The Surgical Management of Colorectal Complications from Irradiation for Carcinoma of the Cervix

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Abstract

Bowel injury from radiation given for carcinoma of the cervix is a complex management problem. Prospectively collected computerized data from April 1989 to June 1997 (8 years) were analysed. There were 84 women with a mean age of 60.6 (standard error 1.2) years. Bleeding from radiation proctitis presented much earlier [mean 19.9 (1.9) months after radiotherapy] than either strictures [mean 81.9 (18.4) months, P = 0.008] or rectovaginal fistula [mean 95.5 (39.0) months]. Topical formalin application successfully controlled bleeding in 49 of 55 patients (89.1%) with radiation proctocolitis. The remaining 6 patients, as well as all 14 patients with symptomatic strictures and all 14 patients with rectovaginal fistula underwent surgery. Rectal strictures were successfully dilated in 2. Bowel resection with reanastomosis (with stoma defunction) was performed in 12 and stoma was created in the remaining 20 because of poor general medical condition or advanced recurrent malignancy. The postoperative mortality was 3% (1 bronchopneumonia) and morbidity was 9% (1 anastomotic leak, 1 urinary infection and 1 wound infection). At a mean follow up of 35 (2.4) months, 7 (21.2%) other postoperative patients have since died (all of these from recurrent cancer). We conclude that topical formalin is effective for controlling bleeding radiation proctitis. When not successful or where other radiation complications occur, judicious surgery dependent upon the patient's general condition can be safely and effectively performed. The longer term results are worthwhile, especially where there is no recurrent cancer.

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Introduction

Radiation bowel injury is a significant clinical problem because of the technical difficulties of surgery. Among the more common causes is radiation of carcinoma of the cervix, because radiotherapy is the principle mode of treatment for this fourth most common malignancy in women in Singapore (after carcinoma of the breast, colorectal carcinoma and carcinoma of the lung).[1] The side-effects of treatment include radiation proctitis and possibly progression to chronic bleeding, stricture or fistula formation.[2,3] The management of bleeding from radiation proctitis has been largely ineffective[4-11] until the introduction of intra-rectal topical formalin application.[12-14] Where surgery is required, stoma creation is safer but palliation is often inadequate.[15,16] Resection can be technically difficult owing to the fibrosis and relative ischaemia of the irradiated tissues.[2,15-17]

Given the incompletely resolved problems concerning the management of this condition, it was thought timely to review our experience over the last 8 years. In particular, long-term follow-up information pertaining to the results of formalin application is sparse and there was a need to re-assess the results of surgery since progress over the last decade.

Patients and Methods

Analysis was performed on a computerised database, containing data prospectively accrued from patients managed in the Department of Colorectal Surgery, Singapore General Hospital, from April 1989 to June 1997. All patients had undergone 75 to 85 Gy external beam and subsequent brachytherapy, for histologically proven carcinoma of the cervix. The diagnosis of radiation injury was confirmed on histology of colonoscopic biopsies and / or surgical resection specimens. Pelvic CT scans were performed to exclude recurrent cervical cancer. In addition, those with rectovaginal fistulas were further evaluated with either a barium enema or fistulogram.

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Topical intra-rectal formalin application was performed using 4% formalin according to the method previously described.[12] Following treatment, the patients continued to be reviewed at 3 monthly intervals in clinic. Statistical significance was tested using the non-parametric Mann-Whitney method.

Results

Eighty-four women [mean age 61.3 years; standard error (SE) 1.2 years] were treated for complications of radiotherapy during the 8-year period. Thirteen (15.5%) had previous abdominal surgery. The most common complication was radiation proctitis (n = 55, 65.6%), which presented at a mean 19.9 (1.9) months after completion of radiotherapy. This presentation was much earlier than the other complications—stricture [n = 14, 16.7%; mean presentation = 81.9 (18.4) months), P = 0.008], rectovaginal fistula [n = 14, 16.7%; mean presentation = 95.5 (39.0) months, P = 0.07] and ileitis (n = 1, 1.2%; presentation = 180 months).

Radiation Proctitis

The mean age of the 55 patients was 61.9 (SE 1.5) years. All presented with fresh or altered blood in the stools, which increased in frequency. In addition, 5 (6%) of these patients also had some rectal pains. The rectal bleeding necessitated blood transfusions [mean 5 (1.2) units blood] in 23 patients (41.8%). Colonoscopy showed inflammation restricted usually in proximity to the upper rectum or distal sigmoid. In addition, shallow ulcerations of the inflammed tissue were found in 2 patients (3.6%).

All these patients were treated initially with topical rectal formalin application. This included 8 patients (14.5%) who had failed previous treatment with steriod, sucralfate, salazosulfapyridine or transexamic acid enemas. The later were administered prior to the introduction of topical formalin application in September 1991.[12] All 8 patients had had courses of steroid enemas. One patient was treated additionally with sucralfate enemas and salazosulfapyridine and tranexamic acid. However, formalin re-application was often needed to stop bleeding, the mean number of applications being 1.4 (0.9) times. In fact, 16 (29.1%) patients required 2 applications, and another 3 (5.5%) patients needed 3 applications before the symptoms were satisfactorily palliated. Surgery was eventually required in 6 (10.9%) patients whose bleeding were refractory to repeated formalin applications. Low anterior resections were performed for the injured rectum and sigmoid colons in 3 of these patients. The anorectal anastomoses were all protected with temporary defunctioning ileostomies. One of the patients also had a concomitant total hysterectomy and salphingo-oophorectomy for cervical cancer recurrence. A Hartmann's procedure was performed in one patient, in whom the anal sphincter function was thought to be inadequate. Sigmoid terminal colostomies were done in the remaining 2 patients, who were in poor general medical condition. Satisfactory control of the bleeding was attained after all these procedures.

Radiation Strictures

The mean age of the 14 patients with radiation strictures was 67.3 (3.8) years. The 2 most common presentations were difficulty in defaecation and reduction in stool caliber (n = 10, 71.4%). The other 4 (28.6%) patients had intestinal obstruction. At endoscopy, the strictures were at the rectum (n = 8, 57.1%), recto sigmoid junction (n = 3, 21.4%) and distal sigmoid colon (n = 3, 21.4%). Pelvic CT scans and histopathology of the surgically resected specimens (where appropriate) showed no cancer recurrences in these patients. Treatment for rectal strictures consisted of initial dilatation under anaesthesia, using Hegar dilators. This was successful in the long term for 2 of the 3 patients. The remaining patient, as well as 6 others with more proximal strictures, underwent low anterior resection with temporary defunctioning ileostomies. There have been no recurrences of symptoms to date, after closure of the ileostomies. The remaining 5 patients with proximal strictures (who were in poorer general medical condition) underwent either Hartmann's procedure (n = 1) or loop sigmoid colostomies (n = 4).

Rectovaginal Fistulas

The mean age of the 14 patients with radiation caused rectovaginal fistulas was 68.3 (3.4) years. They all presented with passage of faeces per vagina. In addition, 2 (14.3%) of these patients also had a vesico-vaginal and 1 (7.2%) also had an ileo-vaginal fistula. Of note was the presence of concomitant locally recurrent cervical carcinoma in 7 (50%), one of whom also had multiple lung metastases. However, the cancer recurrences were all away from the rectovaginal fistula and biopsy of the site excluded malignancy to be the direct cause of fistulation. Surgical management consisted of low anterior resection and total hysterectomy with bilateral salphingo-oophorectomy in 2 patients (14.3%). Both of these patients had early cancer recurrences confined locally, and resected en-block. One of these patients also had a vesico-vaginal fistula, which also required concomitant cystectomy and ileal conduit reconstruction. The remaining 12 patients (85.7%) were treated with stomas (sigmoid end colostomies n = 5, sigmoid loop colostomies n = 4, ileostomy n = 3) because of poorer general medical condition or advanced stage of recurrent malignancies.

Radiation Enteritis

A 71-year-old patient presented 15 years after radio-

therapy with intestinal obstruction. Severe radiation enteritis with a sealed off perforation at the terminal ileum was found at laparotomy. A limited right hemicolectomy was performed.

Results of Surgery

Overall, 33 patients underwent bowel resection (n = 13, 36.4%) or stoma creation (n = 20, 60.6%) surgery. Postoperative mortality consisted of 1 patient (3%), who died of bronchopneumonia after rectal stricture resection. Morbidity was found in 3 patients (9%): 1 minor anastomotic leak (which responded to conservative management), 1 urinary tract infection and 1 wound infection. To date, after a mean follow up of 35 (2.4) months, 7 (21.2%) other patients have since died. All these deaths were due to recurrence of cervical carcinoma.

Discussion

Eighty-four patients were treated for post radiation bowel injuries in a specialised colorectal practice, over an 8-year period. Published incidence of such injury is 1% to 20%, which may be increasing because radiotherapy is gaining popularity as a primary or adjuvant treatment for pelvic malignancies (including gynaecological, as well as prostate, bladder and rectal tumours).[18,19] We found that the rectum was the most common site of radiation bowel injury. Although the small bowel is the most sensitive to radiation, the rectum is more vulnerable owing to its fixed anatomy. Radiation proctitis is the commonest complication (65.6%), which presented at a mean 19.9 months after radiotherapy. The time of presentation after radiotherapy was significantly shorter than the mean 81.9 months for strictures and 95.5 months for rectovaginal fistulas. The later did not reach statistical significance, probably because of the relatively smaller numbers in our series, but these findings were consistent with previous report.[20] The delayed presentation of these other complications was likely due to the progression of tissue ischaemia and fibrosis, which subsequently developed in certain patients.

Topical formalin application was found to be successful in controlling radiation proctocolitis bleeding in 89%, although 35% needed repeated applications. Formalin application was first used to control radiation cystitis bleeding, but the 10% formalin instilled into the bladder led to symptomatic vesico-urethral reflux problems.[21] However, since its introduction,[12] no problems have been encountered with the use of 4% topical formalin for radiation proctocolitis. Besides, other forms of treatment including steroid, sucralfate, sulfasalazine and tranexamic acid enemas have been shown to be ineffective and laser therapy is not widely available.[22,23] Thus, formalin application remains a promising first line of therapy for radiation proctitis, before subjecting patients (who are often in poor general medical condition) to major surgery.

In our series, the mortality was 7.8% and morbidity 7.8% with bowel resection. There was 0% mortality and 10% morbidity with stoma creation. This was consistent with the 21% mortality and 36% morbidity previously reported for bowel resections.[24] Where the results of bowel resection and stoma creation surgery were not separately analysed, mortalities of 0% to 45% and morbidities of 11% to 65% have been reported.[2,15,20,25] Thus, surgery for irradiation bowel injury remains technically challenging because of adhesions and poor tissue healing. Where the general medical condition of the patient is poor or where there is advanced recurrent cancer, a stoma is advisable. Where resection is performed, all radiation injured tissue should be removed so that an anastomosis can be made with healthy tissue. In addition, a diverting stoma would be prudent.[2,3,17,26] Nonetheless, with the judicious choice and application of good surgical technique, minimum acceptable mortality and morbidity can be obtained. The long-term results can be satisfactory with 21.2% death at a mean 35 months follow-up, all the result of recurrent cervical carcinoma.

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