Case Report

Diabetic Myonecrosis in a Patient with Hepatitis B-Induced Liver Cirrhosis

Su Min Park MD, You Jeong Kim MD, Seung Man Kim MD, Na Han MD, Eun Ju Lee MD, Tae Kyoon Kim MD, Tae Nyun Kim MD, Min Jeong Kwon MD, PhD, Mi Kyung Kim MD, PhD, Soon Hee Lee MD, Jeong Hyun Park MD, PhD, Byung Doo Rhee MD, PhD, Bo Mi Kim MD, PhD, Sun Joo Lee MD, PhD

Paik Diabetes Centre, Department of Internal Medicine, Inje University College of Medicine, Busan, Korea

Department of Pathology, Inje University College of Medicine, Busan, Korea

Department of Radiology, Inje University College of Medicine, Busan, Korea

Abstract

Diabetic myonecrosis—a rare complication of long-standing, poorly controlled diabetes mellitus—typically presents with acute-onset muscle pain, is self-limiting, and responds well to conservative management.

We report a case of diabetic myonecrosis in a 33-year-old man with hepatitis B-induced liver cirrhosis and type 2 diabetes who presented with abdominal distension and pain in the left thigh. Diabetic myonecrosis was diagnosed based on clinical presentation, radiological findings, magnetic resonance imaging and histopathological investigations; he was successfully treated conservatively with insulin and analgesics. Diabetic myonecrosis should be considered in the differential diagnosis of muscle pain in patients with diabetes.

Introduction

Diabetic myonecrosis is a rare complication of diabetes mellitus. Only approximately 100 cases have been published (1). The prevalence of various complications increases with the duration of diabetes; thus, this rare complication may be encountered in patients with long-standing diabetes. Typically, it presents as acute-onset muscle pain, localized in the lower limb. The clinical features of diabetic myonecrosis are nonspecific; therefore, its diagnosis and treatment are often delayed. Although several cases of diabetic myonecrosis occurring in association with other diseases have been reported (2–5), to the best of our knowledge, only 1 case of associated liver cirrhosis has been reported thus far (1). We report here a case of diabetic myonecrosis associated with hepatitis B-induced liver cirrhosis in a young patient with diabetes and review the clinical differences from previously reported cases.

Case Report

A 33-year-old man with hepatitis B-induced liver cirrhosis and type 2 diabetes presented with abdominal distension and pain in the left thigh. He had been diagnosed with diabetes and liver cirrhosis 5 years before presentation. The patient had increased...
palsy in the thigh on moving the limb. The pain had started 6 days before presentation and worsened to the extent of limiting his activity to bed rest. There was no history of injury to the left thigh; furthermore, no constitutional symptoms were observed. His history revealed recurrent episodes of variceal bleeding in January 2011 and June 2011. The patient was a smoker and a social drinker; however, he denied the use of recreational and illegal drugs.

On clinical examination, the left thigh showed localized increase in temperature and swelling of the medial aspect, and was tender and firm with pitting oedema. Loss of vibratory and light touch sensation of the legs were observed. The patient was well oriented in place, time and person. The abdomen was distended and nontender to palpation. There was no guarding, rigidity or peritoneal signs. Abdominal distension was improved after paracentesis of 3 L ascitic fluid, and analysis of this ascitic fluid revealed no evidence of infection.

Laboratory examinations revealed the following: total leukocyte count, 3.58 × 10⁹/L; hemoglobin, 84 g/L; platelets, 45 × 10⁹/L; C-reactive protein, 8.9 mg/L; glycated hemoglobin (A1C), 11.5%; serum glucose, 25.58 mmol/L and serum creatinine, 51.23 μmol/L. Thyroid function was normal, and the levels of alanine aminotransferase, aspartate aminotransferase and creatine kinase were within the normal range. Liver function tests revealed the following: serum bilirubin levels, 18.7 μmol/L; serum albumin, 31 g/L and international normalized ratio of prothrombin time, 1.36. The Child-Pugh score was B. Blood cultures and tests for autoimmune myositis (anti-phospholipid antibody, and antinuclear antibody) were negative. An electrocardiogram showed normal sinus rhythm.

Ultrasonography showed diffuse swelling of the soft tissue in the muscle compartments in the thigh without any evidence of abscess (Figure 1A). A colour Doppler study revealed decreased internal vascularity, with increased vascularity around the hypoechoic areas, and ruled out deep vein thrombosis (Figure 1B). Magnetic resonance imaging (MRI) revealed high signal intensity and swelling of the left adductor and right vastus medialis muscle, suggesting diabetic myonecrosis (Figure 2A–D). We performed muscle biopsy to distinguish the disease from cellulitis, and observed coagulative necrosis and acute inflammation (Figure 3). Bacterial and fungal cultures were negative. Before confirmation from biopsy results, we could not completely exclude the possibility of an infection; therefore, we treated the patient with insulin, analgesics and empirical antibiotics. After diabetic myonecrosis was confirmed, the patient was treated conservatively with insulin and analgesics. Therapy for decompensated liver cirrhosis was also provided. However, the pain persisted and at 20 days after the initiation of therapy, he complained of pain in the right thigh. He was taken continuously the conservative treatment. The pain and oedema improved over a period of 4 to 5 weeks after initiation of therapy.

Discussion

Diabetic myonecrosis is a rare manifestation of long-standing and poorly controlled diabetes (6). However, the prevalence of diabetes is increasing with sedentary lifestyles, poor diet, lack of exercise and an aging population; we can therefore expect the prevalence of diabetic myonecrosis to increase along with that of other diabetes-related complications. Diabetic microangiopathy has been proposed as a mechanism underlying muscle infarction. Other hypotheses discuss alterations in the coagulation–fibrinolysis system with elevated concentrations of factor VII, thrombomodulin, fibrinogen and antiphospholipid.
antibodies (7). We consider that in the present patient, smoking and liver cirrhosis were related to microangiopathy and alterations in the coagulation–fibrinolysis system. In the previously reported case of diabetic myonecrosis associated with liver cirrhosis (1), the cause of the liver cirrhosis was alcohol consumption, and the prothrombin time was high; however, in the present case, the prothrombin time was nearly close to normal although the Child–Pugh score was B. The glycemic control was poorer in the present case, so that might also lead to microangiopathy. Physicians should be aware that diabetic myonecrosis can occur in diabetic patients with other underlying diseases.

Sudden onset of pain in the involved muscle is the usual presentation of diabetic myonecrosis. Severe pain is highly characteristic of diabetic myonecrosis and is not typically observed in necrotizing fascitis or pyomyositis in patients with diabetic neuropathy (8). Although necrotizing fascitis typically presents with severe pain disproportionate to the degree of skin inflammation, certain patients (especially those with diabetic neuropathy) experience minimal pain, resulting in a missed diagnosis (9). The thigh muscles are most commonly affected by diabetic myonecrosis, and bilateral disease is reported in approximately 10% of cases (6). Physical examination of most patients reveals swelling, tenderness and edema in the affected area. Most patients also show other microvascular complications, such as nephropathy, retinopathy and neuropathy.

Magnetic resonance imaging plays an important role in the diagnosis of diabetic myonecrosis, and the main findings include increased signal intensity of the affected muscle area in T2-weighted images and isointense or hypointense appearance in T1-weighted images (10). Most case reports of diabetic myonecrosis describe MRI findings; however, for this patient, the ultrasonography and Doppler findings helped in differentiating diabetic myonecrosis from other diseases, including abscess and venous thrombosis. Ultrasonographic findings may thus help in differential diagnoses when diabetic myonecrosis is suspected but MRI is not immediately available. If ultrasonographic findings such as those described above are observed, physicians should recognize that additional examinations, such as MRI, may be needed.

The radiological differential diagnosis of diabetic myonecrosis includes deep vein thrombosis, soft-tissue abscess and cellulitis. Although diagnostic biopsy is performed in many cases, a clear indication for biopsy is essential because of its potential complications, including bleeding, secondary infection and delayed healing of the biopsy site.

Diabetic myonecrosis is a self-limiting disease, and conservative management—including bed rest and the administration of nonsteroidal anti-inflammatory drugs or narcotics for pain—can adequately control the disorder. For possible microvascular

Figure 2. (A, B) Coronal and axial fat-suppressed fast spin-echo T2-weighted magnetic resonance image reveals diffusely nonhomogeneous high signal intensity involving the left sartorius, gracilis and adductor muscles. Note extensive subcutaneous oedema of the medial thigh (white arrows) and the very minimal subfascial fluid (black arrows). (C, D) Coronal and axial fat-suppressed T1-weighted magnetic resonance image obtained after gadolinium administration shows marginal enhancement (arrows) with internal low signal intensity areas (star), representing muscle necrosis of the left adductor muscles. There is internal streaky enhancement, which represents viable muscle fibres (arrowhead).

Figure 3. Muscle biopsy specimen shows diffuse coagulative myonecrosis with acute inflammation. The head of the blue arrow indicates a blood vessel filled with a fibrin clot with recanalization (hematoxylin and eosin; original magnification ×100).
complications, antiplatelet therapy could theoretically be effective \(11,12\). In this patient, antiplatelet drugs were not administered, as he had concurrent liver cirrhosis with a history of recurrent variceal bleeding.

Although the short-term prognosis of diabetic myonecrosis is generally good, the long-term prognosis of such patients is poor. The main difficulty is generalized microvasculopathy leading to life-threatening complications \(13,14\). Recurrence has been reported in 47.82% cases involving either the same or the other limb \(6\). Patients with diabetic myonecrosis are typically at high risk for other complications and should be evaluated for retinopathy, neuropathy, atherosclerosis and nephropathy. Most importantly, long-term management should include strict glycemic control.

A high degree of suspicion and early differential diagnosis are important for diabetic myonecrosis. Delayed diagnosis can lead to unnecessary testing and treatment for other causes such as infection, with a delay in adequate pain control. As diabetic myonecrosis can be treated with conservative management in the absence of other complications and without prolonged hospitalization, it is important for physicians to consider this clinical entity in the differential diagnosis of muscle pain in a patient with diabetes mellitus.

**Author Disclosures**

The authors declare no conflicts of interest.

**References**