TIBIALIS POSTERIOR TRANSFER FOR THE CORRECTION OF FOOT DROP IN LEPROSY

LONG-TERM OUTCOME

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A comparison was made of the results produced by the circumtibial and interosseous routes of transfer of tibialis posterior for the correction of foot drop due to leprosy neuritis. The findings in 69 feet, of which 63 also had elongation of tendo Achillis, showed that the interosseous route gave a much lower incidence of recurrent inversion deformity of the foot. The results, in terms of improvement in gait and prevention of trophic changes, were satisfactory.

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Foot drop due to paralysis of the anterior tibial and peroneal muscles is found in 2% to 5% of newly-diagnosed leprosy patients (Schipper et al 1994; van Braekel and Khawas 1994).

Leprosy neuritis affects nerves where they are close to the skin and pass through a narrow fibro-osseous canal. In the leg this involves the lateral popliteal nerve at the neck of the fibula which leads to foot drop, and the posterior tibial nerve in the tarsal tunnel which produces anaesthesia of the sole. When both nerves are damaged the main impact of walking falls on the anaesthetic forefoot rather than on the heel and causes trophic ulceration.

The aim of this study was to assess the long-term outcome of tibialis posterior transfer for the correction of foot drop due to leprosy and to compare the circumtibial (CT) with the interosseous (IO) route.

PATIENTS AND METHODS

Between 1987 and 1993 at the Anandaban Leprosy Hospital, Kathmandu, Nepal, 110 corrections for foot drop were performed on 105 feet in 95 patients (83 men and 12 women). Five of the circumtibial corrections were revised to an interosseous route during the period of the study. Ten patients had bilateral corrections.

Final follow-up data on recurrent inversion were available for 69 feet at least six months after operation, and for 59 of them also measurements of active dorsiflexion and plantar flexion and records of recurrent ulceration and bone loss.

The average age of the patients was 33.5 years (13 to 75), and the average duration of foot drop before operation was 4 years 3 months. Of the 69 reviewed feet, 53 had had complete foot drop whereas in 16 only the dorsiflexors were affected and the evertors were normal. The CT route was used in 26 feet, mainly before 1992, and the IO route in 43; 32 operations were on the left foot and 37 on the right.

Operative techniques. The main details of the technique for the IO route have been described elsewhere (Selvapandian and Brand 1959; Srinivasan 1968; Warren 1968; Richard 1989). Tendo Achillis is routinely lengthened by an open Z lengthening and sutured so that the foot can be passively dorsiflexed to at least 65°. To prevent adhesions to the tibia and for better lateral lift it is important that the interosseous membrane is widely opened and that the tibialis posterior is rerouted from the posterior to the anterior compartment lateral to the wasted belly of tibialis anterior. A lateral slip of the tendon is attached to the peroneus brevis or tertius tendons at maximum tension with the foot dorsiflexed to 20°. The medial slip is sutured to the tibialis anterior tendon at neutral tension. The leg is placed in a plaster cast for three weeks with the foot well dorsiflexed to relieve tension on the tendon sutures.

In the CT transfer, the tibialis posterior tendon is brought medially and subcutaneously around to the front of the tibia. After being withdrawn into the lower medial leg it is split into two slips and tunnelled to the dorsum of the foot. The slip to the peroneal tendons must cross at least 3 cm above the ankle to ensure eversion.

The medial slip of the transferred tendon was attached to tibialis anterior in 68 feet and to extensor hallucis (an old preferred method) in one. The lateral slip was attached to extensor digitorum longus in 31 feet early in the series, and to the peronei in 38 feet. It is generally believed that attachment to extensor digitorum longus leads to a higher incidence of clawing in mobile toes and this transfer is not now used.
After three weeks the cast is split and intensive re-education is begun. This includes contraction of tibialis posterior to dorsiflex the foot and later, co-ordination exercises (alternate dorsiflexion and relaxation but not plantar flexion) and relearning of ‘swing-phase walking’ with crutches. In the third week out of plaster the patient is allowed partial weight-bearing in parallel bars or with crutches and continues to practise swing-phase walking on parallel bars. Active plantar flexion is allowed six weeks after operation and the patient is given a sandbag (500 to 1000 g) to use for exercises to build muscle strength. Patients gradually increase weight-bearing until by the ninth or tenth week after operation they can walk without crutches, and can practise walking up and down stairs. Usually at the end of that week they are ready for discharge from intensive physiotherapy.

RESULTS

The average duration of immobilisation in plaster was 28 days (21 to 42) and the average time to discharge from hospital from the date of operation was ten weeks (6 to 30). The average final follow-up was 31 months (6 to 85).

Of the 59 feet for whom preoperative and final follow-up data on further bone loss were available, 45 (76%) had no further bone loss and only two (4%) had more than two ‘points’ of bone loss after the operation. Each toe and each metatarsal head count as one ‘point’.

All of the CT transfers and half of the IO transfers were done before 1992. Since then IO has been performed almost exclusively. Two exceptions were patients with a calcified and unyielding interosseous membrane. Thus there is a significant difference in the duration of follow-up; 4.27 years for CT and 1.55 years for IO.

Table I. Details of the results in the two groups

<table>
<thead>
<tr>
<th></th>
<th>Circumtibial</th>
<th>Interosseous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of feet operated</td>
<td>43</td>
<td>67</td>
</tr>
<tr>
<td>Number of feet reviewed in detail</td>
<td>26</td>
<td>43</td>
</tr>
<tr>
<td>Mean follow-up (years)</td>
<td>4.27</td>
<td>1.55</td>
</tr>
<tr>
<td>Recurrent inversion (number)</td>
<td>21</td>
<td>1</td>
</tr>
<tr>
<td>Mean active dorsiflexion (degrees)</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Mean active plantar flexion (degrees)</td>
<td>22</td>
<td>9</td>
</tr>
</tbody>
</table>

Long-term follow-up data regarding inversion were available for all 69 patients. Of the 26 patients who had CT, 21 had recurrent inversion compared with only one of the 43 who had IO transfer. Normal evertors with tibialis anterior paralysis did not protect against inversion at final follow-up after CT transfer. Of 16 patients with medial foot drop for whom data were available, three of the six who had CT developed recurrent inversion against none in the IO group. Table I shows the differences in mean dorsiflexion and plantar flexion between the two groups.

Only six patients in this study did not have lengthening of tendo Achillis. At final follow-up patients who had an LTA had a significantly greater likelihood of active dorsiflexion above 90°. Failure to lengthen tendo Achillis can lead to a poor result.

DISCUSSION

Tibialis posterior transfer done by either route, plus elongation of tendo Achillis, will produce active dorsiflexion in 80% of patients, with the restoration of near-normal gait in 94%. The CT route, however, was associated with an unacceptably high rate of recurrent inversion leading to ulceration of the lateral border of the foot. This observation was also made in a small subgroup of patients by Hall (1977). Circumtibial transfer should be reserved for patients with a calcified and unyielding interosseous membrane; these are usually elderly with recurrent inflammation and infection in the foot. If this type of transfer is performed, the tendon bifurcation must be at least 3 cm above the ankle so that the line of pull is as close to the vertical as possible. Wherever possible an interosseous route should be used.

There was no evidence in this series of the ‘crippling adhesions’ said to be associated with the IO route (Andersen 1963), and at final follow-up the IO route produced better active dorsiflexion although less active plantar flexion than the CT route.

Conclusions. Tibialis posterior transfer with open elongation of tendo Achillis gives excellent results in foot drop due to leprosy neuritis. An interosseous route is preferred with split attachment to tibialis anterior and to peroneus brevis or tertius tendons. Immobilisation for three weeks in a plaster cast in maximum dorsiflexion is sufficient, with full weight-bearing and active plantar flexion starting six weeks after operation.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

REFERENCES


