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Management outcome of peroneal nerve injury at knee level: experience of a single military institution

Wyniki leczenia uszkodzenia nerwu strzałkowego na wysokości kolana: doświadczenie oddziału szpitala wojskowego

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Abstract

Background and purpose: We investigated the management outcome of common peroneal nerve decompression at the knee level between the years 2005 and 2009.

Material and methods: Thirty consecutive patients with knee-level peroneal nerve injury who underwent decompression surgery and external neurolysis at our institution were evaluated preoperatively and postoperatively by electrophysiological studies and motor examination (Medical Research Council grading).

Results: Twenty-eight of the cases were male and 2 were female. Mean age was 31.1 for males and 57.5 for females. Physical activity during military training (overstretch/contusion) was the cause of nerve lesion in the majority of the patients ($n = 28$, 93%). Mean time interval between the diagnosis and the surgery was 5 months. Follow-up time ranged from 3 to 48 months (mean: 14 months). Twenty-nine of 30 (97%) patients recovered totally or near totally in foot/toe dorsiflexion.

Conclusions: Early decompression and neurolysis of the common peroneal nerve (CPN) at knee level after strenuous physical activity offers excellent functional recovery. Additionally, for knee-level CPN injuries, in order to minimize the postoperative scar, pain and delay in wound healing, we strictly advocate short 'lazy S-shaped incision' around the fibular head in supine position unlike the classical extensive opening up to the superior border of the popliteal fossa in prone position.

Streszczenie

Wstęp i cel pracy: Autorzy ocenili wyniki chirurgicznego odbarczenia nerwu strzałkowego wspólnego na wysokości kolana, wykonywanego w latach 2005–2009.

Materiał i metody: Przedoperacyjnej i pooperacyjnej ocenie klinicznej (w skali *Medical Research Council*) oraz elektrofizjologicznej poddano 30 kolejnych pacjentów z uszkodzeniem nerwu strzałkowego na wysokości kolana, u których wykonano odbarczenie chirurgiczne z zewnętrzną neurolizą.

Wyniki: Wśród leczonych było 28 mężczyzn (średnia wieku: 31,1 roku) i dwie kobiety (średnia wieku: 57,5 roku). U zdecydowanej większości pacjentów ($n = 28$, 93%) przyczyną uszkodzenia nerwu była aktywność fizyczna w czasie szkolenia wojskowego (nadmierne rozciągnięcie/stłuczenie). Średnia czasu od rozpoznania do operacji wyniosła 5 miesięcy. Obserwacja po zabiegu trwała od 3 do 48 miesięcy (średnia: 14 miesięcy). U 29 na 30 chorych (97%) uzyskano pełny lub prawie pełny powrót zgięcia grzbietowego stopy/palców.

Wnioski: Wczesne chirurgiczne odbarczenie i neuroliza nerwu strzałkowego wspólnego na wysokości kolana w leczeniu urazu powstałego wskutek nadmiernej aktywności fizycznej daje możliwość znakomitej poprawy czynnościowej. Ponadto w przypadku uszkodzeń nerwu strzałkowego wspólnego na wysokości kolana w celu zminimalizowania blizny pooperacyjnej, nasilenia bólu i opóźnienia w gojeniu się rany pooperacyjnej autorzy usilnie zalecają krótkie cięcie w kształcie wydłużonej

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litery „S" wokół głowy strzałki u chorego w pozycji leżącej na plecach zamiast klasycznego otwarcia aż do górnej granicy dołu podkolanowego w pozycji leżącej na brzuchu.

Słowa kluczowe: uszkodzenie nerwu strzałkowego, neuroliza, aktywność fizyczna, szkolenie wojskowe, wyniki leczenia.

Introduction

The common peroneal nerve (CPN) is one of the most frequently entrapped nerves in the extremities [1-6]. Entrapment of the nerve mostly occurs on the lateral side of the knee where the nerve traverses the fibular head and runs more superficially. While the deeper and anterior branch of the CPN, namely the deep peroneal nerve (DPN), innervates the muscles of the anterior calf, the superficial branch, the superficial peroneal nerve (SPN), is responsible for the motor and sensory innervation of the muscles of the lateral calf. These two branches run together and are generally entrapped at the same time. Aetiological factors mainly include long-lasting crouching, sitting cross-legged, knee bending, improper leg casts, prosthesis and complications of orthopaedic surgery [6-8]. Loss of motor strength, atrophy, sensorial impairment in the anterior and lateral calf muscles as well as weakness in the dorsiflexion and eversion of foot and toes constitute the main clinical picture of peroneal nerve injury. Diagnosis is generally established by the history, physical examination, and electrophysiological tests. L5 radiculopathy and metabolic sensory-motor neuropathies are other entities to be considered in the differential diagnosis [9].

There are limited reports on the optimum surgical management modality and the timing of surgical intervention for peroneal nerve lesions. In this regard, we believe that our series contributes to the issue of peripheral nerve injury in regard to timing of surgery and surgical approach.

Material and methods

Between 2005 and 2009, thirty consecutive patients with CPN injury underwent surgical intervention under general anaesthesia at Gulhane Military Medical Academy Hospital. Functional recovery status was evaluated prospectively by Medical Research Council (MRC) grading. Mean follow-up time was 14 months and patients were examined regularly at 3-month intervals and electromyography was repeated at 6 and 12 months after surgery. Twenty-eight of the cases were male and 2 were female. Mean age was 31.1 years for males and 57.5 years for females. While strenuous sport activity and training exercises in the military setting was the only responsible factor in the majority of cases (n = 28, 93%), nerve injury occurred idiopathically as entrapment neuropathy in 2 patients (7%). These two patients were female and their mean age (57.5 years) was far higher than that of men (31.1 years). Complete loss of foot dorsiflexion was present in 11 patients and ankle jerk was absent in 4 patients. Surgery was performed between 12 days and 48 months (mean: 5 months) after the onset of the symptoms. Decompression and external neurolysis in nontransected nerves were carried out satisfactorily in all patients.

Results

Table 1 outlines the patients' characteristics and the surgical results. The foot and toe dorsiflexion returned to 5/5 motor strength in 25 (83%) of the patients. Nine of 11 patients (81%) with complete loss of foot dorsiflexion preoperatively recovered fully in the follow-up period. While recovery was almost complete (mild paresis + 4/5 strength) in 4 (14%) patients, we did not observe any improvement in only 1 (3%) patient. Additionally, there was improvement in nerve conduction tests postoperatively in 29 (97%) of the patients. There were no surgery-related complications.

Discussion

Relevant surgical anatomy

The CPN originates as the lateral terminal branch of the sciatic nerve at the distal third of the thigh. It travels obliquely across the distal thigh on the lateral aspect of the popliteal fossa, where it has close proximity with the medial border of the biceps femoris muscle. As the nerve goes inferolaterally, it crosses the lateral head of the gastrocnemius muscle and reaches the area just posterior to the fibular head. It curves around the fibular head and