A Rare Fracture That Ottawa Ankle Rules are Insufficient: Isolated Posterior Malleolar Fracture

Ottowa Kriterlerinin Yetersiz Kaldığı Nadir Bir Kırık: İzole Posterior Malleol Kırığı

İzole Posterior Malleol / Isolated Posterior Malleolar Fracture

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Özet

İzole posterior malleol kırığı ayak bilek kırıkları arasında oldukça nadir görülen bir kırıktır. 23 yaşında erkek hasta yüksekten düşme sonrası başlayan ayak bilek ağrısı nedeni ile acil servise başvurdu. Bilgisayarlı tomografide posterior malleolde kırık hattı izlenen hastaya, kırığın eklem hattının %25'inden azını içermesinden dolayı konservatif tedavi planlanarak diz altı alçı uygulandı ve 6. haftada rehabilitasyona başlandı. İzole posterior malleol kırığı tanısı farklı travma mekanizmasıyla oluşması nedeniyle Ottowa kriterleri ile her zaman konulamaz. Bu sebeple uyumsuz klinik bulgusu olan, ayak bilek travması geçirmiş hastalarda izole posterior malleol kırığı akılda tutulmalıdır.

Anahtar Kelimeler

Ayak Bileği; Kırık; Posterior Malleol; Ottowa Ayak Bileği Kuralları

Abstract

Isolated fracture of the posterior malleolus is rare. A 23 year- old male patient admitted to our emergency department suffering from ankle pain after fall. Computed tomography revealed fracture line at posterior malleolus. As well as it encompasses less than 25% of the joint surface, conservative treatment planned and below-knee cast was applied. Physical therapy was started at six week later. Due to different mechanism of occurrence it is hard to diagnose isolated posterior malleolus fracture by means of Ottawa ankle rules. Thus when clinical manifestation is incompatible with radiologic appearance, diagnose of isolated posterior malleolus fracture should be kept in mind.

Keywords

Ankle; Fracture; Posterior Malleolus; Ottowa Ankle Rules

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Introduction

Trauma, the health problem that affects especially the young population, holds an important place in the admission to the emergency services [1,2]. Ankle injuries are one of the common injuries during sport activities. Although ankle sprains are certainly the most common injuries, ankle injuries are the lower limb fracture to present more frequently. Ankle fractures are seen with an incidence of 1-2 per 1000 persons per year in emergency departments. Coincidence of fracture of posterior malleolus and injuries of ligaments and the other types of fractures of ankle is frequently seen. Isolated fracture of posterior malleolus has a reportedly low incidence [3]. Although having low incidence, in case of diagnostic failure, due to leading towards chronic ankle problems, this case highlights the importance of diagnosing isolated posterior malleolar fracture needs more attention.

Case Report

A 23 year old male limping and suffering from right ankle pain due to landing from a 2-3 meters high structure admitted to emergency department (ED). On detailed questioning, he reported that he had landed on his right foot, which was immediately folded beneath him due to failure of keeping balance. Visual inspection of the right ankle and foot revealed no significant edema and deformity. According to Ottawa ankle rules, he had no tenderness at the medial or lateral malleoli and no pain on metatarsi. Moreover there was no sign of injuries of deltoid and lateral collateral ligaments. Fibular compression test evidencing proximal fibular injury was negative. Active range of motion and passive range of motion was full.

Initially there was a low suspicion of fracture, because the typical applications of Ottawa Ankle Rules were negative, as he could ambulate with low pain, no tenderness to palpation at the malleoli. Due to incompatibility of clinical manifestation and ankle pain, radiographs of patient were ordered. Radiographs confirmed the presence of an isolated posterior malleolar fracture encompassing less than 25% of the joint surface [Figure 1]. There was no evidence of fracture relevant with distal or proximal fibula. Computed tomography was immediately ordered for further evaluation to rule out any other injuries. Computed tomography revealed no other pathology except posterior malleolar fracture [Figure 2]. Fracture was reviewed to be stable due to having no concomitant injuries, being non-displaced fracture and encompassing less than 25% of the joint surface. The patient was placed in a non-weight bearing below-knee cast. The patient was encouraged for progressive weight bearing gradually once the cast was removed. Healing of the fracture was noted on radiographs taken 2 months later.

Discussion

Ankle fractures are vital importance because of needing prolonged immobilization, causing to withdraw from social life and causing chronic pain due to fracture involving joint. Ankle fractures may occur in different types due to trauma type, quality of bone, history of ankle fracture and position of ankle at impact. Ankle fractures account for 3.92 % of the entire body fractures. Roughly 7-44 % of ankle joint fractures are accompanied by posterior malleolar fractures which are rarely seen alone. The



Figure 1. Isolated posterior malleolar fracture on the lateral view

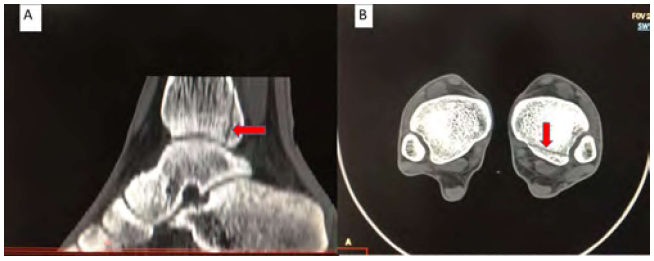


Figure 2. Isolated posterior malleolar fracture on the lateral [Figure 2A] view and transvers [Figure 2B] view of Computerized Tomographic evaluation of the lower leg

integrity of the posterior malleolus and its ligamentous attachment has vital importance for tibiotalar load transfer, posterior talar stability, and rotatory ankle stability [4].

There are many classifications related with ankle fractures. Classification based on clinical or radiological criteria is important in terms of definition of the fracture, orientation of treatment and evaluation of treatment outcomes. The most widely accepted classification system in clinical use for this purpose is the classification of Henderson [5]. In this system, ankle fractures are typically classified as unimalleolar (isolated internal or external or anterior or posterior), bimalleolar (concomitant fractures of internal and external malleoli) and trimalleolar (concomitant fractures of internal, external and posterior malleoli).

80-95% of patients presenting to EDs with ankle injuries received X-rays even though only 15% of the patients offered X-rays have bony pathologies [6]. The Ottawa Ankle Rules (OARs) as a method of physical examination were developed to decrease cost of ordering extraneous radiographs while reducing the risk of missing fractures of the ankle. After assessment

based on the OARs, ordering extraneous radiographs reduces by 28% [7]. Although having high sensitivity, the OARs have a specifity of 10-79% varying over a wide range. Tenderness to palpation of the posterior edge or tip of either malleoli (palpating 6 cm proximally) and/or inability to fully weight bear at least 4 steps are the indications for ordering X-rays [8]. But unfortunately, OARs fall short of suspected posterior malleolar fracture. Thus when clinical manifestation is incompatible with radiologic assay (AP, lateral and mortis), diagnose of isolated posterior malleolus fracture should be kept in mind. While the findings of plain radiographs did not indicate that a fracture was likely in patients with clinically suspected fracture, additional imaging methods should be ordered. Besides, 50 degrees of external rotation radiographs can give an idea of fracture [4]. CT scan is of greater value in case of suspected fracture.

Posterolateral tibial lip of ankle is known as Volkmann's triangle. Fractures of this site is named as posterior malleolar fractures. Roughly 7-44 % of ankle joint fractures are accompanied by posterior malleolar fractures which are rarely seen alone [9]. Although supination and external rotation mechanism causes isolated posterior malleolar fractures according to classification of Lauge-Hansen; Michelson could not produce isolated posterior malleolar fracture by means of the mechanism described by Lauge-Hansen from cadaver studies [10]. According to literature, a common mechanism of injury for posterior malleolar fractures includes plantar hyperflexion of the foot combined with an axial load such as may occur with slipping or falling [11]. Fractures occur due to imbalance between tensile strength of posterior inferior tibiofibular ligament and compression force of the dome of the talus. The size and stability of posterior segment, congruency of joint surface and posterior talar subluxation is important in deciding the treatment of fractures of posterior malleolar fracture. Internal fixation is recommended when the posterior malleolar fragment constitutes more than 25% of the tibiotalar joint surface [12]. Posterior talar subluxation is commonly seen in bimalleolar or trimalleolar fractures. Arrangement of the other fractures also corrects posterior talar subluxation by means of ligamentotaxis [13]. In our case, the patient was placed in a non-weight bearing below-knee cast and surgical treatment was avoided due to having no concomitant injuries, being non-displaced fracture and encompassing less than 25% of the joint surface.

As a conclusion, isolated posterior malleolar fractures are fairly rare entities due to specific mechanism occurrence. Despite the success in facilitating the diagnosis of ankle fractures, the OARs demonstrate failure in ruling out certain ankle fractures such as isolated posterior malleolar fractures due to not having specific rules for posterior malleolar fractures, ultimately causes misdiagnosing the posterior malleolar fractures and lead to pain and degenerative changes. Suspect of malleolar fracture is the first step in the diagnose of posterior malleolar fracture.

Competing interests

The authors declare that they have no competing interests.

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