

Traumatic rectal perforation presenting as necrotising fasciitis of the lower limb

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ABSTRACT

Necrotising fasciitis is a life-threatening soft tissue infection that is associated with high mortality and morbidity. It has been described in the form of Fournier's gangrene following rectal perforations related to colorectal cancer. In these rare instances, spontaneous perforation of locally-advanced rectal carcinoma provides an entry point for bacterial seeding to the surrounding soft tissues, resulting in Gram-negative sepsis of the perineum. To our knowledge, necrotising fasciitis extending beyond the perineum due to rectal perforation has not been previously described. We report an unusual self-induced traumatic rectal perforation presenting with severe necrotising fasciitis of the lower limb in a 73-year-old Chinese man. Our patient was successfully treated with a multidisciplinary approach that involved a defunctioning colostomy as well as prompt and rigorous debridement of the affected limb. We also review the literature on the management of retroperitoneal rectal perforations and their sequelae, as well as discuss the various surgical options commonly applied and their outcomes.

Keywords: colonic irrigation complication, intestinal perforation, necrotising fasciitis, rectal perforation

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INTRODUCTION

Rectal perforation, most frequently a result of advanced rectal carcinoma, has been known to cause severe pelvic and perineal infections. However, soft tissue infection extending beyond the perineum due to rectal perforation has not been described. We present an unusual case of severe necrotising fasciitis of the lower limb secondary to self-induced traumatic rectal perforation, and review the literature on the management of retroperitoneal rectal perforations.

CASE REPORT

A 73-year-old Chinese man presented to the orthopaedic department with a one-week history of left gluteal



Fig. 1 Photograph shows blistering of the posterior aspect of the left leg, consistent with severe soft tissue infection involving the posterior compartment.

pain associated with fever. He had a history of Duke's B (T4N0M0) rectal cancer five years prior to this presentation, which was treated with an ultra-low anterior resection with a coloanal hand-sewn anastomosis. This was followed by adjuvant chemotherapy and radiotherapy, which he completed within six months following surgery. Yearly review and colonoscopy showed no locoregional recurrence of the cancer or distant metastasis, although he had developed a mild anal stricture postoperatively, causing long-standing constipation. This had been treated non-surgically using laxatives. He was also an ex-opium smoker who was on sublingual buprenorphine at the time of presentation. Further history-taking revealed that in the week prior to presentation, he had been using tap water directly from a rubber hose inserted per rectum, as a form of irrigation enema to relieve his constipation. He denied digital rectal evacuation or direct trauma to the gluteal area or lower limbs. There was also no history of abdominal or pelvic pain, nor was there any per rectal bleeding prior to admission.

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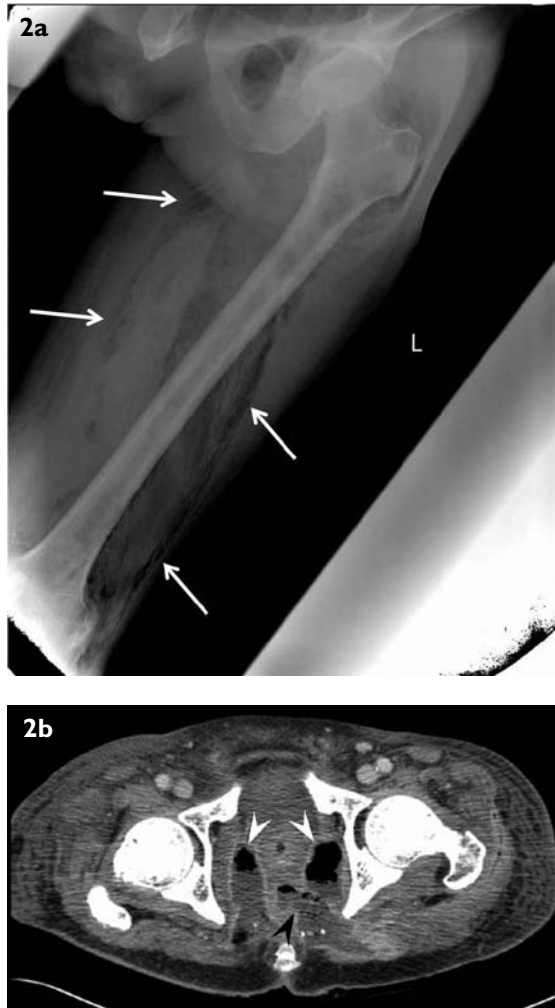


Fig. 2 (a) Left leg radiograph shows both subcutaneous and intermuscular gas (white arrows) (b) Axial CT image of the pelvis shows a large perforation (black arrowhead) of the left posterolateral wall of the lower rectum with gas and faeces tracking into the ischioanal fossae and left gluteal region (white arrowheads).

At presentation, he was febrile with a temperature of 38.5°C, and appeared toxic but was haemodynamically stable. Physical examination revealed swelling, erythema, blistering and subcutaneous crepitus of the left lower limb, extending from the gluteal region posteriorly down to the ankle (Fig. 1). Abdominal and systemic examinations were normal. Initial blood investigations revealed a normal white cell count of $7.6 \times 10^9/L$. His haemoglobin level and platelet count were normal. Serum creatine kinase (CK) levels were markedly raised at 1,283 U/L while CK-MB levels were only slightly elevated at 18.5 $\mu\text{g/L}$ with a normal troponin-T level of $< 0.01 \mu\text{g/L}$, suggesting the presence of rhabdomyolysis. Pelvic and left leg radiographs showed subcutaneous and intermuscular gas which led to the diagnosis of lower limb necrotising fasciitis with gas gangrene (Fig. 2a). In view of his history of self-administered colonic

irrigation, rectal perforation was suspected as the underlying source of infection for his left leg necrotising fasciitis. A digital rectal examination revealed a 2-cm defect in the left posterolateral wall of the lower rectum. This was confirmed with a computed tomography (CT) of the pelvis that revealed a perforation at the site of the coloanal anastomosis on the left side, with extensive gas in the lower pelvic cavity, ischioanal fossae, tracking along the left-sided gluteal region and inferiorly to the intermuscular planes of the left thigh (Fig. 2b).

The patient was immediately commenced on broad-spectrum antibiotics and referred to the colorectal surgical team. Prompt surgical intervention was undertaken by the colorectal and orthopaedic surgeons to explore and debride the perineum and left lower limb (Figs. 3a & b). Intraoperatively, a large, left posterolateral rectal perforation was found with retroperitoneal contamination tracking down the left leg. There was myonecrosis and necrotising fasciitis of the biceps femoris with faeculent material throughout the posterior compartment of the leg. The muscles of the lateral and adductor compartments as well as those of the left calf were oedematous but viable. A laparotomy was carried out which revealed no intraabdominal involvement. Following a distal colonic washout, a defunctioning transverse loop colostomy was performed at the same sitting.

The patient required four further wound debridements in the subsequent two months. Wound cultures grew *Pseudomonas aeruginosa* and *Enterococcus* species, for which antibiotic therapy was tailored accordingly. He developed a complication of pulmonary embolism after the third wound debridement which was treated with anticoagulation using low-molecular weight heparin and insertion of an inferior vena caval filter. He was subsequently put on long-term anticoagulation with warfarin. Skin coverage was later achieved using split skin grafting, which had taken well by three months (Fig. 4). At six months after his initial presentation, his left leg wounds had healed completely although he had a small persistent perianal fistula that eventually healed with antibiotics. Currently, at two years follow-up, he is well and able to ambulate independently following an intensive postoperative rehabilitation programme.

DISCUSSION

Necrotising fasciitis in association with rectal perforation has rarely been reported in the literature. Thus far, the majority of cases involve spontaneous perforation due to colorectal malignancy, with infection limited to the perineum, such as Fournier's gangrene.⁽¹⁻⁵⁾ Rectal perforation allows direct bacterial translocation into the



Fig. 3 Operative photographs show (a) extensive debridement of the left thigh and leg, leaving healthy underlying muscles; and (b) extensive posterior compartment debridement of the left lower limb.



Fig. 4 Photograph taken six weeks post-presentation shows excellent results after split skin grafting of the extensive tissue defect, following debridement of the left leg.

perineal and retroperitoneal soft tissues which, if left untreated, potentially leads to fulminant infection and sepsis.^(6,7) Highton et al reported a case of rectal cancer presenting with necrotising fasciitis of the posterior thigh,⁽⁷⁾ while Lam et al reported a case of retroperitoneal perforation of a sigmoid carcinoma leading to a psoas abscess with infection spreading to the thigh.⁽⁸⁾

Apart from carcinoma, rectal perforation as a result of direct trauma is a well-described entity. More specifically, retrograde enemas and colonic irrigation as a form of alternative medical practice have been known to cause iatrogenic colorectal perforation, necessitating surgery.⁽⁹⁻¹²⁾ These patients usually present with acute abdomen, following free intraperitoneal perforation or with lower pelvic pain in cases of retroperitoneal perforation. To our knowledge, our patient is the first reported case in the English literature to present with necrotising fasciitis of the lower limb following traumatic rectal perforation. The unusual presentation of

our patient illustrates that a high degree of suspicion is required for prompt diagnosis of necrotising fasciitis, and that effort must be made to obtain a detailed history in the context of the patient's medical history. A meticulous physical examination is also paramount in clinching the diagnosis early to enable a successful outcome.

Necrotising fasciitis related to rectal perforations is usually a synergistic infection involving both aerobic and anaerobic organisms, most commonly *Escherichia coli*, *Bacteroides fragilis*, *Enterococcus* spp. and mixed anaerobes.⁽¹⁻⁴⁾ The onset may be indolent, but often carries out a fulminant course with high mortality.⁽²⁾ Treatment involves the use of high-dose antibiotic therapy, systemic support, and prompt and radical surgical debridement of the infected tissues.^(1,3) For our patient, a multidisciplinary team of orthopaedic and colorectal surgeons was involved in the surgical management from the start, allowing for early colonic diversion, and possibly reducing bacterial load to facilitate tissue healing.

The treatment outcomes of retroperitoneal perforations of the rectum have been evaluated mainly in the context of iatrogenic perforation, following barium enema or radical prostatectomy.⁽¹⁴⁻¹⁶⁾ In such instances, pre-procedural bowel preparation is usually performed, and this significantly reduces soilage or extravasation in the event of rectal perforation. As such, conservative management of small perforations or primary repair of large rectal defects without temporary colonic diversion is largely considered to be adequate in the management of iatrogenic rectal perforation.^(14,16) However, most reports suggest that late presentation, a poorly-prepared colon, gross soilage or contrast extravasation, and the presence of abscess formation are poor prognostic factors which significantly increase the complications of retroperitoneal rectal perforations.⁽¹⁴⁾ Such conditions usually necessitate operative management rather than systemic antibiotic therapy alone.⁽¹⁴⁻¹⁶⁾ Traumatic low-rectal perforations, such as that described in our patient, often have occult presentations with delayed diagnosis.⁽⁹⁻¹²⁾ This invariably results in greater tissue soilage and a higher risk of abscess formation. Surgical debridement is imperative in such circumstances. However, further considerations here would be whether faecal diversion with a temporary loop colostomy is necessary and whether repair of the mucosal defect is beneficial. Eu et al reported successfully treating five cases of traumatic rectal perforations using the principles of parenteral antibiotics, presacral drainage, distal bowel irrigation, primary repair of rectal perforation and sphincter muscles, and faecal diversion.⁽⁹⁾

The use of self-administered irrigation enemas for chronic constipation in our local population is not an uncommon practice, although this has not been specifically studied in the current literature. Rectal irrigation has also been popularised by many alternative medical practitioners, as a safe way to “cleanse” the colon, in addition to claims of various health benefits. Many forms of self-administered as well as alleged professional methods are now widely available to the public. There are also few restrictions on unregistered alternative practitioners whose practices are not monitored or governed. Unfortunately, many patients are ignorant of the dangers and possible injuries that can result from improper administration of enemas.⁽¹¹⁾ Improper insertion of the rectal tube may cause direct bowel perforation, and injuries may also be due to excessive high water pressure.^(11,14,15) The authors of this paper strongly discourage the use of self-administered rectal irrigation for constipation, particularly in patients with previous colorectal surgery.

In conclusion, necrotising fasciitis is usually

described in the form of Fournier’s gangrene following rectal perforations. In this paper, we present an unusual case of lower limb necrotising fasciitis following a traumatic rectal perforation. The remarkable recovery of our patient could be attributed to prompt diagnosis and a multidisciplinary approach of aggressive antibiotic treatment, and thorough debridement with colonic defunctioning. Surgical intervention is appropriate for traumatic perforations, as opposed to iatrogenic perforations in a prepared colon where conservative management may be adequate. Alternative medical practices involving the use of irrigation enemas should be strongly discouraged in view of the high risks of traumatic rectal perforation, and the associated morbidity and mortality.

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