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Differential diagnosis in an professional basketball player with foot pain: is it an avulsion fracture or an os supranaviculare?

Ayağında ağrı yakınması olan profesyonel basketbolcuda ayırıcı tanı: Avülsiyon kırığı veya os supranavikulare?

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The os supranaviculare is an accessory bone located on the dorsal aspect of the talonavicular joint close to the midpoint. This rare incidental skeletal variant has an estimated prevalence of 1%. It may rarely become symptomatic and should not be confused with cortical avulsion fractures of navicular or talar head. We present the case of a 25-year-old professional basketball player with pain on the dorsum of his right foot after twisting his ankle during a regular season match. Magnetic resonance imaging findings of the player's foot represented a flake of bone on the superior part of the talar head. The differential diagnosis and clinical outcome of this unusual case are briefly discussed.

Key words: Talus fracture; os supranaviculare; Pirie's bone; basketball player.

Os supranavikulare; talonavikular eklemin dorsalinde, orta hatta yakın olarak yerleşmiş aksesuvar bir kemiktir. Çok sık rastlanmayan bu varyasyonunun yaygınlığı %1 olarak tahmin edilmektedir. Nadiren semptomatik olan bu kemiğin, os navikulare veya talus başının kortikal avulsiyon kırıklarıyla karıştırılmaması gerekmektedir. Bu yazıda, bir basketbol karşılaşması sırasında ayak bileği inversiyonu sonucu sağ ayak dorsumunda ağrı yakınması olan, 25 yaşında profesyonel bir basketbolcunun bulguları değerlendirildi. Manyetik rezonans görüntüleme ile incelenen oyuncunun sağ ayağında, talus başı üzerinde, bir kemik parçası saptandı. Nadir görülen bu olgunun ayırıcı tanısı ve klinik bulguları kısaca tartışıldı.

Anahtar sözcükler: Talus kırıkları; os supranavikulare; Pirie kemiği; basketbolcu.

The talus has a head, constricted neck and a body. It ossifies from one center that appears during the sixth month of intrauterine life. The neck accepts most of the nutrient arteries. Branches from the posterior tibial, dorsalis pedis and peroneal arteries provide the major blood supply to the talus.[1]

Fractures of the talus include fractures of the head, neck, body, medial or lateral process and osteochondral injuries. Talar fractures are uncommon representing only 0.1% to 0.85% of all fractures;[2] and only 3% to 10% of all talar fractures involve the head of the talus.[3,4] Distinguishing these fractures from the accessory bones located in this area is essential for the optimal treatment, especially of professional athletes.

The os supranaviculare or Pirie's bone is an accessory bone located on the dorsal aspect of the talonavicular joint, close to the midpoint. It is a very rare skeletal variant with an estimated prevalence of 1%.[5-8] It may rarely become symptomatic and may be misdiagnosed as the cortical avulsion fracture of the talar head.[9]

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In this case report, we present an unusual cortical avulsion fracture of the talar head and its differential diagnosis from os supranaviculare in an professional basketball player.

CASE REPORT

A 25-year-old male professional basketball player sprained his right ankle during a regular season match. He sustained his injury upon landing from a jump for a rebound. Although he reported a sharp pain on the dorsum of his foot he was able to complete the match. The player complained of discomfort and pain on the same area the next day and was referred to the joint diseases and related surgery department of orthopedics.

Inspection of the foot was normal. On examination, a little swelling was noticed on the dorsum of the foot. Palpation of the talonavicular joint area and the passive movements of the ankle joint, especially plantar flexion, caused severe pain. The X-ray and the magnetic resonance imaging demonstrated a bone flake on the superior part of the talonavicular joint (Figure 1). X-rays of the contralateral foot were normal. A presumptive diagnosis of cortical avulsion fracture of the talar head was made and the images have been referred to the anatomy department for consultation and the differential diagnosis of a symptomatic os supranaviculare.

Considering the clinical outcome and the mechanism of injury, it is concluded that the hyperextension of the dorsal talonavicular ligament with the sprain of the ankle caused a cortical avulsion fracture of the talar head.

Conservative treatment through immobilization of the foot by taping, physical therapy and anti-inflammatory medication were suggested. The player was back to high-level competition in two weeks with diminished pain on the dorsum of his foot.

DISCUSSION

The cortical avulsion fractures of the tarsal navicular occur as a result of a twisting force applied to the foot and are mostly seen in middle-aged women wearing high-heeled shoes.[9,10] This type of fractures might be confused with the accessory bone known as os supranaviculare or Pirie's bone. In order to distinguish avulsion fracture of the region and the true os supranaviculare, clinical background and the radiology are the most important features. Like in our case, a bone chip is the most common finding from the radiological standpoint. Associated soft tissue swelling and lack of cortication are the supporting elements. Actually, the mechanism of the injury and the severe pain experienced after the ankle sprain were the two main findings that helped us confirm the avulsion fracture diagnosis. We believe that a hyper plantar flexion of the ankle joint led to the separation of talonavicular joint and a hyperextension of the dorsal talonavicular ligament crossing this joint caused the detachment of a bone flake from the dorsum of the talus head.

In literature, talar fractures are commonly reported in snowboarders. In the study by Kirkpatrick et al.,[11] talus fractures accounted for 2.3% of 3213 snowboarding injuries, which is approximately 15 times more frequent than the normal population.

Figure 1. X-ray and magnetic resonance imaging of right foot of the basketball player showing the bone flake located on the superior aspect of the talonavicular joint.

Biomechanical studies have shown that eversion in combination with axial load and extension is the main mechanism that leads to lateral talar process fractures.[12-14] It is known that certain fractures of the talus must be aggressively treated to prevent serious long-term sequel formation. Although the fracture presented here was not an example of this kind of an injury, we believe that it is important to distinguish this type of a cortical avulsion fracture and an accessory ossicle accurately, so that a proper treatment can be instituted and professional athletes no more need long recuperation periods before returning to sports.

In conclusion, this case not only represents a very rare fracture pattern in a basketball player that has not been reported before, but it also highlights the importance of the anatomical knowledge of the accessory ossicles and sesamoid bones of the foot.

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