Acute radiation enteritis causing small bowel obstruction

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ABSTRACT

Although much is known about the late intestinal side effects of radiation, comparatively little has been published about its acute complications. We present a case of a small bowel obstruction due to acute radiation enteritis. As radiotherapy continues to expand its role in the management of oncological disease, clinicians should remain alert to the resulting undesired effects.

KEYWORDS

Radiation enteritis Radiotherapy Acute enteritis

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Case history

A 77-year-old man with symptomatic sacral and pelvic side wall metastases from a prostatic endometrioid adenocarcinoma was started on high dose palliative radiotherapy. A 60Gy mid-plane dose was planned in thirty fractions over six weeks using an anterior to posterior field arrangement (Figs 1a and 1b) to encompass all known symptomatic metastases. After 40Gy in 20 fractions over 28 days, he developed complete bowel obstruction. An examination revealed abdominal distension with diffuse tenderness and no abdominal scars. A raised white cell count of $14.4 \times 10^9/l$ and C-reactive protein of 213mg/l were found. An abdominal x-ray revealed dilated loops of small bowel with a paucity of colonic gas. CT (Fig 1c) demonstrated several oedematous and thickened pelvic small bowel loops causing multifocal obstruction and a diagnosis of acute radiation enteritis (ARE) was made. After resuscitation, the patient was managed supportively with bowel rest and total parenteral nutrition.

Twelve days after the onset of symptoms, he suffered a self-limited but major lower gastrointestinal (GI) haemorrhage with a haemoglobin drop from 119g/l to 52g/l. Emergency upper and lower GI endoscopies were conducted but these did not identify a cause in the upper tract or colon. After three weeks of conservative management, the patient's symptoms resolved with a gradual return of bowel activity and he was successfully discharged.

Discussion

Although much is known about the late intestinal side effects of radiation, comparatively little has been published

about its acute complications. A search of the English language literature revealed no cases of acute bowel obstruction from ARE. ARE results from damage to the rapidly dividing mucosal crypt cells¹ and microvascular endothelium.² The degree of damage varies among individuals and is influenced by genomic susceptibility to ionising radiation. The patient described was not known to harbour any DNA damage repair defects. Acute non-obstructing small bowel injury is common in abdominopelvic radiotherapy. Although modern protocols with close attention to dose/fractionation, field size, arrangement and immobilisation techniques (eg use of a 'belly board' allowing displacement of the small bowel from the pelvis) can reduce the injury sustained, a dose of 30Gy or more can induce mucosal lesions in 90% of patients, with diarrhoea developing within two weeks.¹

The diagnosis of ARE is challenging and typically based on computed tomography appearances in the context of recent exposure.³ Mucosal lesions may also result in a clinically significant haemorrhage.⁵ Treatment is supportive as episodes are usually self limiting. Probiotics are of prophylactic use in reducing symptoms, particularly diarrhoea.¹ High dose sulfasalazine can reduce the symptoms of ARE in established cases⁴ and loperamide has a role in reducing stool frequency and volume.² Surgical intervention is considered a last resort and reserved for complicated mechanical obstruction and life threatening haemorrhage only.⁵ The irradiated tissue predisposes to an increased risk of fistulation and anastomotic leakage. For this reason, bypass or defunctioning stomas have been advocated.⁵ When necessary, resection and anastomosis using margins free from ARE are prudent and supported by studies on chronic radiation enteritis.⁵ As radiotherapy continues to expand its

role in the management of oncological disease, clinicians should remain alert to the resulting undesired effects.

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Figure 1 Axial (1a) and coronal (1b) views of radiotherapy fields with isodoses in cGy. Note the significant volume of small bowel in the anterior pelvis receiving 4,050 cGy (red isodose line). 1c: Portal venous phase axial CT image through the pelvis demonstrating small bowel wall thickening (closed arrows), mesenteric injection (block arrow) and proximal loop dilatation (arrowhead). Note the left pelvic side wall nodal recurrence (open arrow).