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Pyomyositis☆,☆☆

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ABSTRACT

Poorly controlled diabetes is associated with an increased risk of infectious complications. With the increasing prevalence of diabetes, many more people are being looked after in primary care. We describe a case of pyomyositis, a potentially severe but uncommon complication of poorly controlled diabetes that was not recognised in the community. Clinicians looking after people with diabetes need to be aware that prolonged, unexplained symptoms need specialist assessment.

1. The case

A 41-year-old lady with a 22-year history of poorly controlled diabetes was referred with a 6-week history of bilateral thigh pain and leg weakness. The pain was acute in onset and she also noticed difficulty in walking, in particular describing difficulty climbing stairs. Her general practitioner initially suspected that she had drug-induced myositis and stopped her statin. This did not result in any symptomatic improvement and so the patient was referred to this institution.

On further questioning, she admitted to feeling unwell and had been suffering with night sweats. She denied injecting insulin in her legs or through her clothes and had not suffered any recent trauma. She had not had any foreign travel in the recent past.

She had had several admissions for diabetic ketoacidosis (DKA) over the years, with six episodes in the previous 12 months. She had recently also had another admission for deliberate self-harm.

Her medications on admission were insulin and citalopram. There had been no change to her insulin regime prior to the onset of symptoms.

Neurological examination showed bilateral thigh tenderness with mild hip flexion weakness. Reflexes were preserved and there were no sensory abnormalities. There were no cutaneous lesions and no evidence of a rash or erythema. Chest examination was normal and cardiovascular examination was normal other than a previously identified systolic murmur and a tachycardia.

Her white cell count was 15.3×10^9/l (ref. range $4.0–11.0\times10^9$/l) with a neutrophilia of 12.3×10^9/l (ref. range $2.0–7.5\times10^9$/l). Biochemical investigations showed a normal creatine kinase (CK) level at 147 U/l (ref. range 55–170 U/l); however, her inflammatory markers were significantly raised with a C-reactive protein >320 mg/l (ref. range 0–10 mg/l). Blood glucose monitoring showed high blood glucose levels, but there was no evidence of DKA.

An MRI was arranged of her thoracolumbar spine and thighs. This showed multiple areas of high signal changes in her thighs that were felt to represent abscesses. The sequential images are shown in Figs. 1, 2, and 3.

Fluid taken from an ultrasound-guided aspiration from one of these lesions grew *Staphylococcus aureus*.

A diagnosis of pyomyositis was made and she was initially treated with intravenous flucloxacillin. The major collection in the right groin was surgically drained and her intravenous treatment was continued for 2 weeks. During this time the night sweats abated and her C-reactive protein level fell to 18 mg/l and her white cell count fell to 10.5×10^9/l. She was then treated with a further 4 weeks of oral flucloxacillin.

2. Discussion

Pyomyositis is an acute bacterial infection occurring in skeletal muscle with no obvious local source of infection. The symptoms are consistent with the clinical activity. There is often a prodrome with a low-grade fever, generalised aches, and pains progressing onto weakness and evidence of abscess formation if they are superficial. The clinical progression of pyomyositis can be divided into three stages (Chiedozi, 1979).

☆ We declare that we have no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

☆☆ Informed, signed, consent was obtained from the patient allowing publication. Dr Marath and Dr Yates drafted the initial versions of the manuscript. All authors looked after the patient. Dr Dhatariya was in charge of the patients' care and finalised the manuscript. He acts as the guarantor for this article.

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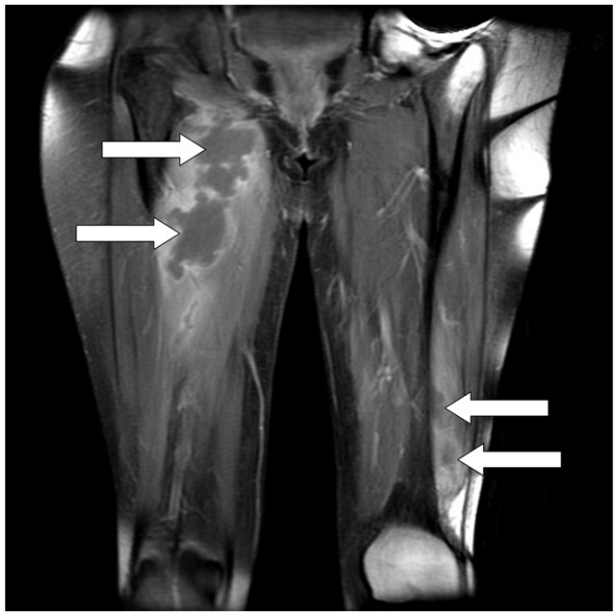

Fig. 1. Sequential images taken at different depths of tissue showing the multiple abscesses throughout both legs (solid arrows).

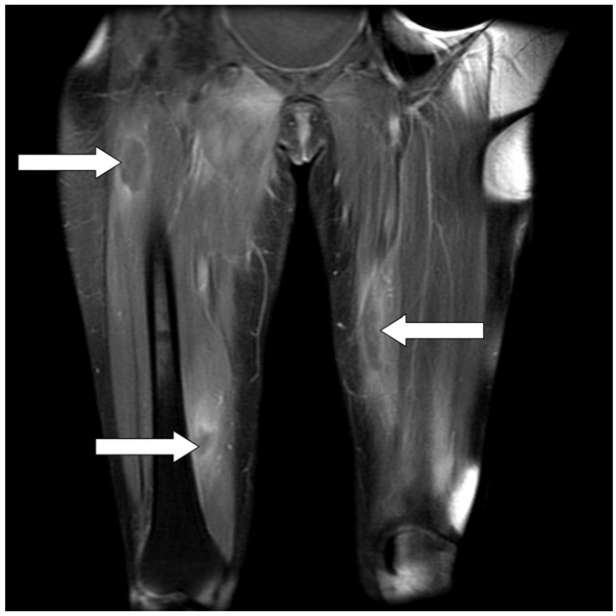

Fig. 3. Sequential images taken at different depths of tissue showing the multiple abscesses throughout both legs (solid arrows).

Stage 1 is characterised by low-grade fever and localized cramps and muscle pain. Palpation may reveal a woody texture of the affected muscle group. Fluctuation is not apparent at this stage and blood tests may show a leukocytosis. However, only a minority of patients (~2%) seek medical attention at this stage. Stage 2 tends to occur 10–21 days after Stage 1 and is characterised by fever, severe muscle pain, and muscle tenderness. A fluctuant swelling may be palpable and aspiration of affected muscle typically yields pus. Inflammatory markers including white cell count and C-reactive protein are markedly elevated. The majority of patients (~90%) present at this stage. Stage 3 is characterised by complications which may include septic shock, renal failure, disseminated infection, and, rarely, rhabdomyolysis.

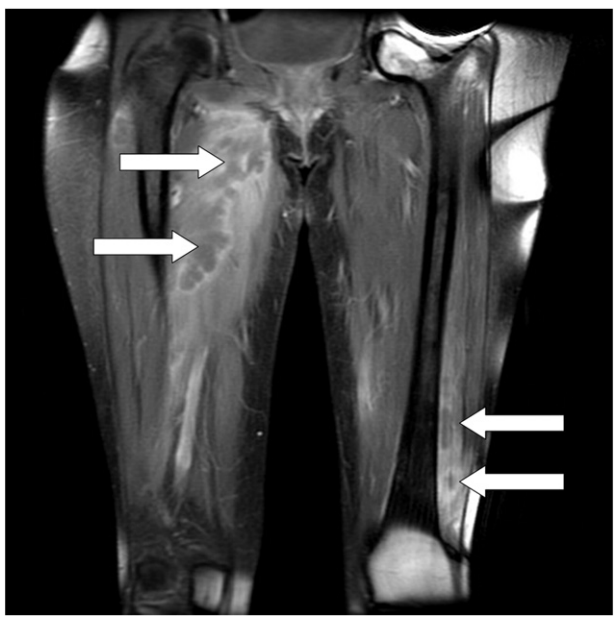

Fig. 2. Sequential images taken at different depths of tissue showing the multiple abscesses throughout both legs (solid arrows).

Imaging is the best diagnostic modality because it helps to define the extent of infection as well as to exclude other pathologies. CT is preferred over ultrasound, although the latter may also be useful diagnostically and therapeutically especially where CT is not available (Quillin & McAlister, 1991). Plain CT could detect muscle swelling, while contrast enhanced CT imaging may show rim enhancement in cases of abscess formation (Struk, Munk, Lee, Ho, & Worsley, 2001). Magnetic resonance imaging is considered to be the gold standard because it is helpful in differentiating other pathological processes from pyomyositis, outlines the extent of involvement, and localizes the fluid collection. Pyomyositis in its early period demonstrates ill-defined muscle enlargement with increased signal on T2-weighted images. Myositis shows no signal changes or mild hypointensity on T1-weighted images, but diffuse hyperintensity on T2-weighted images, with no or minimal enhancement following intravenous contrast media (Yildirim Donmez & Feldman, 2008). In the suppurative phase, gadolinium-enhanced images may demonstrate either thick or thin rim enhancement of the abscess wall (Yu, Hsiao, Hsu, & Ting-Fang Shih, 2004).

Pyomyositis occurring in tropical regions most often occurs in active and healthy men, but could be related to HIV (Crum, 2004) or parasitic infection. While relatively rarely found in temperate climates, it is most commonly encountered in immunocompromised individuals, such as those with poorly controlled diabetes (Yoneda & Oda, 2003). Other predisposing factors may include injection drug use, trauma, or malnutrition (Crum, 2004; Gomez-Reino, Aznar, Pablos, Diaz-Gonzalez, & Laffron, 1994). The thighs are the most commonly affected site (54%) followed by back (13%), buttock (11%), arm (9%), and chest wall (4%) (Gomez-Reino et al., 1994). Seventy-five percent of pyomyositis occurring in temperate climates is due to *S. aureus* (Christin & Sarosi, 1992) with Group A *Streptococcus*, *Pneumococcus*, *Pseudomonas, Neisseria*, and *Hemophilus* occasionally being responsible (Bickels, Ben-Sira, Kessler, & Wientroub, 2002). Inflammatory markers are usually raised, although CK levels are often normal (Bickels et al., 2002).

Pyomyositis may be confused with more common causes of leg pain and weakness in patients with diabetes including diabetic amyotrophy, spinal pathology including epidural abscess, and inflammatory myopathies. Cellulitis, deep vein thrombosis, osteomyelitis, and necrotizing fasciitis can also present with similar symptoms. A

high index of clinical suspicion is needed to avoid diagnostic delay and the development of systemic sepsis. Muscle tenderness is the clue.

Treatment of pyomyositis depends on the stage of the disease; in the invasive stage, anti-staphylococcal antibiotics should be given for 2–4 weeks (Armstrong, D'Amato, & Strong, 1993). Surgical drainage followed by antibiotic treatment is required in patients presenting during the suppurative phase (Chiedozi, 1979; Hall, Callaghan, Moloney, Martinez, & Harrelson, 1990).

The prognosis of this condition is relatively good with timely intervention with antibiotics and surgery. Recurrence is very rare and there are only very few case reports of recurrent pyomyositis (Wong, Lecky, Hart, Crooks, & Soloman, 2008). Mortality rate is less than 1.5% in patients presenting in the early phase but has been reported to be as high as 15% in cases who present late (Levin, Gardner, & Waldvogel, 1971).

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