

Case Report

Fracture of the posterior malleolus: an underdiagnosed condition

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ABSTRACT

The ankle joint is the most commonly injured joint during sports activity. While ankle sprains occur more frequently, ankle fractures are less common. Due to its low incidence, the isolated fracture of the posterior malleolus still represents a diagnosis challenge. This article reports a case of a female with a posterior malleolus isolated fracture after falling while performing sports activity. Clinical examination and conventional radiography were consistent with diagnosis of a simple ankle sprain and the patient was discharged with a conservative approach for lateral ankle sprain. Due to persistent pain the patient return for additional examination, which the differential diagnosis revealed an isolated fracture of the posterior malleolus without displacement of the fragment. The patient was immobilized with a suropodalic splint for 4 weeks followed by additional conservative. At the fourth month of follow-up, the patient was asymptomatic and showed good clinical and functional outcomes. This case highlights the importance of a comprehensive medical history and detailed clinical examination which may reveal pathological features that require a differential diagnosis.

Keywords: Fracture, Posterior malleolus, Differential diagnosis, Radiography, Ankle

INTRODUCTION

Ankle joint sprains represent up to one third of the sports injuries, with an estimated incidence of 2.15 sprains per 1000 persons in the United States of America.¹ It is known that this condition leads to elevated prophylactic costs and it is associated with morbidity even after the treatment due to its chronicity, re-injury rate and subsequent dysfunction and residual symptomatology.² Less frequently, the isolated fracture of the posterior malleolus, also known as “parachute injury”, it is a difficult condition to diagnose and many times forgotten.³⁻⁶

When compared to other ankle injuries, the isolated fractures of the posterior malleolus occur less frequently. In this sense, 25 cases of isolated fractures of the posterior malleolus were found in a cohort of 2500 patients with ankle injuries.⁷ These injuries may occur

isolated or in combination with other injuries, such as, trimalleolar fractures, proximal fibular fractures, syndesmotic injuries or low-energy tibial shaft spiral-type fractures.^{3,4,8} In this line, Kukkonen and colleagues reported that a fourth of the tibial shaft spiral-type fractures were associated with posterior malleolus fractures.⁸ Usually, these fractures are related to a specific injury mechanism comprising, plantar flexion in axial load at the moment of ground impact, supination or external rotation of the talus in axial load, or progressive external rotation of the talus.⁹

Given the need to standardize the diagnosis and complementary imaging procedures on ankle injuries, Stiell and collaborators created the "Ottawa Ankle Rules", a clinical and radiological decision algorithm aiming to reduce the high number of radiographs made at the ankle joint, often considered unnecessary.¹⁰ This clinical decision model has been widely used in

emergency services, comprising a 95-100% sensitivity for detection of internal and external malleoli fractures, responsible for a reduction of 30-40% of unnecessary radiographs.¹¹⁻¹³ However, the decision model shows to be ineffective in the diagnose of posterior malleolus fractures since these patients frequently report non-specific complaints of an usual ankle sprain, without any sensibility in the parameters described by the Ottawa rules.^{3,14} Additionally, it has been reported that these injuries are difficult to diagnose through conventional radiograph views, justifying other methods of diagnosis.^{6,14}

Due to its low incidence, the unspecific symptomatology and incorrect diagnosis, the isolated injuries of the posterior malleolus represent a clinico-radiological challenge. In this sense, the objective of this case report was to describe and discuss the rationale of diagnosis of this injury and to alert to the occurrence of these injuries that are often forgotten.

CASE REPORT

Clinical history

Female patient with 39 years old presented to the emergency department complaining of pain in her right ankle joint and lower limb. The patients reported a downfall trauma while performing moderate running, which resulted in the reported symptoms. The patient could not accurately describe the mechanism of injury and reported diffuse pain, in the lateral malleolus and inframalleolar compartment, but failed to specify the exact location of the pain. Moreover, the injury showed to be associated to a partial functional limitation on the ankle joint.

Objective exam

In the clinical examination, the patient presented pain during palpation of the anterior talofibular ligament of the right ankle joint, however without pain when palpating the specific bony landmarks (proximal fibula, base of the fifth metatarsal, navicular and calcaneus). The visual inspection of the ankle showed a considerable edema. The passive and active ankle mobility presented limitation in all directions due to the pain symptoms. Despite the patient's visible limping, she was able to tolerate walking after the trauma.

After the clinical examination, the conventional imaging procedures were performed to exclude potential malleolar fractures. This exam consisted in anteroposterior and profile radiographs of the right ankle joint. After analysis, the radiographies did not reveal any acute changes as shown in Figure 1.

Once the clinical and imaging examination showed no evidence of bony injury or any other signs of significant acute changes, the patients were discharged with

diagnosis of ankle lateral sprain. The prescribed treatment was rest, cryotherapy, unloading of the right lower limb, postural drainage, analgesic physical agents, oral anti-inflammatory medication and compressive bandage to limit the provocative movements of symptoms.



Figure 1: Conventional radiographs of the right ankle joint, without signals of acute injury. A) radiograph with frontal view; b) radiograph with sagittal view.

Differential diagnosis

Two weeks after the initial trauma and due to the persistent symptoms, the patient underwent magnetic resonance imaging (MRI) of her right ankle, which revealed an isolated fracture of the posterior malleolus without displacement of the fragment as shown in Figure 2.

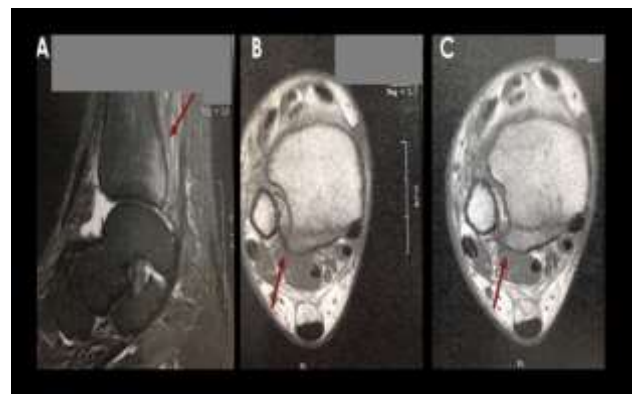


Figure 2: MRI exam images of the right ankle joint, where it is visible the isolated fracture of the posterior malleolus (arrow). A) Sagittal view; B and C) Axial view.

Treatment and follow-up

Given the diagnosis, the patient was immobilized with a suropodalic splint for a 4-week period. Following this period, the patient was referred to physical medicine and rehabilitation consultation in order to initiate the rehabilitation. By the fourth month after the trauma, the patient was discharged presenting a functional and

asymptomatic ankle, scoring 97 points in the American Orthopaedic Foot and Ankle Society score (AOFAS). Additionally, the follow-up radiography showed signs of bone consolidation as given in Figure 3.



Figure 3: Follow-up conventional radiographs of the right ankle joint, with signs of bone consolidation. A) Radiograph with frontal view; B) Radiograph with sagittal view.

DISCUSSION

The diagnosis of isolated fracture of the posterior malleolus is still a challenge when compared to other ankle fractures, often underdiagnosed during the clinical examination, which can even simulate a sprained ankle.³⁻⁶

This case report highlights the utmost importance of a comprehensive history taking and detailed clinical examination. In this sense, the most common mechanism of injury is plantar flexion associated to axial load since in these conditions the impact is transferred to the posterolateral tibial lip, 4 to 8-fold superior than in any other position.¹⁵ Nevertheless, other mechanisms may also lead this particular ankle fracture.⁹

Based on radiography and computed tomography (CT), Haraguchi and collaborators divided the posterior malleolus fractures in three different types: type 1, fracture of the posterolateral portion of the tibia; type 2, fracture of the posterolateral portion of the tibia up to the medial malleolus; type 3, one or more small fragments of the posterior lip of the malleolus.⁶

Taking into account that these particular fracture symptoms may simulate an ankle sprain, it is crucial to perform a differential diagnosis examination. Hence, following the suspicion of posterior malleolus fracture which was not detected by the initial ankle radiographs (anteroposterior and profile views), the profile view with 50° external rotation may help to identify possible ankle fractures.¹⁶ Moreover, the patient should be referred to additional imaging exams, in particular MRI and CT

exams, in case of additional clarifications are needed.^{4,17,18}

It has been reported that posterior malleolus fractures involving small fragments (up to 25% of the articular surface) present good outcomes when treated conservatively, without the need for fixation surgical procedures.¹⁹⁻²¹ Nonetheless, fragments bigger than 25-30% of the articular surface and with articular incongruence (anteroposterior difference greater than 2 mm), the internal fixation of the fragment is indicated.^{6,22,23} In this sense, a posterolateral approach provides a more direct access due to space created between the fibular and Achilles tendons.⁶ In addition, bilateral weight-bearing at early stages of rehabilitation may enhance the outcomes of the internal fixation.²⁴

This case report showed the unique features that this type of ankle fracture may present, highlighting the need for differential diagnosis in the clinical practice. In this sense, due to the small dimension of the fragment, conventional radiography was not able to identify the fragment. Thus, a profile view radiographs at 50° of external rotation should be considered. Moreover, when the mechanism of injury is known (plantar flexion in axial load) and there are reasons for suspicion, MRI or CT imaging should be also performed. This injury, if correctly identified, may have indication for conservative approach with good clinical and functional outcomes.

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