

Common Peroneal Nerve Palsy after Excision of a Skin Mass in the Posterolateral Popliteal Fossa Region

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The aim of this article is to report a patient with an iatrogenic injury of the common peroneal nerve (CPN) caused by compression due to tight fascial closure after surgical excision of a skin mass in the posterolateral popliteal fossa area. Injury to the CPN results in significant disability with foot drop. Palsy of the CPN is a most frequent complication of various orthopedic or other surgical procedures in the lower leg. The clinicians must keep in mind the complications of the nerve and profound knowledge of anatomy around the posterior popliteal region to minimize an unwanted complication. (J Kor Neurotraumatol Soc 2007;3:103-106)

KEY WORDS: Common peroneal nerve · Compression neuropathy · Popliteal fossa.

Introduction

Common peroneal nerve (CPN) injury produces significant functional disability. There is loss of capacity to lift the foot and toes (dorsiflexion), as well as loss of the ability to evert the foot.

Injuries to this nerve are frequently related to trauma or postural entrapment of the nerve at the fibular head.^{1,5,8,14)} Nontraumatic causes are rare and commonly involve tumors, ganglia, cysts, osteophyte or hematoma.^{6,8)} At the level of the fibular head the superficial position of the nerve renders it vulnerable to compression by various lesions like as osteophytes, bony deformity following trauma and tumors. The CPN may also be injured in association with the orthopedic or other surgical procedures around the popliteal fossa area.^{3,4,7,8)}

A case of an iatrogenic CPN palsy caused by surgical excision of a skin mass in the posterolateral popliteal fossa area is presented. We will review the relevant literatures and discuss its mechanism, diagnostic investigation, disease progression, and treatment options.

Case Report

An 85-year-old man was referred from a local private clinic with a right foot drop and dull pain and numbness in the right leg. He underwent a simple excision of an approximately 1.5 cm sized tender skin mass at the right posterolateral popliteal fossa area at the local private clinic. Immediately after the operation, the patient complained of complete foot drop and pain on the dorsum of his right foot and reported that he felt radiating pain along the anterolateral aspect of the leg to the dorsomedial aspect of the foot. Two weeks after the operation, he was transferred to our hospital to get an operation for the right leg disability. Unfortunately the doctor of the private clinic did not send the specimen to the pathologist.

On physical examination, a 4 cm sized transverse operation scar was seen at the posterolateral popliteal fossa of the right leg. The muscle strength revealed a complete weakness to dorsiflexion of the right ankle and toes, and ankle dorsoversion, both grade 1 of 5. Sensation was diminished on the dorsum of the right foot and the anterolateral side of the calf. The Tinel sign was negative around the previous operation scar.

Electrophysiological studies confirmed denervation of the muscles supplied by the right CPN, which suggested impairment of this nerve at the level of the fibular head. We had thought that the right CPN had been cut during the previous operation. Surgical exploration of the right CPN

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FIGURE 1. Preoperative photograph showing the previous operation scar (inserted photograph, black arrow), marking of the fibular head (asterisk), and an operative skin incision.

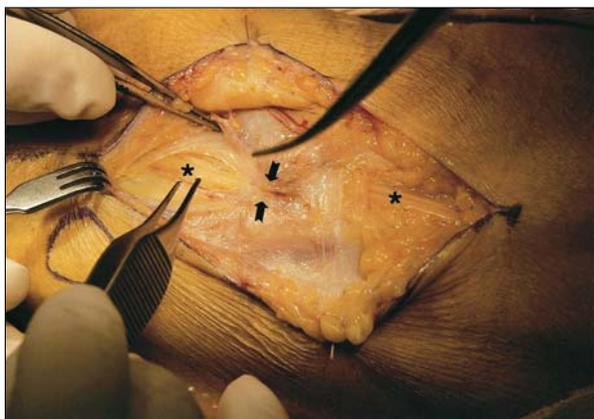


FIGURE 2. An intraoperative photograph showing the tight fascial closure (black arrows) and the common peroneal nerve (asterisks).

was performed under the general anesthesia 2 weeks later after transfer. We revised the previous operation scar and extended it longitudinally about 12 cm in length (Figure 1). The lateral ankle region of the right leg was also prepared as a donor site for the sural nerve transplantation. A tight fascial closure by absorbable sutures, compressing the CPN, was observed during the surgery (Figure 2). The fascial band compressing the nerve was dissected and surrounding soft tissues released. Unexpectedly, the continuity of the nerve was preserved when we opened the fascial closure (Figure 3). The nerve was just compressed and entrapped by the previous tight fascial sutures. There was no internal scarring or neuroma in continuity noted. We checked the electrical continuity of the nerve using an intraoperative nerve stimulator (NIM-2[®], Medtronic Xomed, Jacksonville, FL). When we stimulated the proximal portion of the nerve as 1.0 mA, muscle contractions were observed at the right peroneus longus muscle which showed positive results for electrical continuity. The wound was



FIGURE 3. After release of the fascial band and surrounding soft tissue. The common peroneal nerve shows an intact continuity without edema or neuroma formation.

closed without tension. On the day after the surgery, the strength of the affected muscles remained unchanged, but the numbness and pain had been improved. The patient was provided with a dorsiflexion assist ankle-foot brace. Six months after surgery, the patient had decreased paresthesia and some improvement in sensation by light touch. However, no significant change in motor function has been detected during the follow-up period.

Discussion

The common peroneal nerve (CPN) takes origin from the sciatic nerve in the posterior aspect of the middle third of the thigh and travels around the head of the fibula bone at the fibula neck, just below the knee. At the level of the fibular head this nerve then turns anteriorly around the fibular head.¹⁰ In this site of the nerve is particularly vulnerable to injury because of its fixed attachment in the region of the neck of the fibula and it also has a rather superficial course in this area which is only covered by the skin and subcutaneous tissue.^{8,10,15} After it curves over the posterior rim of the fibular head, it enters a tunnel formed by the two heads of the peroneus longus muscle and the fibular neck.

Injury to the peroneal nerve results in significant disability. There is loss of capacity to lift the foot and toes, as well as loss of the ability to evert the foot. The common causes of compression of this nerve at the level of the fibular head include trauma, surgery around the knee, after anterior cervical spine surgery, habitual cross legged sitting, pressure on lateral leg during operative procedure and pressured by short leg casts or splints following fractures.^{1,5,8,14,16,17} The exact mechanism of the injury in our case was not a direct injury to the nerve but a compression by the tight fascial

closure after the removal of a simple skin mass because of the lack of knowledge of anatomy around the popliteal fossa. Iatrogenic nerve injury may be minimized during procedure around the popliteal fossa by a meticulous approach and good knowledge of anatomy.

Although electromyography (EMG) and motor conduction velocity of the CPN across the fibular head is important in establishing the diagnosis of the common peroneal neuropathy, a careful history and thorough physical examination are more helpful to diagnosis. In patients with severe compression or injury to popliteal fossa area, the CPN may be involved leading to a characteristic dropfoot deformity, as shown in our patient. On physical examination, one may find wasting of the muscles of the anterolateral compartment of the leg. Sensory loss may extend over the anterolateral aspect of the leg and dorsum of the foot.^{5,14)} EMG provides a wealth of information for assessing nerve injuries, and nerve conduction studies may help to localize lesions immediately after injury. It is also a useful tool to differentiate between a radicular lesion at the L5 level and a peripheral lesion of the CPN.¹²⁾ Recently magnetic resonance imaging demonstrates very clearly not only the normal anatomy of the peroneal nerve but also the pathologic lesions including fatty infiltration, atrophy or hypertrophy in the muscle compartments innervated by the involved nerve in the posterolateral aspect of the knee.¹⁴⁾ When associated with trauma or surgery, the incidence of development of symptoms can be differentiated the exact cause of the palsy. Acute onset of the palsy is probably related to direct nerve injury or extrinsic compression due to hematoma or compartment syndrome. When an acute palsy of the CPN is developed after the surgical procedure in the popliteal fossa region, the wound should be revised and released the extrinsic compression.

The treatment options of the CPN injury are vary.^{8,13)} Conservative treatment may be effective in a certain type of posture related entrapment.^{2,17)} The prognosis for complete recovery of the nerve is, however, poor and was found in only 21% associated with dislocation of the knee.¹¹⁾ The decision about when surgery is necessary is important for optimal functional recovery. In general, 3–4 months of conservative treatment should be performed initially, after which, in case of failure surgical managements are recommended.^{2,5,8,13)} A delay of more than 6 months after injury diminishes the chances of functional recovery.⁸⁾ Therefore, it is important that surgical candidates be operated on during this optimal period so as to minimize scarring and muscle atrophy. Damaged nerve segments must be correctly identified, visually inspected, and manually palpated during the operation. The direct recording of nerve action potentials

or observation of direct muscle contractions using the nerve stimulator were introduced to augment intraoperative assessment of nerve functions, because operative observation, palpation of a lesion, and even histologic biopsies are not completely reliable.⁹⁾ The presence of nerve action potentials beyond the damaged sites or significant contraction of innervated muscles indicate preserved axonal function or regeneration, which bodes well for functional recovery. Conversely, the absence of nerve action potentials or muscle contractions are correlated histologically with grade 4 Sunderland lesions (neurotmesis), suggesting inadequate regeneration and poor functional recovery.

Despite an incomplete lesion of the nerve, we could not achieve a favorable outcome in the present case. There might be several reasons for the poor result. First, it might be related to lack of regeneration potential because of too old age of the patient. Second, it seemed there was some confusion as the CPN had been cut during the procedure before surgery. Because of the confusion, the timing of the operation was delayed and resulted in poor outcome.

Conclusion

We report an unusual iatrogenic injury of the common peroneal nerve caused by tight fascial closure after excision of a skin mass in the posterolateral popliteal region. To minimize an unwanted iatrogenic injury of this nerve during surgical procedures around this area, clinicians should be aware of complications of this nerve and a good knowledge of anatomy.

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