Diabetic Muscle Infarction in a Patient Admitted to the Cardiac Ward

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Abstract

Diabetic muscle infarction (DMI) is a rare complication of long-standing diabetes mellitus. This is the first case of DMI reported by cardiologists. A 49-year-old patient with a history of diabetes and hypertension for only two years was admitted to the cardiac ward due to pain in the left thigh with pitting edema in both lower extremities. Magnetic resonance imaging finally confirmed the presence of DMI in the left thigh, which was improved by treatment with anticoagulants, analgesics and rest. However, the typical clinical symptoms of DMI were unrecognizable at the start of treatment, which may be attributed to a lack of awareness of this rare condition among non-endocrinologist physicians.

Key words: diabetic muscle infarction, diabetes mellitus, cardiac

Case Report

A 49-year-old Chinese man was admitted to our cardiac ward due to uncontrolled hypertension and lower limb edema, although he complained of acute pain with localized swelling in his left thigh lasting for three days at the clinic visit. Two years prior to admission, he was found to have essential hypertension and type 2 diabetes mellitus, at which time oral medications were initiated. His blood pressure and glucose level were poorly controlled with oral medication for two years, and he had experienced recurrent lower limb edema that was usually diminished with diuretics. Three days earlier, he had felt pitting edema in the lower extremities and pain in the left thigh that restricted him to bed rest at home. He denied any trauma, stinging, fever or chills before the onset of pain.

The patient was afebrile. A cardiac examination revealed slight cardiac dullness and normal heart sounds with no murmurs. No wheezes or rales were identified in his lungs. Moderate pitting edema was observed in both lower extremities, although it was more obvious on the left side. A palpable mass measuring 15 cm x 15 cm was found in the middle of the left thigh, which was hard and warm with mild erythema and tenderness. The circumference of the thigh (15 cm above the patella) was 50.1 cm on the left side and 46.1 cm on the right, while the circumference of the leg (15 cm below the patella) was 35.5 cm on the left side and 34.5 cm on the right. However, the popliteal pulse, posterior tibial pulse and dorsalis pedis pulse were strong and symmetrical in both lower limbs.

Laboratory tests demonstrated a normal total white blood cell count with a slightly increased neutrophil level of 77.8%, as well as normal liver and renal functions. Neither proteinuria nor microalbuminuria was present. However, both the fasting glucose (9.6 mmol/L) and hemoglobin A1C (7.9%) values were elevated. The levels of creatine kinase (CK) (268 IU/L, reference: 20-140 IU/L), troponin T (34.3 ng/L, reference: <14 ng/L), D-dimer (0.52 mg/L, reference: <0.24 mg/L) and N-terminal pro-B-type natriuretic peptide (2,645 pg/mL, reference: 0-88 pg/mL) were elevated on admission.

In addition to the administration of irbesartan and insulin for blood pressure and diabetes control, oral furosemide was given to relieve the patient’s symptoms of heart failure, including lower limb edema. Vascular ultrasound identified mild atherosclerosis in the lower extremities; however, no evidence of venous thrombosis was observed. An X-ray of

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Received for publication October 11, 2013; Accepted for publication January 5, 2014
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Although its pathogenesis is not yet well understood, DMI of diabetes mellitus first reported by Angervall (1) in 1965. However, magnetic resonance imaging (MRI) was performed, the local pain and swelling of the left thigh persisted. Thereafter, the pitting edema in the legs subsided after two days, although the left hip demonstrated only osteoporosis. The bilateral pitting edema in the legs subsided after two days, although the local pain and swelling of the left thigh persisted. Therefore, magnetic resonance imaging (MRI) was performed, which finally confirmed the presence of muscle infarction in the left thigh primarily involving the left vastus medialis, vastus intermedius and biceps femoris (Figure a, b). Treatment with heparin injection followed by oral aspirin, analgesics and rest was administered, and the pain and swelling dissipated over several days.

**Discussion**

Diabetic muscle infarction (DMI) is a rare complication of diabetes mellitus first reported by Angervall (1) in 1965. Although its pathogenesis is not yet well understood, DMI is likely caused by vascular diseases, such as arteriosclerosis and diabetic microangiopathy (2). In most cases, it is associated with a long duration of diabetes, with an average of 14.3 years, and occurs in association with multiple chronic diabetic complications (3). Although DMI is more frequently reported in patients with type 1 diabetes (3), it can be encountered in those with type 2 diabetes of a short duration and less microangiopathy, as observed in the current patient (4). Surprisingly, there was only one patient with type 1 diabetes among the dozen cases of DMI reported in China. This finding may indicate a racial difference between Asian and Western countries. DMI presents as the sudden onset of painful and diffuse muscle swelling with a tender mass. The lower extremities are usually affected, mostly the thigh, followed by the calf (3, 5). Upper limb or bilateral involvement is extremely rare (6). No specific biomarkers for DMI have been identified, and elevation of the CK level, as observed in 50% of reported cases, depends on the interval between symptom onset and the first hospital visit (3, 6). Invasive muscle biopsies remain the gold standard of diagnosis; however, in the era of MRI, this modality is reserved only for patients with suspected compartment syndrome or abscesses (4). Instead, MRI has become the most valuable technique for confirming the presence of DMI, in which T1-weighted images of the lesion site show a low or equal signal compared to that observed in normal muscle, while T2-weighted images demonstrate a high signal.

To our knowledge, this is the first case of DMI reported by cardiologists. The patient was admitted to the cardiac ward due to concomitant hypertension with lower limb edema suggestive of heart failure, although he primarily complained of pain and swelling in the thigh. A relationship between the onset of DMI and heart failure has not been previously reported, nor was it identified in the current case; however, both conditions may be associated with atherosclerosis and diabetic microangiopathy. The typical clinical symptoms of DMI were unrecognizable to the clinic physician and attending cardiologist at the start of treatment, which may be attributed to the lack of awareness of this rare complication of diabetes and its occurrence with other comorbidities. Therefore, the purpose of this report is to reinforce the concept, clinical presentation and MRI findings of DMI, to non-endocrinologist physicians in particular. Certainly, some major differential diagnoses must be considered and excluded, such as inflammatory, vascular, infectious, traumatic or neoplastic lesions (7). Rest, analgesics and aggressive blood glucose control constitute the mainstay of therapy for DMI, while long-term anticoagulation is also recommended to prevent recurrent infarction (8). Although the short-term recovery is usually good, the long-term prognosis is unsatisfactory due to the potential for relapse and the presence of other severe complications in patients with long-standing diabetes.

The authors state that they have no Conflict of Interest (COI).

**References**