Case Report

Calcific Myonecrosis of the Leg: A Case Report

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Keywords

Calcification · Compartment syndrome · Myonecrosis · Neurovascular injury

Abstract

Calcific myonecrosis is characterized by central liquefaction and peripheral calcification involving the entire muscle mass and is considered to be a late sequel of compartment syndrome. Being a rare presentation, considering differential diagnosis is important. Diagnosis is based on history of trauma and typical radiological features. Symptomatic patients require complete excision of the mass while asymptomatic patients can be treated nonoperatively.

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Introduction

Calcific myonecrosis is characterized by central liquefaction and peripheral calcification involving the entire muscle mass. Calcific myonecrosis is considered to be a late sequel of post-traumatic compartment syndrome [1]. Very few cases have been reported to date with confirmed diagnosis of calcific myonecrosis [1–8]. In this case report, we shall discuss the diagnostic approach, decision making, and surgical planning.

Case Report

A 70-year-old man came with complaints of pain, swelling and pus discharge from the left leg of 15–20 days' duration. Clinically, the patient had a ununited femoral shaft fracture with a discharging sinus over the anterior aspect of the leg in the upper third region. The discharge consisted of thick reddish-brown pus with bony debris, with fluctuant swelling in the antero-lateral aspect of the leg. There was complete wasting of leg muscles with an active/passive ankle, and toe movements were absent. Systemic examination was normal. The patient had a history of a gunshot injury 50 years back, with a sustained femoral fracture and common peroneal nerve injury with foot drop. The fracture of the femur was treated conservatively at that time, considering the compound fracture and the bullet was left in situ. On examination, the patient had an ununited femoral fracture with limb shortening of approximately 10 cm and equinovarus deformity of the foot; however, the patient was able to perform his daily activities with some restriction and was not complaining of it.

Radiological evaluation confirmed the ununited femur with the bullet in situ and the radiograph of the leg had a calcific fusiform mass over the anterolateral aspect extending from the neck of the fibula to the ankle joint. Multiple bony spicules in form of sheets were present in circumferential manner. Further CT and MRI evaluation confirmed fusiform masses with peripheral calcification within the tibialis anterior and peroneal muscle, and mass extension with some fluid collection in the anterolateral compartment. No bony lesion or cortical erosion was noted on the CT scan. Pus culture sensitivity was done. The culture showed a gram-positive organism without any specific growth, as the patient was already on oral antibiotics administered by a surgeon elsewhere and thus the patient was started on injectable antibiotic empirically (Fig. 1, 2, 3).

Treatment

Surgery was planned in two stages: first, open biopsy followed by definitive management. We went through the literature to search for previous cases described so far and the clinico-radiological features were in favor of calcific myonecrosis; however, we still planned biopsy to confirm it.

An anterolateral approach was taken for biopsy. Further deep dissection drainage consisted of thick brown pus with muscle and bony debris. A large single calcific mass seems to have replaced complete muscle tissue of the anterolateral compartment of the leg. Hence, our diagnosis was confirmed intraoperatively and we went ahead with complete debridement and curettage.

The whole tibialis anterior muscle was necrosed, containing bony spicules within the mass and the peroneal muscle belly was completely replaced by calcium, which was chalky in consistency. The neurovascular bundle in the anterolateral compartment was identified and isolated. En mass removal of the tibialis anterior and peroneal muscle was done and thorough debridement was carried out. The wound was left open for drainage and secondary closure was performed after 7 days. Histologically, there was necrotic muscle tissue with calcium flecks in the periphery.

The femoral fracture was not a frank nonunion but a fibrous nonunion so there was no abnormal mobility. Thus, it was treated nonoperatively considering the duration of more than 25 years since the fracture. The patient was able to bear partial weight on the limb due to some stability and he was concerned only for the discharging sinus and wanted treatment for that in particular (Fig. 4, 5).

Discussion

Calcific myonecrosis was first reported by Gallie and Thompson in 1960 [9]. Liquefaction and calcification within muscle mass are a rare presentation and very few cases have been reported so far. A total of 48 cases have been reported since the time it was first described. The anterolateral compartment of the leg is a usual site, affecting the tibialis anterior and peroneal muscle.

Though the pathogenesis of calcific myonecrosis is not completely known, the possible factors can either be vascular injury followed by compartment syndrome or a peripheral nerve injury [2]. In our case, the patient had a gunshot injury to the thigh, sustained femoral fracture with common peroneal nerve injury and possibly some vascular damage with compartment syndrome, though the exact details and previous documentation were not available. As per the literature, ischemia and compartment syndrome have been reported in only few cases but the involvement of the common peroneal nerve has been reported in all of the previous cases. Another possible pathophysiology is recurrent hemorrhage within necrosed and fibrotic muscle tissue, but the exact mechanism could not be established [4, 5].

Radiologically, it needs to be differentiated from myositis ossificans. Calcific myonecrosis is characterized by a fusiform mass with peripheral calcification and central lucency while myositis shows trabecular and lamellar bone in the periphery progressing centrally and usually presents over a short duration of weeks to a few months following a trauma. MRI is helpful to differentiate between the two. Another difference includes soft tissue neoplasm with secondary calcification [8] and dystrophic calcification in case of a hematoma, abscess or polymyositis [1, 2, 4]. In order to differentiate calcific myonecrosis from malignancy, a past history of a significant trauma and compartment syndrome play an important role; further, MRI is helpful to differentiate these two. Soft tissue tumor shows homogenous mineralization unlike peripheral calcification in calcific myonecrosis. However, a history of a trauma and localized involvement of a single muscle mass excludes these differentials.

Our report highlights the diagnosis approach, the importance of including the patient's past history, taking into account differentials while dealing with such rare cases as well as the management guideline. Nonoperative treatment is the preferred approach if the patient is asymptomatic, even with such a large calcification, although it is tempting for a young surgeon to opt for surgery irrespective of postoperative complications. Previous case reports fail to discuss differentials and specific treatment guidelines [1, 3, 4]. In asymptomatic patients, the management should be observation and clinical follow-up [7, 8]. Nonoperative treatment includes observation, analgesics if required and adequate care of the infection at any other area of the body. No other specific medication has been described in the literature. Our patient presented with pain, swelling and a discharging sinus over the leg, thus biopsy followed by complete excision was planned.

Thus, a history of a previous trauma combined with a neurovascular injury and typical radiological features allows to confirm the diagnosis of calcific myonecrosis. A few studies do not favor open excision, considering complications such as secondary infection [2]. However, marginal excision of the calcified mass along with the muscle belly resulted in the complete resolution of symptoms (Fig. 6).

Conclusion

This case report highlights the approach to diagnosis, the importance of taking into account the patient's past history, considering differentials while dealing with such rare cases as well as the management guideline. Nonoperative treatment is the preferred approach if the patient is asymptomatic, even with such a large calcification, although it is tempting for a young surgeon to opt for surgery irrespective of postoperative complications. Marginal excision is the treatment of choice in symptomatic patients.

Statement of Ethics

This case report complies with the guidelines for human studies and research and was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. The patient has given his written informed consent to publish this case including the publication of images.

Disclosure Statement

The authors have no potential conflict of interest to disclose relevant to this article.

Author Contributions

This is to declare that all authors made substantial contributions to the conception of the work, its analysis and gave final approval for the version to be published. The authors contributed to its critical revision concerning its content and agree to be accountable for all aspects of the work.

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Fig. 1. Anteroposterior and lateral radiograph. Ununited femoral shaft fracture.

Fig. 2. Anteroposterior and lateral radiograph. Leg with a calcified mass in the anterolateral aspect.

Fig. 3. CT scan images. A calcified mass involving the whole anterolateral compartment.

Fig. 4. Left leg with a discharging sinus, anterolateral exposure showing an amorphous calcium deposit in the muscle mass, an isolated neurovascular bundle, excised necrotic and calcified muscle mass.

Fig. 5. Histology: necrotic muscle tissue with calcium deposit at the periphery.

Fig. 6. Postoperative radiograph of the leg and the leg after 2 weeks of follow-up: healthy wound showing good granulation.