A safe method of gut resection in women with complicated post-radiation enteritis after cervix cancer

V. Smyrniotis[1], G. Kostopanagiotou[2], E. Gamaletsos[1], K. Theodoraki[2], A. Kondi-Pafiti[3], N. Panagiotopoulos[4], J. Vassiliou[1], C. Sykiotis[4]

Departments of Surgery[1], Anesthesiology[2], Pathology[3] and Obstetrics & Gynecology[4], University of Athens Medical School, Aretaieon Hospital, Athens (Greece)

Summary

Background: Resection of the irradiated gut in women with cervical cancer is complicated by high morbidity and mortality mainly due to accidental injuries to the adjacent intrapelvic structures. To eliminate these injuries a new method is proposed.

Method: Six patients between 41 and 56 years old who had received radiation therapy for cervical cancer were operated on for post-radiation injury of the terminal ileum. All patients underwent partial resection of the irradiated small bowel plus right colectomy. The surgical technique was undertaken so as to leave parts of the small bowel (20 to 45 cm) adherent to the adjacent organs when complete resection was judged precarious.

Results: All patients had an uneventful recovery with 6 to 14 days hospitalization. No complications related to the remaining intrabdominal parts of the gut were observed. All patients died of the primary disease over 1 to 5 years postoperatively.

Conclusion: The method is safe, simple and eliminates injuries to the adjacent structures.

Key words: Post-radiation enteritis; Gut resection; Cervix cancer; Surgical treatment.

Introduction

Radiation-associated enteritis in women with cervix cancer constitutes a serious complication, which may jeopardize any benefit of radiotherapy [1, 2]. Small bowel obstruction and necrosis are the most undesirable complications and may occur at an early stage when long survival is anticipated [1, 3-9]. Optimal treatment of these complications is the resection of radiation-injured bowel and the re-establishment of the continuity of the alimentary tract in healthy margins, since disruption of anastomoses constructed on irradiated bowel is extremely high [7, 10, 11].

However, complete resection of the radiation-injured bowel having hard adhesions to intrapelvic organs may be extremely difficult and is often complicated by accidental injuries to the adjacent structures. The repair of these injuries frequently fails and can be complicated by high morbidity and mortality [3, 7, 10-12].

We hypothesize that partial resection of the radiation-injured bowel, leaving back defunctionalized segments that are inseparable from vital organs, may be a new alternative to obviate the aforementioned complications and ensuing morbidity and mortality.

Our study aims at assessing the postoperative problems associated with this method and discussing various technical aspects.

Patients-Methods

Patients: Our study included six female patients between 41 and 56 years old who had received full radiation therapy for cervical cancer (Stage I to II). One to 15 years after completion of treatment, four patients presented with acute abdomen and two with obstructive ileum. All patients underwent an urgent exploratory laparotomy. In the four patients presenting with acute abdomen, perforation of the terminal ileum and intrapelvic abscess formation was found, while in the remaining two the terminal ileum was adherent on to the intrapelvic organs and obstructed with severe ischemic injuries (Table 1).

Method: After grossly securing healthy proximal bowel as much as possible, resection of the irradiated segment including the right colon was decided in order to secure anastomoses in tissue with healthy margins. In all patients, segments (20 to 45 cm) of the radiation-injured bowel which were inseparable from vital organs were left in place taking care to open up their lumen and securing hemostasis. An end to side anastomosis between the small bowel and the tranverse colon established the continuity of the alimentary tract. The abdomen was copiously washed out with normal saline and a drain tube was placed in the pelvis. The abdominal wound was closed by the standard way.

Results

All patients underwent a small bowel resection combined with resection of the right colon. The remaining functional small bowel varied between 80 to 160 cm. The size of the defunctionalized small bowel segments left within the pelvis were estimated between 20 and 45 cm (Table 1).

All patients had an uneventful postoperative course. The drains were removed three to four days later. Oral intake was resumed after four to six days. Diarrhea occurred and was controlled by diet and medication in the three patients where a massive small bowel resection had to be carried out in order to reach healthy edges. Wound infection was observed in three patients. Hospital stay was six to 14 days.

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Table 1. — *Data of patients operated on for post-radiation enteritis.*

Age	Post-radiation complications	Surgical treatment	Postoperative complications	Hospital stay (days)	Overall survival (months)
41	Ileum necrosis	Small bowel resection plus right colectomy (25*)	Wound infection	9	13
53	Ileum necrosis	Small bowel resection plus right colectomy (30*)	Wound infection	14	15
44	Ileum necrosis	Small bowel resection plus right colectomy (40*)	Wound infection	12	35
46	Ileum necrosis	Small bowel resection plus right colectomy (35*)	None	10	45
48	Ileum obstruction	Small bowel resection plus right colectomy (45*)	None	6	52
56	Ileum obstruction	Small bowel resection plus right colectomy (40*)	None	8	62

*length (in cm) of defunctionilized small bowel which had to be left within the pelvis.

On follow-up, the patients died over one to five years time after surgery from advance of the primary disease. No complications related to the intrapelvic remaining bowel were detected, except in one patient who presented with seromucinous vaginal discharge in amounts non-influencing her daily routine.

Discussion

Post-radiation enteritis is commonly encountered either acutely or in the chronic type [1, 4, 5]. Acute radiation enteritis is a frequent occurence in patients receiving abdominal or pelvic radiation. The large and small bowel which are housed in the pelvis are the most affected in cases of pelvic radiation as it happens in women with cervical cancer [4, 9]. Acute radiation enteritis is due to the direct effect of radiation on bowel mucosa [3, 9]. The management of these patients is virtually symptomatic and supportive, aiming at alleviating nausea, pain, vomiting, diarrhea or tenesmus. Fortunately, the symptoms are self-limiting and resolve within weeks of completion of therapy [11, 12].

By contrast, chronic radiation enteritis constitutes an indolent but often progressive syndrome. It may begin as soon as two months after completion of radiotherapy or as late as three years later [6, 13]. The underlying pathology of chronic radiation enteritis is characterized by obliterative endarteritis with subsequent mural fibrosis and ischemic changes resulting in perforation, obstruction, fistula formation or bleeding [14]. It has been estimated that 5-15% of patients receiving pelvic radiotherapy will sooner or later present with chronic radiation enteritis and as many as half of them will require surgical intervention [4-7, 11-14].

Management of these patients is a cumbersome task and no surgical means such as symptom-controlling medication, diet modification or parenteral nutrition should be initially tried. Surgical intervention is reserved for the most recalcitrant cases and for patients presenting with life-threatening complications. Postoperative morbidity and mortality rates average 30-50% and 10-15%, respectively [13, 15]. The surgical technique should be tailored according to patients' general status and type of complication [7, 11, 12]. Resection, by-pass and diversion or exclusion of the radiation-injured bowel are the options we have to resort to [7, 14, 15].

In general, resection should be considered as the optimum treatment in selected cases of complicated radiation gut injuries [7]. When gut resection is decided, care should be taken to achieve healthy bowel edges proximally and distally in order to secure a safe primary anastomosis. Therefore, concomitant to small bowel resection, right colectomy is always advisable since the cecum is frequently badly damaged. The small bowel should be anastomosed to the transverse colon. This strategy was suitable and adopted in our patients with excellent results. By contrast, when rectosigmoid post-radiation complications, such as stenosis, bleeding or fistula formation require surgical intervention, proximal colostomy is recommended [11-13].

However, bowel resections in these patients are extremely troublesome for two reasons; first, the healing process of the radiated tissue is poor; second, chronic radiation enteritis is complicated by development of hard adhesions between the intrapelvic organs rendering the dissection and complete resection of the injured bowel laborious and dangerous. Accidental injuries to the bladder, ureters, sigmoid colon and vascular structures are frequent and bear an unacceptably high morbidity and mortality rate due to tissue healing impairment and failure of the attempted repairs [11, 12, 14, 15].

Our study demonstrates that, partial resection of the irradiated gut, instead of complete, eliminates these accidental injuries to adjacent vital structures with which gut is adherent, rendering complete dissection precarious [13]. These small bowel remnants are harmless and our patients had one to five years of survival. It should be stressed that primary anastomoses should be carried out in healthy gut segments and this principle should direct the extent of gut resection [16, 17]. Obliteration of the lumen of the gut remnants appears to contribute significantly to eliminating intrabdominal infections and fistula formation postoperatively.

In conclusion, bowel resection in complicated chronic radiation enteritis is associated with high morbidity and mortality due mainly to accidental injuries to surrounding vital structures. Partial resection of the radiation-injured gut, leaving defunctionalized parts on the nearby organs which are adherent, eliminates inadvertent injuries, accelerates the surgical procedure and considerably reduces the associated morbidity and mortality.

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Address reprint requests to:
V. SMYRNIOTIS, M.D.
22, Hanioti Str.
154 52 Athens (Greece)