Case report

Thigh infection: a rare complication of colonic perforation

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INTRODUCTION

Thigh infection is a rare complication of intra-abdominal sepsis. We report two cases of infection in the thigh resulting from colonic perforation; one patient subsequently developed necrotising fasciitis, a rare and often fatal condition affecting subcutaneous tissues characterised by spreading inflammation along fascial planes with initial sparing of overlying skin and underlying muscle.

CASE REPORTS

Case 1. A 55-year-old woman was initially referred for a gynaecological opinion with a history of crampy lower abdominal pain; a large bowel lesion was suspected and a barium enema undertaken. Before the results of this X-ray were known she was admitted urgently to the medical unit where a history of tiredness and weight loss of 1–2 stones in the previous two months was obtained. She also suffered from arthritis and hypothyroidism for which she was being treated with a non-steroidal anti-inflammatory drug and thyroxine 100 µg daily respectively. On admission she was noted to be pale (haemoglobin 10.1 g/100 ml) with a leucocytosis (WCC 32 x 100³, 91% neutrophils), and an ESR of 9 mm/hr. On the next day she developed a pyrexia of 39.6°C for which no cause was identified and she complained of severe pain in her back. The barium enema performed prior to admission had revealed diverticular disease with a persistent irregularity in the mid pelvic colon consistent with a neoplasm. Three days after admission she was transferred to the surgical unit for flexible sigmoidoscopy, but this was not possible due to faecal loading of the rectum. On that evening she again developed a pyrexia of 39.4°C. Full blood picture, blood cultures, sputum, and urine for organisms and sensitivities were obtained and she was commenced on antibiotic therapy with mezlocillin 2 g three times daily. Forty-eight hours later she complained of further pain in her abdomen, back, and right hip. On examination she was noted to have tenderness in her lower abdomen with muscle guarding and rebound. The right thigh was erythematous and held in a flexed
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position. Passive extension of the hip caused considerable pain. Straight X-ray of the abdomen suggested a mass in the right iliac fossa and surgical emphysema in the pelvic tissues.

In view of these findings emergency laparotomy was undertaken at which numerous small bowel adhesions were found in the lower abdomen with surgical emphysema visible and palpable in the pelvis. An abscess had formed posterolateral to the rectum on the left side of the pelvis due to a perforated stenosing carcinoma in the mid sigmoid colon. A Hartmann procedure was undertaken after sigmoid colectomy. On the second postoperative day she complained of pain in her right hip similar to the pain she had suffered for many years as a result of her arthritis. The thigh was inflamed by the 7th day and by the 11th postoperative day she had developed a fluctuant area on the lateral aspect of her right thigh approximately 10 cm above the knee joint. On the next day a 6 cm incision was made in the lower part of the lateral aspect of the thigh, revealing marked destruction of the subcutaneous tissues with sparing of the overlying skin and underlying muscle and releasing one litre of pus. A large drain was inserted into the space which appeared to extend up to the greater trochanter. A mixture of Strept. viridians, Coliforms, and Proteus species were found on culture of the pus.

Her general condition failed to improve despite treatment with mezlocillin, gentamicin and metronidazole and high calorie intake by both enteral and parenteral routes. A sinogram was performed through the drain revealing a communication between the thigh abscess cavity and the pelvis through the sacrosciatic notch. Subsequently her thigh was incised from the greater trochanter to the lateral condyle of the femur when the necrotic fascia lata was excised and the communication with a large pelvic abscess laid open. Six hours postoperatively the patient developed septicemic shock and died. Pathological examination of the sigmoid colon revealed a perforated Duke's B adenocarcinoma.

Case 2. A 66-year-old male was admitted with a four week history of lower abdominal pain radiating to his left flank. The pain had been so severe that for three weeks he had been confined to bed with a diagnosis of possible sciatica. On the day of admission the pain had become worse and he had not passed urine for 12 hours. There were no other gastrointestinal or genitourinary symptoms. He was pyrexic (38°C) and looked ill. He was tender in the left renal angle and left flank, with pitting oedema. There was tenderness and guarding in the left lower abdomen and bowel sounds were absent. A urinary catheter was inserted obtaining 700 ml of foul-smelling urine, but no organisms were noted on direct microscopy or on subsequent culture. Haematological investigations revealed a leucocytosis (23 × 10^3/ml). Blood urea was elevated to 22.7 mmol/l. X-rays revealed gas in the soft tissues of his left thigh. Blood cultures were taken and therapy with intravenous benzylpenicillin and gentamicin was instituted. Intensive resuscitation was required before laparotomy could be carried out.

At laparotomy through a left Rutherford-Morrison incision he was noted to have subcutaneous gas and pus in the abdominal wall. Pus originating from perforated diverticular disease of the pelvic colon extended throughout the peritoneal cavity. Peritoneal toilet was undertaken, drains were placed in the abdominal and pelvic cavities and a transverse defunctioning colostomy was fashioned. The lateral aspect of his left thigh was incised widely and a small amount of pus and gas

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was released. One week later his thigh incision was extended to drain a further collection of pus. On each occasion a mixed flora of \textit{Bacteroides}, \textit{Coliforms}, and \textit{Streptococci} was cultured. Initially his condition improved but over the ensuing weeks he developed overwhelming sepsis with multi-system organ failure and he died 25 days postoperatively.

\section*{DISCUSSION}

Subcutaneous emphysema of the abdominal wall or lower limb has been recognised as an unusual sign of intra-abdominal sepsis either from enteric perforation or gas formation in an intra-abdominal abscess.\textsuperscript{1} The sepsis may result from both benign and malignant disease. Thigh abscesses more commonly follow local infections such as pyomyositis secondary to trauma, infected haematoma, osteomyelitis, cellulitis or thrombophlebitis.\textsuperscript{2} In those cases resulting from enteric perforation the most common sites of perforation are the colon and rectum, with infection spreading into neighbouring extraperitoneal tissues.

Injection of air into the presacral space of cadavers results in surgical emphysema in the lower abdominal wall, thigh, and buttock regions. The routes by which such extension can occur are neurovascular bundles, defects in the abdominal wall, femoral vessels or through the pelvic floor alongside the rectal tissues.\textsuperscript{1} In a review of 46 cases of thigh abscess resulting from enteric perforation, Rotstein and colleagues found 39 to arise from the colorectum, four from the appendix and three cases from the small bowel; the common feature of all these cases being perforation into extraperitoneal tissues.\textsuperscript{2} The commonest cause of colonic perforation was carcinoma.

It is reported that between three and nine percent of colonic carcinomas will have perforated by time of presentation. This has been considered to be a poor prognostic factor, being associated with operative mortality figures (death within 30 days of operation) of 18–80\% and five year survival figures of 12–25\%.\textsuperscript{3,4,5,6} In one series comparing perforating and non-perforating carcinomas the operative mortality was increased fourfold and the five year survival reduced similarly when the tumour had perforated by time of presentation. This has been attributed to more advanced local disease with a higher percentage of advanced stages, to lower rates of resectability, and to high operative mortality due to emergency and life-threatening initial presentation. Emergency surgery, especially in the elderly, carries a worse prognosis.\textsuperscript{3,5,6}

Necrotising fasciitis is a rare infection of subcutaneous tissues, resulting in liquefactive necrosis caused by bacterial hyaluronidase and lipase in which the skin and underlying muscles are initially spared; it is associated with a mortality rate of between 30–60\%.\textsuperscript{8} The infection was described by Hippocrates and Galen in ancient times, and by Melenev in 1924 who named it "acute haemolytic streptococcal gangrene".\textsuperscript{9} Giuliano and colleagues undertook bacteriological studies in 16 cases and reached the conclusion that two forms of necrotising fasciitis exist, due either to Group A Streptococci or to a mixed growth of facultative and anaerobic organisms.\textsuperscript{10} Necrotising fasciitis affects the extremities most often but can also occur on the abdomen, neck, face, perineum and genitalia\textsuperscript{8} and may follow any breach of the protective integument; thus minor trauma, injection injuries, frost bite and compound fractures may all result in this
widespread infection. Biochemically or immunologically compromised individuals such as diabetics, pregnant women, those with renal failure, cirrhosis or patients with an underlying malignancy are especially susceptible.

The clinical course in both types of necrotising fasciitis is identical. Initially there are signs of inflammation with localised evidence of cellulitis. The skin becomes tense and shiny gradually darkening to a dusky blue, with blistering. Necrosis of subcutaneous tissues results in a thin, watery, foul-smelling fluid referred to as "dishwater pus". Eventually with thrombosis of skin nutrient arteries areas of necrosis form, later developing into frank gangrene with generalised signs of systemic toxicity leading to septic emboli or septicaemic shock. The diagnosis should be suspected when a patient's condition deteriorates rapidly after developing a soft tissue infection. Radiologic evidence of gas in the soft tissues and in the fascial planes may support the diagnosis and CT scanning may also prove helpful. The definitive diagnosis is made at operation when the ability to pass a blunt instrument between the subcutaneous layer and the underlying muscle without resistance is said to be pathognomonic. Frozen section biopsy at operation may aid diagnosis and when combined with appropriate treatment has reduced mortality from 72·7% to 12·5% \(^8\) in one series.

Aggressive treatment must be instigated early as the survival rate is inversely proportional to length of delay. Radical débridement and drainage of the affected tissues with adequate treatment of the underlying cause are required. High dose parenteral antibiotic treatment is necessary, penicillin G being the most appropriate for group A Streptococcal infection,\(^8\),\(^11\) with metronidazole being a suitable agent for use against anaerobic organisms; delay beyond seven days in instigating treatment nearly always proves fatal.\(^8\)

The first case reported confirms the poor prognosis associated with perforated colonic carcinoma requiring emergency surgery, and illustrates one of the recognised routes available for spread of infection from the abdomen to the thigh through the sacrosciatic notch. It is unusual in that the sigmoid colonic perforation occurred in a relatively young patient causing infection and necrotising fasciitis in the right thigh. The second case also highlights this unusual complication of colonic perforation. Thigh infection should be suspected in patients who present with symptoms and signs referred to the lower back and hip in whom the general physical condition suggests more serious underlying pathology. In such patients an urgent barium enema may be the most appropriate form of investigation. Where signs of localised sepsis exist in the thigh, immediate exploration is indicated and if communication with the pelvis is identified laparotomy should be undertaken concurrently so that the precipitating cause can be adequately treated, by colonic resection, drainage of pelvic or intra-abdominal abscess, and diversion of the faecal stream.

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