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CASE REPORT

Compartment Syndrome Following Directly Repair of Hernia of Anterior Tibialis

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We present a case of a patient with hernia of anterior tibialis who was treated operatively. Muscle herniation through a fascial defect is rare, which requires repair of fascial defects. We performed a simple closure of fascial defect. A fasciotomy was proceeded to complication of acute compartment syndrome developed after the operation. The sequelae as weakness of dorsiflexion of ankle and big toe were present.

Key words: Muscle hernia, anterior tibialis, compartment syndrome, fasciotomy

INTRODUCTION

Herniation of muscle is characterized by a focal muscular protrusion through an acquired or congenital defect in the deep fascia. Muscle hernias through an overlying fascial defect most commonly occur in athletes or young adults, especially in athletes with occupations requiring excessive strain on the legs.[1] The most frequent muscle hernia of lower extremity is that of the tibialis anterior.[2] It often creates a minor cosmetic problem and patients are usually asymptomatic, but may rarely complain of pain, cramps, or local tenderness after prolonged exertion in most severe cases. Treatment is usually necessary for troublesome symptoms or for cosmetic reasons. When conservative management such as elastic support and restriction of exercise is ineffective, surgical treatment is necessarily required. Compartment syndrome is one of the serious complications of the treatment for a herniation of the tibialis anterior.

CASE REPORT

A 20-year-old man presented with a 6-month history of sudden onset of pain and mass protrusion over the left lower leg. Physical examination showed a mass located over anterior compartment of lower leg with local tenderness. The mass of hernia [Figure 1] increased with dorsiflexion of ankle and during standing, and a palpable defect of fascia was noted. The magnetic resonance imaging of the lower leg obtained with fat suppression fast spin-echo T2-weighted sequence showed stranding over left tibialis anterior muscle and small amount of fluid around the tendon sheath [Figure 2]. Given this result, the patient was diagnosed with a muscle hernia in the tibialis anterior, and surgical intervention was arranged.

We found a defect of fascia with 8 cm in length [Figure 3] and the muscle hernia of left tibialis anterior upon surgery. The defect was repaired with primary suture under some tension [Figure 4]. The muscle inflammation was not significant. After 24 h of the operation, unexpectedly, the patient exhibited a severe and spontaneous pain over left lower leg. Although the vascular status was intact, weakness of dorsiflexion of ankle and swelled toe was noted. The incision wound was opened with fasciotomy 48 h after surgery, and necrosis of tibialis anterior was noted [Figure 5].

During the following 2 weeks, additional debridement with changing of the dressing was arranged until the dead tissue was adequately debrided and closure of wound without tension. The pain in lower leg pain was dramatically improved after fasciotomy and the muscle tone of extensor hallucis longus well recovered in 1 month after the procedure. The weakness of dorsiflexion of ankle joint was still noted, and the report of nerve conduction velocity electromyography revealed common peroneal nerve neuropathy with active denervation. The patient has been undergoing a series of rehabilitation programs until now.

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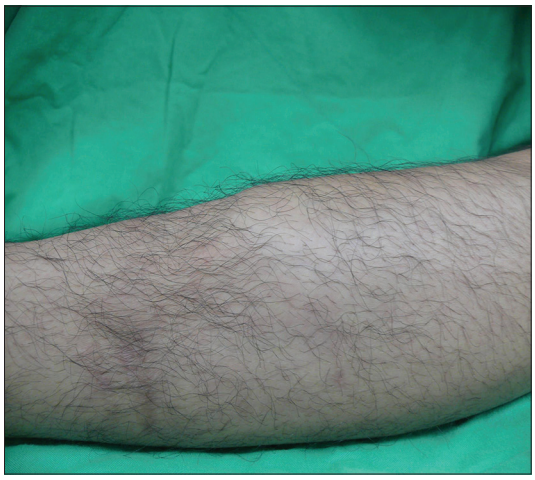

Figure 1: A palpable mass was noted over anterior compartment of left lower leg

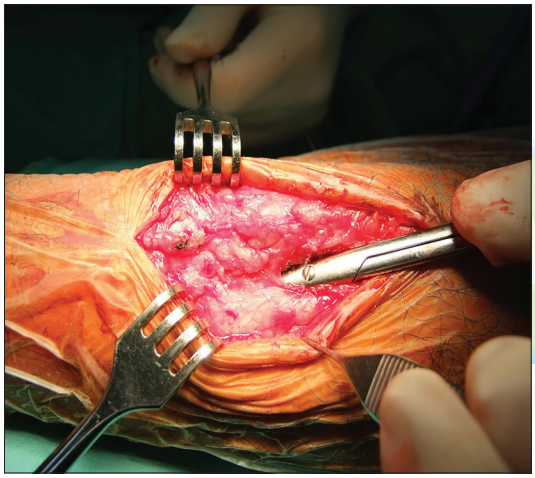

Figure 3: A defect of fascia with 8 cm in length was noted above the tibialis anterior muscle

Figure 5: Muscle necrosis was noted 48 h after previous operation

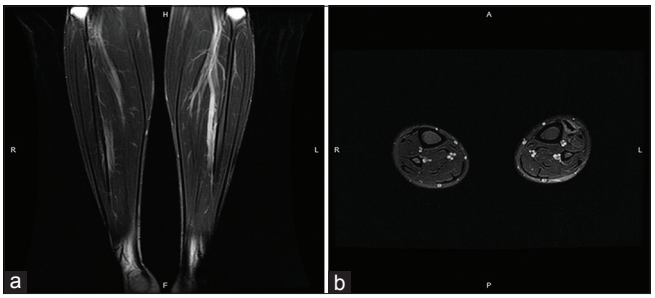

Figure 2: (a) The magnetic resonance imaging of fast spin-echo T2-weighted showed stranding over left tibialis anterior muscle and some fluid around the tendon sheath (Axial plane). (b) The magnetic resonance imaging of fast spin-echo T2-weighted showed stranding over left tibialis anterior muscle and some fluid around the tendon sheath (Coronal plane)

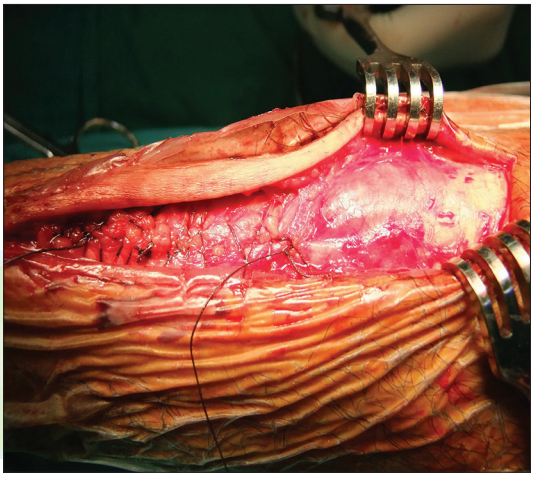

Figure 4: The defect was repaired under primarily suture with 1-0 Vicryl

DISCUSSION

Muscle herniation is suggested to be posttraumatic or spontaneous. It is attributed to a penetrating injury or a herniation caused by overexertion or trauma of fascial muscle. Spontaneous hernias, on the other hand, are considered a consequence of chronic stress exposure, including regular, vigorous physical exercise with consequent muscular hypertrophy and elevated intra-compartmental pressure. In 1929, Ihde reported a series of 12 patients about hernias of the leg and classified hernias as constitutional or traumatic.[3] To our knowledge, this patient is the only one case of spontaneous herniated tibialis anterior muscle with complication of compartment syndrome in recent 5 years in our institute.

Muscle herniation through an overlying fascial defect is most commonly described in athletes or adults with occupations requiring excessive strain on the legs.[1,4] It generally occurs in lower extremity, and the anterolateral

tibial compartment is one of the most common sites affected by muscle herniation.[1,4]

Treatment for muscle herniation of tibialis anterior is controversial. Asymptomatic lesions need no specific treatment. Conservative treatment such as exercise restriction or a use of elastic support is initially used for asymptomatic lesion.[5] If it becomes symptomatic, surgical treatment is considered. Traditional options included direct closure of the fascial defect and a surgical repair with a Mersilene mesh or a periosteal flap. [2] However, surgical repairs of fascial defect can lead to elevation of intra-compartmental pressure since the compartment is relatively small. The elevation of pressure is attributed to the edema in postoperative period, predisposing the development of compartment syndrome in the anterior compartment.[5-7] Longitudinal fasciotomy extending the length of the compartment is the priority to prevent serious complications.[7,8] However, fascial defects often generate a minor cosmetic problem but do not usually result in a function disturbance. In order to prevention of muscle necrosis after direct closure of herniated muscle in narrowing compartment, two-stage repair was highly suggested in our experience.

Although the clinical signs of compartment syndrome are well-described,[9] clinician's awareness plays an important role in the diagnosis. In patients at risk for compartment syndrome, repetitive examinations are necessarily required for this dynamic process. While early studies stated irreversible nerve and muscle damage begin after 5–6 h of ischemia,[10] more recent clinical studies revealed that muscle necrosis occurred within the first 3 h.[11] It is suggested that pain as clinical sign of compartment syndrome might be ignored in patients with reduced vigilance or previously treated with analgesics. Adequate documentation is necessary to compare the results during the clinical course.[12]

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Conflicts of interest

There are no conflicts of interest.

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