the conclusion of pre-RT. If at that time of surgery the patient developed sciatic or perineal pain suggestive of a major nerve root infiltration or if at surgical exploration we found invasion of the pelvic sidewall, sacrum or major vessels, or extrapelvic metastatic disease, then the exenteration attempt was terminated.

The group of patients who were found at the time of surgery to have clinically resectable tumors attached to neighboring pelvic organs underwent a primary pelvic exenteration. Patients whose surgical specimen documented full bowel penetration (Dukes B2 or higher) but had no previous treatment, received post-RT at doses of 50 Gy administered in 25 fractions using the aforementioned technique in the pre-RT group. Patients with significant surgical complications delaying adjuvant therapy, or those patients with reservations about the benefit of further adjuvant treatments, elected to have surgery only and served as a reference arm in this report.

A total pelvic exenteration (TPE) included the resection of all pelvic viscera (rectum, bladder, prostate, and seminal vesicle in men, and the uterus, ovaries, and vagina in women). PPE was defined as the extirpation of the rectum, uterus, ovaries, and vagina in women. Indications for total pelvic exenteration included documented involvement of the bladder, prostate, or seminal vesicles based on the preoperative imaging evaluation or clinical suspicion during the surgical exploration of the pelvis. The indication for posterior pelvic exenterations was for ventral rectal tumors clinically or radiologically attached to the upper one-third of the vagina or uterus. All patients underwent mechanical bowel preparation with preoperative antibiotics as indicated by Condon (10). We added a third-generation cephalosporin intravenously starting 2 h before surgery and continued four daily doses until the 7th postoperative day. After TPE, urinary diversion was performed with the technique as described by Bricker, using a small-bowel loop conduit (11). The end-to-side ureteroileal anastomosis was performed with a Vicryl 4–0 suture. A ureteral catheter was routinely inserted; the proximal tip was put in the renal pelvis, and the distal tip was brought out through the ileal loop. Penrose drains were placed in the retroperitoneum. All drains were removed on the 7th day. For patients who underwent a TPE, the greater omentum was mobilized to provide a pelvic floor. A wide perineal dissection was performed and the pelvis was packed with large compresses soaked with iodine. If possible, the skin edges of the perineal wound were approximated with separate stitches of nylon 2–0. We began to remove the perineal packing on the 4th postoperative day, and completed the process on the 5th or 6th postoperative day.

The surgical specimens were classified by the Astler-Coller modification of Dukes’ classification (12), and the modification of Gunderson–Sosin (13) was added when the tumor invaded neighboring organs. The classification system is as follows: A—Tumor limited to the mucosa and submucosa; negative lymph nodes. B1—Tumor extension into but not through the muscularis propria; negative lymph nodes. B2—Tumor extension through the muscularis propria; negative lymph nodes. B3—Adherence to or invasion of surrounding organs or structures;