CASE REPORT

Pseudoaneurysm of the Posterior Tibial Artery Following Tenotomy in Congenital Talipes Equinovarus (CTEV)

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Abstract

A two-week-old infant with congenital talipes equinovarus (CTEV) deformity was managed by Ponseti technique and Achilles tenotomy following which the child developed a pseudoaneurysm of the posterior tibial artery. Further management of the child was done by sequential casting following which the pseudoaneurysm involuted spontaneously. Subsequently, a percutaneous Achilles tenotomy was performed.

Keywords: Achilles, Clubfoot, Ponseti.

Introduction

Idiopathic clubfoot or congenital talipes equinovarus (CTEV) is one of the commonest congenital deformities of childhood encountered in the outpatient department (OPD). Conventionally, clubfoot is managed conservatively using manipulative method which involves serial casting followed by a long-term brace for maintaining the correction as described by Dr. Ignacio Ponseti in the late 1940s.[1]

After achieving complete foot abduction with the serial Ponseti casting, majority of patients also warrant a percutaneous tenotomy of the Achilles tendon to address the remaining equinus deformity.[2] Unfortunately patients with idiopathic clubfoot frequently have underlying vascular malformations in their lower limbs.[3-6] In over 90% of limbs with clubfoot, the anterior tibial artery is either absent or significantly reduced.[6-8] When conducting either an open clubfoot release or a percutaneous Achilles tenotomy on a patient with an absent posterior tibial artery and a deficient anterior tibial artery, the peroneal artery becomes the major artery to the foot and must be very carefully protected.[4,9] Complications following percutaneous Achilles tenotomy are rare. Dobbs, *et al*. documented four instances of bleeding complications (from a series of 219 tenotomies) that were thought to have been brought on by injuries to the peroneal artery and/or the smaller saphenous vein during the percutaneous Achilles tenotomy.[10] None required vascular surgical intervention to resolve, and none developed into a pseudoaneurysm. Burgardt, e*t al*. described a case of a pseudoaneurysm that developed after a percutaneous Achilles tenotomy and relapsed deformity. The pseudoaneurysm was effectively treated with further Ponseti casting with an emphasis on placing pressure on it by moulding the cast.[11] We present a child wherein the pseudoaneurysm that developed following a percutaneous Achilles tenotomy was managed conservatively by serial casting.

Case Description

A 2-week-old baby girl, born at 37 weeks gestation by normal vaginal delivery, was brought to the pediatric orthopedic outpatient department for a gross deformity in both feet noticed since birth. Examination revealed bilateral CTEV deformity. The Pirani Score was six bilaterally suggestive of bilateral severe deformity. The parents denied any family history of CTEV.

The baby was managed by sequential manipulation and casting for the next five weeks by the Ponseti method. A senior orthopedic surgeon with significant prior experience performed bilateral percutaneous Achilles tenotomy under local anesthesia. Ponseti cast was applied for the next three weeks in 20º dorsiflexion. One day after removal of the case, a swelling of 3 cm × 2 cm size was noticed over the posteromedial aspect of the left ankle (**Fig. 1**). The overlying skin appeared erythematous but

Fig.1 Swelling over posteromedial aspect of left ankle noticed following first tenotomy.

Fig.2 Resolution of left ankle swelling due to pseudoaneurysm following sequential casting.

without any associated local rise of temperature. Aspiration of the swelling revealed altered bloody fluid. Culture of the aspirated fluid did not reveal any bacterial growth. Doppler ultrasound of the swelling was suggestive of a thrombosed pseudoaneurysm of size 2.5 cm × 2.3 cm on the posteromedial aspect of the left ankle communicating with the posterior tibial artery (PTA) through a neck, with a sack of size 1.6 cm × 0.8 cm filled with the color flow. The neck of the pseudoaneurysm was proximal to the terminal bifurcation of the PTA artery.

Further management of the pseudoaneurysm was done by Ponseti casting for four weeks with an emphasis on placing pressure on it by moulding the cast. An excellent correction of the deformity was achieved, although some equinus deformity remained in the left ankle. The pseudoaneurysm was thrombosed as confirmed by repeat ultrasonography of the left ankle. We further continued casting for the next two weeks till the swelling was completely resolved. A repeat percutaneous Achilles tenotomy was done 3 months after the initial tenotomy, and a cast was applied for three weeks. Following the removal of the cast, a tenotomy scar was seen with no swelling and the foot had excellent correction (**Fig. 2**). We then applied a foot abduction brace with a bar. The patient was regularly followed in the outpatient department; a follow-up visit seven months after the tenotomy revealed 20° dorsiflexion and 50° abduction, bilaterally with no recurrence of left ankle swelling.

Discussion

Ponseti technique of casting for idiopathic clubfoot is a time-tested and trusted technique of manipulation of CTEV deformity.[1] Percutaneous Achilles tenotomy performed as a part of this method, is required in approximately 60-90% of patients and is reported a safe procedure without any complications.[2,10] Numerous studies have documented the presence of vascular abnormalities in the lower extremities in individuals with idiopathic clubfoot.[3-9] Almost 90% of limbs with clubfoot deformity have an absent or significantly reduced anterior tibial artery perfusion.[6-8]

When performing either an open clubfoot release or a

percutaneous Achilles tenotomy on a patient with an absent posterior tibial artery and a deficient anterior tibial artery, the peroneal artery becomes the main artery to the foot and needs to be safeguarded with extreme caution.[4-9] Pseudoa-neurysm is a vascular anomaly that develops when the continuity of the artery wall is disrupted as due to an infection, trauma, or iatrogenic reasons. It results in the creation of a perfused sac around an injured vessel, enclosed by the media, adventitia, or soft tissue.[10] Pseudoaneurysm following percutaneous Achilles tenotomy is a rare complication and its management has been reported by various authors. In 2004, Dobb, *et al*. reviewed 219 idiopathic clubfeet cases, wherein a percutaneous Achilles tenotomy was done in 200 cases (91%) when less than 10° dorsiflexion persisted after casting. Four (2%) patients had serious bleeding complications, three of which were thought to be caused by a presumed peroneal artery injury and one by a lesser saphenous vein injury, warranting a omprehensive lower extremity vascular assessment prior to Achilles tenotomy.[11] Burghardt, *et al*. reported a case of pseudo-aneurysm after Ponseti percutaneous Achilles tenotomy in a 15-weeks-old boy with bilateral idiopathic clubfoot in which percutaneous Achilles tenotomy was done bilaterally and a Ponseti cast was applied for three weeks. The pseudo-aneurysm was effectively treated with further Ponseti casting with an emphasis on placing pressure on it by moulding the cast.[12] Doshi, *et al*. reported a case of bilateral pseudoaneurysm following percutaneous Achilles teno-tomy. A color doppler ultrasound scan of the Achilles tendons on both limbs confirmed a pseudoaneurysm arising from the distal peroneal arteries. To allow for soft tissue recovery, they chose to remove the cast for a week before continuing bilateral below-knee plaster cast treatment. After casting weekly for four weeks, they noticed a necrotic area over the tenotomy site on the left side. Pseudoaneurysms were managed surgically with excision, hematoma evacuation, and peroneal artery ligation, followed by Achilles tendon lengthening.[13]

We conclude that a thorough lower extremity vascular examination (palpation of dorsalis pedis, posterior tibial, and peroneal artery pulses) should be done in every patient before performing Achilles tenotomy. Doppler ultrasono-graphy should be considered in patients with absent dorsalis pedis and/or posterior tibial artery and an open tenotomy should be considered to avoid complications. If pseudo-aneurysm occurs following the percutaneous Achilles tenotomy, it may be managed with additional Ponseti casts with an emphasis on moulding over the swelling, till the swelling completely involutes. A repeat doppler ultrasono-gram is advised to confirm the resolution of the pseudoaneurysm. If it is completely obliterated, we can repeat the Achilles tenotomy and keep the foot in a foot abduction brace and followed up regularly.

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