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Case Report

Osteochondroma of the calcaneus

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ABSTRACT

Osteochondroma is a benign osteocartilaginous lesion characterized by a bony projection covered by a cartilage cap. Although it is one of the most common benign bone tumors, its occurrence in the calcaneus is uncommon. A lesion arising from the posterosuperior calcaneus may clinically resemble a Haglund deformity and may remain difficult to distinguish from other causes of posterior heel prominence. We report the case of a patient with insulin-treated diabetes mellitus and diabetic peripheral neuropathy with neuropathic osteoarthropathy who presented with painless, progressive deformities of both feet evolving over six years. The most prominent lesion was located on the posterosuperior aspect of the right calcaneus and caused difficulty wearing shoes because of mechanical conflict. Plain radiography demonstrated marked hypertrophy of the posterosuperior calcaneus without bone lysis or sclerosis. Computed tomography demonstrated an osseous formation measuring approximately 30 mm in anteroposterior diameter. Magnetic resonance imaging showed a lobulated osteocartilaginous-appearing formation measuring approximately 28 × 16 mm arising from the posterosuperior calcaneus and extending anteriorly, with enlargement around the insertion of the Achilles tendon. The imaging characteristics were considered most compatible with an osteochondroma. Calcaneal osteochondroma is a rare cause of posterior heel deformity and may mimic a Haglund deformity or another calcaneal exostosis. Cross-sectional imaging, particularly MRI, is useful for characterizing the lesion and assessing its relationship with adjacent soft tissues. In an asymptomatic patient with diabetes and peripheral neuropathy, conservative management with appropriate footwear and regular skin surveillance may be preferable when there is no ulceration, infection, significant pain, or radiological evidence of aggressive behavior.

Keywords: Osteochondroma, Calcaneus, Exostosis, Posterior heel deformity, Diabetic neuropathy, Haglund deformity

INTRODUCTION

Osteochondroma is a benign osteocartilaginous lesion characterized by a projection arising from the surface of a bone and covered by a cartilage cap. It is the most common benign bone tumor and is generally diagnosed during childhood or adolescence. Most lesions cease growing after skeletal maturity. Osteochondromas usually occur in the metaphyseal regions of long bones, particularly around the knee and proximal humerus, whereas lesions of the foot and ankle are uncommon.[1,2]

The lesion is considered a developmental abnormality related to displaced growth-plate cartilage and abnormal endochondral ossification. A characteristic imaging feature is continuity between the cortex and medullary cavity of the osteochondroma and those of the parent bone.[1,2] Most solitary osteochondromas are asymptomatic and are discovered incidentally. When symptoms occur, they are usually related to mechanical irritation or compression of adjacent structures, including tendons, bursae, nerves and vessels. Other complications include

fracture, deformity, bursitis and, rarely, malignant transformation.[2,3]

The calcaneus is an unusual location for osteochondroma. Several cases of calcaneal osteochondroma have been described, including lesions arising from the inferior medial calcaneal tubercle, the plantar aspect of the calcaneus and the peroneal tubercle.[4-6] These reports illustrate the clinical variability of calcaneal osteochondromas and the potential for mechanical symptoms related to footwear or weight bearing.

A posterosuperior calcaneal osteochondroma is particularly challenging because its clinical appearance can resemble a Haglund deformity. Haglund deformity refers to a prominent posterosuperior calcaneal contour that may cause mechanical impingement between the calcaneus, Achilles tendon and footwear. Magnetic resonance imaging can demonstrate associated Achilles tendon abnormalities, retrocalcaneal bursitis and adjacent soft-tissue changes.[7] Therefore, the distinction between a common posterosuperior calcaneal prominence and an osteochondroma requires careful radiological assessment.

MRI is particularly useful in the evaluation of osteochondromas because it provides information about the cartilage cap and adjacent soft tissues. It can also identify complications such as bursitis, tendon irritation, neurovascular compression and features suggestive of malignant transformation.[8,9] A cartilage cap that becomes abnormally thick in an adult, particularly when associated with new pain or growth after skeletal maturity, should raise concern for secondary chondrosarcoma.[8,9]

The therapeutic approach depends on symptoms, lesion characteristics and complications. Asymptomatic lesions with typical benign imaging features can generally be observed, whereas surgical excision is considered when the lesion produces significant symptoms, mechanical impairment, compression of adjacent structures, cosmetic problems or suspicious features.[3,10]

The presence of diabetes and peripheral neuropathy adds an important therapeutic consideration. Diabetic neuropathy can impair protective sensation and increase the risk of unnoticed pressure-related skin injury. Appropriate footwear, foot surveillance and prevention of ulceration are therefore essential components of diabetic foot care.[11]

We report a rare case of a large posterosuperior calcaneal osteochondroma suspected on imaging in a patient with insulin-treated diabetes mellitus and diabetic peripheral neuropathy. The objective of this report is to describe the clinical and radiological presentation and to discuss the diagnostic and therapeutic challenges associated with this unusual localization.

CASE REPORT

A patient with a history of insulin-treated diabetes mellitus and diabetic peripheral neuropathy was evaluated for progressive and painless deformities of both feet. The patient reported no sporting activity and had no particular occupational activity. The deformities had progressively developed over approximately six years.

The patient did not report significant pain during walking and had no major limitation in daily activities. However, the progressive prominence of the posterior aspect of the right heel caused difficulty wearing conventional shoes. The main functional complaint was mechanical conflict between the posterior heel prominence and the shoe counter. Clinical examination revealed multiple bony prominences involving both feet. These included prominences around the head of the fifth metatarsal, the tarsal region and the left talus. The most prominent and clinically relevant deformity was located at the posterosuperior aspect of the right calcaneus. Bilateral medial deviation of the great toes was also observed. Despite these deformities, the patient remained independently ambulatory without significant gait impairment. There was no significant tenderness of the right heel.



Figure 1: X-ray shows a dysmorphism of the calcaneus, with hypertrophy of the posterosuperior side of its greater tuberosity. The posterosuperior edge of the calcaneus is very enlarged, with no sclerosis or bone lysis.

The skin overlying the calcaneal prominence was intact. There was no ulceration, erythema, discharge, local inflammatory reaction or evidence of active infection. This finding was considered particularly relevant because of the patient's diabetic neuropathy and the associated risk of pressure-related skin injury. Peripheral neurological examination was compatible with diabetic peripheral neuropathy, subsequently confirmed by electromyographic assessment. There was no clinical evidence of an acute Charcot neuroarthropathy episode at the time of evaluation. Plain radiographs of the right ankle demonstrated marked enlargement and dysmorphism of the posterosuperior portion of the calcaneal tuberosity. The lesion appeared as a prominent osseous formation without

obvious cortical destruction, bone lysis or significant sclerosis (Figure 1).

Computed tomography was subsequently performed to characterize the osseous lesion more precisely. It demonstrated a prominent osseous formation measuring approximately 30 mm in anteroposterior diameter, arising from the posterosuperior non-articular portion of the calcaneus and extending anteriorly (Figure 2). The lesion produced marked enlargement of the posterior calcaneal contour.



Figure 2: 3D CT scan showing osteoformation measuring 30 mm in anteroposterior diameter, extending anteriorly and at the non-articular upper part of the calcaneus.

Magnetic resonance imaging was performed to evaluate the lesion and its relationship with the Achilles tendon. MRI demonstrated a lobulated osteocartilaginous-appearing formation measuring approximately 28 × 16 mm on the posterosuperior surface of the calcaneus. The lesion extended anteriorly along the non-articular superior portion of the calcaneus and produced an enlarged appearance around the insertion of the Achilles tendon (Figure 3). No aggressive soft-tissue component was identified.

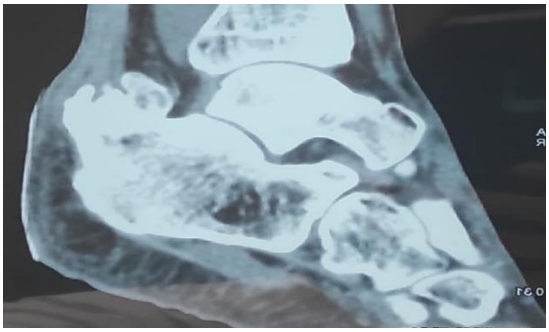


Figure 3: MRI of the foot with axial of the right foot showing a bony outgrowth on the posterior superior surface of the calcaneus; measuring 28 x 16 mm, this poly-lobed formation gives an enlarged appearance to the insertion of the achilles tendon

The combination of the anatomical location, morphology and imaging characteristics was considered most compatible with an osteochondroma. However, because the patient did not undergo surgical excision, histopathological confirmation was not available. Given the presence of multiple bony prominences involving both feet, multiple exostoses were also considered in the differential diagnosis.

In view of the absence of pain, ulceration, infection, significant functional impairment or suspicious imaging findings, surgical excision was not considered mandatory. In addition, diabetes mellitus and confirmed peripheral neuropathy represented important considerations because of the potential risk of postoperative wound complications.

Conservative management was therefore selected. The patient was advised to use appropriately fitted footwear with adequate posterior heel space to reduce mechanical pressure over the calcaneal prominence. Regular inspection of the skin was recommended because of the patient's neuropathy and the possibility of pressure-related lesions occurring without significant pain.

At clinical follow-up, the patient remained stable, without development of ulceration, local infection or significant pain. Surgical excision remains an option disabling mechanical symptoms, recurrent skin lesions, infection or suspicious radiological changes develop.

DISCUSSION

The present case illustrates an unusual posterosuperior calcaneal osseous lesion radiologically considered most compatible with an osteochondroma. Several characteristics deserve discussion, particularly the anatomical location, the clinical presentation, the imaging findings, the differential diagnosis and the therapeutic decision.

First, the location of the lesion is unusual. Osteochondromas predominantly affect the metaphyseal regions of long bones, while lesions of the foot and ankle are uncommon.[1,2] The literature contains several reports of calcaneal osteochondromas arising from different regions of the calcaneus. Blitz and Lopez described a giant solitary osteochondroma arising from the inferior medial calcaneal tubercle, measuring 8×4.2×2.1 cm, which was surgically excised.[4] Patnala et al also reported an osteochondroma arising from the plantar surface of the calcaneus that caused difficulty with ambulation and was successfully treated surgically.[5] Karakurum et al described bilateral symmetric osteochondromas of the peroneal tubercles of the calcaneus.[6] These observations confirm that although rare, the calcaneus can be involved at several anatomical sites.

Our patient differs from these previously reported cases because the lesion was located on the posterosuperior surface of the calcaneus and presented predominantly as a footwear-related mechanical problem rather than pain or impaired weight bearing. This location is clinically

important because a posterosuperior calcaneal prominence is commonly interpreted as a Haglund deformity. Haglund syndrome is associated with posterosuperior calcaneal prominence, Achilles tendon abnormalities and retrocalcaneal or retro-Achilles bursitis.[7] In the present case, the absence of significant pain and inflammatory changes, together with the exostotic morphology on CT and MRI, favored an osteochondroma rather than symptomatic Haglund syndrome.

The clinical presentation was also consistent with the benign nature of most osteochondromas. Our patient had a six-year history of progressive deformity without significant pain. The principal symptom was difficulty wearing shoes because of mechanical conflict. Osteochondromas are frequently asymptomatic, while symptomatic lesions may cause pain, pressure symptoms, deformity, restricted movement or compression of adjacent structures.[2,3] A series of 116 surgically treated osteochondromas reported pain, pressure symptoms, limitation of movement and cosmetic concerns among the principal indications for excision.[10] In our patient, the mechanical conflict was relatively mild and did not justify surgery in the context of the patient's comorbidities.

The radiological findings were important in supporting the diagnosis. Plain radiography demonstrated marked posterosuperior calcaneal enlargement without lysis or sclerosis. CT provided a more accurate assessment of the osseous architecture and lesion extent. The typical radiological diagnosis of osteochondroma relies on corticomedullary continuity between the lesion and the parent bone.[1,2] MRI then provided additional information concerning the cartilage component and adjacent soft tissues.

MRI is particularly valuable when an osteochondroma becomes symptomatic or occurs in an anatomically complex location. Mehta et al demonstrated that MRI can identify the causes of symptoms related to osteochondromas and characterize associated soft-tissue complications.[8] Woertler et al similarly emphasized the value of MRI for detecting mechanical irritation, bursitis, neurovascular complications and malignant transformation.[9] In our patient, MRI demonstrated the relationship between the bony lesion and the Achilles tendon insertion and did not identify an aggressive soft-tissue component.

The cartilage cap is an important imaging feature. The cartilage cap may be thin and difficult to identify in adults and may even become inconspicuous after skeletal maturity.[8,9] A thickened cartilage cap, particularly in an adult, combined with new pain or continued growth after skeletal maturity, should raise concern for malignant transformation. Bernard et al. demonstrated the usefulness of standardized CT and MRI measurement of cartilage-cap thickness in distinguishing benign osteochondromas from secondary chondrosarcomas.[12] In our patient, there was no reported thick or suspicious cartilage cap and no clinical evidence of malignant transformation.

The presence of multiple bony prominences in our patient raised the possibility of multiple osteochondromas. Multiple osteochondromas may occur in hereditary multiple exostoses, an autosomal dominant disorder associated with multiple skeletal lesions and increased risk of complications.[2,3] However, our patient did not undergo a complete skeletal survey or genetic investigation, and therefore hereditary multiple exostoses could not be confirmed. The additional bony prominences could also represent unrelated degenerative, neuropathic or mechanical changes. This diagnostic uncertainty is acknowledged as a limitation of the present case.

Another important aspect is the coexistence of diabetic peripheral neuropathy. Neuropathy reduces protective sensation and increases the risk of repetitive trauma and unnoticed pressure-related skin lesions.[11] The patient's prominent posterior calcaneal deformity therefore had potential implications beyond simple cosmetic deformity. Although the patient was asymptomatic, continuous pressure from footwear could theoretically lead to skin breakdown and subsequent infection.

For this reason, footwear modification and preventive surveillance were considered important. Current diabetic foot guidelines recommend appropriate, well-fitting therapeutic footwear for patients at increased risk of ulceration and emphasize regular foot care and management of pre-ulcerative lesions.[11] In our patient, maintaining intact skin was particularly important because neuropathy could delay recognition of a developing pressure lesion.

The decision not to operate was also based on the risk-benefit balance of surgery. Surgical excision is appropriate for symptomatic osteochondromas, particularly when there is significant pain, mechanical impairment, compression of adjacent structures, cosmetic concern or suspicion of malignant transformation.[3,10] However, surgery itself may produce complications. In Khare's series, complications included infection and vascular injury.[10] In a patient with diabetes and peripheral neuropathy, postoperative wound problems may be particularly concerning.

Our management therefore differs from several published calcaneal osteochondroma cases in which excision was performed because of pain, impaired ambulation or substantial mechanical symptoms.[4,5] In our patient, the lesion was large but clinically well tolerated, and the skin remained healthy. Consequently, conservative management was considered justified.

The absence of histopathological confirmation is the principal limitation of this case. The diagnosis was based on clinical and radiological findings, and osteochondroma was considered the most likely diagnosis. Histological

examination would have provided definitive confirmation but would have required surgical intervention in an otherwise asymptomatic patient. The decision to avoid surgery was therefore individualized according to symptoms, imaging characteristics and the patient's risk profile.

The case also demonstrates the importance of distinguishing an osteochondroma from a Haglund deformity. The latter is much more common and typically presents with posterior heel pain and soft-tissue irritation.[7] In contrast, the present lesion had an exostotic morphology and a relatively indolent clinical course. Recognition of osteochondroma in this location is important because management and follow-up may differ from those of conventional Haglund syndrome. Finally, long-term clinical surveillance remains appropriate. New persistent pain, rapid enlargement, growth after skeletal maturity, or development of a soft-tissue mass should prompt repeat imaging and consideration of histopathological evaluation because these findings may indicate a complication or malignant transformation.[2,3,9]

CONCLUSION

Posterosuperior calcaneal osteochondroma is a rare cause of posterior heel deformity and may mimic a Haglund deformity. In the present case, the lesion produced a marked calcaneal prominence and mechanical conflict with footwear but remained clinically asymptomatic, with no skin lesion or radiological sign of aggressive behavior. Radiography demonstrated the bony deformity, CT accurately characterized the osseous component, and MRI was useful for evaluating the lesion and its relationship with the Achilles tendon.

In patients with diabetes and peripheral neuropathy, treatment should be individualized. When the lesion is asymptomatic, the skin remains intact and imaging does not suggest aggressive behavior, conservative management with appropriate footwear and regular skin surveillance may be reasonable. Surgical excision should remain an option if significant symptoms, recurrent skin lesions, infection, functional impairment or suspicious radiological changes develop.

The absence of histopathological confirmation represents a limitation of this report. Nevertheless, the case emphasizes that osteochondroma should be considered in the differential diagnosis of unusual posterosuperior calcaneal deformities, particularly when imaging demonstrates a characteristic exostotic lesion.

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