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Clinical case

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Fracture of the medial tubercle of the posterior process of the talus in a futsal player. A rare fracture successfully treated conservatively

Fractura del tubérculo medial de la apófisis posterior del astrágalo en un jugador de fútbol rápido. Una fractura poco frecuente tratada con éxito de forma conservadora

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ABSTRACT. Talus is the second largest bone in the posterior region of the foot and participates in the talocrural (ankle), subtalar, and talonavicular joints. Talar fractures account for only one percent of all feet and ankle fractures, being the fracture of the medial tubercle of the posterior process of the talus an uncommon injury, caused by the rupture of the posterior talotibial ligament after dorsiflexion and traumatic pronation. Such fractures may not be radiographically evident, as described in this rare case of fracture of the medial tubercle of the posterior process of the talus with a satisfactory outcome without the need for surgical treatment.

Keywords: talus, tarsal bones, fractures, bonem, magnetic resonance imaging.

RESUMEN. El astrágalo es el segundo hueso más grande en la región posterior del pie y participa en las articulaciones talocrural (tobillo), subtalar y talonavicular. Las fracturas del astrágalo representan solo el uno por ciento de todas las fracturas de pies y tobillos, siendo la fractura del tubérculo medial del proceso posterior del astrágalo una lesión poco común, causada por la ruptura del ligamento talotibial posterior después de la dorsiflexión y la pronación traumática. Tales fracturas pueden no ser evidentes radiográficamente, como se describe en este caso raro de fractura del tubérculo medial del proceso posterior del astrágalo con un resultado satisfactorio sin necesidad de tratamiento quirúrgico.

Palabras clave: astrágalo, huesos tarsianos, fracturas óseas, resonancia magnética.

Introduction

The talus, the second-largest bone in the posterior foot, plays a key role in multiple joints, including the talocrural (ankle), talocalcaneal (subtalar), and talonavicular joints. Talus fractures are rare, accounting for approximately 1% of all foot and ankle fractures.[1] Among these, fractures of the medial tubercle of the posterior process of the talus are particularly uncommon. Such fractures often result from the avulsion of the posterior talotibial ligament, typically following traumatic dorsiflexion and pronation, and are not always evident on standard radiographs.[2]

The first description of a medial tubercle fracture of the posterior process of the talus was provided by Cedell in

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1974. His cases predominantly involved physically active individuals, notably three soccer players, all of whom sustained high-intensity ankle torsions followed by medial pain and swelling.[3,4] While most ankle sprains involve the lateral structures, pain and swelling on the medial side should raise suspicion for differential diagnoses such as bone contusions, osteochondral injuries, or occult fractures.

This article presents a rare case of a posterior process fracture of the talus in a futsal player, a condition with limited reports in the literature.

This article presents a case of a posterior process fracture of the talus in a futsal player, which is considered rare in the literature and has limited reported occurrences.

Clinical case

An 18-year-old professional futsal player presented with right ankle pain following a sprain sustained during a match two days prior. He weighed 80 kg and was 1.79 m tall, with no significant past medical history, aside from a resolved right ankle sprain two years earlier. On examination, there was lateral ankle edema, restricted eversion and inversion, and tenderness over the lateral aspect of the ankle. Initial radiographs were unremarkable. However, due to persistent restriction in ankle mobility, magnetic resonance imaging (MRI) was performed, revealing edema and a fracture of the medial tubercle of the posterior process of the talus, with a 0.5 cm diastasis between the fragments. Additionally, there was a small effusion and contact between the fractured fragment and the flexor hallucis longus tendon *(Figure 1)*.

The patient was managed with analgesic physiotherapy, open-chain lower limb exercises, and immobilization in an orthopedic orthosis for three weeks. After 21 days, partial weight-bearing was initiated, followed by sensory-motor and proprioceptive exercises, along with sports-specific rehabilitation. By the fifth week, the patient resumed sports activities, including direction changes, and by the sixth week, treadmill exercises were incorporated. At the six-week follow-up, the patient showed no signs of instability, edema, or functional limitations. He returned to full competitive sports activities by the ninth week. The treatment protocol followed closely aligned with that for grade three ankle sprains, emphasizing early weight-bearing and mobility for effective and safe rehabilitation.

Discussion

Fracture of the medial tubercle of the posterior process of the talus is a rare injury, typically caused by an avulsion force exerted on the deep posterior deltoid ligament (posterior talotibial ligament), often associated with sudden pronation and dorsiflexion of the foot.[3] Other mechanisms include direct trauma to the posteromedial talus or forced dorsiflexion during high-energy impacts. Diagnosing this injury can be challenging, as it may not be visible on standard radiographs.[5] Advanced imaging modalities such as oblique radiographs with external rotation, computed tomography (CT), and MRI are essential for accurate diagnosis.[6] Delayed diagnosis or treatment may result in complications like necrosis, pseudoarthrosis, and ankle instability.[7,8]

In cases of trauma with pain and tenderness in the posteromedial ankle, oblique radiographs with external rotation and CT scans provide better visualization of the lesion.[5] Additionally, MRI can help identify the involvement of the flexor hallucis longus tendon, which may be interposed between fracture fragments. MRI is superior to CT for evaluating musculotendinous and ligamentous structures. O'Loughlin, et al. recommend MRI for patients experiencing significant pain or instability in the posterior ankle following trauma, as fractures in this region are often missed on plain radiographs.[9]

For non-displaced or minimally displaced fractures, conservative treatment with immobilization and non-

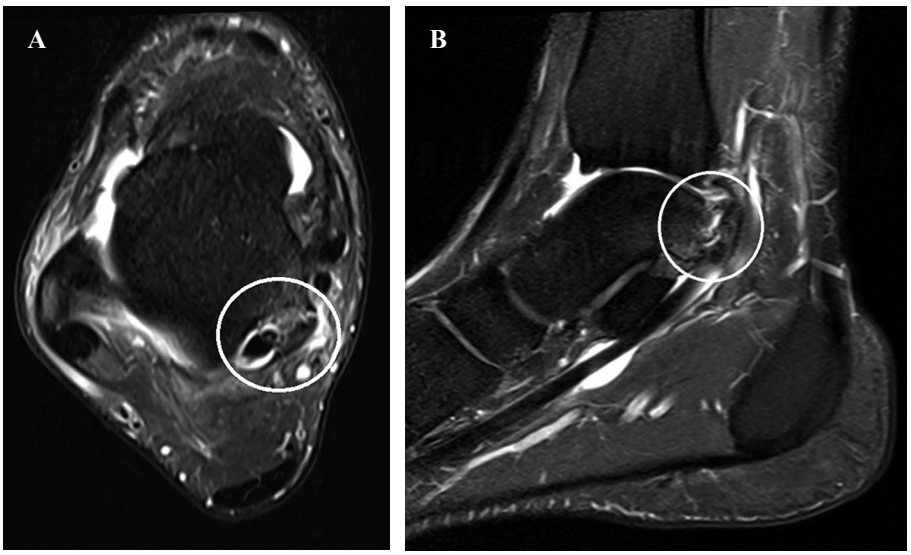

Figure 1:

Magnetic resonance imaging of the **A)** axial section and **B)** sagittal section in the DP FAT SAT sequence demonstrating edema with fracture of the medial tubercle of the posterior process of the talus, showing a slight liquid effusion between them and contact of the flexor hallucis longus tendon with the lateral portion of the fractured fragment (white circle).

weight-bearing may be effective. Delayed diagnosis can lead to painful pseudoarthrosis, which may require surgical excision. However, there is still uncertainty about how much displacement necessitates open reduction and internal fixation.[5] In a case series by Kim, et al., five patients sustained fractures of the medial tubercle of the posterior process during sports activities.[10] Two were acutely diagnosed and successfully treated with immobilization, while the remaining three required surgical excision due to persistent pain.[10] This highlights the importance of prompt diagnosis and appropriate management, as untreated avulsion fractures often require surgical intervention.

In severe grade 3 ankle sprains, differential diagnosis initially follows the Ottawa Ankle Rules to exclude malleolar fractures or tarsometatarsal dislocations using plain radiographs.[11] In cases involving accessory bones like the *Os trigonum*, found in about 25% of the population, comparative radiographs of the contralateral foot may be needed. If trauma is suspected, MRI is recommended to detect bone edema and rule out fractures.[11] While MRI is not always indicated and often does not alter treatment, it is necessary when pain and medial edema persist beyond the typical recovery period of six to eight weeks. Despite the high cost of MRI, many patients may continue to recover satisfactorily with conservative treatment without an exact diagnosis. Endoscopic excision of fracture fragments is a safe and effective alternative to open surgical treatment, according to a systematic review by Zwiers, et al. Although fractures of the lateral and posterior processes of the talus are uncommon, they are significant injuries that can lead to substantial disability if undiagnosed or inadequately treated.[11]

Conclusion

Although definitive treatment guidelines for fractures of the posterior process of the talus are lacking, this case contributes to the growing understanding of conservative management when these fractures are diagnosed early. The patient was treated with conservative measures, including analgesic physical therapy, and returned to competitive sports within nine weeks. The treatment protocol mirrored that used for grade three ankle sprains, emphasizing functional rehabilitation with early weight-bearing and mobility, which led to an effective and safe recovery.

This case has also influenced clinical practice by highlighting the importance of considering occult fractures in patients presenting with persistent pain and limited mobility following high-energy ankle injuries, even when initial radiographs are normal. In similar patients with comparable clinical features, early use of advanced imaging, such as MRI, can facilitate prompt diagnosis and treatment, potentially preventing complications like pseudoarthrosis or prolonged disability. As a result, this case reinforces the need for a high index of suspicion and the use of individualized treatment protocols that combine early functional rehabilitation with appropriate imaging, improving outcomes for patients with rare fractures like this one.

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