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CASE REPORT

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Calcific myonecrosis

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Abstract Calcific myonecrosis is a rare and late sequela of compartment syndrome, which becomes symptomatic years after the initial trauma. We diagnosed this condition in a 64-year old man, 42 years after he sustained a shot-gun wound to the right lower leg. Total excision of a peripherally calcified, cystic mass, continuous with the anterior tibial muscle belly resulted in complete resolution of symptoms. Consideration of the diagnosis is warranted in patients with a history of major injury who develop a soft tissue mass in the traumatized compartment. The treatment of choice is marginal excision.

Résumé La myonécrose calcifiante est une séquelle rare et tardive du syndrome des loges. Elle devient symptomatique des annés aprés le traumatisme initial. Nous présentons un patient de sexe masculin agé de 64 ans avec une myonécrose calcifiante et qui a été blessé par une arme á feu au niveau de sa jambe il y a 42 ans. La masse molle entourée d'une capsule calcifiée développée dans les fibres de muscle tibial antérieur. La symptomatologie a totalement disparue. Il faut penser au diagnostic de myosite calcifiante devant la découverte d'une masse molle dans un compartiment musculaire avec la notion d'un traumatisme majeur dans les antécédents. Le traitement de choix est l'excision compléte dans la mesure des possibilités techniques.

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Introduction

If a compartment syndrome is not treated with early fasciotomy and decompression, muscle necrosis and fibrosis may occur, resulting in contractures and loss of function. Calcific myonecrosis is a late sequela of the compartment syndrome, which becomes symptomatic years after the initial event. Details of a patient with calcific myonecrosis are presented in this paper and treatment options are discussed in light of the 15 previous reports in the literature.

Case report

A male aged 64 years was seen in the orthopaedic clinic with the complaint of a mass in the right leg. He had been aware of the swelling for 3 years, and vaguely remembered a traumatic event that had precipitated his symptoms. He had sustained a shot-gun injury to the right leg 42 years ago. The injury had been treated with rest and dressings. He remembered severe pain and swelling after the event that had subsided in time. The motion in his right ankle had gradually decreased and he was unable to dorsiflex his toes. Nevertheless, he had worked without hindrance as a farmer for 40 years.

Physical examination revealed a non-tender, fluctuant mass of 5×9 cm in the distal third of the right leg. The ankle was in neutral position and no active or passive ankle movement was possible. The toe flexors had limited active motion and their strength was graded as 3. There was no active toe extension and no deep peroneal nerve sensation. The dorsalis pedis pulse was not palpable. No deformity or leg length discrepancy was present.

Radiographs (Fig. 1) and magnetic resonance imaging studies (Fig. 2, 3) of the lower leg were undertaken and operation was then performed. After an incisional biopsy, a second stage marginal excision was carried out through an anterior longitudinal incision. Most of the anterior compartment was occupied by the mass but there was a 4 cm segment of viable muscle tissue in the proximal part of the tibialis anterior; the muscle fibers blended with the mass distally. The extensor hallucis longus and extensor digitorum longus muscles, the anterior tibial artery and veins, and the deep peroneal nerve could not be detected. The lesion extended to the anterior part of the ankle capsule. A total marginal excision was performed for the lesion in the anterior compartment, while that in the deep posterior compartment was left undisturbed. The wound was closed over a suction drain. Postoperatively, a first generation cephalosporin antibiotic was administered intravenously for three days.

Fig. 1 **a** Lateral lower leg radiograph demonstrating diffuse soft tissue calcification with anterior tibial erosion and posterior cortical thickening. **b** Anteroposterior radiograph showing periosteal reaction at the lateral aspect of the tibia and metallic fragment due to a shot-gun wound

Fig. 2 **a** Sagittal T1W image shows heterogeneous soft tissue mass in the anterior tibial and extensor digitorum muscles. This lesion measures up to 3.5×3.8×11 cm and 1.1×1.6×5.6 cm in the greatest dimensions with intermediate and high signal intensity. **b** High signal intensity on T2W images which is consistent with cystic degeneration with proteinous content. Note peripheral and inner hypointense areas representing calcification

Fig. 3 Transverse Postcontrast FS T1 W images showing peripheral ring enhancement of thick fibrous capsule around calcified lesion. Note no enhancement in calcified areas

Fig. 4a, b After resection of the calcified cystic mass in the anterior compartment. **a** Lateral radiography, **b** Anteroposterior radiograph of the left lower leg with residual deep posterior compartment mass

The excised specimen was a bright pink-red, cystic mass 28×4×4 cm in dimension. The central part of the lesion was filled with amorphous necrotic and calcified material. Histopathological examination revealed that the cyst wall was composed of cholesterol clefts, foamy cells, multinucleated foreign body type giant cells and organising tissue. A small amount of striated muscle was present near the cyst. All the cultures were negative.

The incision healed uneventfully without any skin or dead space problems. The patient was asymptomatic at the last follow-up visit six months after the operation. At this time anteroposterior and lateral radiographs showed no evidence of a residual lesion in the anterior compartment and an undisturbed calcified mass in the posterior compartment (Fig. 4).

Discussion

Ischaemic contractures and sensory deficits are known complications of the compartment syndrome. Calcific myonecrosis is however, a rare sequel and only 15 cases have been reported in the literature [1–6]. As in our pa-

tient, all were diagnosed 27–64 years (mean 41 years) after the initial event. The diagnosis may be difficult due to the long time interval between the trauma and symptoms of the calcific myonecrosis. In our patient the arguments in favour of the diagnosis of compartment syndrome were the history of severe trauma, pain and swelling followed by functional deficit. Other sequelaes of the compartment syndrome such as sensory deficits and absence of pulses may be helpful diagnostic features.

Different treatment options have been proposed in the literature. Viau et al.[6] reported two patients with lesions in the anterior compartments of the lower leg. After incision and drainage, the wounds were left open for dressing changes. Both of the intra-lesional incomplete excisions were complicated by secondary infections. One of the patients eventually had a below knee amputation, while the other lived with the draining wound.

O'Keefe et al.[4] reported three cases with marginal excision in two patients and intra-lesional debridement with the wound left open in a third. The patient with intra-lesional debridement developed hypotension and cardiac arrest and an above knee amputation had to be performed at a later stage. The patient died 2 months later from gastrointestinal complications.

Renwick et al.[5] reported a cystic degeneration in the superficial posterior compartment which was treated with complete excision and closed primarily over a suction drain. Healing was uneventful.

Early et all.[2] reported two patients in whom complete excision of calcified cystic masses in the anterior compartment was undertaken. The resultant dead space was partially filled with a viable tibialis posterior muscle transfer in order to avoid secondary infection and complications. The results were satisfactory and no chronic drainage occurred.

As in our patient, complete excision is the definitive treatment for this condition. Incomplete debridements carry a high risk of secondary infection and predispose to other complications. Muscle transfers may be helpful to fill the dead space but are not always necessary. As the affected persons have adapted to the impaired function of the limb, reconstructive procedures for the improvement of function is not often required.

The diagnosis of calcific myonecrosis should be considered in persons with a history of major trauma and the presence of a soft tissue mass in the same compartment. Marginal excision is the treatment of choice.

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