Radiation Enteritis: A Rare Complication of the Transverse Colon in Uterine Cancer

Kenji YOSHIMURA, Ichiro HIRATA*, Kentaro MAEMURA*, Kazunori SUGI* and Tetsuo TAHARA*

Abstract

Radiation therapy is a powerful method for the control of cancer. The utilization of abdominal or pelvic radiation has been extended, and the incidence of radiation enteritis appears to be increasing. The majority of the induced lesions is in the distal ileum, sigmoid colon, or rectum. Reported here is an unusual case of radiation enteritis which caused a severe sequelae of stricture in the transverse colon as a long-term effect of therapeutic irradiation for uterine cancer, and required a surgical resection.

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Introduction

The incidence of radiation enteritis seems to have risen in recent years with the increasing utilization of radiation therapy for abdominal or pelvic malignancies (1). Tolerance doses of digestive organs to irradiation are thought to be very close to the therapeutic dosages for the tumors, and therefore radiation injury to the gut is inevitable to a certain extent (2–4). Radiation enteritis is regarded as a progressive disease, and is possible to induce organic problems such as bleeding, stricture, perforation or fistula as well as functional disorders to the intestine (5–7). Total parenteral nutrition and bowel rest are very important in the treatment of radiation enteritis, of which effect appears to be enhanced by methylprednisolone (8). Nakada et al have also reported the effect of hyperbaric oxygenation therapy consisting of 100 percent oxygen (9), however many cases of irradiated bowels have required surgical resection (10, 11). We report an uncommon case of radiation enteritis which formed a severely stenotic lesion of the transverse colon in addition to damage of the rectosigmoid colon, after a course of pelvic irradiation for uterine cervical cancer.

Case Report

A 57-year-old woman was admitted to the hospital with left lower abdominal pain, fever, and melena. Seven months previously, the patient underwent a total abdominal hysterectomy and bilateral salpingo-oophorectomy, for stage IIb uterine cervical cancer. She received 1.8 Gy of linac a day to her pelvis for 28 days after the operation.

On physical examination, there was no adenopathy. Abdominal examination demonstrated a well-healed surgical scar and skin pigmentation in the lower abdomen. Moderate tenderness was noted on the left lower abdomen, however there were no peritoneal signs.

Laboratory evaluation at the time of admission (Table 1) showed a white blood cell count of 12,980/mm³ with a marked left shift of the granulocytic series, hemoglobin 9.9 g/dl, hematocrit 31.6%, C-reactive protein 13.45 mg/dl, and erythrocyte sedimentation rate of 69 mm/h. Blood chemistry, including liver and kidney function tests, and blood coagulation, was normal. Fecal bacterial cultures revealed a few colonies of *Enterococcus* sp., *Escherichia coli*, and *Candida* sp. Urinalysis was positive for occult blood, but negative for bacterial or fungal cultures. Result of Mantoux's reaction was negative.

Sigmoidoscopy on the day of admission revealed several circumferential ulcers with relatively sharp distal and proximal demarcation, and diffuse hemorrhage or hyperemia of the mucosa, in the rectosigmoid colon (Fig. 1A). Characteristic telangiectasia with atrophy of the mucosa was also seen (Fig. 1B).

She was diagnosed as radiation enteritis and was started on an oral salazosulfapyridine 4 g a day and 1 mg dosages of betamethasone suppository daily (8). Intravenous antibiotics were also continued with total parenteral nutrition for peritonitis, and she seemed to respond to the treatment with partial relief of her symptoms.

Total colonoscopy on the 71st day in hospital revealed that only redness and telangiectasia of the mucosa remained in the rectosigmoid colon, which was equivalent to grade Ia of Sherman's classification (12). However, a remarkable stricture smaller than the diameter of the fibroscope was found in the

From the Department of Internal Medicine, Kodama Hospital, Hyogo and *the Second Department of Internal Medicine, Osaka Medical College, Osaka
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Reprint requests should be addressed to Dr. Kenji Yoshimura, the Department of Internal Medicine, Kodama Hospital, 24-9, Kawamo 3-chome, Takarazuka, Hyogo 665-0842

Table 1. Laboratory Data on Admission

Blood cell count		Lactate dehydrogenase	260 IU/l
White blood cell	12,980 / μ l	Cholinesterase	80 IU/l
(Neutrophil)	88.7 %	Amylase	40 IU/l
Red blood cell	260 $\times$ 10 ⁴ / μ l	Total cholesterol	164 mg/dl
Hemoglobin	9.9 g/dl	Triglyceride	84 mg/dl
Hematocrit	31.6 %	Blood urea nitrogen	21 mg/dl
MCV	121.6 fl	Creatinine	0.9 mg/dl
MCH	38.0 pg	Na	134 mEq/l
Platelet	12.6 $\times$ 10 ⁴ / μ l	K	4.0 mEq/l
Blood Chemistry		Cl	100 mEq/l
Total protein	6.1 g/dl	C-reactive protein	13.45 mg/dl
Albumin	3.3 g/dl	ESR	69 mm/h
AST	24 IU/l		
ALT	11 IU/l		

MCV: mean corpuscular volume, MCH: mean corpuscular hemoglobin, AST: aspartate aminotransferase, ALT: alanine aminotransferase, ESR: erythrocyte sedimentation rate.

Figure 1. Endoscopic findings of the sigmoid colon on admission. A) Diffuse hemorrhage or hyperemia of the mucosa and several ulcers with relatively clear demarcation are seen in the rectosigmoid colon. B) Characteristic telangiectasia exists in part with atrophic mucosa.

transverse colon.

Barium enema (Fig. 2A) showed a severe stricture about 9 cm long in the middle of the transverse colon, of which demarcation was not clear; no abnormalities of the wall suggestive of a malignant tumor were found. On the other hand, barium enema before the operation of the uterine cervical cancer (Fig. 2B) showed an obvious ptosis of the transverse colon into the pelvic cavity, however no invasive lesions of the cancer were observed in the colon.

The patient underwent resection of the stenotic lesion followed by immediate restorative anastomosis. The surgical specimen of the transverse colon (Fig. 3A), demonstrated a localized stricture with hemorrhage and several small ulcerations and a remarkable thickening or outgrowth of the wall and mesentery. The final pathological examination (Fig. 3B) revealed a severe fibrosis and scattered hemorrhage of the whole mucosa, and an obliterative vasculitis.

Figure 2. Barium enema after the radiation therapy, and before the operation for uterine cancer. A) Barium enema shows a severe stricture about 9 cm long in the middle of the transverse colon, of which demarcation is unclear, and no irregularity of the mucosa suggestive of a malignant tumor was found. B) Barium enema before the operation for uterine cervical cancer shows a remarkable ptosis of the transverse colon into the pelvic cavity.

Figure 3. Macroscopic and microscopic findings of the resected lesion. A) Macroscopic appearance of the resected stenotic lesion shows a significant thickening or outgrowth of the intestinal wall and mesentery with hemorrhage and several small ulcers. B) Microscopic examination reveals a severe fibrosis and scattered hemorrhage of the whole mucosa, and an obliterative vasculitis (HE stain, ×40).

Discussion

It is estimated that half of all patients with malignant disease undergo therapeutic irradiation at some time during their course of treatment, and radiation therapy has brought much benefit of cure to many malignant diseases. However, the tolerance doses of digestive organs are very close to the therapeutic dosages required to control many cancers (2, 3). In the case described here, the patient received 50.4 Gy of external irradiation to her pelvis after the operation for stage IIb uterine cervical cancer; this dosage is thought to be very close to the tolerance doses of the small bowel and colon.

The majority of patients therefore have an acute enteritis manifested as diarrhea and tenesmus during the course of pelvic irradiation, however these symptoms are reversible and are usually self-limited. On the other hand, late radiation effects on the bowel cause more serious complications, such as perforation, fistula, stricture, or hemorrhage (13), which are progressive and may become a cause of death (1, 6, 7). These late radiation-induced lesions are thought to develop based on the histological changes of obliterative endoarteritis, submucosal fibrosis and lymphatic ectasia.

The rectum, sigmoid colon, and terminal ileum appear to be particularly at risk from pelvic irradiation. Galland and Spencer (10) reported eighty cases of radiation colitis induced by pelvic radiotherapy which included 13, 23, and 43 lesions of the rectum, sigmoid colon, and terminal ileum, respectively. Only one lesion was encountered in the transverse colon, of which details are not mentioned in the report (11). The ascending and descending colon are not involved. It may be because the ascending, transverse, and descending colon are relatively free of radiation beam. In the present patient, a serious complication of severe stricture of the transverse colon remained about one-half year after the therapeutic irradiation to the pelvis, while no stenotic lesions were observed in the rectosigmoid colon.

Barium enema of the patient before the operation for uterine cervical cancer showed a remarkable ptosis of the transverse colon into the pelvic cavity; the transverse colon is thought to have been within the radiation area. For the present patient, it is suggested that the injury could have been minimized by

using not only external but also internal treatment including the technique of afterloading, using the Trendelenburg's position, or distending the bladder with water, to reduce the radiation beam to the transverse colon. It is also reported that the use of polyglycolic acid mesh slings appears efficacious to keep the bowel out of the pelvis (14).

Considering the present case, it is concluded that we need to try to provide more individualized regimens of irradiation as described above to reduce the incidence of radiation enteritis.

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