

Case Report

Acquired Flat Foot due to Tibialis Posterior Rupture, a Known Yet Missed Cause

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Abstract

Rupture of tibialis posterior tendon is a known cause of acquired flat foot but the diagnosis is missed or delayed in most of the cases. It may lead to significant morbidity. We present a case of 13 years old boy with history of blunt trauma to his left foot one year back and presented with pain medial aspect of right foot and difficulty in prolonged walking and running. Clinically he had a flat and hyperpronated foot. His x-rays were normal and MRI revealed partial tear of posterior tibial tendon. He was recommended medial arch support, shoe modification, NSAIDs and referred to orthopedic surgeon for repair. Posterior tibialis tendon dysfunction is one of the concealed injuries that require earliest diagnosis and immediate attention, failing which the outcomes can have debilitating effects on patient's quality of life. This is important to prevent foot deformities and long term disability.

Key words: Acquired flat foot, tibialis posterior, diagnosis.

Introduction :

Acquired flat foot is a rare condition which can be due to neuropathic, degenerative and traumatic causes¹. Rupture of tibialis posterior is a known cause of acquired flat foot but the diagnosis is delayed in most of the cases². The likelihood of tibialis posterior involvement as a potential cause of flat foot deformity is less emphasised in clinical practice, even though it has an established association with foot trauma. Missed or delayed diagnosis leads to significant morbidity especially in active individuals due to chronic pain³. Late complications include a rigid deformity with forefoot abduction and valgus heel. Rupture of tibialis posterior muscle is diagnosed on clinical evaluation and can be confirmed by ultrasound, bone scintigraphy

and MRI⁴. Conservative treatment includes, rest, ice, immobilisation and orthosis⁵. For refractory or advance cases, surgical options may be considered, which include tendon debridement, tendon transfer, corrective osteotomy and orthodesis⁶.

Case Report :

A 13-year-old male presented to our clinic with complaint of pain on medial aspect of left foot and sole. His pain started one year ago after sustaining a blunt trauma to the undersurface of right foot while he was running barefooted. He described it as a sharp pain of acute onset. He could not recall any ankle twisting but had temporary ankle swelling for which he did not seek any medical advice initially. His swelling subsided gradually while a dull pain on the medial border and sole of the foot persisted. His symptoms were aggravated with standing, walking and running which was limiting his mobility and sporting activities. He remained under follow-up with general physician and orthopaedician, and had multiple x-rays of his foot. His condition did not improve with use of topical analgesics and short courses of NSAIDs. His symptoms progressively got worse and were later referred to rehabilitation medicine for further management. There was no history of any metabolic or inflammatory disorder. On examination he had pesplanovalgus deformity on left side with flattening of medial longitudinal arch while the right foot was normal. There was hyperpronation and

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abduction of left forefoot (Fig 1). Localised tenderness was present over the navicular bone area. Medial arch was lower on the affected side and was unable to perform left heel raise. Active range of motion of ankle and foot were normal. He had an antalgic gait pattern. X rays of the left foot did not reveal any bony abnormality. His baseline lab investigations including blood complete picture, erythrocyte sedimentation rate, C-reactive protein, serum uric acid, blood sugar random and rheumatoid factor were within normal limits. MRI of the left foot revealed a partial tear to the tibialis posterior tendon at its insertion into the navicular bone (Fig 2). A diagnosis of acquired flat foot secondary to partial tear of tibialis posterior was established. The patient was recommended orthotic medial arch support, shoe modification and physiotherapy and was referred to orthopaedic surgeon for tendon repair.

Discussion:

Acquired flat foot has a number of causes which include degenerative changes secondary to osteoarthritis, inflammatory arthritis and fractures of the foot and ankle¹. Neuropathic conditions include diabetes mellitus, severe peripheral neuropathies and leprosy while acquired causes include tear of the spring ligament, tibialis posterior rupture and rarely tear of tibialis anterior⁷. Patients with acquired flat foot secondary to a generalised medical condition are diagnosed early as compared to those patients developing it after a traumatic event. There can be a delay of months to years before a correct diagnosis is reached as most patients presenting with posterior tibialis tendon dysfunction are misdiagnosed as ankle sprain or arthritis⁸.

Tibialis posterior is plantar flexor and invertor of the foot. It is a dynamic stabiliser of medial longitudinal arch of the foot. It lies posterior to the medial malleolus and inserts into the navicular tuberosity and plantar aspect of tarsal bones. The tendon is at greatest stress immediately after heel strike when foot moves into increased inversion⁹. Foot inversion after heel strike predisposes the tendon to greatest stress⁹. Tibialis posterior rupture is a documented cause of acquired flat foot deformity but it is often missed on clinical examination leading to a delay in diagnosis. Patients are insufficiently treated and are likely to have further complications. In a case series of 17 patients with posterior tibial tendon rupture, the average time to treatment was found to be 43 months¹⁰. In all but two of the patients, incorrect diagnosis had been made on initial assessment. In almost all patients who sustain a

rupture of the tibialis posterior tendon, there is a history of ankle trauma¹. Typically the mechanism of injury is forced foot eversion. Younger patients and athletes, tend to sustain a traumatic avulsion of the tendon at its insertion into the navicular, while middle aged or elderly individuals often have inflammatory or degenerative type tear.

Its prevalence increases with age and is found to be up to 10% among elderly. Diabetes mellitus, seronegative arthritis, hypertension, steroid injection around the joint are associated risk factors of tibialis posterior rupture¹¹. The tibialis posterior dysfunction progression has been classified in four stages which facilitates its management¹². Stage I ; is tendon inflammation, stage II; the tendon is elongated and there is acquired flat foot deformity, stage III ; fixed foot deformity with degenerative changes at subtalar joints and stage IV; additional degenerative changes at ankle joints.

The diagnosis is mainly clinical. It usually presents with tenderness and swelling at the medial aspect of the foot with difficulty in inversion of foot and inability to stand on forefoot. The arch gradually collapses, the heel goes into valgus and the forefoot is abducted leading to 'too many toes' sign¹³. Radiographs are recommended to rule out other causes and to stage the rupture depending on the degenerative changes in the ankle and subtalar joints. Conservative treatment is focused on rest, icing, immobilisation, orthotic supports, NSAIDs and modified footwear¹⁴.

The surgical management includes tendon debridement, tendon transfer and osteotomy for stage I, tendon transfer and reconstruction for stage II and subtalar and pan talar orthodesis for stage III and stage IV respectively⁶. Closed fractures of ankle have been associated with posterior tibialis tendon ruptures. Hence soft-tissue injuries must be considered in the management of unusual or complex fractures around ankle.¹⁵ Though it remains one of the commonest ruptured tendon in adult foot injuries, non-specific symptoms of foot pain and complexity of foot dynamics may distract the physicians to consider ligamentous and joint injuries as their initial diagnoses. Initial x-rays are usually focused on fractures and dislocations and low arches can be overlooked as an obscure sign of an underlying soft tissue injury. MRI may appear to be an aggressive modality in the initial phases of investigating a painful foot. Hence it is usually reserved for refractory cases as it is expensive and not readily available, especially in developing health systems.

Conclusions:

Posterior tibialis tendon dysfunction is one of the concealed injuries that requires earliest diagnosis and immediate attention, failing which, the outcomes can have debilitating effects on patient's quality of life. Clinical and radiological evidence of flat foot post-trauma, should raise a high suspicion of posterior tibialis tendon rupture as it occurs more frequently than anticipated, and has tremendous therapeutic implications. This is important to prevent foot deformities and long term disability.



Fig 1: Hyperpronation of Left Foot



Fig 2: MRI Left Foot Showing Partial tear of Tibialis Posterior

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