

Congenital Symptomatic Flat Foot with Talonavicular Coalition

Ram Shah, K.^{1*}, Sujan Paudel, R.² & Ankit Shrivastava³

¹Janaki Medical College, Janakpurdham, Nepal

²Scheer Memorial Adventist Hospital, Banepa, Nepal

³Janakpur Trauma Hospital, Janakpurdham, Nepal

*Correspondence to: Dr. Ram Shah, K., Janaki Medical College, Janakpurdham, Nepal.

Copyright

© 2019 Dr. Ram Shah, K., *et al.* This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Received: 09 July 2019

Published: 17 July 2019

Keywords: *Talonavicular; Tarsal Coalition; Flat Foot*

Abstract

Congenital talonavicular coalition is a rare condition which results in ankle and foot pain. Tarsal coalitions have a very low incidence (2%) in the general population and they are often underdiagnosed. The objective of this case report is to present the case of a 16 years old female patient with a bilateral symptomatic talonavicular coalition which was treated conservatively. A review of the literature was also carried out to better understand the management of this rare condition.

Introduction

Congenital fusion of two or more of the tarsal bones is known as tarsal coalition. It presents clinically as chronic ankle and foot pain. The incidence of tarsal coalition is as low as 2% [1]. It is classified on the basis of the morphology of the bridging tissue as fibrous (syndesmosis), chondral (synchondrosis), or bony (synostosis) bridge [2]. Demonstration of fibrous and cartilaginous coalitions by Magnetic resonance imaging found its incidence to be as high as 11% [3]. The clinical presentation may vary from an asymptomatic form to a chronic foot and ankle pain.

Talonavicular (TN) coalition is much less common than other tarsal coalitions [1,4]. It represents 1% of all tarsal coalitions [5,6]. The genetic anomalies associated with TN coalition have been identified as mutations of the noggin (NOG) gene [7]. TN coalition is frequently bilateral and associated with several orthopaedic anomalies, such as clinodactyly, symphalangism, great toe being shorter than the second and ball-and-socket ankle [6,8].

Though asymptomatic form is common, a small proportion of patients may have a painful bony prominence over the navicular, particularly during sports or working activities [6,9,10]. The present report describes a case of a patient with symptomatic bilateral TN coalition managed by conservative treatment.

Case Report

A 16 years old female patient arrived at our clinic complaining of bilateral foot and ankle pain without any history of trauma. She had pain for 5 years only during running, jumping and prolonged walking. The patient herself managed such symptoms by taking oral analgesics. Physical examination of the feet revealed the loss of the medial longitudinal arch of both feet (flatfoot deformity), with pain in the area of the navicular bone during inversion/eversion movements (Fig. 1). She complained of pain over the calcaneocuboid joint. No swelling was present at the examination, as no range of motion (ROM) limitation was assessed. No associated anatomical alterations, congenital disorders, or neurological impairments were recorded. Standard X-rays revealed an uncommon TN coalition (Fig. 2). No family history resulted for tarsal coalitions.



Figure 1: Congenital flat feet deformity



Figure 2: Weight-bearing X-rays of both feet in an oblique (A) and dorsoplantar (B) view, showing a bilateral talonavicular coalition

The patient, after receiving complete information on the different treatment options, agreed to be treated by conservative measures, such as paracetamol and ibuprofen in case of pain, physical therapy (eccentric exercises of the calf and laser therapy) and functional foot orthoses with medial arch supports for a 12-month period. This conservative treatment was well tolerated.

Discussion

TN coalition is reported to be less common than talocalcaneal or calcaneonavicular type. Calcaneonavicular and talocalcaneal coalitions are more symptomatic than TN. These usually are incidentally discovered on plain X-rays after a minor trauma [11]. Diagnosis is made at variable age; previous publications have reported cases of 20 as well as 50 years old patients [1,8,9].

Clinical symptoms of the tarsal coalition are usually seen after sprains or other minor injuries to the involved foot. This leads to a rigid, painful foot. The pain is worsened by continued activities [12]. Subtalar stiffness results in pathologic kinematics with increased risk of ankle sprains, planovalgus foot deformity, and progressive joint degeneration [13].

As for other deformities, its etiology is probably a failure of differentiation and segmentation of the primitive mesenchymal tissue [8]. Although reportedly transmitted as an autosomal-dominant disorder, tarsal coalition may be inherited as an autosomal-recessive trait [9]. Moreover, the majority of such congenital alterations are reported as bilateral [6,9,10] and associated with other deformities, such as symphalangism, multiple synostosis syndrome, tarsal-carpal coalition syndrome, brachydactyly type, and stapes ankylosis with broad thumb and toes [7,14].

The abnormal union of tarsal bones may lead to excessive strain on the other joints that are characterized by overuse stresses to compensate the loss of ROM due to coalition [15-17]. A TN coalition may have an

almost complete restriction of inversion–eversion movement, thereby increasing the overload on the subtalar joint. Also, the first metatarsophalangeal joint may suffer for such increase of stress resulting in hyperkeratosis and secondary hyperpronation of the foot [9].

In the present case, there was no family history indicating a probable autosomal dominant nature of the coalition. All degenerative changes mentioned before have been found in the described case, particularly for the right foot. Furthermore, the mechanical overload of the calcaneocuboid joint referred by the patient could be observed in the right foot.

Treatment options for tarsal coalitions may vary from conservative to surgical procedures. Conservative therapy is necessarily considered first line, while surgery is performed in the case of failure [18-20]. In such cases, both osteotomy and joint fusion have been considered useful strategies [16-18].

Different types of surgeries were described in talocalcaneal and calcaneonavicular coalitions with unpredictable long-term results, but no such findings were reported in the literature on TN coalitions [21,22]. Miguez *et al*, [9] in a symptomatic TN bilateral coalition, performed a calcaneocuboid joint distraction arthrodesis and plantarflexion osteotomy of first metatarsal to relieve pain and improve alignment of both feet [9]. Ellington *et al*, [16] in patients with ball and socket ankle joint associated with a talonavicular tarsal coalition, compared the supramalleolar osteotomy with the tibiotalar calcaneal arthrodesis.

Surgery has demonstrated good short-term results but long-term follow-up on TN coalitions is not available [8,18] On considering current life expectancy of the general population and undisclosed long-term results of the surgical techniques, it is legitimate to consider conservative treatment as the first option. Moreover, patient's age and the moderate symptoms referred led us to propose a conservative management as the first choice. The patient was informed that in the case of recurrence of symptoms, a surgical solution–arthrodesis or osteotomy–may be considered in the future.

Conclusion

Talonavicular coalition is a rare condition that should be taken into consideration as a cause of bilateral chronic foot pain and midfoot osteoarthritis. The conservative treatment appears to be the gold standard, given the variable outcomes of surgery in the literature.

Bibliography

1. Shtofmakher, G., Rozenstrauch, A. & Cohen, R. (2014). An incidental talonavicular coalition in a diabetic patient: a podiatric perspective. *BMJ Case Rep.*, 2014.
2. Lawrence, D. A., Rolen, M. F., Haims, A. H., Zayour, Z. & Moukaddam, H. A. (2014). Tarsal Coalitions: Radiographic, CT, and MR Imaging Findings. *Hss j.*, 10(2), 153-166.
3. Nalaboff, K. M. & Schweitzer, M. E. (2008). MRI of tarsal coalition: frequency, distribution, and innovative signs. *Bull NYU Hosp Jt Dis.*, 66(1), 14-21.

4. Bonk, J. H. & Tozzi, M. A. (1989). Congenital talonavicular synostosis. A review of the literature and a case report. *J Am Podiatr Med Assoc.*, 79(4), 186-189.
5. Vincent, K. A. (1998). Tarsal coalition and painful flatfoot. *J Am Acad Orthop Surg.*, 6(5), 274-281.
6. David, D. R., Clark, N. E. & Bier, J. A. (1998). Congenital talonavicular coalition. Review of the literature, case report, and orthotic management. *J Am Podiatr Med Assoc.*, 88(5), 223-227.
7. Takano, K., Ogasawara, N., Matsunaga, T., Mutai, H., Sakurai, A., Ishikawa, A., et al. (2016). A novel nonsense mutation in the NOG gene causes familial NOG-related symphalangism spectrum disorder. *Hum Genome Var.*, 3, 16023.
8. Kembhavi, R. S. & James, B. (2015). A Rare Combination of Ipsilateral Partial Talocalcaneal and Talonavicular Coalition. *J Clin Diagn Res.*, 9(12), Rd07-8.
9. Migues, A., Slullitel, G. A., Suarez, E. & Galan, H. L. (2009). Case reports: symptomatic bilateral talonavicular coalition. *Clin Orthop Relat Res.*, 467(1), 288-292.
10. Bryson, D., Uzoigwe, C. E., Bhagat, S. B. & Menon, D. K. (2011). Complete bony coalition of the talus and navicular: decades of discomfort. *BMJ Case Rep.*, 2011.
11. Macera, A., Teodonno, F., Carulli, C., Frances Borrego, A. & Innocenti, M. (2017). Talonavicular Coalition as a Cause of Foot Pain. *Joints.*, 5(4), 246-248.
12. Bohne, W. H. (2001). Tarsal coalition. *Curr Opin Pediatr.*, 13(1), 29-35.
13. Klammer, G., Espinosa, N. & Iselin, L. D. (2018). Coalitions of the Tarsal Bones. *Foot Ankle Clin.*, 23(3), 435-449.
14. Brennan, S. A., Kiernan, C., Maleki, F., Bergin, D. & Kearns, S. R. (2012). Talonavicular synostosis with lateral ankle instability-A case report and review of the literature. *Foot Ankle Surg.*, 18(3), e34-6.
15. Pontious, J., Hillstrom, H. J., Monahan, T. & Connelly, S. (1993). Talonavicular coalition. Objective gait analysis. *J Am Podiatr Med Assoc.*, 83(7), 379-385.
16. Ellington, J. K. & Myerson, M. S. (2013). Surgical correction of the ball and socket ankle joint in the adult associated with a talonavicular tarsal coalition. *Foot Ankle Int.*, 34(10), 1381-1388.
17. Southerland, J. T., Boberg, J. S., Downey, M. S., Nakra, A. & Rabjohn, L. V. (2012). McGlamry's comprehensive textbook of foot and ankle surgery: Lippincott Williams & Wilkins.
18. Doyle, S. M. & Kumar, S. J. (1999). Symptomatic talonavicular coalition. *J Pediatr Orthop.*, 19(4), 508-510.

19. Ozyurek, S., Guler, F., Turan, A. & Kose, O. (2013). Symptomatic talar beak in talocalcaneal coalition. *BMJ Case Rep.*, 2013.
20. Varner, K. E. & Michelson, J. D. (2000). Tarsal coalition in adults. *Foot Ankle Int.*, 21(8), 669-672.
21. Swiontkowski, M. F., Scranton, P. E. & Hansen, S. (1983). Tarsal coalitions: long-term results of surgical treatment. *J Pediatr Orthop.*, 3(3), 287-292.
22. Khoshbin, A., Law, P. W., Caspi, L. & Wright, J. G. (2013). Long-term functional outcomes of resected tarsal coalitions. *Foot Ankle Int.*, 34(10), 1370-1375.