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Isolated Fracture of the Posterior Margin of the Tibia: The Report of Three Cases in Our Milieu

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Abstract

The isolated fracture of the posterior margin of the tibia is a rare lesion. Painful swelling at the back of the internal malleolus area remains the main clinical sign. The common experience proves that the fractures of the posterior malleolus occupy a significant proportion of the fractures of the bones of the ankle, isolated fractures of the posterior malleolus, nowadays called fractures of the posterior margin of the tibia are relatively rare. An X-ray of the ankle is sufficient to confirm the diagnosis. Sometimes CT scan is used when there is a doubt or for old lesions. The management of ankle fractures, which is associated with posterior malleolus fractures, still has no consensus on the classification of the fracture, indications of surgery, operation technique and the best treatment algorithm, including functional outcomes. We report three cases of isolated fractures of the posterior margin of the tibia in young patients treated with a plaster cast boot in order to share our experience in management of such lesions.

Subject Areas

Orthopedics

Keywords

Isolated Fracture, Posterior Margin, Tibia, Plaster Cast Boot

1. Introduction

Malleolus fractures are frequent lesions [1]. They are the third most frequent traumatic lesions of the musculoskeletal system, after fractures of the wrist and the upper extremity of the femur (01 malleolar fracture for six fractures of the

lower limb) [1].

Some recent studies showed that the incidence of ankle fractures is around 9% of all fractures [2] [3]. It was also established that between 7% and 44% of ankle fractures involved a posterior fracture of the malleolus. Even though the common experience proves that the fractures of the posterior malleolus occupy a significant proportion of the fractures of the bones of the ankle, isolated fractures of the posterior malleolus, nowadays called fractures of the posterior margin of the tibia [4], are relatively rare. Their frequency is estimated at 1% of all ankle bone fractures. We report three cases of isolated fractures of the posterior malleolus in young patients in order to show how we have managed it in our environment by using a plaster cast.

2. Clinical Observation

Case 1

19-year-old, scooter driver, reportedly ejected from his motorcycle falling on the back side of his right ankle.

Clinical exam found up a swollen ankle remarkable on the posterior side of the ankle with the skin intact. The patient felt severe pain on palpation of the posterior side of the internal malleolar.

Antero-Posterior and lateral X-ray views of the right ankle showed that a fracture of the posterior margin of the tibia was confirmed by CT (**Figure 1** and **Figure 2**).

As the displacement of the fracture was small, we opted for an orthopaedic treatment with a flat boot.

Case 2

29-year-old patient reported to have suffered from a work-related accident. He slipped on the stairs with his right feet in hyper plantar flexion with the heel compressed axially.

Figure 1. Antero-posterior and lateral X-ray views of the ankle showing a fracture of the posterior margin of the tibia.

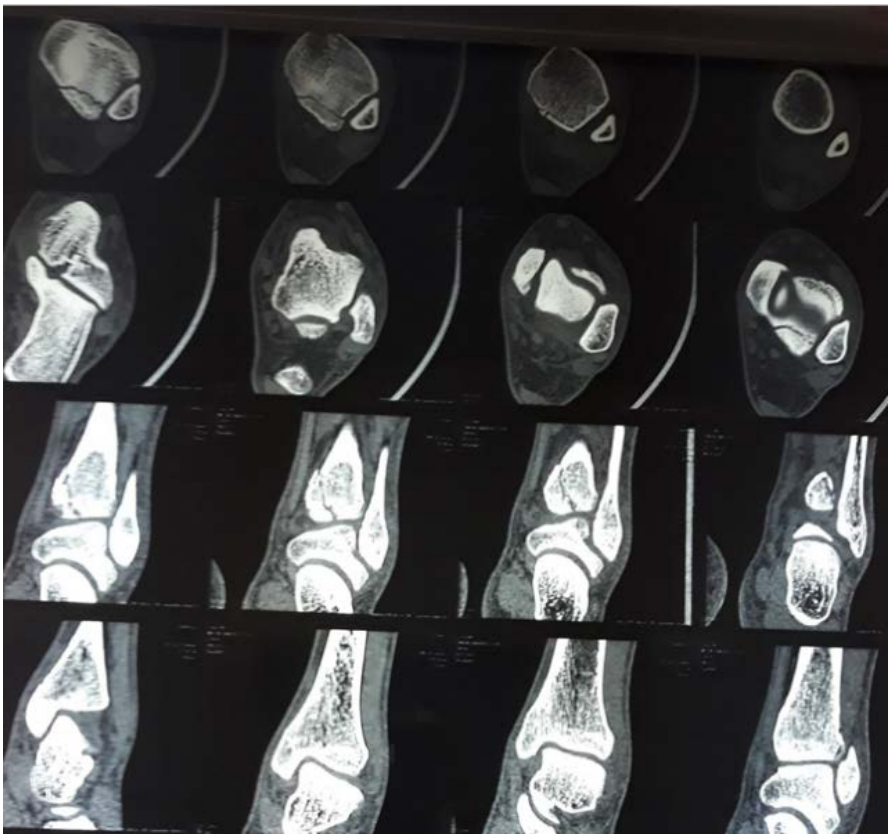

Figure 2. CT of the ankle showing an isolated nondisplaced fracture of the posterior margin of the tibia (small shell type according to Haragushi).

Clinical exam notice the swelling with exquisite pain on palpation of the posterior side of the ankle.

Antero-posterior and lateral X-ray views of the ankle showed an isolated fracture of the posterior margin of the tibia (**Figure 3**).

Orthopaedic treatment by plaster cast boot was our management, because of the displacement of the fracture around 01 mm.

Case 3

32-year-old patient suffered from a domestic accident. She fell with her foot in excessive plantar flexion and an axial compression of the heel fixed against a bag of sand.

Clinical exam, reported the swelling of the ankle more pronounced at the back of the internal malleolar and an exquisite pain on palpation of the back side of the internal malleolar.

Postero-anterior and X-rays of the ankle showed an isolated fracture of the posterior margin of the tibia (**Figure 4**).

Considering the absence of displacement we opted for plaster cast boot treatment.

All the three patients received pain medicine, anticoagulation at a preventive dose and the limb was left non-weight bearing for 06 weeks.

After an average follow-up of 48 months, all the patients were evaluated

Figure 3. X-ray images showing an isolated fracture of the posterior margin of the tibia.

Figure 4. X-ray images showing an isolated fracture of the posterior margin of the tibia.

Figure 5. Normal follow-up radiograph at 48 months.

according to the Kitaoka score with a satisfactory result (Pain = 45/45 Function 40/40 and Alignement 15/15).

The radiological (**Figure 5**) and functional (**Figure 6**) results.

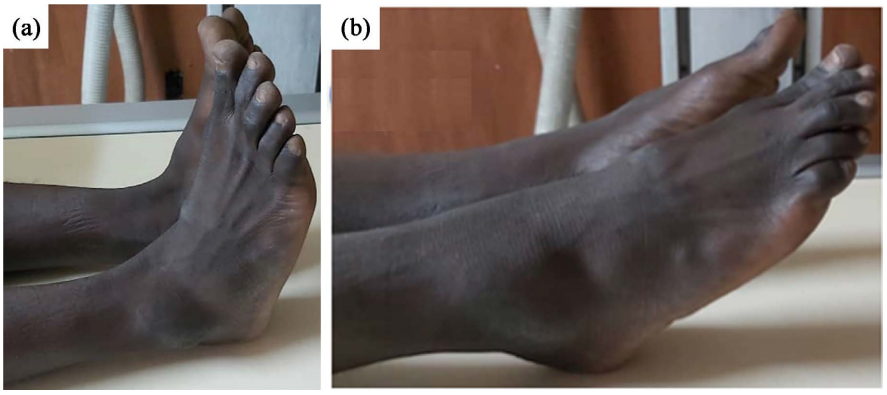

Figure 6. Functional result at 48 months. (a) full ankle flexion; (b) full ankle extension.

3. Discussion

Malleolar fractures are frequent lesions in traumatology [1]. In 14% to 44% of cases, ankle fractures are associated with a fracture of the posterior malleolus [5], while isolated fractures of the posterior malleolus represent only 1% [6] [7].

Isolated, they constitute a rare affection that can go unnoticed [8]. It was described for the first time in 1943 by Tobin [9] as "paratrooper fracture".

The review study till 2016 literature similarly identified a total of 75 cases of isolated posterior malleolus fracture injuries [10].

The mechanism of this lesion is usually indirect by a plantar hyper flexion of the foot associated with axial compression of the posterior margin of the tibia by the talus [4]. However, a direct shock could be responsible of this lesion as reported in our first case.

Standard ankle radiographs is sufficient to reveal an isolated fracture of the posterior margin of the tibia. In 1971, Mandell [11] advocated for a lateral view with an external rotation of the ankle to better visualize the posterior tibia.

Fractures of the posterior margin of the tibia are classified as articular fractures with pure separation, B1 type according to AO [12].

If there is a doubt, we can use CT scan to confirm the diagnosis. The imaging of choice for an isolated posterior malleolus fracture, therefore, has been a 3D reconstruction CT scan [13].

Ligament injury and osteochondral lesions evaluation warrants magnetic resonance imaging (MRI) [14]. The goal has been to identify the extent and severity of the injury.

Haraguchi *et al.* [13] reviewed both plain film and CT imaging with posterior malleolar fractures and classified the fractures into three categories: Type I, a fracture through the posterior lateral portion of the tibia (67%); Type II, a fracture through posterior lateral portion and into the medial malleolus (19%); and Type III, one or more small shell fractures of the posterior lip (14%) (Our 1st patient). This classification was proposed because CT imaging allowed better visualization of the fracture, including the presence of small fragments. Association with posterior subluxation/dislocation of the talocrural joint was 30% for type I, 60% for type II and 11% for Type III fractures.

Although management of ankle fractures, which are associated with posterior malleolus fracture, has been defined by many authors, there is still no consensus on classification of the fracture, indications of surgery, operation technique and the best treatment algorithm, also including functional outcomes [15].

Swart *et al.* [16] recalled that the indication is based on certain criteria such as: the size of the fragment should be 25% - 30% greater than the articular surface, the displacement of the fragment greater than 2 mm and the existence of an impacted articular surface.

We recommended orthopaedic treatment by plaster cast boot for 6 weeks in the absence of these different criteria in our patients.

However, surgical fixation has allowed for earlier weight bearing when compared to conservative treatment. Early weight bearing has been shown to potentially improve outcomes with internal fixation of ankle fractures. In the presence of additional fractures or multiple fragments, fixation may be necessary for overall ankle stability [17] [18].

The risk of osteoarthritis of the ankle is not excluded even in cases of minimal fracture of the posterior margin [4].

4. Conclusion

An isolated fracture of the posterior margin of the tibia is a rare lesion. It, most often, arises from an indirect trauma injury by hyper plantar flexion of the foot. Clinical exams find a painful oedematous back side of the internal malleolar, which should prompt to think about it. The diagnosis is radiographic and CT scan in case of doubt. The risk of post-traumatic osteoarthritis cannot be ruled out despite good treatment.

Conflicts of Interest

The authors declare no conflicts of interest.

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