Case Report

A rare case of cubonavicular coalition

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Abstract

Tarsal coalition is a condition described by partial union between tarsal bones. Its clinical significance is the potential cause for chronic pain in the ankle and foot. Diagnosis of this condition may be delayed until adolescence or early adulthood, and is often made incidentally on examination for other purposes. Treatments for this condition can range from conservative options to surgical approach. The calcaneonavicular and talocalcaneal subtypes make up the majority of this condition, with involvement among other tarsal bones much rarer in comparison. This report illustrates the cubonaviclar subtype, which has only been described in very small number cases.

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Introduction

Tarsal coalition refers to a condition in which there is a partial union between 2 or more tarsal bones in the midfoot and hindfoot. It has been reported in up to 13% of population, and can be a cause of long-term ankle and hindfoot pain [1]. Findings may be detected on plain radiographs, computed tomography (CT), and magnetic resonance studies. It can often be overlooked in treating young patients presenting with foot and ankle pain [2]. The calcaneonavicular and talocalcaneal types consist of overwhelmingly most of the total reported tarsal coalition cases, with the remaining subtypes exceedingly rare in comparison. Here, we present a rare case of cubonavicular coalition.

Case report

A 34-year-old female with noncontributory medical history originally presented to an outside institution after suffering left ulna and pilon fractures involving the right distal tibia after a motor vehicle accident. The patient was initially treated conservatively with fiberglass casting and external fixation of the distal right tibia, and was referred to the orthopedics department at our institution for further management.

The initial CT examination of the injured extremity at our institution 10 days after the injury revealed comminuted distal tibial fracture. Incidentally noted was abnormal apposition of the cuboid and the navicular bones, with narrowing, irregularity and sclerosis along the apposed bony margins. This finding was most compatible with fibrous or cartilaginous cubonavicular coalition.

The patient had follow-up clinic visits for symptoms related to post traumatic arthritis, and was managed with repeated intra-articular steroid injections. The symptoms persisted despite temporary relief from the injections. The repeated CT examination 3 years after the initial injury again showed findings compatible with fibrous or cartilaginous cubonavicular coalition (Figs 1A and B). The patient eventually

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underwent arthroscopic surgery, with extensive debridement of the osteophytes and removal of the loose bodies, and experienced symptomatic relief 6 weeks after the arthroscopic surgery.

Discussion

Tarsal coalition is a congenital condition after autosomal dominant inheritance. It results from lack of segmentation of the bony structures during fetal development, which results in complete or partial fusion of tarsal bones when detected on imaging. The abnormality is present at birth; however, is usually discovered later in life with development of symptoms during adolescence or young adulthood, coinciding with progressive coalition ossification. Symptoms usually consist of restrictive motion and pain associated with the site of coalition [3].

The prevalence of tarsal coalition is not clearly established, and has been estimated to range from as low as 1% [2,4] to up to 13% [1]. There is also reported predilection for the male gender. The condition presents bilaterally in 50% of the cases regardless of the laterality of the initial symptoms on presentation. It is often found in conjunction with spastic valgus pes planus because of the reaction to protect the area from pain [5]. Three types of coalition exist based on morphology of the abnormal bridging, which include bony (synostosis), cartilaginous (synchondrosis), and fibrous (syndesmosis). Regarding the tarsal bone involved, the most common subtype of tarsal coalition, which accounts for 90% of the presentation, include calcaneonavicular (45%) and talocalcaneal (~45%) [2]. The cubonavicular subtype accounts for less than 1% of all tarsal coalition, with less than 10 cases reported as of 2015 [4].

Plain film study is often the first available imaging study for evaluation; however, the diagnostic efficacy is limited given the restricted views. Certain radiographic signs, such as talar beaking and the C-sign, are well described for calcaneonavicular and talocalcaneal coalition in literature [2]. Diagnosis of more occult types of tarsal coalition usually is only performed using the CT or magnetic resonance modality. A complete review of imaging findings regarding these conditions can be found elsewhere in review articles and is beyond the scope of this report, although in general there will be evidence of fusion between the tarsal bones, with the connections ranging from complete osseous bridging, or partial fusion with cartilaginous or fibrous tissue according to their morphological subtypes [2].

Conservative treatment for this condition such as immobility may not be sufficient for long-term relief, leading to progressive pain despite initial management [3]. Surgical treatment is usually indicated afterwards and range from resection of coalition to arthrodesis [3].

Although cubonavicular coalition is a rare condition, it could be the source of difficult to diagnose chronic foot pain. Although at times discovered incidentally during examination for other purposes, this may be the culprit causing the occult and unrelenting symptoms [4,5]. Therefore, it is crucial to

Fig. 1 — (A) Axial computed tomography (CT) image of the right foot at the level of the cuboid and navicular apposition. Coalition between the bones is evidenced by the abnormal opposition, narrowing, irregularity, and sclerosis (red arrow). (B) Coronal reconstructed CT image of the same foot showing the same findings between the cuboid and navicular (red arrow).
include this case to the growing literature, so that it can be brought to attention as a more widely recognized entity.

REFERENCES

[1] Lawrence DA, Rolen MF, Haims AH, Zayour Z, Moukaddam HA. Tarsal coalitions: radiographic, CT, and MR imaging findings. HSS J 2014;10(2):153–66.

[2] Newman JS, Newberg AH. Congenital tarsal coalition: multimodality evaluation with emphasis on CT and MR imaging. Radiographics 2000;20:321–32.

[3] Vincent KA. Tarsal coalition and painful flatfoot. J Am Acad Orthop Surg 1998;6(5):274–81.

[4] Awan O, Graham JA. The rare cuboid-navicular coalition presenting as chronic foot pain. Case Rep Radiol 2015;2015:4. Article ID 625285.

[5] Piqueres X, de Zabala S, Torrens C, Marin M. Cubonavicular coalition: a case report and literature review. Clin Orthop Relat Res 2002;(396):112–4.