CASE REPORT

Correction of neglected vertical talus deformity in an adult

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SUMMARY

Congenital vertical talus is an uncommon foot deformity that is characterised by a fixed dorsal dislocation of the navicular on the talar head and neck. Left untreated, a congenital vertical talus causes significant long-term disability. We present a case of neglected vertical talus in a middle-aged woman who was successfully treated with resection of the talar head and tendon transfers.

BACKGROUND

Congenital vertical talus is an uncommon foot deformity that is characterised by a fixed dorsal dislocation of the navicular on the talar head and neck.¹ The peroneal and anterior tibialis tendons are contracted, and the foot is everted into a valgus, externally rotated, position. The head of the talus is palpable on the plantar medial aspect of the mid-foot. The Achilles tendon is contracted and the calcaneus is in equinus. Clinically, it is characterised by hindfoot equinus, hindfoot valgus, forefoot abduction and forefoot dorsiflexion at the mid-tarsal joint creating a rocker-bottom appearance.² This deformity can either be idiopathic and isolated or can occur with other conditions such as:

neural tube defects; neuromuscular disorders; malformation syndromes and in chromosomal aberrations.³

The goals of treatment are to restore the normal anatomic relationships between the talus, the navicular and the calcaneus, in order to provide a normal weight distribution through the foot. The operations range from major reconstructive surgeries of extensive peritalar release or mid-tarsal release to serial manipulation, casting followed by talonavicular pin fixation and percutaneous tenotomy of the Achilles tendon.²⁻⁶

Left untreated, a congenital vertical talus causes significant long-term disability. Ambulation is usually not delayed but gait is usually awkward with difficulty balancing. The forefoot becomes rigidly abducted and wearing footwear becomes difficult.⁷ Since the heel does not touch the ground, patients have poor push-off and are forced to weight bear on the talar head, which develops painful callosities at early adolescence.² After the age of 3 years, an untreated vertical talus results in permanent deformity in the anterior and middle subtalar facets. There may not be sufficient remodelling potential of the articular surfaces after an

Figure 1 Preoperative clinical photos. (A) Left foot lateral view. (B) Right foot lateral view showing callosity around the talar head. (C) Bilateral forefoot abduction. (D) Valgus heels.

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Figure 2 Preoperative radiographs. (A) Bilateral forefoot abduction. (B) Right vertical talus. (C) Left oblique talus.

open reduction of the talonavicular joint and a medial column shortening, and a lateral column lengthening procedure may be necessary. Patients older than 8 years of age often require a triple arthrodesis.² We present a case of neglected vertical talus in a middle-aged woman who was successfully treated with resection of the talar head and tendon transfers.

CASE PRESENTATION

A 56-year-old woman had bilateral foot deformity since youth. Until recently, she did not seek medical advice. In recent years, she reported increasing pain over the right medial mid-foot prominence and right knee. Clinically, there was rocker bottom deformity of both feet with painful callosity over the medial arch bony prominence of the right foot and valgus heel. There were hallux elevatus and hallux flexus deformities (figure 1). All the deformities were rigid. X-rays showed right vertical talus and left oblique talus deformities (figure 2). The right subtalar joint was dislocated with the calcaneus seat under the fibula.

There were no syndromal features or neurological problems. Correction of right foot deformity was performed.

TREATMENT

The patient was put in a supine position and a thigh tourniquet was provided. A medial longitudinal incision was made. The talus was exposed and osteotomised at the level of the upper surface of the calcaneus. This allowed subsequent medial shift of the calcaneus under the talar body (figure 3). The resected talar head and neck were morselised. The tibialis anterior tendon was identified and a long Z-cut was performed. The distal segment was transferred proximally through the navicular insertion of the tibialis posterior tendon. A bone tunnel was made from the sustentaculum tali to the lateral calcaneal wall around the peroneal tendons. A lateral incision was made. The tight lateral capsuloligamentous structures and the ligaments of the sinus tarsi were released and the tight peroneus brevis tendon was cut so that the calcaneus could be shifted medially under the talar body. The peroneus longus tendon was sutured

Figure 3 Resection of the talar head (arrow) at the level of the calcaneal facet (red line).

Figure 4 (A) Long Z-lengthening of tibialis anterior tendon. (B) The distal limb (a) was transferred plantar through the tibialis posterior insertion (b). (C) A bone tunnel was made at the sustentaculum tali (d). (D) The distal limb was transferred laterally through the bone tunnel. (c) Navicular. (e) Talar dome.

Figure 5 Lateral wound. The distal limb of the tibialis anterior tendon (a) and the peroneus longus tendon (b) were sutured to the proximal stump of the peroneus brevis tendon (c).

under tension to the proximal stump of the peroneus brevis. The distal segment of the tibialis anterior tendon was transferred laterally through the bone tunnel (figure 4). It was sutured under tension to the proximal stump of the peroneus brevis (figure 5). The dorsal proximal part of the navicular and the tubercle of the navicular were resected as it impinged onto the distal tibia and medial malleolus, respectively, during correction of the forefoot abduction by tensioning of the distal tibialis anterior tendon segment. The superficial deltoid ligament was plicated and reinforced by suturing the proximal tibialis anterior tendon to the tibialis posterior tendon insertion. The valgus heel deformity was then corrected (figure 6). The subtalar joint was packed with the morselised bone graft.

Next, the hallux elevatus and hallux flexus deformities were corrected. The flexor hallucis brevis insertion was released. The flexor hallucis longus was cut at its insertion and transferred to the neck of first metatarsal to plantarflex the first metatarsal (figure 7). The medial column of the foot was stabilised by the

Figure 6 (A–C) The superficial deltoid ligament (b) was plicated and augmented by transfer of the proximal limb of the tibialis anterior tendon (a). (D) The valgus heel was corrected.

Figure 7 (A) The flexor hallucis brevis (a) and longus (b) were cut at their insertions. (B and C) The flexor hallucis longus tendon was transferred dorsally through a bone tunnel at the neck of the first metatarsal (c) and sutured to itself. (D) The hallux elevatus and flexus deformities were corrected.

Figure 8 Illustration of the tendon transfers. Flexor hallucis longus (FHL) was transferred to the neck of the first metatarsal. The distal limb of the tibialis anterior tendon (TAd) was transferred plantarly to calcaneus. The proximal limb of the tibialis anterior tendon (TAp) was transferred to the superficial deltoid ligament and the tibialis posterior insertion.

tendon transfers (figure 8). A short leg cast was applied and the patient was advised non-weight-bearing walking for 8 weeks and then weight bearing walking with a cast boot for another 4 weeks.

OUTCOME AND FOLLOW-UP

At follow-up 21 months after the operation, the painful callosity had subsided and the hindfoot valgus, forefoot abduction, hallux elevatus and flexus deformities were corrected (figure 9).

DISCUSSION

Resection of the talar head was performed in this patient in order to relieve the pressure of the medial arch. The resection is at the level of the calcaneal facet. This can facilitate the correction of the subtalar dislocation in order to prevent recurrent deformity.^{8 9} Shortening of the medial column by resection of the talar head can facilitate subsequent correction of the

Figure 9 (A and B) Postoperative clinical photos. (C and D) Postoperative radiographs.

forefoot abduction by tendon transfers. The plantar rerouting of the tibialis anterior tendon acts as a strong plantar support to the medial column and an adductor to the forefoot.¹⁰ The navicular was not excised because the navicular tubercle and the tibialis posterior insertion was an important anchorage point for the tendon transfers. Medial column plantar wedge osteotomy has been suggested to correct the hallux elevatus and flexus deformities.^{11 12} This was not needed in this case as the talar head was already resected and the navicular was hinged on the distal tibia. Flexor hallucis longus transfer can provide sufficient correction.¹³ The valgus heel deformity was corrected by the medial translation of the calcaneus under the talus and stabilised by plication of the superficial deltoid ligament and tibialis anterior tendon transfer. By means of the tendon transfers, correction of the deformity without the need of implant fixation can be achieved. The problem of this approach is that the normal talonavicular relationship cannot be achieved and the ankle motion is expected to be limited. This may be beneficial to this patient as the ankle joint was already degenerated. Limitation of ankle motion may retard the rate of deterioration.

Learning points

- ▶ Neglected vertical talus deformity results in painful deformity affecting weight bearing and walking.
- ▶ Correction of the lateral translation of the calcaneus underneath the talus is important.
- ▶ Resection of the talar head and tendon transfers is a feasible approach.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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