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AN UNUSUAL CAUSE OF SUBTALAR PAIN AND INSTABILITY: ACCESSORY CALCANEUS

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We report on a 45-yr-old male sports instructor with chronic pain and instability of the ankle. He was a recreational basketball player, but because of repeated ankle sprains and chronic subtalar pain this activity became impossible. The radiologic findings were compatible with the diagnosis of accessory calcaneus. In an initial therapeutic approach the patient was treated conservatively with taping and physical therapy, but this failed to relieve the symptoms. Next, a ligamentoplasty was performed. The instability improved, but the pain remained the same. Finally the accessory calcaneus was resected and short term follow-up was unremarkable. Accessory calcaneus is an uncommon anatomical variation that may cause subtalar pain and instability. Resection of the accessory bone may be necessary to provide relief of symptoms. Accessory calcaneus can be well demonstrated on CT, SPECT-CT, and MR. MR and nuclear medicine can indicate instability of the accessory bone by showing bone marrow edema on MR or uptake on fusion imaging.

Key-word: Calcaneus.

Sesamoid bones and accessory ossicles about the foot and ankle are relatively common and represent developmental variants (1, 2). The most common accessory bones are os trigonum, accessory navicular , os peroneum, os supranaviculare, os vesalianum, and os intermetatarseum. Sesamoid bones arise within the tendon and are located adjacent to an articulation. Some sesamoid bones may have an articular surface, such as the sesamoid bone at the level of the first metatarsophalangeal joint.

Accessory calcaneal ossicle is very rare. To the best of our our knowledge only a few case reports have been published (2-9). This anatomic variant should not be confused with an os calcaneum secundarium (or accessorium), which corresponds to a small ossicle located at the level of the anterior process of the calcaneus. This other variant may easily be confused with an avulsion fracture. Instability of the accessory os calcaneum may lead to bone marrow edema pattern on MR, or uptake on nuclear medicine studies.

Case report

A 45-year-old male sports instructor was seen at the orthopaedic clinic because of instability and pain along the lateral aspect of the ankle. His favorite sports activities were basketball and rock climbing, but these activities had become difficult. The patient's past medical history was positive for recurrent ankle sprains. Taping and physical therapy were unsuccessful in relieving symptoms. Physical exam revealed pain with pressure at the sinus tarsi. Weakness of the peroneal tendons was also evident. There was no evidence of a deformity of the foot arches. Radiography (Fig. 1) showed a bony structure in the sinus tarsi. A stress radiograph (Fig. 2) revealed lateral ligament laxity. MR imaging (Fig. 3) demonstrated a split tear of the peroneus brevis tendon. In addition, a large bony structure in the sinus tarsi was seen. Bone marrow edema was evident in the ossicle as well as in the adjacent talus, which suggested instability of the anatomical variant and impingement. Total body bone scan (Fig. 4) showed a hot spot area at the level of the right calcaneum. At SPECT-CT tracer uptake (Fig. 5) was seen in the calcaneus and the accessory bone. The patient was further treated conservatively, but his symptoms did not improve. Stress radiographs confirmed lateral ligament laxity and a Duquesnoy-Bostrom ligamentoplasty procedure was performed. The instability significantly improved. Nevertheless, chronic subtalar pain remained present. The next treatment step was resection of the accessory bone. The patient is doing well at short term follow-up.

Fig. 1. — Lateral plain film. Note the corticalized accessory bone at the level of the sinus tarsi (arrow).

Fig. 2. — AP stress radiograph. Note widening of the lateral tibio-talar joint space (arrow).

Discussion

Ossification of the os calcaneum occurs around the 6th gestational month from a central endochondral and a lateral intramembranous

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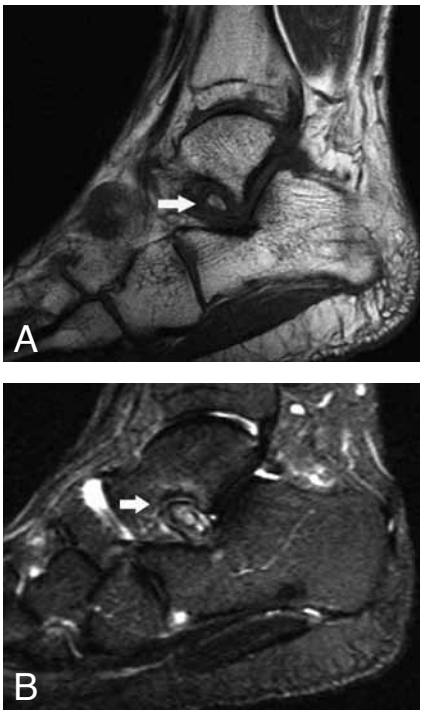

Fig. 3. — Sagittal T1-TSE weighted (A) and STIR weighted (B) MR. A. Note accessory bone inside the sinus tarsi (arrow). B. Note bone marrow edema pattern inside the accessory bone, as well as in the talus directly above the accessory bone, suggesting subtalar impingement (arrow).

Fig. 4. — Bone scan (total body). Note 'hot spot' at the level of the right calcaneum.

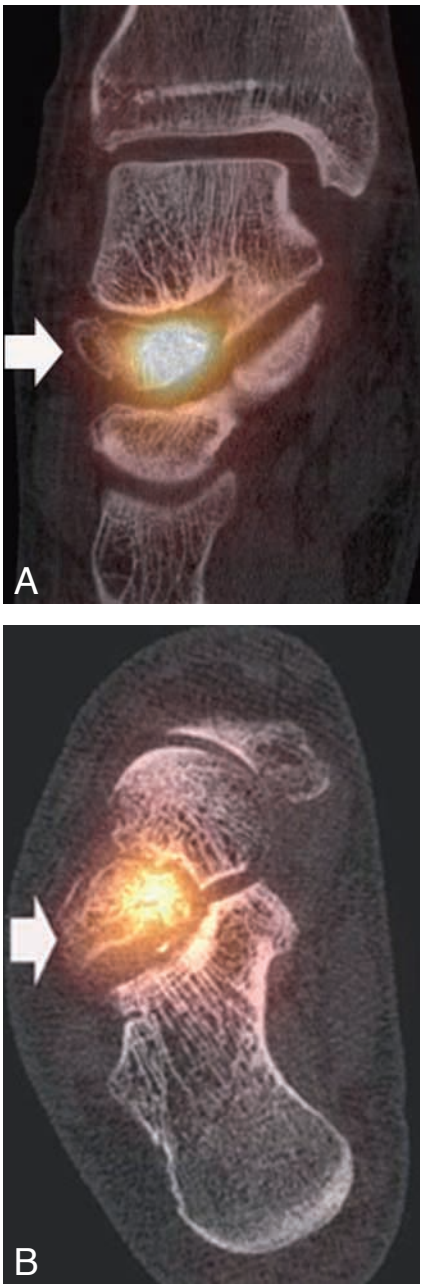

Fig. 5. — (A, B). SPECT-CT. A large irregular bone inside the sinus tarsi is shown, with tracer accumulation at the medial aspect (arrows).

focus (10). A secondary posterior apophyseal ossification center appears around the age of 6-10 years, and may cause Sever's syndrome.

The accessory calcaneus corresponds to a persistent apophysis at the level of the lateral calcaneal tuberosity (11). It is peculiar in that most case reports mention a previous history of ankle sprains and instability. Perhaps during childhood an accessory calcaneal apophysis could develop as a result of increased blood supply secondary to trauma. An accessory os calcaneus is located between the calcaneus, cuboid, talus, and navicular bone, and may have articulations with any of these bones. The accessory bone may be asymptomatic if small, or may limit normal range of motion of the hindfoot. This in turn may lead to early degenerative changes or subtalar conflict. Limitation of motion in the subtalar joint may lead to increased stress at the ankle joint. The ankle may then become more susceptible to sprains.

Excision of the bone fragment is believed to relieve symptoms and prevent degenerative changes (6).

Diagnosis of an accessory calcaneus is sometimes possible on lateral radiographs. CT with multiplanar reconstructions is best able to show the relationship with adjacent bones. MR may reveal bone marrow oedema as a result of instability of the ossicle. In our patient T1 fat suppressed sequences following intravenous contrast administration were obtained, and revealed enhancement, a finding compatible with an inflammatory reaction. SPECT-CT is an excellent fusion technique in this setting. It shows the bony structure and relationship to adjacent bones. In addition, SPECT-CT provides an indication of the instability of the accessory calcaneum and conflict with adjacent bones. Either MR and radiography or SPECT-CT are valuable techniques to demonstrate the abnormality and the potentially associated instability of the fragment. Although ultrasound in experinced hands, may allow a limited assessment of the sinus tarsi, it is not possible to demonstrate bone

marrow edema or osteoblastic reaction with this method, both findings which are important since they indicate instability of the accessory bone.

Optimal treatment options in the setting of accessory calcaneus are unclear. In our patient, joint laxity was first addressed, but the performed ligamentoplasty was not effective for subtalar pain. Excision of the accessory bone may be the only option to provide relief of subtalar pain.

In conclusion, we present a case of an unusual bony anatomical variant of the foot, the accessory os calcaneus. Although this variant can be detected on plain films, MR and SPECT-CT are valuable additional imaging methods that can show evidence of instability of the accessory bone.

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