Scholars Journal of Medical Case Reports

OPEN ACCESS

Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

Traumatology & Orthopedic Surgery

Tibialis Posterior Tendon Transfer for Foot Drop: Case Report

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DOI: 10.36347/sjmcr.2023.v11i10.028 | **Received:** 05.09.2023 | **Accepted:** 13.10.2023 | **Published:** 17.10.2023

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Abstract **Case Report**

Irreparable sciatic nerve palsy is a cause of foot drop and resulting in absent or weak most of the muscles in leg. There may be dysfunctions of all tendons in the leg excepting Achilles tendon and plantaris tendon. The treatment of this atypical neurologic injury has not been defined. I reported a case of foot drop case of patient who presented with paralysis of the external popliteal sciatic nerve, The neurological exam revealed a deficit of the dorso flexion of the foot and hypoesthesia of the dorsal region of the foot concomitant with a section of the external popliteal sciatic nerve. tibialis posterior transfer gives good results in terms of normal gait, high patients, satisfaction with minimal donor site morbidity and low complication rate.

Keywords: Foot drop, Posterior tibial tendon, Tendon transfer.

1. INTRODUCTION

Foot drop is a complex problem, defined as a significant weakness of foot dorsiflexion. Foot drop results in loss of dorsiflexion, ankle eversion and extension of toes [1]. Tendon transfer restores the dorsiflexion of the foot and allows near normal functional activity in patients with foot drop [2], The purpose of this study was to report objective and validated functional outcome measures over intermediate term follow-up after TP tendon transfer for foot drop secondary to peroneal nerve palsy.

2. CASE REPORT

We report the case of a 32 year old male patient who presented with paralysis of the external popliteal sciatic nerve following an agression with a machette on his left leg. The initial exam found a patient who was conscious and hemodynamically stable, he had several lacerations to the left leg. The neurological exam revealed a deficit of the dorso flexion of the foot and hypoesthesia of the dorsal region of the foot concomitant with a section of the external popliteal sciatic nerve. The vascular exam was normal.

The patient underwent exploration under spinal anesthesia, the external popliteal sciatic nerve was found to be sectioned at several points. He underwent a suture of the external popliteal sciatica nerve using polyprolene 7/0.

The evolution was marked by a persistance of the hypoesthesia of the dorsal region of the foot, a dropping foot and a high stepping gait. After 1 year of intensive physiotherapy, splinting and electrostimulation of the external popliteal sciatic nerve, there was still no improvement of the dropping foot.

An Electroneuromyogramme of the sciatic nerve was done, it revealed an absence of conduction of the nerve impulses in the external popliteal sciatic nerve with a conservation of the internal popliteal sciatic nerve. The decision was then taken to perform an anterior tibial tendon transfer.

The intervention was done under spinal anesthesia, to begin with an incision was done over the tuberosity of the navicular bone to expose the insertion of the posterior tibialis tendon, the tendon was then liberated and sectioned at its insertion. An anterior ankle incision prolonged to the foot was then made in order to expose the medial cuneiform bone of the foot. A subcutaneous tunnel was then made between the posterior tibialis tendon and the anterior ankle incision circumventing the tibia medially. The posterior tibialis tendon was then separated in two slips and then routed through a circumtibial route, one slip was sutured to the anterior tibialis tendon using Nylon 2/0 and another was fixed to the intermediate cuneiform using a staple and a bone anchor. Care was taken to fix the foot in an optimal position of dorsiflexion (in which the least pronation and supination are detected).

Figure 1: Identification and tunneling of tibialis posterior tendon through interosseous membrane

Figure 2: Lengthened tibialis posterior tendon with non-absorbable suture

Figure 3: Fixation of tibialis posterior tendon to the intermediate cuneiform

The quality of our fixation was then tested by plantar and dorso flexion of the foot, the fixation was found to be satisfactory. The incisions were then sutured and the foot was placed in a splint postoperatively for 6 weeks. After 6 weeks the patient began undergoing physiotherapy, the evolution at 1 year is satisfactory with the patient able to perform dorsiflexion of the foot and able to walk with a normal gait and perform daily activities without any difficulties.

Figure 4: Post operative picture after 1 year

3. DISCUSSION

Peroneal nerve injury is known to be the most common cause of trauma-induced foot drop as it courses around the fibular neck, resulting in absent or weak anterior and lateral compartment muscle function . In patients with foot drop that has lasted for more than 1 year with little chance of motor function improvement, a tendon transfer could be considered to re-create a balanced foot that is plantigrade and functional. Several tendon transfer procedures have been employed to treat foot drop due to irreparable peroneal nerve palsy.

Anterior transfer of the tibialis posterior tendon transfer is preferred by many authors and several modifications and improvements have been made to the original technique [3, 4]. Jeng proposed the principles of tendon transfer, the goal of tendon transfer should be an achievement of stable plantigrade foot without requiring a brace. This is possible if there is adequate preoperative tendon strength, adherence to the basic principles of tendon transfer during surgery, and intensive retraining of the muscle in the recovery phase [3].

Hepper reported a case with anterior and posterior tibialis dysfunction following hip dislocation. The peroneus longus tendon was transferred into the tibialis anterior insertion to restore ankle dorsiflexion, the flexor digitorum longus tendon was transferred to the navicular tuberosity to restore hindfoot inversion and reconstruct the tibialis posterior [3, 5].

Fixation of transferred tendon can be done to bone (cuneiform, base of the 2nd/3rd metatarsal or cuboid) or tendons on the dorsum of foot. Fixing the transferred tendon into bones is technically more difficult; it requires pull-out wire sutures, staples or bone anchor, causes neuropathic arthropathy of the tarsal joints and does not correct dropping of the forefoot and toes [2]. Watkins *et al*., Codivilla [6], and Putti [7] are considered as the pioneers of the tibialis posterior tendon transfer to the dorsum of the foot through the interosseous route [8]. This technique has few drawbacks in that the length of the transposed tibialis posterior tendon was insufficient preventing tendon-to-bone fixation [9]. Tendon-to-bone fixation was done by Barr *et al*., who inserted the tendon to the intermediate or lateral cuneiform or base of 2nd metatarsal bone through the interosseous route [10].

Ober inserted the tendon to the base of the 3rd metatarsal through the circumtibial route [11]. In tendon-to bone transfer, stable fixation was done by pull-out wire, staples, screws, or bone anchors [12]. Rath recommended early active mobilization of tibialis posterior transfer post operatively [3]. Ideally, one should wait for 1 year for nerve recovery before contemplating the tendon transfer [13]. Some authors recommend early tendon transfer and claimed to have good results [14]. In future studies, further improvements can be made to enhance functional recovery and to improve the quality of life of the affected individuals.

CONCLUSION

Foot drop is caused by lesions of either the sciatic nerve or the external popliteal sciatic nerve, it is a handicap that causes restriction of daily activities. When surgical nerve reparation is unsuccesful, anterior transfer of the tibialis posterior tendon can produce excellent results and allow patients to resume their daily activities.

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