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Pretibial Panniculitis Ossificans—A Rare but Significant Diagnosis

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ABSTRACT

Pretibial panniculitis ossificans is a rare condition. In this report, we describe a 67-year-old male localized to his right pretibial tissue, approximately 20 years after contusion to the same area.

Heterotopic calcification is described as the presence of bone in soft tissue where bone normally does not exist (1). Panniculitis ossificans is a form of dystrophic heterotopic calcification that is located within the subcutaneous tissues (2–4). Trauma is frequently associated with this occurrence but is not always a precursor. The importance of these benign lesions is that that they can present and mimic, both grossly and histopathologically, other significantly more sinister lesions (5); thus, early accurate diagnosis is critically important with regard to optimizing patient management.

Case Report

Patient Information

In February 2016, a 67-year-old male presented to an elective foot and ankle orthopedic clinic with a primary complaint of severe bilateral hallux valgus that had been ongoing for several years. The patient's secondary complaint was that of a mass on the anterior aspect of his right lower leg. The lump was in the mid-shaft region and relatively prominent. His relevant medical history was that of peripheral vascular disease, hypertension, and hallux valgus, as mentioned. The patient also complained of marked mechanical discomfort being elicited by the lesion, particularly on ankle plantar/dorsiflexion, which had become acutely more significant. Although symptomatically the lesion had become more bothersome over the months preceding the consultation, the patient noted that it had, in fact, been present for several years, possibly upward of 20, but remained relatively asymptomatic and consistently sized until the recent growth period. Although the patient could not recall a definitive history of trauma to the specific region of late, he did recount a traumatic injury to his pretibial area ~20 years prior during a game of football, after which he recalled a minor mass being present.

Examination revealed a pretibial mass measuring roughly 6 × 3 cm, slightly irregular in its appearance and nontender to palpation. There was no surrounding erythema or edema and no evidence of skin breakdown or ulceration. Magnetic resonance imaging (MRI) had been scheduled by the patient's primary care physician before referral to the orthopedic outpatient clinic, as a result of the incidental discovery of this lesion on a plain film 3 years prior. The MRI sequences involved T1-weighted images before and after the administration of gadolinium contrast and also T2-weighted, fat-suppressed images (Figs. 1–4). This MRI demonstrated "a lesion with 2 dense multifocal, superficial, subcutaneous deposits, with no suspicious soft tissue mass or enhancement of the surrounding tissues." It was noted that the lesion was in contact with the tibialis anterior but showed no evidence of invasion of same, and no tibial cortical involvement was noted. Further imaging by means of computed tomography (CT) was advised.

A noncontrast CT was subsequently performed with soft tissue and bony algorithm reconstructions. This demonstrated a lesion of 56 × 30 × 11 mm with predominantly peripheral mineralization and central hypomyelination. It also noted that an essentially continuous plane of separation existed between the lesion and the tibial cortex, with no evidence of any periosteal reaction or surrounding soft tissue masses.

The combined results of these radiological investigations and clinical examination produced a diagnosis suggestive of panniculitis ossificans.

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Fig. 1. Anteroposterior and lateral radiograph of the right tibia and fibula.

Based on this, a decision was made on consultation between the patient and the surgeon to proceed with an elective excision of the lesion.

Procedure

The procedure was performed under general anesthetic with the patient in a supine position. A tourniquet was applied and inflated to the appropriate pressure following the administration of intravenous antibiotics along with local antimicrobial protocols. A direct incision was made over the lesion, and careful dissection of the superficial structures was performed so as not to incise into the mass itself. Intraoperatively, it was noted that the lesion itself was easily separated from the skin but was notably more adherent to the deeper tissue structures. However, it detached en bloc and showed no evidence of any periosteal or bone infiltration. The surface was irregular and nodular in appearance. In the local areas surrounding the lesion, a small amount of a white caseous-like substance was noted. Samples of this material and the lesion in its entirety were dispatched to be analyzed both microbiologically and histopathologically. Pre- and intraoperative images of the resected specimen can be seen in Figs. 5–8.

Microbiological examination of the specimen and local material was negative for any organism growth. The definitive histopathological examination confirmed the following, with the official report stating that the lesion contained “adipose tissue and fibroconnective tissue

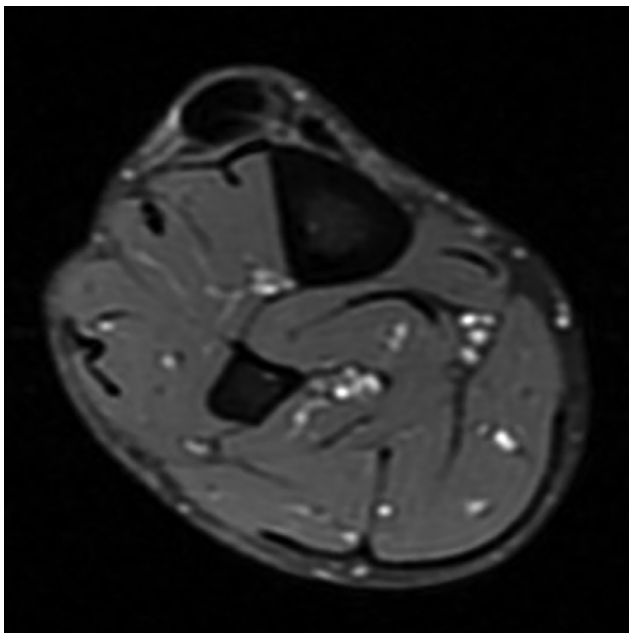

Fig. 3. Axial T1-weighted image postcontrast.

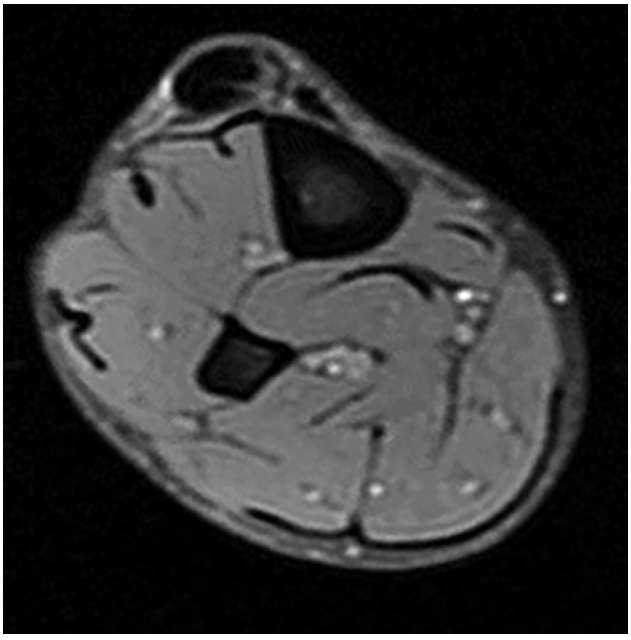

Fig. 2. Axial T1-weighted image precontrast.

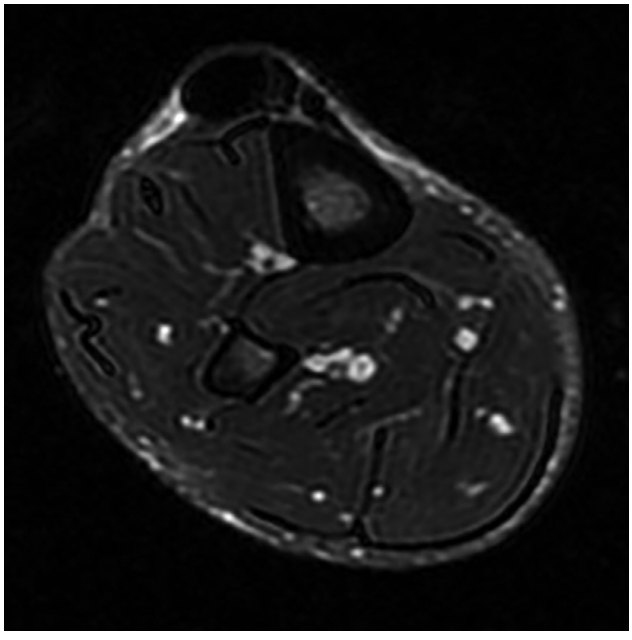

Fig. 4. Axial T2-weighted image with fat suppression.

Fig. 5. Preoperative image of a pretibial lesion.

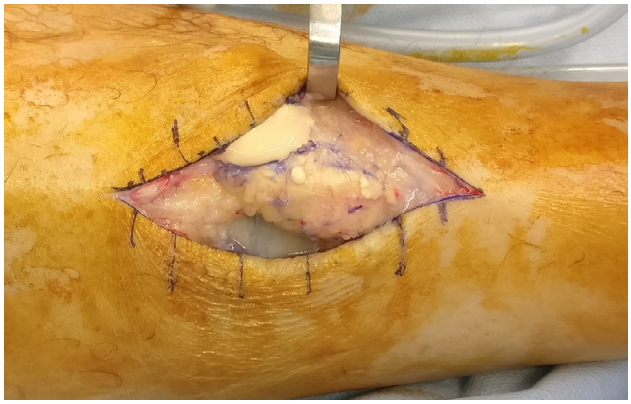

Fig. 6. Intraoperative image demonstrating the integration of the mass with the surrounding tissues.

Fig. 7. Resected specimen (whole).

within which there was extensive calcification and foci of ossification with spicules of bone and bone marrow" (Figs. 9 and 10). Focally, there was granular debris with associated hemorrhage and inflammatory reaction. There was no evidence of malignancy. The findings were said to be "in keeping with panniculitis ossificans."

Postoperatively, the patient had no significant issues. His pretibial wound had healed remarkably well at routine 6-week postoperative review. Further consultation at 12 months noted excellent overall results (Fig. 11), with complete resolution of all symptoms for the patient and, importantly, no recurrence of the lesion evident.

Fig. 8. Resected specimen (core exposed).

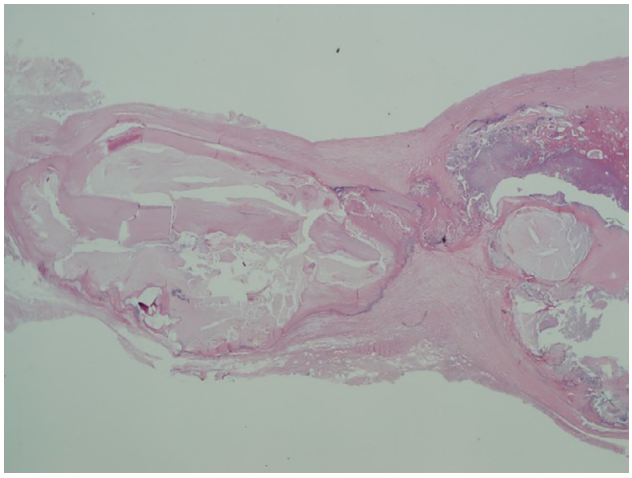

Fig. 9. Low-power microscopic view of resected specimen demonstrating fibroconnective tissue and calcification (magnification × 40; hematoxylin and eosin stain).

Discussion

Heterotopic calcification is the presence of bone in soft tissue where bone normally does not exist (1). Panniculitis ossificans is a form of dystrophic heterotopic calcification located within the subcutaneous tissues (2–4). Trauma is frequently associated with this occurrence but is not always a precursor. In panniculitis ossificans, the calcification is usually linked to degeneration of necrotic tissue (4) and to the stimulation of osteoprogenitor stem cells that usually lie dormant within said tissue. With adequate stimulation, these cells have the ability to differentiate into osteoblast cells, thus commencing the process of osteoid formation, which, in turn, leads to mature heterotopic bone (6). The specific stimulus, however, is not definitive, with Billings et al (7) noting that a number of specific morphogenic proteins, if deposited in soft tissues, have the ability to stimulate this ossification.

Symptoms associated with these masses are resultant of the space-occupying nature of the mass and its distortion of local tissues and alteration of innate biomechanics, and as such tend to be directly

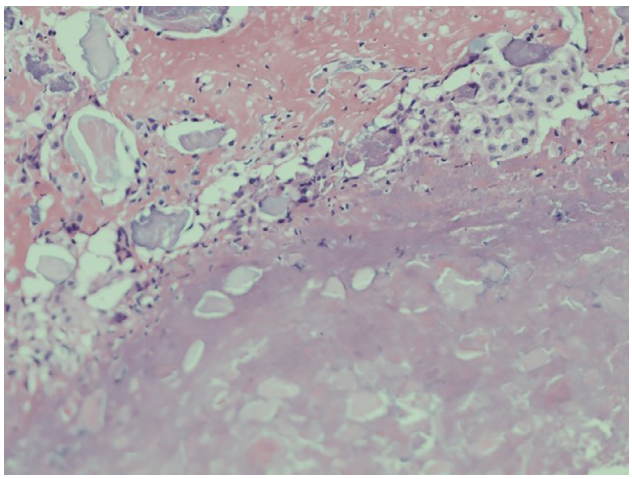

Fig. 10. High-power microscopic view of fibroconnective tissue and calcification (magnification × 400; hematoxylin and eosin stain).

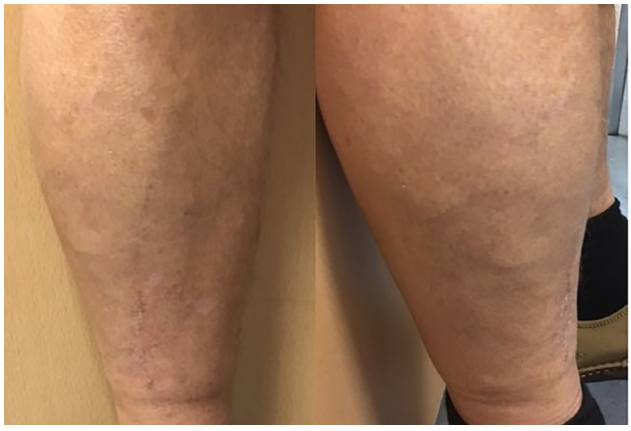

Fig. 11. Follow-up images 12 months postoperatively.

related to both their anatomical location and size (4). Radiological investigations of choice are primarily plain-film radiographs (8). However, in the acute setting, the ossifications are often missed on radiographs, and as such, CT, MRI, and radionucleotide bone scans can prove to be useful adjuncts with earlier diagnostic capabilities (4,9,10).

Panniculitis ossificans is frequently mistaken for more sinister lesions both clinically and histopathologically, most commonly and certainly most significantly that of osteosarcoma (5). Other differentials depending on location include chondrosarcoma and other fibroblastic/myofibroblastic tumors (11), whereas benign presentations such as osteochondroma and myositis ossificans are other less worrisome alternatives. The gold standard means for accurate histological diagnosis of these lesions is to examine the sections subsequent to staining with hematoxylin and eosin (12). However, it has been noted that, histologically, the lesion is very similar to myositis ossificans and can be extremely difficult to differentiate from osteosarcoma even on histological examination, more so if the examination is performed in the acute phase (5).

In conclusion, panniculitis ossificans is a rare diagnosis, with its importance directly linked to its likeness to other more sinister alternative diagnoses. What we have demonstrated in this case is that biopsy before excision is not exclusively necessary and that one can confidently proceed once adequate preoperative imaging and assessment have been performed.

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