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Accessory Navicular Syndrome as an Unusual Cause of Medial Foot Pain: A Case Report

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ABSTRACT
Background: *Accessory navicular bone (ANB) is the second most common accessory bone in the foot with incidence of 4%-20% in the general population.Due to its particular anatomical location in the foot and the biomechanics of locomotion, this accessory ossicle may initially seem unimportant but can really cause severe pain, morbidity, and even deformity that can lead to flat feet. Most cases are asymptomatic and can be only an incidental finding on plain radiograph of the foot. Accessory navicular syndrome (ANS) or Osnaviculare syndrome is simply a symptomatic accessory navicular and is usually associated with medial foot discomfort and tibialis posterior tendon dysfunction and thus increasing risk for flat foot deformity especially in young people and in women.*
Case description: *A 35 years old female, farmer by occupation, presented with a 4 months history of pain and swelling in the medial aspect of her right foot, insidious in onset and progressively increasing, aggravated by prolonged standing and walking and during bare foot activities in the farm and improved with rest. No prior history of trauma or any inflammatory disease was present. She had been taking nonsteroidal anti-inflammatory drugs (NSAIDS) but no any relief. Examination of her right foot revealed mildly depressed medial longitudinal arch as compared to left foot and she was unable to stand on the toes of the right foot. Mild swelling and tenderness over the navicular area was noted. Laboratory investigations were normal. Plain radiograph of her right foot showed a type II Accessory navicular bone (ANB). MRI was done to assess the tibialis posterior tendon integrity which was intact. Management options and prognosis were explained to the patient. As patient already had been taking NSAIDS without any relief; she had been given corticosteroid injection mixed with local anaesthetic drug at the synchondrosis site under image intensifier in the operating room. Post injection rest was recommended with cast immobilization for the duration of 4 weeks and subsequently mobilized with modified shoe with silicon insole and medial arch support. She was advised to modify her activities. Pain improved on subsequent follow up at 4 weeks with conservative management. She did not complain of any tenderness after 3 months of follow up. She was then 3 monthly followed up and remained pain free even after 12 month follow up. The patient was left to follow-up after six months then.*
Conclusion: *Accessory navicular syndrome is a rare condition. Orthopaedic surgeons should be aware with the presence of accessory ossicles in the feet, and born in mind when patient with medial foot pain after strenuous*

activities with or without PTT dysfunction or flat foot, should be also examined and investigated for symptomatic accessory bone especially type II.

Clinical significance: *Orthopaedics should be aware of accessory navicular syndrome as an unusual cause of medial foot pain because of its significant accompanying Patho-biomechanical considerations and association with flexible flat foot. With the knowledge of the condition and by early recognizing and managing the case, surgeon will be able to resolve discomfort, improve dysfunction and restore the quality of life of the patient with conservative management. However small proportion of cases require surgical intervention.*

Keywords: *Accessory navicular syndrome, Symptomaticaccessory navicular bone, Medial foot pain, Posterior tibial tendon dysfunction, Flat foot.*

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I. BACKGROUND

The human body has numerous accessory ossicles as a normal variant of bone development. These developmental variations occur due to failure of fusion of secondary ossification centers of the parent bone. Accessory navicular bone (ANB) also described as ostibialeexternum (OTE), osnaviculare secundarium, prehallux, Pirie's bone, and talonaviculare ossicle is the second most common accessory bone in the foot with incidence of 4%-20% in the general population [1].Due to its particular anatomical location in the foot and the biomechanics of locomotion, this accessory ossicle may initially seem unimportant but can really cause severe pain, morbidity, and even deformity that can lead to flat feet.Most cases are asymptomatic and can be only an incidental finding on plain radiograph of the foot. Accessory navicular syndrome (ANS) or Osnaviculare syndrome is simply a symptomatic accessory navicular [2] and is usually associated with medial foot discomfort and tibialis posterior tendon dysfunction and thus increasing risk for flat foot deformity especially in young people and in women. ANS may be triggered by trauma or by overuse particularly in high impact sports such as basketball or soccer or chronic irritation due to ill-fitting foot wear. We report a case of Accessory navicular syndrome in a 35 years old female working in farm.

II. CASE DESCRIPTION

A 35 years old previously healthy female, farmer by occupation, presented with a 4 months history of pain and swelling in the medial aspect of her right foot, insidious in onset and progressively increasing. It was aggravated by prolonged standing and walking and during bare foot activities in the farm and improved with rest. No prior history of trauma or any inflammatory disease such as gout or rheumatoid arthritis was present. She had been taking nonsteroidal anti-inflammatory drugs (NSAIDS) but no any relief. Examination of her right foot revealed mildly depressed medial longitudinal arch as compared to left foot and she was unable to stand on the toes of the right foot. Mild swelling and tenderness over the navicular area was noted. Laboratory investigations with her metabolic and inflammatory profiles were normal. Plain radiograph of her right foot showed a type II Accessory navicular bone (ANB). [Fig. 1A and B] MRI was done to assess the tibialis posterior tendon integrity which was intact; an ANB and synchondrosis with associated inflammation was confirmed. Management options and prognosis were explained. As patient already had been taking NSAIDS without any relief; she had been given corticosteroid injection mixed with local anaesthetic drug at the synchondrosis site under image intensifier in the operating room. Post injection rest was recommended with below knee boot cast immobilization for the duration of 4 weeks and subsequently mobilized with modified shoe with silicon insole and medial arch support. She was advised to modify her farm related activities and not to work on bare feet in the farms. Pain improved on subsequent follow up at 4 weeks with conservative management.She did not complain of any tenderness after 3 months of follow up. She was then 3 monthly followed up and remained pain free even after 12 month follow up. The patient was left to follow-up after six months then.

III. DISCUSSION

The accessory navicular bone has been presented in 10-14 % of the normal feet and Bauhin was the first to described it in 1605[3]. It occurs due to failure of fusion of secondary ossification centers of navicular at the medial tuberosity, which is the site of attachment of tibialis posterior tendon. It can be present bilaterally in 50%-90% of cases. Females have higher prevalence than males [4]. Three distinct types of accessory navicular have been described by Coughlin et al. [5]. [Fig. 2]

Type I (30%) - a small, round or oval shaped separate ossicle embedded within the Posterior tibial tendon (PTT).

Type II (50%) - a larger, triangular or heart shaped ossicle adjacent to the navicular tuberosity and connected to the native bone by a synchondrosis.

Type III (20%) - also called as cornuate or gorilloid or hooked navicular, formed by fusion of accessory bone with the navicular, causing prominent tuberosity.
Types II and III are commonly associated with pathology such as PTT dysfunction [2].
There can be aberrant, more proximal insertion of PTT onto the accessory bone biomechanically reducing the leverage of the medial malleolus onto PTT, thereby increasing the stress on the tendon. In most cases, a flatfoot deformity is linked to the accessory navicular. This could be accounted for by the fact that PTT supports the medial longitudinal arch of the foot. This support may dampen with the abnormal insertion of PTT, which could flatten the arch. The accessory navicular and pes planus do not, however, appear to have a clear cause and effect relationship.

Not all the individuals with this accessory bone have symptoms,[6] Most cases are asymptomatic, but it may cause symptoms in a small proportion (<1%). The symptoms appear when the accessory navicular bone is too large or when a traumatism causes an injury in the fibrous tissue between the navicular and accessory navicular bones, leading to a phenomenon similar to a fracture considered to be the cause of the pain. As the posterior tibial tendon attaches to the accessory navicular, it is constantly stretching the bone, causing with every step a greater displacement between fragments. The most frequent complaints among symptomatic people are pain and tenderness. Pain is located over the medial aspect of navicular and is aggravated by weight-bearing, athletic activity or wearing of ill-fitting Shoes [7]. The medial aspect/tuberosity of the navicular as well as the PTT insertion may both be tender. Resisted inversion may be painful [2].

Diagnosis is commonly suggested by medical history and painful sensitivity within the area of the head of the navicular bone. Radiological examination is needed to allow the surgeon to visualise the accessory navicular. No other tests are generally required, but MRI or CT can be useful in order to establish the relationship between accessory navicular and posterior tibial tendon. Any degenerative changes at the synchondrosis in type II accessory navicular may be demonstrated with the help of CT scan [2]. MRI has the highest sensitivity and specificity for the diagnosis, demonstrating both bone marrow edema within the accessory and the native bone; and soft tissue edema as well [8].

Initial management should always be conservative irrespective of the type of accessory bone. In case of acute pain, apart from activity restriction, NSAIDs can be useful. Modification of footwear to reduce pressure over prominent tuberosity, to provide medial arch support is effective in case of flat foot [2,7]. Local infiltration of corticosteroids can also be tried but seldom results in complete pain relief [9]. For persistent symptoms, or in cases with acute onset following an injury, a below-knee cast or a short leg-walking cast may be used [2,9]. In cases where conservative measures fail, surgery needs to be considered. Modified Kidner's procedure involving removal of the accessory bone and advancing the insertion of the PTT to the surface of navicular from where the accessory was removed is the preferred choice. For type II accessory navicular, percutaneous drilling of the synchondrosis can be performed to bring about and facilitate bone consolidation between the native and accessory bones [9].

IV. CONCLUSION

Accessory navicular syndrome is a rare condition. Orthopaedic surgeons should be aware with the presence of accessory ossicles in the feet, and born in mind when patient with medial foot pain after strenuous activities with or without PTT dysfunction or flat foot, should be also examined and investigated for symptomatic accessory bone especially type II.

CLINICAL SIGNIFICANCE

Orthopaedics should be aware of accessory navicular syndrome as an unusual cause of medial foot pain because of its significant accompanying Patho-biomechanical considerations and association with flexible flat foot. With the knowledge of the condition and by early recognizing and managing the case, surgeon will be able to resolve discomfort, improve dysfunction and restore the quality of life of the patient with conservative management. However small proportion of cases require surgical intervention.

Informed Consent: Written informed consent was obtained from patient who participated in this case.
Conflict of interest: None.
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Fig.1A and B: Plain radiograph of the right foot AP(A) and Oblique(B) views showing Accessory navicular bone type II.

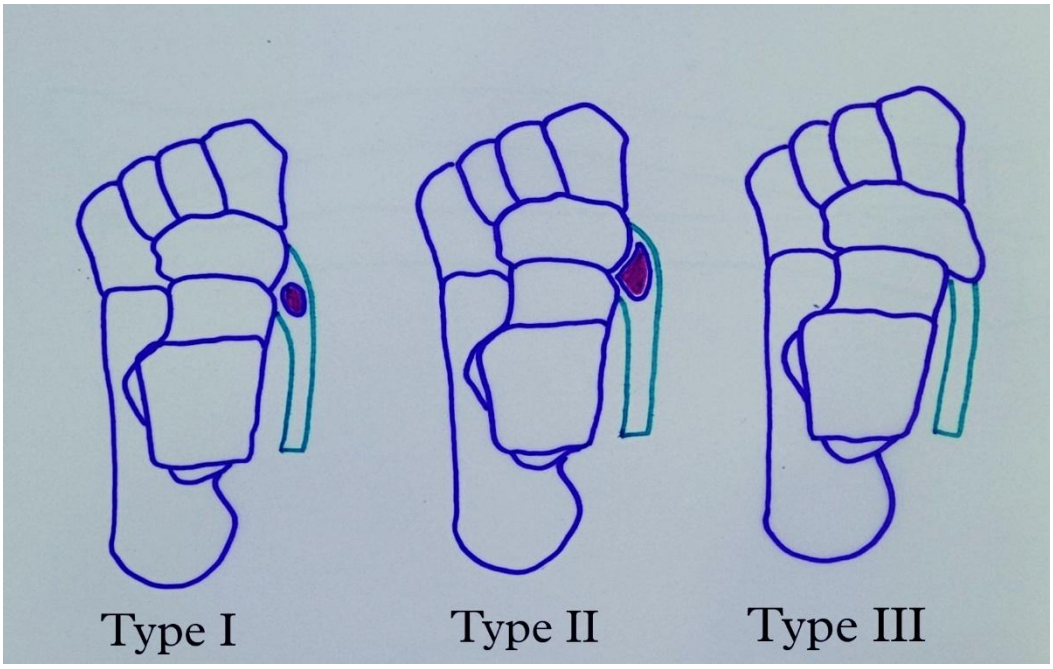

Fig. 2: Three distinct types of accessory navicular bone.