CASE REPORT

Necrotising fasciitis secondary to perforated rectal adenocarcinoma presenting as a thigh swelling

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SUMMARY

A 62-year-old man was admitted to the medical admissions ward with right thigh pain presumed to be a deep vein thrombosis (DVT). Subsequent duplex ultrasonography excluded a DVT but noted the presence of a significant amount of subcutaneous gas. A plain film radiograph was performed with the same finding raising the possibility of necrotising fasciitis (NF). Only at this point was digital rectal examination performed revealing a large rectal mass oozing pus and blood. CT imaging showed thickening of the rectum consistent with a tumour with gas and fluid in the perirectal space extending to the anterolateral right femur. Despite aggressive debridement and treatment, the patient deteriorated and died 6 weeks later. This case should serve as a reminder to consider digital rectal examination and the occurrence of a rectal perforation in all patients who present with suspicious thigh swellings.

BACKGROUND

This case is a clear and very interesting message for medical students and trainee doctors. Clinicians should have a high index of suspicion for rectal cancers given their prevalence and a low threshold for performing digital rectal examination.

CASE PRESENTATION

A 62-year-old man presented to the Acute Medical Unit with right thigh pain. The pain began following a sudden 'pop' while bending over gardening 2 weeks prior. He reported 6 months of intermittent diarrhoea, as well as faecal incontinence and 4 stone weight loss. There was a history of smoking and a chronically high alcohol intake, but no other medical or surgical history. On examination, the patient was unable to weight bear on his right leg and there was a large tender swelling on the lateral aspect of the thigh. He had fever at 38.6°C and confused but otherwise haemodynamically stable. Cardiorespiratory and abdominal examinations were unremarkable but he was cachexic. Blood tests revealed a microcytic anaemia (haemoglobin 74 g/L) with raised white cell count and inflammatory markers.

INVESTIGATIONS

A Doppler ultrasound scan excluded the initial diagnosis of venous thromboembolism but did suggest there was gas within the soft tissues. An X-ray of the femur and a CT of the thorax, abdomen and pelvis were arranged. The X-ray excluded a bony injury but that was not noted until a consultant ward round on day 3 of the admission when gas was seen within the soft tissues (figure 1).

Figure 1 X-ray showing subcutaneous gas collection.

At this point, the possibility of necrotising fasciitis (NF) was raised. The swelling was fluctuant by this time and an aspirate revealed foul smelling pus with a Gram stain showing Gram-positive cocci, Gram-positive rods and Gram-negative rods. A specimen later grew *Escherichia coli* and mixed anaerobes. Rectal examination revealed a large rectal mass that oozed blood and pus on palpation. The CT scan was expedited and showed extensive asymmetrical thickening of the rectum consistent with a rectal tumour as well as gas and fluid in the perirectal space extending to the right thigh, with a large gas and fluid collection in the anterolateral right femur (figures 2 and 3). MRI was then performed (figure 4), which clearly showed the rectal perforation.

Figure 2 CT image showing perforated rectal cancer.

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Figure 3 CT showing extent of gas collection.

DIFFERENTIAL DIAGNOSIS

- ▶ Deep vein thrombosis
- ▶ Cellulitis
- ▶ Isolated soft tissue collection/abscess
- ▶ Lipoma
- ▶ Sarcoma
- ▶ NF

TREATMENT

Intravenous antibiotic therapy was started and the patient underwent an incision and drainage with fasciotomy of the right thigh as a joint procedure involving the Orthopaedic and Colorectal Surgery teams. They found a fluctuant swelling in the anterolateral thigh from the buttock to the distal one-third of the thigh.

Figure 4 MRI showing rectal perforation.

On dissection there was foul, faeculent smelling soapy thick pus with air and gas over the deep fascia. The muscles in the anterior and lateral thigh as well as the posterior compartment were extensively devitalised, however, the hip capsule was intact. In total, 900 mL of pus and blood was collected. Extensive debridement of the necrosed and diseased tissue was performed, followed by a washout and packing. The patient later underwent an uncomplicated defunctioning end sigmoid colectomy. A decision was made not to intervene surgically with the rectal tumour at this point.

OUTCOME AND FOLLOW-UP

Over the next 2 weeks, the patient was managed in level 3 and then level 2 care settings before stepping down to a surgical ward. He underwent 5 washouts of the wound and was treated with vacuum-assisted closure (VAC) therapy. MRI showed a T3/4 N1 Mx rectal malignancy, which was confirmed on flexible sigmoidoscopy with the biopsy showing a moderately differentiated adenocarcinoma. Unfortunately, after a 6-week admission the patient finally succumbed to his malignancy and died.

DISCUSSION

Although rare, rectal perforation has been known to cause NF of the perineum (Fournier's gangrene). There are, however, only a small number of reported cases of perforation of a rectal malignancy leading to NF of the thigh. In our literature search we found nine case reports of patients presenting with NF of the thigh (table 1), of which only four were caused by perforation of a rectal carcinoma. There are several possible routes of entry for faecal matter and infection to invade the thigh: femoral sheath, femoral canal, psoas sheath, sciatic notch and the obturator foramen.

NF is a potentially life-threatening infection of the subcutaneous tissues and fascia. A number of factors have been found to increase the risk of developing the condition, such as malignancy, alcoholism, malnutrition, diabetes, chronic hepatitis, male sex, old age, smoking and alcohol consumption. Owing to the variable presentation, it is often initially missed, leading to lengthy delays in diagnosis and treatment, which have been estimated at being as high as 76% even with surgical debridement.¹⁰ Patients usually present with pain that is often described as out of proportion to clinical findings and often without a precipitating cause. It is not until they develop skin changes and palpable crepitus that the diagnosis becomes clear, but this can often take days, by which time septic shock is often taking effect. As group A *Streptococcus* is the most commonly isolated organism, patients often deteriorate rapidly with a toxic shock-like presentation.

In this case, the patient grew several organisms. Such polymicrobial infections have been described to present in a much more insidious way, explaining why he had symptoms for 2 weeks but never developed septic shock. In contrast, group A *Streptococcus* and *Clostridium* have been known to present in a more hyperacute way, with the rapid development of septic shock.

Urgent surgical debridement down to healthy tissue remains the mainstay of management, aiming to arrest progression of infection and reduce systemic toxicity. Antibiotics should be started, initially with broad spectrum agents with subsequent narrowing based on cultures. The use of intravenous immunoglobulins has been much debated. Theoretically, the IVIG should reduce streptococcal superantigen T-cell and macrophage-mediated immune response and subsequently reduce the toxic shock often seen with NF. However, there is still little data to back up or refute the routine use of IVIG in NF.¹¹

Table 1 The nine reported case reports of necrotising fasciitis of the thigh

Author	Year	Location	Cause	Location of necrotising fasciitis	Bacteria cultured	Status
Haemers <i>et al</i> ¹	2013	The Netherlands	Perforated rectal tumour	Right buttock and lower limb	<i>Escherichia coli</i> , Group G haemolytic <i>Streptococcus</i> , <i>Candida albicans</i>	Died (4 days postadmission)
Liu <i>et al</i> ²	2006	Hong Kong	Perforated rectal tumour	Both lower limbs	Group G <i>Streptococcus</i>	Died (7 days postadmission)
Fu <i>et al</i> ³	2009	Singapore	Perforated coloanal anastomosis	Left lower limb	<i>Pseudomonas aeruginosa</i> , <i>Enterococcus</i> spp	Alive at 2 years postinfection
Highton <i>et al</i> ⁴	2009	UK	Perforated rectal tumour	Right thigh to knee	<i>E. coli</i> and anaerobes	Alive
Takakura <i>et al</i> ⁵	2009	Japan	Sigmoid perforation with retroperitoneal abscess	Left thigh	<i>E. coli</i> and anaerobes	Alive
Chen <i>et al</i> ⁶	2010	Taiwan	Rectal cancer with metastatic spread to retroperitoneum	Right thigh	<i>Klebsiella pneumonia</i> and other anaerobic bacteria	Died
Chuang <i>et al</i> ⁷	2012	Taiwan	Perforated descending colon tumour	Left thigh and lower leg	<i>E. coli</i> , β — <i>Streptococcus</i> non-ABD and anaerobes	Alive
Khalil <i>et al</i> ⁸	2010	France	Perforated rectal tumour	Right thigh	Not stated	Died (6 years after infection)
Lam <i>et al</i> ⁹	1996	Hong Kong	Sigmoid bowel perforation	Left psoas abscess to left upper thigh	<i>E. coli</i> , <i>Bacteroides fragilis</i> , <i>Edwardsiella tarda</i> , <i>Staphylococcus</i> and Group G streptococci	Died

ABD, Streptococcus; non-ABD, streptococcal organism which does not conform to group A, B or C.

There is some evidence that the use of hyperbaric oxygen in the management of NF can reduce the number of surgical procedures required, and improve morbidity and mortality. This is due to the fact that tissue hypoxia is thought to reduce the effectiveness of intravenous antibiotics and impair tissue healing.¹² The authors of the review also suggest that this is often why patients do not respond clinically to intravenous antibiotics but rather to surgical debridement.

A retrospective study by Riseman *et al*¹³ found that mortality rates were 4.5% among NF patients treated with hyperbaric oxygen compared to a 9.4% mortality rate in those who went without. Furthermore, a 2005 study of 42 patients found that hyperbaric oxygen treatment adjunctive to 'comprehensive and aggressive management' reduced both mortality (34% compared to 11.9%) and morbidity (a 50% amputation rate compared to 0%).¹⁴

Despite a small number of minor studies supporting the treatment, such as those listed above, a recent Cochrane analysis found that all relevant published studies were of insufficient quality to meet the review's inclusion criteria. The authors concluded that good-quality clinical trials were needed to define the role of the treatment.¹⁵

In the case of the current patient, VAC therapy was used to treat the debrided thigh wound. However, less evidence exists to support the use of this treatment.^{16–18} The handful of peer reviewed literature pieces on the topic are confined to case reports or case series. These had all subjectively found favourable results. The authors could find no study or research literature on this topic, however.

Learning points

- Always consider an intra-abdominal source when presented with a lower limb infection.
- Always have a low threshold for digital rectal examination but particularly more so in patients presenting in this manner.
- Early identification and treatment is vital as necrotising fasciitis carries a high fatality rate and survival rates in similar reported cases appear poor.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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