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Symptomatic case of type 1 accessory navicular bone: A case report

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Abstract

Accessory Navicular Bone (ANB) (os navicularum or os tibiale externum) is a common variant of secondary ossification present in 5 to 10 % of the population. Due to its unique anatomical location in foot and associated relation with tibialis posterior tendon, these are usually symptomatic in type 2 ANB or type 3 ANB stages. Often patients with ANB can develop plantar fasciitis or bunions or calcaneal spur.

Case Report: A 20 year old female had a history of pain over the medial aspect of midfoot for 1 year. She had consulted many centers with midfoot pain. Patient had a history of twist injury to the same foot 1 year back and has been diagnosed and treated for the same. Pain subsided for 2 months and again she had similar pain in midfoot for which she was diagnosed as a case of plantar fasciitis and treated conservatively. Later radiographs showed type 1 ANB, but she was treated conservatively with analgesics and sole raise which failed. Finally surgical excision and tibialis posterior advancement done for flat foot and symptomatic relief was achieved.

Discussion: Most of type 1 ANB are asymptomatic, and patients with type 1 ANB are usually incidental finding mostly not requiring any surgical intervention. Cause of midfoot pain in this patient was misdiagnosed as sprained foot initially and lateral attributed to plantar fasciitis, even after radiography showed type 1 ANB.

Conclusion: In case of type 2 or type 3 ANB, that can be a cause of pain in the midfoot due to local mechanical factors. But type 1 ANB can also cause severe midfoot pain, which can be easily missed or misdiagnosed as sprained foot or plantar fasciitis. This case required surgical excision and tibialis posterior advancement for symptomatic relief.

Keywords: Accessory navicular bone, foot and ankle, pes planus, osteosynthesis

Introduction

The Accessory navicular bone is one of the most common accessory ossicles in foot and ankle ^[1]. ANB is often considered a normal variant in 4 to 20 % of the population ^[2]. They can be seen in several different locations and can cause impact on clinical presentation and degree of dysfunction. Occasionally they can be symptomatic and present with midfoot pain and foot deformity. Tibialis posterior is a large muscle of foot and ankle helping in plantar flexion and inversion of foot. Tibialis posterior has multiple insertions in foot with significant insertion in navicular bone. In advanced cases of ANB, constant irritation or damage to the tendon cause pain and pes planus foot. There are three types of ANB: type I is a small round ossicle embedded in the tibialis posterior tendon; type II is a relatively large ossification center which is triangular in shape and connected to the navicular by synchondrosis and type III ANB is the enlarged medial horn of the navicular bone ^[3]. Since most patients presenting with this condition are diagnosed with ankle sprain or arthritis, there may be a delay of months to years before a correct diagnosis is made ^[4]. Overweight individuals and those involved in prolonged standing, walking or other overuse activity are prone to develop a painful symptomatic ANB. ANB is usually diagnosed with X-ray, CT and MRI scans ^[5]. Most of the cases are treated conservatively, some cases require surgery for flatfoot and pain. This case reporting is solely focused on avoiding misdiagnosis of ANB causing severe disability and pain to patients.

Case Report

Here we present a case of a 20 year old female patient, who came to our centre with chronic pain right foot for the past 12 months. She had a history of twisted injury to right foot 1 year back for which she was immobilised for 6 weeks in below knee cast. Later she developed pain over the medial aspect of right midfoot for which she was diagnosed a case of plantar fasciitis and treated conservatively.

She had gradually increasing pain over the medial aspect of foot and she reported to our centre.

Clinical examination of foot showed tenderness over the medial aspect of midfoot and pes planus deformity was noted (FIG.1) patient also had co added symptoms of plantar fasciitis. Radiography of the right foot (FIG. 2) showed type 1 accessory navicular bone according to Coughlin *et al* classification. We tried to treat the patient conservatively with shoe sole raise and analgesics and physiotherapy. But the patient had no improvement in pain and further it got worsened.

Later an MRI foot (FIG 3.) was taken and no further abnormality other than ANB was noted. Then the patient was planned for operative management and after all preoperative assessment the patient was taken for surgery under spinal anaesthesia. Patient was placed in supine position medial midfoot incision made (FIG.4), accessory navicular bone excision done (FIG. 5) and tibialis posterior tendon advancement done to more plantar aspect of navicular bone using suture anchor. (Kidner procedure) (Fig. 7) [6] and Planus correction done. (Fig 6) Foot was placed in a below knee cast in mild inversion neutral position with medial cavus support. Absorbable subcuticular sutures were applied. Hence the cast was applied for 6 weeks with non-weight bearing.

Following cast removal, the patient had medial foot arch restored with good inversion and plantar flexion power. And patient pain was relieved. Weight bearing was started 12 weeks postoperative time. Patient was followed up to 1 year

and she got full pain free functional range of motion of foot and ankle. Till now patient had no recurrence of pain.

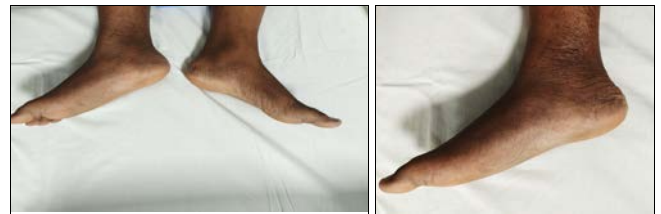


Fig 1: Pes planus deformity right foot



Fig 2: Xray Showing type 1 accessory navicular bone

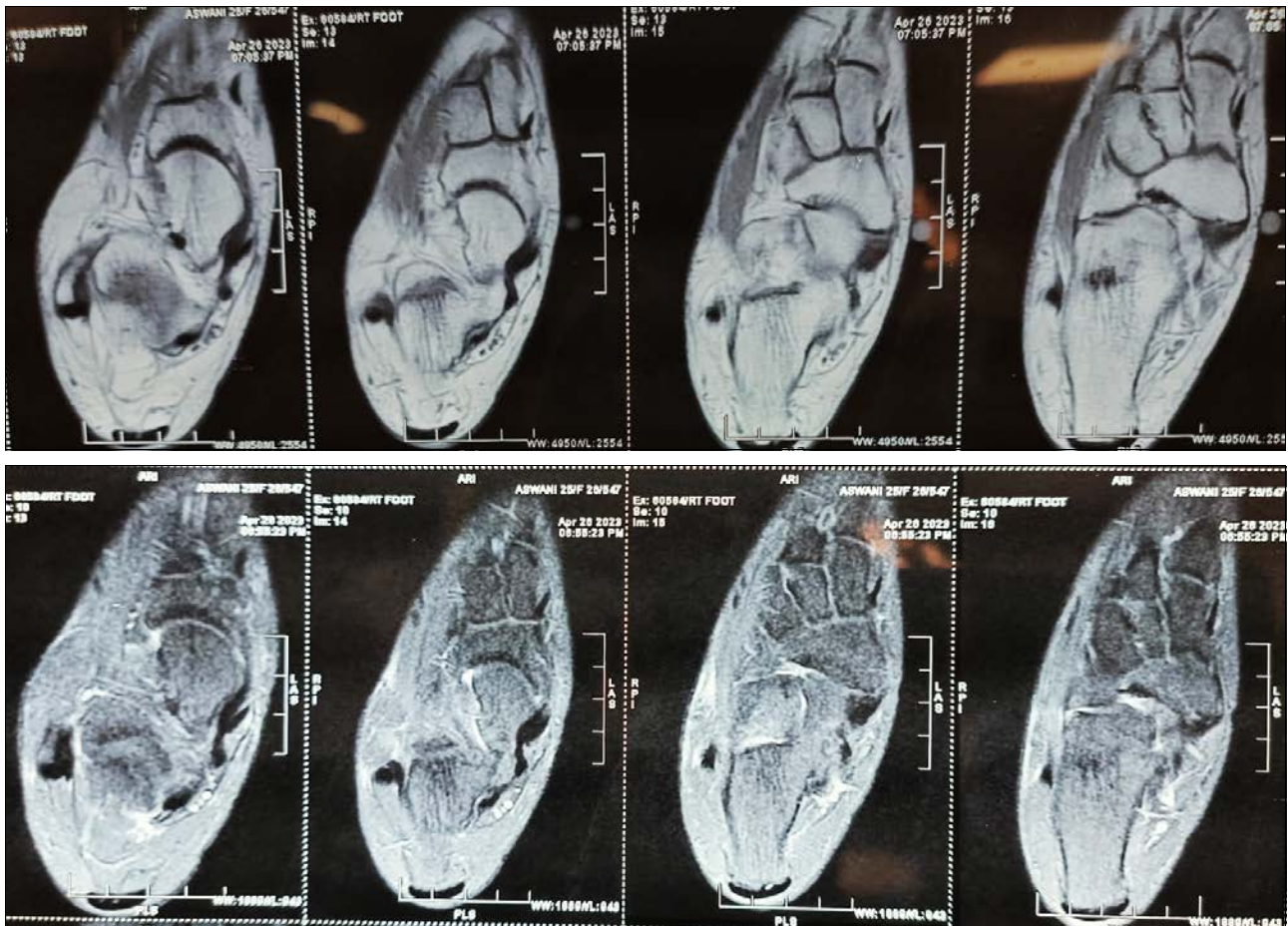


Fig 3: MRI Right foot for confirming diagnosis



Fig 4: Medial approach of foot



Fig 5: Excision of accessory navicular bone



Fig 6: Kidner procedure with restoration of medial plantar arch



Fig 7: Post operative Xray with rerouted Tibialis posterior tendon with suture anchor

Type 1		<ul style="list-style-type: none"> - Also known as os tibiale externum - Sesamoid bone embedded within the distal portion of posterior tibial tendon - Usually asymptomatic
Type 2		<ul style="list-style-type: none"> - Triangle shaped accessory bone attached to the navicular tuberosity by a 1-2 mm layer of fibrocartilage - May cause posterior tibial tendon dysfunction
Type 3		<ul style="list-style-type: none"> - Fused accessory navicular bone resulting in a prominent navicular tuberosity called a cornuate or hooked navicular - Traditionally symptomatic because of the prominence

Fig 8: Geist classification for Accessory Navicular Bone

Discussion

Accessory Navicular Bone is a congenital anomaly where the medial navicular tuberosity forms a secondary ossification centre [7]. This phenomenon was first described by Bauhn in 1605 [8]. Most of the accessory navicular bone are asymptomatic especially type 1 variants. Variable locations with respect to tibialis posterior tendon and main navicular bone is crucial in determining the clinical presentation and dysfunction grade in these patients. Of the various classifications of the accessory navicular bone, the Geist classification (FIG. 8) may be the most widely used [7]. This scheme outlines three types. Type I is a small ossicle within the substance of the posterior tibial tendon (PTT) [9]. Type II is described as a triangular or heart-shaped ossicle that is united to the parent navicular by a cartilaginous synchondrosis measuring 8 to 12 mm in size [9]. The type II accessory navicular bone accounts for 70% of symptomatic cases [10]. Last, type III represents a cornuate accessory navicular fused to the main navicular by a bony bridge [9]. The presentation of a symptomatic navicular bone is typically chronic or acute on chronic medial foot pain centred over the medial side of the navicular [11].

In our study this was a 20 year old female with complaints of medial foot pain following trivial trauma to right foot 1 year back. She went through a series of conservative management for twist injury ankle and plantar fasciitis. Later diagnosed as a case of highly symptomatic Type 1 ANB with pes planus deformity and was operated with accessory navicular bone excision with Tibialis posterior transposition (Kidner procedure). She became totally asymptomatic following the procedure, cast was removed after 6 weeks post op. There was no distal neurological deficit or vascular compromise. Medial foot arch was restored with good power and range of inversion and plantar flexion movements. We received a satisfactory outcome following a 6 month followup.

Sahibzada N. Mansoor and Farooq A. Rathore in their study included a case series of 5 cases with symptomatic ANB. All 5 cases were type 2 and 3 symptomatic cases with type 2 treated conservatively and type 3 required surgical correction.

Symptomatic accessory navicular bone is a major cause of morbidity and chronic pain in undiagnosed cases. It can also lead to secondary flat foot deformity in advanced cases [12]. Although considered a normal variant it is often missed by

clinicians evaluating patients for foot pain. As delay in diagnosis occurs in the majority of cases, increasing morbidity due to pain and deformity. Timely diagnosis can help in reducing patient discomfort and preventing flatfoot deformity.

Conclusion

Symptomatic accessory navicular bone is not uncommon. Early diagnosis and management can halt its progression to chronic pain and foot deformities. Conservative treatment is sufficient for most patients. Imaging studies play an important role in identifying exact locations of the accessory bone as well as the pathologic features causing dysfunction in affected individuals. Ultimately, surgery yields the best outcome for young patients with severe symptoms, though conservative management has relevance for less active patients.

Conflict of Interest: Nil

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