



Case report

Use of a tissue expander to protect small bowel during radiotherapy in a cervical cancer patient with severe Crohn's disease

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1. Introduction

Radiation therapy plays a critical role in the treatment of cervical cancer, and chemoradiation is the treatment of choice in patients with advanced cervical cancer. However, the dose of radiation that can be delivered to the pelvis is limited by the variations in normal tissue tolerance of other intra-pelvic structures (small and large bowels, rectums, and bladders) to radiation. Target radiation treatment doses exceed the maximal value of small bowel radiation tolerance, leading to acute toxicity (diarrhea, abdominal cramps, and nausea (Geller et al., 2009)). Late complications of radical radiotherapy for cervical cancer arise in 5–15% of patients (Hamberger et al., 1983); the toxic effects of radiation on the bowel can lead to fibrosis, constriction, and stenosis (Geller et al., 2009). These risks increase with patient history of prior abdominal surgery, smoking, pelvic inflammatory disease, and diabetes (Berek and Hacker, 2009). In the absence of these risk factors, the small bowel can tolerate radiation doses to 30 Gy; the risk of small bowel obstruction rises rapidly at doses greater than 60 Gy, and reaches

100% at doses greater than 70 Gy (Berek and Hacker, 2009). Patients with inflammatory bowel disease are at an even greater risk of acute and chronic radiation-induced injury, with one study finding an overall incidence of severe enteric toxicity at 46% (Willett et al., 2000). Here we describe the case of a patient with cervical cancer and severe inflammatory bowel disease, in whom a saline-filled tissue expander was placed prior to radiotherapy with the goal of removing the small bowel from the radiation field.

2. Case

A 40-year old woman presented to her family doctor with a one month history of abnormal vaginal bleeding and pelvic pain. Her medical history was significant for a 24-year history of Crohn's disease which had been managed surgically as she could not tolerate her medications for various reasons. Over a period of 12 years she had undergone 11 segmental resections. Fourteen years prior to consultation, she had a bowel resection with incidental right salpingo-oophorectomy and subtotal hysterectomy, ostensibly because of adhesions between the bowel and uterus and adnexa. At the time the patient presented to her family doctor, she had not had a Pap smear for fourteen years, as she was not aware that she still had a cervix.

A Pap smear was performed and cytology showed a high-grade squamous intraepithelial lesion (HSIL). On colposcopy, an endocervical curettage also showed HSIL, and a biopsy taken in a loop electrosurgical excision procedure showed extensive poorly-differentiated squamous cell carcinoma. A bimanual exam revealed a 5–6 cm mass palpable in the upper vagina.

On MRI, a 5-cm mass was seen infiltrating the remnant of the cervix, with extension into the parametria and proximal half of the vagina (FIGO Stage IIB). Enlarged, irregular pelvic lymph nodes were seen, although it was unclear whether these were related to her malignancy or Crohn's disease. A PET scan showed intense radiotracer in the cervical malignancy with multiple metabolically active parailiac lymph nodes bilaterally, consistent with nodal metastases. Both small and large bowels were FDG-avid.

The size of the malignancy and the suspicious pelvic lymph nodes made this patient a candidate for radical radiotherapy with cisplatin chemotherapy; however, there was concern that her Crohn's disease would be aggravated with radiation.

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Table 1
Examples in the Literature of Pelvic Prosthesis Insertion in Order to Prevent Radiation Enterotoxicity.

Author and year	Number of patients	Indication	Tissue expander (TE) filled to: (cm ³)	Mesh	Radiation enteritis	Complications due to prosthesis
Sugarbaker 1983	1	Unspecified	1000	Prosthetic mesh	none	none
Lasser 1986	9	Rectal cancer	?	?	none	none
Cuttat 1991	4	Rectal cancer	500	?	none	none
Herbert 1993	14	Endometrial, colorectal, anal cancer	450–850	none	Statistical decrease in enteritis in patients with TE placement (compared to 63 patients not receiving TE)	Ileus (n = 1) Bowel perforation after removal of TE (n = 2) Perineal dehiscence in patient with transvaginal placement of TE in pelvic exenteration (n = 1) Hydronephrosis (n = 1) Constipation (n = 1)
Delaloye 1994	18	Cervical cancer	350–400	Vicryl mesh	none	Abscess (n = 4), fistula (n = 4), TE extrusion (n = 1), TE deflation (n = 3)
Hoffman 1998	58	Sarcomas; endometrial, vaginal, cervical, rectal, colon, anal cancer	450–1500	none	none	Heaviness (n = 1) Flank pain (n = 2)
Sezeur 1999	22	Retroperitoneal sarcoma, pelvic cancer	600	Vicryl mesh	none	Bowel injury during positioning of tissue expander (n = 1) Adhesions of bowel to implant (n = 1) PE (n = 1)
Burnett 2000	7	Cervical cancer	960–1200	none	none	none
Abhyankar 2005	1	Retroperitoneal rhabdomyosarcoma	250	Vicryl mesh	none	none
Holmebakk 2006	1	Retroperitoneal recurrence of colorectal cancer	500	none	none	none
White 2007	33	Sarcomas, endometrial, vaginal, colon, rectal cancer	700	Dexon mesh	none	Cystitis (n = 1) Ileus (n = 1)
Angster 2010	2	Cervical cancer, retroperitoneal sarcoma	400 500	none	none	none
Geller 2009	10	Cervical cancer	720	none	none	Migration implant (n = 1) Vesicovaginal fistula (n = 1) Enterocutaneous fistula (n = 1) Rectovaginal fistula (n = 1)
McKay 2011	1	Prostate cancer	350	none	none	none
Valle 2011	28	Cervical cancer	?	none	none	Fever (n = 4), periprosthetic hemorrhage effusion (n = 2)
Perez-Munoz, 2014	20	Pelvic Ewing's sarcoma	~500	none	none	Mild diarrhea (n = 1)

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