



## A case of intraneural ganglion cyst of the peroneal nerve: A rapid recovery after incision of cyst

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### Abstract

**Introduction:** Intraneural ganglion cysts (INGCs) are an infrequent cause of foot drop. INGCs are benign mucinous cysts within the epineurium of peripheral nerves, which are usually observed in the peroneal nerve at the knee typically leading to symptoms and signs of peripheral neuropathy.

**Case Report:** A 40-year-old man with foot drop who had undergone a spinal study for discopathy was examined in this study. The patient had peroneal nerve compression at the neck of the fibula resulting from an extra neural cyst. Surgical exploration revealed an intraneural cyst. Epineurium was incised and the cyst was evacuated. In a two-week post-surgery follow up, his foot drop had improved partially and the remainder of his symptoms resolved.

**Conclusion:** Awareness of the intraneural cysts of peroneal nerve as a cause for foot drop is important because early surgical intervention could reverse the course of disease.

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### Introduction

Peroneal nerve palsy, the most common peripheral neuropathy of the lower extremity, has multiple causes, including prolonged bed rest, casting, and space occupying lesions with pressure effect on the nerve, prolonged squatting position and prolonged anesthesia in supine position that may manifest with acute or progressive peroneal nerve neuropathy.<sup>1</sup>

Intraneural ganglion cysts (INGCs) are benign mucinous cysts within the epineurium of peripheral nerves, which are usually observed in the peroneal nerve at the knee typically leading to symptoms and signs of peripheral neuropathy.<sup>1,2</sup> The common peroneal nerve is the most frequently involved nerve, although cysts at the ulnar, sciatic, and tibial nerves have also been

reported.<sup>3-5</sup> Today, there is substantial evidence to support an articular synovial theory as the etiology for all INGCs. Spinner et al. demonstrated that the prototypical intraneural cysts of the common peroneal nerve are joint derived.<sup>3</sup> A case of INGC with foot drop that was initially missed and managed for discopathy was presented in the current study.

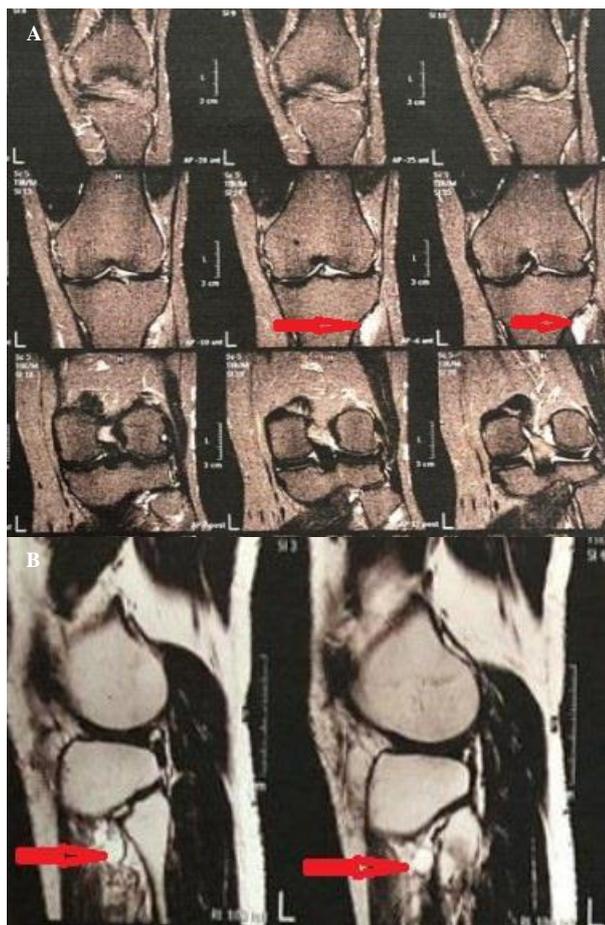
### Case Report

A 40-year-old healthy man with a history of difficulty in dorsiflexion of the left foot during the past two months was studied. He referred to a neurosurgeon and was selected as a case of discopathy with physiotherapy, rest, and analgesia. The past medical history was negative for trauma and diabetes. Based on the examinations, he had pain, tingling,

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and feeling of coldness in the left leg. The straight leg raising test was negative and he had normal knee jerk reflexes bilaterally. He had a foot drop and weak dorsiflexion of the toes. The Tinel's sign was positive for peroneal nerve in the neck of the left fibula. The electromyogram (EMG) and nerve conduction velocity (NCV) studies showed denervation potential in the extensor hallucis longus (EHL) and tibialis anterior muscle and impression was peroneal nerve axonal neuropathy. The magnetic resonance imaging (MRI) of the lumbar spine showed a L4-L5 disc bulging. In addition, the MRI of leg and knee was taken and a radiologist reported a ganglion cyst on the proximal tibiofemoral joint with pressure effect on the peroneal nerve (Figure 1, A and B).



**Figure 1.** Coronal and sagittal T2 weighted images (T2WI) with fat suppression showing cyst, within the common peroneal nerve

An interventional radiologist tried to decompress the cyst under fluoroscopic

control, but it was not helpful. With this impression in mind, a surgery was performed for decompression of the cyst and exploration of the peroneal nerve. Based on the explorations, the deep peroneal nerve was swollen and thickened in distal 3 cm before division to final branches. It was seemed that the nerve was replaced by a gelatinous mass. A longitudinal incision was made on the cyst wall, and it was appeared that a fusiform cystic mass, full of gelatinous liquid, was located inside the epineurium and pushed the nerve fascicles aside (Figure 2, A and B).



**Figure 2.** Intraoperative exploration of nerve showing thickened and transformed peroneal nerve

The nerve fascicles were hard to be detected. Mucoïd material was evacuated from the

cystic mass, and part of the cystic wall was removed. The surgeon could not find a visible track between neural cystic mass and tibiofemoral joint. The proximal tibiofibular joint was partially explored and was unremarkable. The specimen was sent for histopathology and mucoid degeneration and fibrous tissue was reported. In the first follow up -15 days after operation- the patient feels that he could move his toes better than before. One month after the surgery, the patient referred to physiotherapy department and in final follow up, which was 6 months after the decompression, the patient could weakly dorsiflex his foot.

### **Discussion**

An INGCs is a non-neoplastic mucinous cyst within the epineurium of a nerve and commences from an adjoining joints.<sup>6-8</sup> MRI plays an important role in diagnosing this condition and can reliably demonstrate the presence and the pattern of the cystic lesion and the exact level of communication of the cyst to the adjacent joint.<sup>8</sup> Because of the relative rarity of peroneal intraneural cysts and lack of experience of physicians (radiologists and surgeons) with them and the complexity of the findings, they are frequently misdiagnosed and joint communications are not appreciated preoperatively or intraoperatively.<sup>7,8</sup> This was the scenario, which had occurred in the present case and it was considered as an extraneural cyst before surgery. Based on the study by Wilson et al., intraneural ganglion had a cyclic nature and can involve a nearly invisible phase. So that over time, it had dramatic fluctuations in size and configuration. INGCs are increasingly being recognized as an important cause of peroneal neuropathy, occurring in up to 18% of cases. Fluctuating symptoms may be present in some cases due to cyclic nature. A relationship between degenerative changes, joint edema, and intraosseous ganglion cysts, an abnormal joint that may be at risk for capsular defects and cyst formation was reported.<sup>9</sup>

In all cases with extra neural cysts, the

nerve could be easily distinguished from the cyst. The extraneural cysts were more variable in shape compared to the intraneural ganglia, ranging in shape from oval to round with locations that could extend along fascial planes.<sup>10</sup> Moreover, because of the rarity of the condition and inadequate experiences, the surgeon did not perform enough dissection for finding a connection between the nerve and tibiofemoral joint. Another issue was the technique of sampling for the pathological report. After cutting the cyst wall, the fear of further damage to the nerve caused the surgeon to take more careful precautions for the sample removal. In fact, a part of the cyst wall was the nerve itself. pathological report was mucoid degeneration and some fibrous tissue.

### **Conclusion**

In this case, the patient's symptoms quickly recovered. This was probably due to the early surgical intervention and decompression. Nerve recovery is dependent on the time of onset of symptoms. Taking the neural cyst in the list of the differential diagnosis for peroneal nerve palsy would save the function of peroneal nerve by early intervening.

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### **Authors' Contribution**

All of the authors contributed equally.

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### **Conflict of Interest**

Authors have no conflict of interest.

### **Ethical Approval**

The case report was confirmed by the ethics committee of Urmia University of Medical Sciences.

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