Diabetic muscle infarction

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Diabetic muscle infarction (DMI) is a rare complication of longstanding, poorly controlled diabetes. Only a few cases have been reported in the literature. The case of a 34-year-old man with a 7-year history of type 2 diabetes mellitus, with sudden onset of left thigh pain, is described here. A final diagnosis of DMI was made, the pathophysiology of which remains unclear. MRI findings were diagnostic and characteristic. The management of this condition is usually symptomatic. Short-term prognosis is very good; however, the recurrence rate is high. Long-term prognosis is poor, with most patients dying from cardiovascular complications of diabetes within 5 years of diagnosis. This case supports the need for a high index of suspicion, when a poorly controlled patient with diabetes presents with non-traumatic limb pain.

A 34-year-old man was referred to our emergency department (ED) with a 3-week history of non-traumatic pain in the left thigh, which was sudden, spontaneous and progressively getting worse. He needed crutches to get around. He had a history of type 2 diabetes since 1999, dilated cardiomyopathy and renal insufficiency. On examination, localised tenderness was seen in the distal anteromedial aspect of his left thigh. Neuromuscular function was intact. His blood tests and x rays were within normal limits. He was then prescribed analgesics and discharged to the care of his general practitioner.

He returned to the ED 3 weeks later with persistent pain in the thigh and localised swelling, which was now warm and tender. He was unable to bear weight and was now wheel chair bound. Blood tests showed a white blood cell count of 4.09×1000 , C reactive protein level of 53 mg/l (normal <5 mg/l) and erythrocyte sedimentation rate of 76 mm/h. Given the history of poorly controlled diabetes and worsening symptoms, an emergency ultrasound (US) was performed, which showed hyperechogenicity in the vastus medialis. On the basis of these US findings, the radiologist suggested an MRI scan, which was done the next day. Subsequently, he was admitted under the care of the orthopaedic surgeons, for treatment of a suspected diabetic abscess. US-guided aspiration of a suspected abscess was requested. The attending radiologist reviewed the MRI images and suggested that the features were typical of diabetic muscle infarction (DMI). A repeat US was performed, which again demonstrated no focal collection, with normal internal muscle architecture, supporting the contention that this was muscle infarction, rather than an infective myositis. MRI images showed features typical of DMI (fig 1). The patient was then

managed conservatively, and he recovered without any significant problem.

DISCUSSION

DMI is an uncommon complication of diabetes. It was first reported by Angervall and Stener in 1965; however, it is becoming more frequently recognised.¹ It is a sign of underlying vascular disease.

Epidemiology

DMI usually presents in the young (mean age 41.5 years), without gender preference. DMI tends to affect patients with a long history of diabetes (mean 15–17 years) with three-quarters of cases having type 1 diabetes mellitus (DM).² Generally, patients would have had poorly controlled diabetes for at least 5 years. In all, 97% of patients diagnosed with DMI have nephropathy, retinopathy or neuropathy.²

Clinical presentation and differential diagnosis

DMI typically presents as leg pain with or without swelling. On physical examination, 99% of cases are found to have

swelling and tenderness of the involved muscles. Oedema of the affected muscles and overlying subcutaneous tissue can be seen usually, without erythema. A palpable mass or indurated area is felt in 44% of cases. Fever is uncommon, and, if present, one should actively look for an infective pathology.

The diagnosis of DMI should be considered in patients with DM and extensive microvascular disease, who present with atraumatic thigh pain and swelling. DMI most frequently affects the thigh (139 of 166 episodes (83.7%)), and the quadriceps is the most commonly affected muscle; calf involvement is reported in 32 (19.28%) cases. Bilateral affection was reported in 14 (8.4%) cases. The more frequently affected muscles were the vastus lateralis (40 cases of 166 episodes (24%)) and the vastus medialis (37 cases of 166 episodes (22%)). Only one case report of DMI in a muscle of the upper limb (forearm) was reported.³

The differential diagnosis of this condition is broad and classically includes infection (abscess, pyomyositis, necrotising fasciitis), focal inflammatory myositis, venous thrombosis, tumour and diabetic amyotrophy.

Diagnostic testing

Laboratory tests

Creatinine kinase can be normal or increased. There could be an increase in alanine amino transferase, aspartate transaminase and lactic dehydrogenase. White blood cell count is typically normal, with raised C reactive protein and erythrocyte sedimentation rate as in our case.

Imaging

MRI is the diagnostic test of choice. MRI gives a typical picture on T2-weighted images, with marked muscle oedema extending into the perifascicular and subcutaneous tissues. It is considered adequate to confirm diagnosis.⁴ Some consider tissue biopsy as the gold standard. However, there are concerns about wound healing and secondary infection, and so MRI is seldom performed. It is generally performed only to rule out infection or malignancy.

Pathogenesis

The pathogenesis of DMI is still unclear. Diffuse microangiopathic process, possibly associated with hypoxia-reperfusion injury, has been implicated. Some studies raise the possibility that a state of hypercoagulability is the cause.⁵

Figure 1 Transverse Short Tau Inversion Recovery demonstrating extensive oedema centred not only on vastus medialis but also involving the vastus intermedius and adductor insertion. Note the subtle oedema within the contralateral right adductor insertion.

Management

The recommended management of this condition is symptomatic, with pain relief and short-term immobilisation as necessary. This condition tends to resolve over a period of weeks to months in most cases. Optimising diabetic control is of paramount importance.

Prognosis

Short-term prognosis is very good, with the majority of patients making a full recovery. The recurrence rate is reported at 47.82%, with 8.69% involving the originally affected muscle and 39.13% affecting another group.³ Given a mean mortality rate of 10% within 2 years of onset of DMI, patients presenting with DMI should undergo immediate evaluation for end organ damage due to diabetes.

Summary

With a DM epidemic underway,⁶ we expect the prevalence of DMI to increase. The present case supports

the need for a high index of suspicion when a poorly controlled patient with diabetes, presents to the ED with non-traumatic limb pain. If a patient has typical clinical features with normal full blood count and raised inflammatory markers, he or she must immediately proceed to MRI, as it is the best non-invasive technique, and T2-weighted imaging is the most valuable method. Recommended management is symptomatic, with analgesia and short-term immobilisation.

Emerg Med J 2007;**24**:513–514.
doi: 10.1136/emj.2006.040071

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Accepted 29 September 2006

Competing interests: None declared.

Informed consent has been obtained from the patient for publication of his details in this paper.

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