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NAVICULO-MEDIAL CUNEIFORM TARSAL COALITION: A RARE CASE

Radiology

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ABSTRACT

A tarsal coalition is an abnormal fusion of fibrous (syn- desmosis), cartilaginous (synchondrosis), or osseous (synostosis) tissues between the tarsal bones in the hind and midfoot. This union can be either congenital or acquired. The most commonly reported tarsal coalition are the calcaneonavicular and talocalcaneal. Other coalitions including the talonavicular, calcaneocuboid, and cubonavicular have also been reported, but with much lower frequency. In addition, there have been few cases of a naviculocuneiform coalition between the navicular and one or more of the cuneiform bones.

KEYWORDS

INTRODUCTION:
A tarsal coalition is the abnormal union of two or more tarsal bones, which results in abnormal relative motion between them. The coalition may be bony (synostosis), cartilaginous (synchondrosis) or fibrous (syndesmosis). The two commonest types are the calcaneo-navicular and talo-calcaneal coalitions. They typically present with pain around the subtalar joint and loss of varying degrees of the medial arch.

Case report:
A 20-year-old girl presented with progressive pain on the medial side of her right mid-foot for 5 months. The pain improved with rest and exacerbated by exercise and other activities such as walking and running. There was no similar family history.

On examination, there was tenderness and swelling over the right medial cuneiform and navicular joint. The range of motion of the subtalar joint was normal. The left foot was essentially normal. Inflammatory markers were normal with a CRP<5 and ESR of 11. She was started on pain relief with non-steroidal anti- inflammatory drugs (NSAIDs) .She also underwent physiotherapy for strengthening exercises on the right leg. The patient had failed three months of conservative treatment and was therefore referred for a specialist orthopaedic opinion with a presumed diagnosis of chronic septic arthritis.

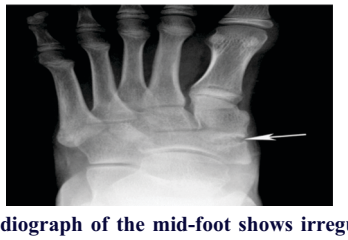

Figure 1: Radiograph of the mid-foot shows irregularity of the navicular-medial cuneiform articulation.

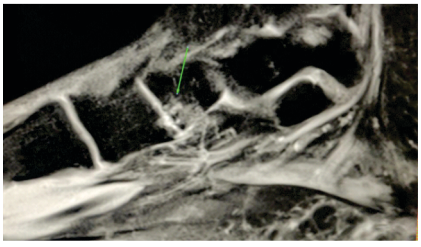

Figure 2:Saggital PDW FSE MR images shows fluid signal intensity at the coalition with irregular articular surface and marrow edema in the navicular and medial cuneiform bones.

Radiographs (Figure 1) of the right foot showed an area of cortical irregularity involving the infero-medial portion of the navicular-medial cuneiform joint with a sclerotic margin and partial bony bridging. MRI of the right foot showed evidence of a partial pseudarthrosis between the navicular and medial cuneiform with associated subchondral bone marrow oedema-like changes. There was fluid signal intensity at the pseudarthrosis. A radiological diagnosis of non- osseous, partial navicular-medial cuneiform coalition was made.

DISCUSSION:
Tarsal coalition is a congenital condition in which there is an abnormal union between two or more tarsal bones due to failure of mesenchymal segmentation during the embryonic period. This defect is possibly an autosomal dominant genetic condition, with an incidence of approximately 1% in the general population. Most patients with tarsal coalition present during the adolescent years when the initial fibrous or cartilaginous union between the tarsal bones begins to ossify.

There is also an association with increased mechanical strain on the joints in this condition. The clinical features of tarsal coalition (pain, stiffness and deformity) are usually not observed until early puberty. The explanation for this is that the cartilaginous coalition needed time to ossify, causing joint restriction and symptomatology.

The incidence of coalitions is higher in the Asian population, especially Koreans.A few cases have been reported in the literature of European and white American ethnicity, but none in the black British race. There is also a slightly higher male preponderance . Any bony combination is possible, but the commonest types are the calcaneo-navicular and talo-calcaneal which account for over 90% of cases. Coalition may also be bilateral. The naviculo-cuneiform coalition is one of the least common types.Pain on the medial aspect of the foot is also a common presentation of a naviculo-cuneiform coalition. Clinically, the patient had no history of fever and had normal blood counts, not suggesting an infectious cause.

Initial imaging with lateral and anteroposterior radiographs of the foot is a useful approach to screen for tarsal coalition. Classical radiographic findings can be divided into direct and indirect. Direct findings include osseous continuity between the involved bones in cases of synostosis, or abnormal narrowing and irregularity of the joint space in non-osseous coalitions, as was seen in the current case.

Indirect findings include the talar beak, C-sign, drunken waiter sign, absent middle facet sign, and anteater sign, these being typically seen with talo-calcaneal and calcaneo-navicular coalitions.Computerized tomography scan is also of value in confirming radiographic suspicion of coalition and will show similar findings to radiographs. It will also clarify the patho-anatomy of the lesion prior to surgical resection.

Magnetic resonance imaging will allow differentiation between synchondroses and synodesmoses depending upon the signal characteristics of the tissue at the pseudarthrosis, fluid signal being consistent with a cartilaginous coalition while low signal suggest a fibrous coalition. Bone marrow oedema-like signal and subchondral cysts are also common findings. The current case showed similar radiographic appearances to those previously described ,and the MRI study suggested that the coalition was cartilaginous in nature.

MANAGEMENT:

The treatment of tarsal coalition is initially conservative for a minimum of 6 months, to be followed by surgical intervention if the former fails. Conservative measures include a reduction in physical activities, a walking POP cast, shoe modification, use of NSAIDs and steroids. With regards to naviculo-medial cuneiform coalition, conservative management appears to have better outcome than operative treatment.

The clinical and radiographic differential diagnoses included chronic septic arthritis and juvenile idiopathic arthritis. However, in both cases it would have been expected that the whole of the joint space would have been affected and more reactive marrow and soft tissue oedematous changes would have been evident on MRI.

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