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Kidner Procedure Without Implant Fixation in Accessory Navicular Patient, has a Good Outcome After 1-Year Evaluation at Prof. IGNG Ngoerah Hospital: A Case Report

I Made Arditya Dwi Yudistira[1], I Wayan Subawa[2]

[1] Resident, Department of Orthopaedic and Traumatology, Faculty of Medicine, University of Udayana/ Prof. Ngoerah General Hospital, Denpasar, Indonesia.
[2] Orthopaedic and Traumatology Consultant, Department of Orthopaedic and Traumatology, Faculty of Medicine, University of Udayana/Prof. Ngoerah General Hospital, Denpasar, Indonesia.

Corresponding Author: I Made Arditya Dwi Yudistira

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ABSTRACT

Introduction: The accessory navicular bone (ANB) is a common developmental anomaly that may cause foot pain, morbidity, and even flatfoot deformity in symptomatic individuals. The Kidner procedure is a widely accepted surgical treatment for symptomatic ANB, typically involving removal of the ANB and reattachment of the posterior tibial tendon. This case report presents a successful 1-year follow-up outcome of an implantless Kidner procedure in a patient with type II ANB.

Case Presentation: A 44-year-old female patient presented with a 3-month history of medial-sided left foot pain, aggravated by walking long distances. Physical examination revealed a bony prominence on the inner side of the left foot, with tenderness on palpation. Radiographs demonstrated a type II ANB. The patient underwent an implantless Kidner procedure under general anesthesia, which involved excision of the accessory navicular, osteotomy of the true navicular, and advancement of the tibialis posterior tendon using ethibond sutures. Postoperative follow-ups at 3, 6, and 12 months showed gradual improvement in the American Orthopedic Foot and Ankle Society (AOFAS) score from 75 to 85 and 90, respectively, with no complications or recurrence of symptoms.

Discussion: The presence of ANB, particularly type II, can result in foot pain and associated complications, requiring surgical intervention if conservative measures fail. The implantless Kidner procedure presented in this case report demonstrates favorable outcomes in symptom resolution and functional improvement. The use of sutures instead of hardware materials for tendon fixation in this modified procedure appears to be safe and effective.

Conclusion: The implantless Kidner procedure is a viable surgical option for the management of symptomatic type II ANB, providing satisfactory results and functional improvement at 1-year follow-up. Further research with larger sample sizes and longer follow-up periods is needed to validate the long-term efficacy of this modified technique.

Keywords: accessory navicular bone, case report, kidner procedure, implantless surgery, tibialis posterior tendon

INTRODUCTION

The accessory navicular bone (ANB) (os navicularum or os tibiale externum) is formed by secondary ossification foci adjacent to the primary navicular bone as a result of developmental variance. ANB is a normal variation that is seen in 4–20 percent of the general population.[1] This extra ossicle may appear unimportant, but due to its specific anatomical position in the foot and the biomechanics of movement, it can cause severe pain, morbidity, and even flat foot deformity. When examining foot discomfort, it is sometimes misdiagnosed as an ankle sprain. The tibialis posterior is a big muscle that helps with plantar flexion and locking of the tarsal bones during stride. The tibialis posterior tendon contains several insertions in the foot, the most important of which is on the medial navicular bone.[2] Damage to the tibialis posterior tendon can occur in advanced cases of symptomatic ANB.

Type I ANB is a small round ossicle lodged in the tibialis posterior tendon; type II ANB is a comparatively big triangular ossification center connected to the navicular by synchondrosis; and type III ANB is the larger medial horn of the navicular bone.[3] Type III, commonly known as the cornuate navicular, is an uncommon morphological entity among the three main forms of ANB.[4] The presence of an accessory navicular bone does not necessarily become symptomatic.[5] The symptoms develop when the auxiliary navicular bone is too large or when a traumatism injures the connective tissue between the navicular and accessory navicular bones, causing a condition akin to a fracture.[6] The posterior tibial tendon is constantly extending the bone as it joins to the auxiliary navicular, generating increased displacement between fragments with each stride.

An ankle sprain or discomfort from rubbing shoes may be the cause of the pain. Flat feet are common in people with accessory navicular syndrome, which puts extra strain on the posterior tibial tendon, causing inflammation or irritation of the auxiliary navicular. During adolescence, while the bones are forming and the growth cartilage is turning into bone, signs and symptoms of accessory navicular may arise. However, symptoms may not appear until later in life.[6]

A noticeable bony prominence on the inner side of the foot, local hyperaemia, swelling, and vague bone discomfort are all signs and symptoms of accessory navicular syndrome, which frequently develop during or after activity periods. Medical history and uncomfortable sensitivity in the area of the navicular bone's head are prominent indicators of diagnosis. The surgeon will need a radiological examination to see the auxiliary navicular. Other tests are rarely necessary, however an MRI or CT scan might be helpful in determining the connection between the auxiliary navicular and the posterior tibial tendon.[7–9]

In order to alleviate the symptoms, non-surgical treatment may be used. Immobilization with a plaster splint, wearing boots when walking to allow the affected area to rest and reduce inflammation, applying an ice bag covered with a thin towel to the affected area to reduce swelling, and prescribing oral non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen are all options. Devices that fit into the shoe and offer support for the plantar arch may be utilized orthotically, and they may play an essential role in preventing future complaints. Symptoms of accessory navicular syndrome can return even after a good treatment. When this happens, nonsurgical treatments are frequently tried again, followed by surgical intervention if all nonsurgical approaches have failed to control the problem and the discomfort has become severe.

The problem is treated surgically by removing the auxiliary bone (which is not required for normal foot function), remodeling the area, and restoring the

posterior tibial tendon to improve its function. Kidner treatment is the most often used procedure to treat the symptomatic accessory navicular. Kidner described a link between the accessory navicular bone and a pes planus deformity in 1929 and L933. He also proposed a surgical procedure that involved removing the ossicle and completely transecting the tibialis posterior tendon before reattaching it to the navicular bone's plantar surface. The goal of the treatment was to relieve pain while also increasing the height of the medial arch. The bone is separated from the posterior tibial tendon and removed after a small incision is made in the location where the auxiliary navicular is palpated.[9] On the remaining normal navicular, the posterior tibial tendon is re-inserted. Threads are used to close the skin incision, and a bandage and plaster splint are used to keep the patient immobilized. After surgery, crutches should be used for several days, and suture threads should be removed within 10 to 14 days.

CASE REPORT

A 44 years old female patient come with a complaint of pain of medial sided part of the left foot since 3 months before admission. She felt the pain was aggravated by activity especially walking in for a long distance. Patient also realized that there is a small lump shown in the medial side of her left foot since 10 months ago. Patient never had medication neither treatment before. The patient had no problem with her shoes. The pre operative AOFAS Score was 65.

Physical examination reveals a 158 cm female with bodyweight of 50 kg. We spot bony prominence on the inner side of the left foot. Tenderness (+) when palpable, immobile, and sized 2x2 cm. Plantar flexion and dorsiflexion is normal. No sign of flat foot. Radiographic shown type-II accessory navicular. After we gave an explanation to the patient, she agreed to be operated.

Figure 1. AP and oblique x-ray on left foot showing type II Accessory navicular bone

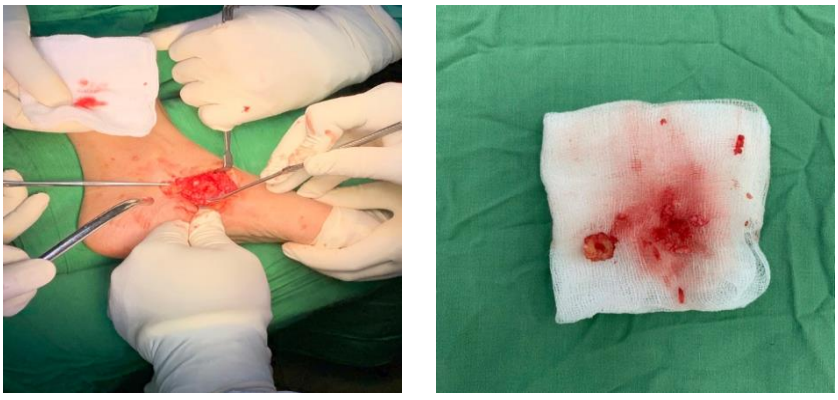

Figure 2. Intraoperative clinical picture, excision on accessory navicular bone

Figure 3. closing the wound by subcutaneous suture, and below knee cast was applied to maintain the position with ankle positioned at 90 degree angle to make the tiibialis posterior muscle relaxed

Figure 4. AP and oblique view post operative x-ray of left foot

The procedure was performed under general anaesthesia. Patient was placed on supine position on the operating table. Operation site was marked between medial malleolus and 1st metatarsal phalangeal. The incision starts from 1 cm around distal of malleolus medial to 1st metatarsal phalangeal joint through accessory navicular. Dissection performed in the retinaculum medial. After the accessory navicular exposed, excision was performed. After the excision, osteotomy (reshaping) was performed in the true navicular. After that, advancement tibialis posterior tendon was performed to the navicular by using ethibond suture 1.0.

The operation wound closed in layers with 2.0 vicryl for the subcutaneous fat, subcuticular undyed 3-0 vicryl. Dressing and below knee cast was applied to maintain the position with ankle positioned at a 90 degree angle to make the tibialis posterior muscle relaxed. Non-Weight-bearing start from the day after the operation. The cast is removed three weeks after the operation. One month after surgery, AOFAS Score was measured and the score was slightly increasing (70). Rehabilitation started 6 weeks after operation. Gradual return to activities and the sport is allowed over the course of three to four months postoperatively. After 3, 6, and 12 months of follow-up, the patient

had no issues, their physical examination was normal, and their AOFAS score increased gradually from 75, 85, and 90.

DISCUSSION

Accessory navicular is one of the most common accessory bones in the foot. Prevalent-wise, the incidence of accessory navicular bone is reported about 2-25% in the general population. A study by Alsager et al. reported accessory navicular bone was relatively common presenting to the outpatient foot and ankle clinic with a prevalence of 23.3%. [10]Accessory navicular bone should be properly addressed when treating a chronic foot pain, it should be distinguished from other conditions such as midfoot or hindfoot fractures. Proper identification and management of accessory navicular bone can contribute to more accurate diagnoses and targeted treatment strategies.

Diagnosing accessory navicular bone involves a combination of clinical assessment, evaluation of symptoms and imaging studies. During the initial evaluation, a thorough physical examination of the foot and ankle should be performed, looking for signs of swelling, tenderness, or any visible prominence. Symptomatic accessory navicular bone is frequently reported in young athletes with symptoms manifesting during exercise or walking, affecting their athletic performance. It is possible for accessory navicular bone to appear in childhood or in early adulthood. The most frequent cause of symptoms in children is pressure from the accessory bone against the shoe.[11] Flat foot secondary to accessory navicular bone is common due to posterior tibialis tendon insufficiency. [12] Imaging studies are often used to confirm the diagnosis, such as X-rays, MRI, or CT scans. Plain radiographic identification of the accessory navicular is mostly sufficient to determine accessory navicular pathology. It correlates with the Coughlin classification for accessory navicular bone. [13,14]

There are mixed reports on which type of Coughlin classification for accessory navicular bone is the highest. Huang et al. supports the more recent epidemiological study by Alsager et al. mentioned female (57.7%) is more commonly affected than men, with type I Coughlin classification of accessory navicular bone is the highest (41%). Type IIA was found the least common among other types.[10,15] On the contrary, a study by Kalbouneh et al. reported that, in India mentioned type II accessory navicular bone is the highest among all types of the Coughlin classification.[16] It suits our patient's case with type II Coughlin classification, in which the navicular tuberosity has a heart-shaped or triangular secondary ossification center that connects to the navicular via a 1-2 mm layer of fibrocartilage or hyaline cartilage. With additional tendon fibers extending to the navicular tuberosity and other tiny bones in the mid-foot, this synchondrosis restricts movement between the navicular and its auxiliary ossicle, which serves as the insertion point for portion of the posterior tibialis tendon. Radiological findings for accessory navicular bone includes accessory bone adjacent to navicular bone with smooth regular edges. MRI may be helpful in diagnosing accessory navicular bone. The MRI findings of painful type II accessory navicular bone are a persistent edema pattern in the accessory navicular bone and within the synchondrosis, indicating osteonecrosis, inflammation and destruction of the cartilage cap. Posterior tibial tendon dysfunction was clinically evident in most patients.[14]

Posterior tendon insufficiency occurs when the posterior tibial tendon becomes weakened or damaged, leading to progressive loss of support over the arch. As the condition worsens, aside from pain, patients may experience a progressive flattening and pronation of the foot, hence noticeable foot deformity and difficulty in walking or performing daily activities. Early intervention is essential in the management of posterior tendon insufficiency. Prevention of posterior tendon insufficiency

is key when managing accessory navicular bone. Conservative treatment options may include rest, ankle and foot immobilization with a brace or cast, physical exercise to strengthen the supporting muscle, orthotic to support the arch, and anti-inflammatory to manage pain and inflammation.[17] In severe cases, surgical intervention is necessary for accessory navicular bone removal and advancement of posterior tibial tendon to the remaining navicular bone, commonly called the Kidner procedure. Multiple options for joint preservation via tendon transfers and osteotomies exist which allow reduction of symptoms and enhanced function even though many of these procedures are not considered to be "arch restoring." In the original Kidner procedure, the entire posterior tibial tendon was released from the navicular and then rerouted through a drill hole placed through the navicular. The original Kidner procedure is now rarely used as a means of treating an isolated accessory navicular. Instead, a modification of the Kidner procedure has become more common place.[17] The modified Kidner procedure consists of carefully removing the accessory and anchoring the posterior tibial tendon to the surface of the navicular where the accessory was removed. The repair may be done by passing a suture through the tendon and then through drill holes in the navicular, or by using a suture anchor.

In our study, an implant-less Kidner procedure was performed successfully. A suture anchor instead of hardware materials like screws to fixate the tendon shows promising results with significant AOFAS score improvement at 1 year follow-up.[17,18] Cha et al. mentioned Kidner procedure provides satisfactory results even though in comparison to simple navicular excision procedure at long term 3 years follow-up, both gave satisfactory results and minimally restored the medial longitudinal arch similarly.[19] The Kidner procedure is generally considered a safe and effective surgical intervention for addressing symptomatic accessory navicular bone. However, as with any surgical procedure, there are potential complications that can arise. Complications may include infection, wound healing issues, nerve injury, blood vessel damage, or recurrence of symptoms. While these complications are relatively rare, they should be discussed with the surgeon prior to the procedure. [20 21]

Implantless Kidner procedure by anchoring the posterior tibial tendon is considered safe and effective. Nevertheless, Further research is needed to assess the superiority of the Kidner procedure over a long period of time and a larger sample population.

CONCLUSION

The accessory navicular is a commonly occurring deformity that, because of its significant accompanying pathomechanical considerations, is closely associated with the pathologic flexible flatfoot. We reported a 43 years old female with type II navicular accessories of the left foot treated with Kidner Procedure. Satisfactory result was observed with the patient able to weight bearing after the operation.

Declaration by Authors

Ethical Approval: This study was approved by the Research Ethics Committee Faculty of Medicine Udayana University, Denpasar, Bali, Indonesia. The Ethical Clearance is provided under the approval of the Chairman of the Committee

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