Rare disease

Primary pyomyositis: an unusual presentation in an older patient with no recognised risk factors

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Summary

Primary pyomyositis is a subacute deep bacterial infection of skeletal muscle. It is typically seen in tropical countries with *Staphylococcus aureus* being the commonest pathogen. Immunocompromised states and trauma are associated with cases in temperate climates where there is an increasing incidence, typically in children and young adults. However, the authors present a case of primary pyomyositis in a previously healthy 80-year-old female. The authors highlight the potential difficulties in early diagnosis of this rare condition in the UK indicating the need for early MRI imaging and the low sensitivity of blood cultures and serum creatine kinase measurements. Treatment, including early surgical drainage and appropriate antibiotic therapy, is discussed.

BACKGROUND

Primary pyomyositis is a subacute deep bacterial infection of skeletal muscle.¹ It is a condition classically seen in Africa, Asia and the South Pacific in areas with tropical climate² however, there is an increasing number of reports in Europe and North America. Typically it affects children and young adults with men being affected more commonly than women.¹ In the developed world the causative pathogen in 70% of the cases is *Staphylococcus aureus*³ however, *Escherichia coli* and *Streptococci* species have also been isolated.^{1,2} Cases in the tropics and cases of children living in temperate climates largely occur in healthy individuals.⁴ However, there is a strong correlation of pyomyositis and underlying medical conditions in adults in the western world. Recognised risk factors include HIV infection, diabetes mellitus, malnutrition, malignancy, intravenous drug abuse, immunosuppressive disease, corticosteroid use, autoimmune and chronic liver disease.^{1,5,6} Trauma to the affected muscle may also predispose to infection due to alteration of the muscle microstructure with subsequent seeding of circulating bloodborne bacteria.^{5,7}

Here we report a rare case of non-tropical pyomyositis of the quadriceps femoris in an older female patient with no recognised risk factors.

CASE PRESENTATION

An 80-year-old Caucasian female presented to the accident and emergency department with a 1 week history of deteriorating left knee and thigh pain unable to weight bear for 3 days. Her medical history included atrial fibrillation and she was diagnosed 6 months before with primary hyperparathyroidism due to a benign adenoma and was awaiting parathyroidectomy. Her medications were warfarin, digoxin, ramipril, ferrous fumarate and vitamin D supplement. She denied history of recent trauma, fever or travel outside England.

On examination she was alert, afebrile and vital observations were normal. Cardiovascular, respiratory and abdominal examinations were unremarkable. The left knee was painfully stiff with a range of movement from 75 to 90 degrees. There was severe knee pain and swelling which extended along the anterior and medial thigh where superficial veins were engorged. The skin was intact and there was no evidence of cellulitis. The distal limb was neurologically intact and examination of the right lower limb was unremarkable.

INVESTIGATIONS

Haematological and biochemical examinations showed a normal white cell count, C reactive protein was 311 mg/l, creatine kinase was 12 U/l (normal range 25–150 U/l) and her international normalised ratio was 5.7 which led to a presumptive initial diagnosis of spontaneous haemarthrosis. Viral hepatitis serology screen and autoimmune screen were negative.

Ultrasound assessment of the left knee revealed an effusion in the suprapatellar pouch containing echogenic fluid which was aspirated. Microbiological examination of the aspiration showed moderate growth of penicillin-sensitive *S aureus*.

A CT scan of the abdomen, pelvis and thigh showed no abdominal or retroperitoneal pathology. Scan of the left thigh showed prominent subcutaneous varicose veins and stranding in the fat with swelling of the underlying adductor muscle compartment. A subsequent MRI of the lower limb showed extensive high signal on the T2 fat suppressed sequences within the musculature of the left thigh mostly affecting vastus medialis, vastus intermedius and the deep portions of vastus lateralis with a lesser involvement of the adductor and posterior muscle compartments (figure 1A,B). A further ultrasound assessment confirmed the lack of an intramuscular fluid collection.

Figure 1 (A, B) Axial images from T2 weighted STIR MRI before operative intervention, 7 days after initial symptoms developed. Extensive high signal can be seen throughout the adductor and anterior compartments without evidence of access formation.

TREATMENT

Two weeks following onset of symptoms the patient had an open biopsy of the vastus intermedius muscle. The muscle appeared pale and there was no evidence of intramuscular collection or subperiosteal abscess. Histological evaluation of the biopsy showed severe inflammatory myopathy with extensive interstitial oedema and infiltration by a dense, active, subacute inflammatory cell infiltrate with extensive sheets of neutrophils and accompanying fibrosis. The findings were consistent with pyomyositis and the appropriate antibiotic regimen was started; intravenous benzylpenicillin and flucloxacillin were commenced which were converted after 5 days to intravenous meropenem as the inflammatory markers failed to improve.

OUTCOME AND FOLLOW-UP

Following a 2-week course of meropenem the pain improved and the inflammatory markers declined steadily. There was an accompanying clinical improvement leading to independent mobility and discharge from hospital 7 weeks after admission.

DISCUSSION

Pyomyositis was first described in 1885 as a tropical disease and referred to as pyomyositis tropicans.^{4–8} Since 1980's similar infections have been increasingly reported

in temperate areas most often affecting immunocompromised individuals.^{1–9}

Pyomyositis is divided into three clinical stages. During the first stage (invasive stage) the infected muscle becomes inflamed and painful and there may be associated mild leucocytosis. Examination will reveal a 'woody' muscle texture with no fluctuation, palpable abscess or surrounding erythema. The second stage (suppurative phase) involves formation of a muscle abscess where patients will usually have severe pain, worsening swelling and fever. Aspiration of the affected area would reveal purulent material. The majority of patients are diagnosed at this stage which lasts 1–3 weeks. The third stage involved systemic toxicity and septicaemia, multifocal abscess formation and shock.^{3–10}

Bulky skeletal muscle groups are most commonly affected such as the quadriceps, the buttock and the iliopsoas muscle.^{1–2} Routine blood tests may show leucocytosis and raised inflammatory markers (C reactive protein and erythrocyte sedimentation rate) which are non-specific. Blood cultures are often unhelpful in the diagnosis of pyomyositis. In a review of 144 patients with pyomyositis only 16%–38% of the patients had a positive blood culture.¹ MRI is the most useful radiological investigation¹ for the diagnosis as it demonstrated diffuse muscle inflammation, subsequent abscess formation and can demonstrate the extent of infection.¹¹

This unusual case demonstrates some of the pitfalls that may delay the diagnosis of pyomyositis in affected individuals. Negative blood culture, a normal creatine kinase and absence of fluid collection could lead the clinician to mistakenly discount the diagnosis. Although previously recognised as a tropical disease and a rare condition affecting young or immunocompromised individuals, pyomyositis should be considered in patients of any age with muscle or joint pain where a clear alternate diagnosis is not made. Timing of presentation and the clinical stage affects the imaging findings but early MRI is invaluable even in the absence of a collection.¹² Early identification of the pathogen is crucial to guide in antibiotic choice as there is an increasing incidence of methicillin-resistant *S aureus* being isolated from infected individuals^{13 14} only a small minority of which may have favourable outcomes.¹⁵

Learning points

- ▶ Primary pyomyositis has an increasing incidence in the Western world and should be considered in patients presenting with acute joint pain and swelling and raised inflammatory markers.
- ▶ Absence of risk factors (ie, foreign travel, HIV infection, malignancy or steroid use) does not exclude pyomyositis.
- ▶ Early diagnosis using appropriate imaging and early administration of intravenous antibiotics is vital.
- ▶ Microbiological cultures are important in choosing an appropriate antibiotic therapy.

Competing interests None.

Patient consent Obtained.

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Hadjipavlou M, Butt DA, McAllister J. Primary pyomyositis: an unusual presentation in an older patient with no recognised risk factors.

BMJ Case Reports 2012;10.1136/bcr.12.2011.5342, Published XXX

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