



CASE REPORT / ПРИКАЗ БОЛЕСНИКА

Arthroscopically assisted resection of overlooked fracture of posterior talar process

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SUMMARY

Introduction The fractures of the posterior process of the talus are relatively rare injuries of the ankle. They most frequently occur via the mechanism of the forced hyper plantar flexion and inversion. Sometimes they are not initially diagnosed, since over 40% of cases of the fractures of the posterior process of the talus are not seen in the initial radiography. The objective of this work is the review of the case study of the arthroscopically treated unhealed fracture of the posterior process of the talus.

Case outline In our case report we present a 30-year-old male, professional soccer player, with a three-month-long history of chronic pain in the region of the left ankle and heel and the fracture of the posterior process of the talus.

Conclusion The work shows all the advantages of minimally invasive surgery – arthroscopic excision of the fragment, quick recovery and returning to physical activities.

Keywords: the fracture of the posterior process of the talus; radiography of the ankle; arthroscopic excision

INTRODUCTION

Talus has a complex anatomy since it is involved in the formation of the tibiofibular, the talocalcaneal, and the talonavicular joint. About 60% of the talus surface is covered with joint cartilage. The talus consists of a body, neck, and head. Talus tissue is poorly vascularized, which often leads to avascular posttraumatic necrosis of the talus. The posterior process of the talus is composed of the lateral tubercle, the medial tubercle, and the groove for the *flexor hallucis longus* (FHL) tendon. The lateral tubercle, also known as the Stieda process, is more posterior than the medial tubercle. There are attachments for the posterior talocalcaneal and posterior talofibular ligaments on the lateral tubercle. The medial tubercle is usually smaller but varies more in size. It includes attachments for the posterior third of the deltoid ligament superior and the medial bundle of the talocalcaneal ligament inferior. The joint surface which articulates with calcaneus is located under both tubercles [1, 2].

Mechanism of injury

There are two most frequent mechanisms of injury to the posterior process of the talus. The first one is the forced hyper plantar flexion and inversion, which causes the direct pressure of the lateral tubercle between the posterior edge of the tibia and the posterior facet of the calcaneus [2, 3]. The second mechanism of injury is forced dorsiflexion and inversion, which leads to the avulsion fracture of the lateral tubercle

(posterior talofibular ligament) [3]. Cedell [4] described the avulsion fracture of the posteromedial tubercle during forced pronation and dorsiflexion of the foot. The rarer mechanism is the direct trauma of the posteromedial facet by impingement of the sustentaculum during supination and forced dorsiflexion with injuries caused by high intensity forces [5].

Diagnosis and clinical features

The diagnosis is made via clinical features and imaging procedures. Swelling and pain in the posterior side of the ankle are usually present, and a positive talar impingement test, with the pain increasing during the active movements of the thumb toe flexion and extension. In a clinical examination, palpation is extremely significant in the posterior talar process as well as apprehension test with great toe flexion (FHL) in order to differentiate it from an ankle sprain [3].

The standard radiography of the ankle is a routine procedure (anteroposterior, mortise and lateral view) [6]. Sometimes Ebraheim X-ray is necessary when standard radiography is insufficient. They are angled beams with external rotation of 45° and 70° [7]. In more than 40% of cases, the fracture of the posterior process of talus is not registered in initial radiography. In such cases, when difficulties are persistent, it is necessary to do computed tomography (CT) and magnetic resonance imaging (MRI). CT and MRI are not needed both, but on CT we could see position of fractured fragments and the relationship between them,

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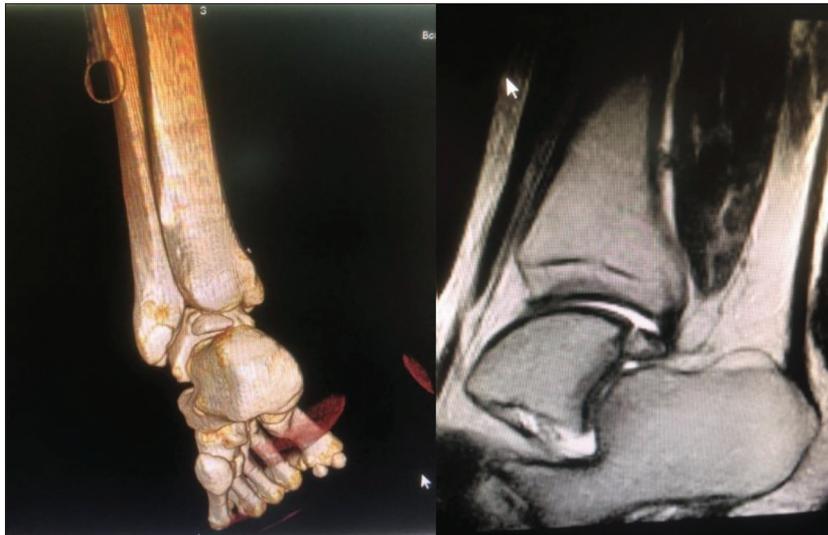


Figure 1. Computed tomography and magnetic resonance imaging showed posterior talar process fracture



Figure 3. The free body was removed through the posteromedial portal

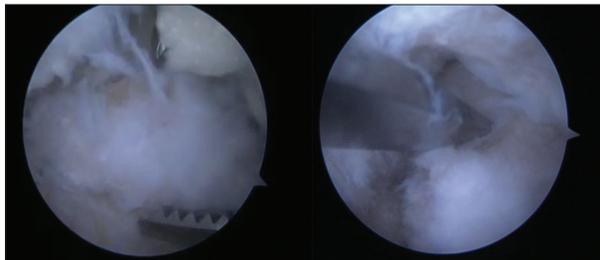


Figure 2. Arthroscopic excision of the posterior process of the talus

and on MRI we could see if there is damage to the soft tissue, especially the FHL tendon [8].

Fractures of the posterior process of the talus

Fractures of posterolateral process (Shepherd fracture)

Fractures of the posterolateral process can be mistaken for an *os trigonum*, which develops as a consequence of secondary ossification when the fusion with the talus body fails. The differentiation between the fracture of the posterolateral process of the talus and *os trigonum* can be performed via CT and nuclear magnetic resonance diagnostics. The clinical picture of the Shepherd fracture can be very similar to an ankle sprain. It differs in the pain during movements in the subtalar joint and the passive movement of the FHL tendon.

Fractures of the posteromedial process of the talus (Cedell fracture)

Cedell [4] first described the fracture of the medial part of the posterior process of the talus. It can also be mistaken for an ankle sprain if the posteromedial pain is ignored.

Fractures of the posterior process of the talus

The fractures of the entire posterior process of the talus are very rare. There are only several described cases [9, 10].

The aim of this work is the case study of the unhealed fracture of the posterior process of the talus with a professional footballer. The applied method of treatment – arthroscopic excision of the bone fragment of the posterior process of the talus – was chosen as a recommended surgical treatment in the modern orthopedic surgery.

CASE REPORT

A 30-year-old male, professional footballer with a three-month-long chronic pain in the region of the left ankle and heel was examined in our hospital for the first time in August 2018 when he was sent to additional CT and MRI diagnostics (Figure 1). The examination revealed the presence of posteromedial pain on palpation and a positive FHL test. Prior to this, he had been treated with physical procedures in another hospital, after the injury by a distortion mechanism in April of the same year. CT and MRI diagnostics revealed a nonunion fracture of the posterior process of the talus and an indication for surgical treatment was set.

The surgery was performed in the conditions of block anesthesia and tourniquet control (280 mmHG) with the patient in prone position. After the surgical field cleaning and preparation, posteromedial and posterolateral portals were created at the level of the lateral malleolus top, medially and laterally in regard to the Achilles tendon. The arthroscope, 4 mm in size, was inserted through the posterolateral portal, and shaver was inserted through the posteromedial portal. After debridement had been performed, a free body by fibrous tissue, i.e., the broken fragment of the posterior process of the talus fixed, was discovered (Figure 2). The free body was then removed through the posteromedial portal (Figure 3). After irrigation, both

portals were closed. Antibiotic and thromboprophylaxis therapy were conducted with the patient according to the protocol (cefazolin 1 g in bolus administered intravenously and nadroparin 0.4 ml subcutaneously 1 × 1 until the 21st postoperative day).

The patient was suggested physical therapy after the discharge, which he conducted completely.

Two weeks after the surgery, at the control examination, the patient was free of any difficulties and with the full range of motion of the left ankle, the FHL test was negative, without any pain posteromedially.

Written consent for publication of this case report and any accompanying images has been obtained by the patient's family member.

DISCUSSION

The fracture of the posterior process of the talus is an infrequent injury difficult to notice by radiography and is frequently overlooked. The treatment of the fracture of the posterior process of the talus are the following: restoring the talus anatomy which prevents a later nonunion of bones or posterior impingement syndrome. Non-displaced fractures of the posterior process of the talus are treated by immobilization in a period of six to eight weeks. With displaced fractures of the posterior process of the talus, surgical treatment is recommended depending on the fragment size (osteosynthesis or excision) [11, 12]. Surgical treatment can be performed by open reduction and internal fixation or the excision of the bone fragment of the posterior process of the talus. Posterolateral or posteromedial approaches can be used for this surgery depending on the localization of the bone fragment. In both of these approaches, surgical trauma is significant due to the deep position of the posterior process in the posterior aspect of the ankle. The complications of an open surgery are a non-healing wound, considering the region, and a greater possibility of infection [13, 14].

Many patients who are treated non-surgically need surgical treatment later because of the fracture nonunion or tarsal tunnel syndrome. Consequently, Swords et al. [15] recommend acute excision of the posterior process of the talus. Due to significant surgical trauma in open surgery, these arthroscopic surgical techniques are being increasingly applied.

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Arthroscopic surgery is a minimally invasive surgery with two small portals posterolaterally and posteromedially in regard to the Achilles tendon at the level of the posterior process of the talus [16]. In an arthroscopic procedure, the complications may be damage to neurovascular structures in the posteromedial compartment, the branch of the posterior tibial artery, the lateral and medial plantar nerve, and an injury to the FHL tendon [17]. In our case, an excision of the bone fragment was performed arthroscopically.

American Orthopaedic Foot and Ankle Society (AOFAS) rating score is a clinical score that evaluates the function of the ankle and foot before and after treatment, where the maximal score of 100 corresponds to the normal function of the ankle. In our case, after the arthroscopic removal of the posterior process of the talus, AOFAS score was 96.3, and before the surgery it was 60.5.

The use of the arthroscopic method of treatment of this injury is on the increase nowadays because of all of the advantages of minimally invasive surgery [18, 19, 20]. In their study, Zwiers et al. [21] followed 410 patients treated by open or endoscopic treatment methods. They proved that the arthroscopic treatment of the fracture of the posterior process of the talus enables significantly faster recovery and returning to sports activities (15.9 weeks with open surgery and 7.2 weeks with arthroscopic surgery). They also proved that major and minor complications are less frequent (15.9% with open surgery vs. 7.2% with arthroscopic surgery) and that the AOFAS score is higher in patients treated with arthroscopic method compared to patients treated with open surgery. Fractures of the posterior process of the talus are injuries which appear with younger physically active persons. These fractures can sometimes be overlooked due to poor radiography signs. This fracture can be diagnosed late, and can give nonunion, pseudoarthrosis, and a consequential posterior impingement syndrome. CT of the ankle must be performed with all suspicious cases. If the fracture is diagnosed late, or the bone fragment is too small, the arthroscopic excision of the bone fragment of the posterior process of the talus is recommended. Osteosynthesis can be performed in acute trauma and if the fragment is large enough. In such cases of late diagnosed fractures, we suggest arthroscopic excision of the fragment as a preferred method and not osteosynthesis.

Conflict of interest: None declared.

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Артроскопски асистирана ресекција превиђеног прелома задњег наставка талуса

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САЖЕТАК

Увод Преломи задњег наставка талуса су релативно ретке повреде скочног зглоба. Настају најчешће механизмом форсиране плантарне флексије и инверзије. Понекад се иницијално не дијагностикују, јер се преко 40% случајева прелома задњег наставка талуса не види на иницијалним радиографијама.

Циљ овог рада је приказ случаја артроскопски леченог нераслог прелома задњег наставка талуса.

Приказ болесника У нашем приказу болесника приказали смо прелом задњег наставка талуса код тридесетогодишњег мушкараца, професионалог фудбалера, са хроничним болом који траје три месеца у пределу левог скочног зглоба и пете.

Закључак Рад показује предности минимално инвазивне хирургије – артроскопске ексцизије фрагмента, бржи опоравак и враћање физичким активностима.

Кључне речи: прелом задњег наставка талуса; радиографија скочног зглоба; артроскопска ексцизија