CASE REPORT

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Schwannoma of the Superficial Peroneal Nerve Presenting as Sciatica

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Schwannomas are benign nerve sheath tumors that can present in various locations and they have variable symptoms. However, schwannoma of the superficial peroneal nerve is rare, and only a limited number of cases have been reported. The authors here describe a case of schwannoma of the superficial peroneal nerve, which was initially considered as a L5 radiculopathy because of its clinical similarity. In the differential diagnosis of nontraumatic and nonarthritic pain of the lower leg and foot, benign tumors, particularly schwannomas of the peroneal nerves should be considered. Treatment by excision can result in relief of the symptoms and maintenance of function.

KEY WORDS : Schwannoma · Superficial peroneal neuropathy · Sciatica.

Introduction

A Schwannoma is a benign or rarely malignant tumor arising in the peripheral nerves or nerve roots[3,8]. These tumors may arise anywhere in the body, where there is a nerve with a Schwann cell sheath[2,8,10,11]. However, there have been only a few reports about a peripheral nerve sheath tumor of the superficial peroneal nerve[6,16]. In the current report, we present an interesting case of a schwannoma of the superficial peroneal nerve in the distal lateral leg with neuralgia. This was first construed as a case of sciatica due to a lumbar disc herniation. The clinical findings of this case are described and discussed.

Case Report

A 51-year-old man presented with a 2-year history of paresthesia on the dorsal side of the right foot and also, he had an intermittent lancinating pain. His symptoms had been progressively worsening for 2months. He gave a history of intermittent lower back pain(LBP) since the age of 45years. For the recurrent pains, he had been treated under the diagnosis of lumbar disc prolapse at L4-L5 level in the orthopedic clinic at another institution. A magnetic resonance imaging(MRI) showed degenerative disc changes in the lumbar region and a diffuse disc bulge at the L4-L5 level, but there was no focal nerve root compression.

On physical examination the patient's vital parameters were normal. There was a mild limitation of back motion and a slight sensory impairment to touch over the dorsum of the right foot. However, there was no weakness of the right foot. His straight leg-raising test was not restricted. A tender spot was noted in the right mid-leg just lateral to the tibial shin. There was a small, barely palpable side-to-side mobile mass, and it measured about 8~12mm in diameter. The skin over the mass was nearly normal. Manipulation of the mass during examination triggered the paresthesia in the right lower limb, especially in the dorsal side of the leg and the foot, and these reactions were reproducible and lasted for a few seconds. The electromyographic findings were suggestive of a supe-

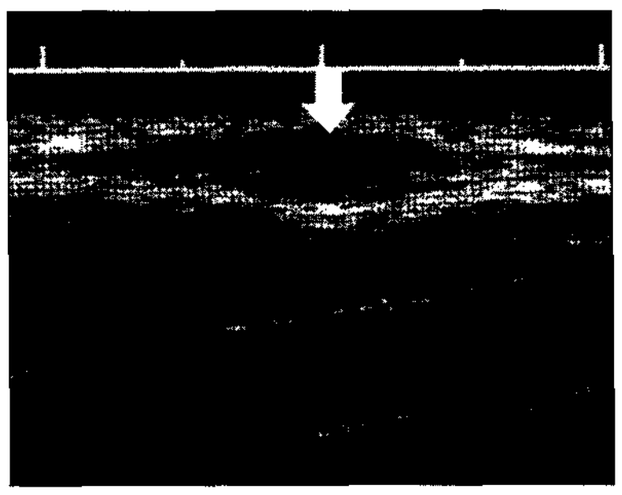

Fig. 1. Ultrasound image of the anterior shin revealing hypoechoic mass (arrow) with well-defined borders. The mass size is 0.8×1.2cm.

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Fig. 2. A Intraoperative photograph showing the mass (black arrows) arising from the superficial peroneal nerve (asterisk) at the lateral leg.

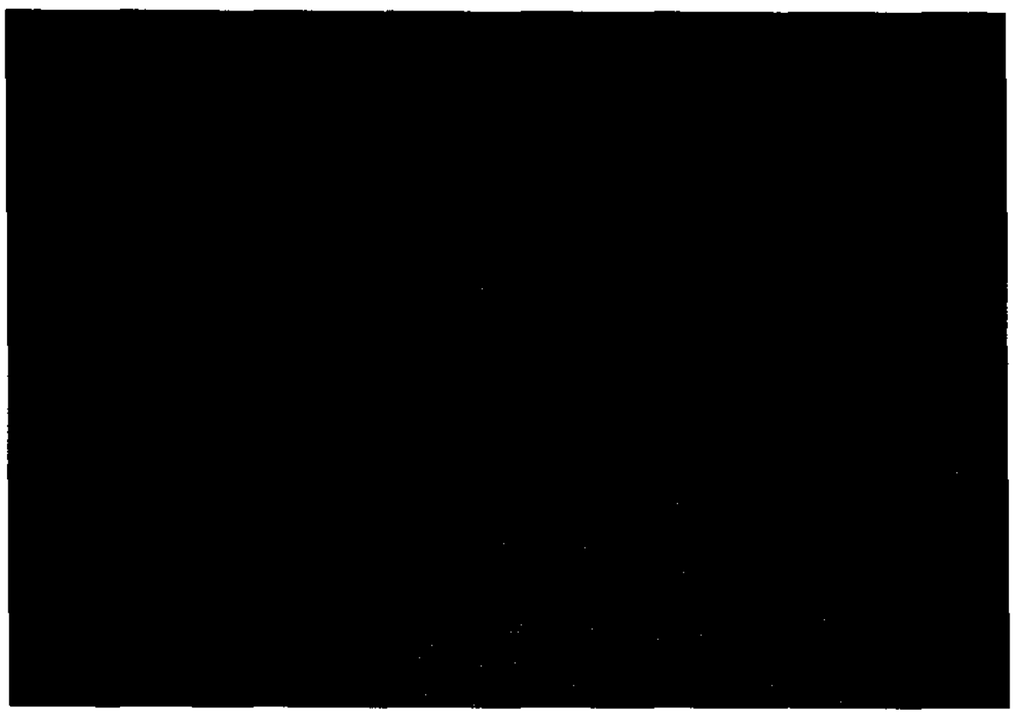

Fig. 3. Photomicrograph showing a benign neoplasm composed of bundles of spindle cells with varying cellularity and nuclear palisading. No mitosis or necrosis is seen (H&E, X100).

rficial peroneal neuropathy, and ultrasonographic scanning showed a well-defined oval shape mass beneath the overlying skin (Fig. 1). He had no family history of neurofibromatosis(NF).

Under local anesthesia, a small vertical skin incision was made and the subcutaneous tissue was incised and retracted. A mass was then found ensheathing the superficial peroneal nerve (Fig. 2). It was an encapsulated solitary soft tumor, which was completely excised without damage to the superficial peroneal nerve under the intraoperative nerve action potential (NAP) recording.

On histopathological examination the mass was found to be a benign schwannoma (Fig. 3). Postoperatively, the patient's symptoms have completely abated. Upon reevaluation 8months later, the patient remains symptom free.

Discussion

The common peroneal nerve, a division of the sciatic, is composed of fibers from L4, L5, S1, and S2 and divides into superficial and deep nerves as it passes around the neck of the fibula[7,14]. The superficial nerve continues down the leg to innervate the lateral compartment. The deep nerve travels distally and medially to enter and innervate the muscle of the anterior compartment of the leg[6].

It is likely that the superficial location and its course directly over the lateral knee and adjacent to the head of the fibula, covered only by the skin and subcutaneous tissues make the common peroneal nerve the most commonly injured nerve in the lower extremity[4,10]. Although, the most common etiology of peroneal neuropathy is external compression at the level of the fibular head, there are several other causes include operative trauma, fibular fracture and intrinsic masses[6].

Over the years, much attention has been given to common peroneal injuries by the compression and less attention to its branches and other pathology such as, tumors[4]. Functional disability resulting from peroneal nerve impairment can be profound, so it is important that we improve our understanding of the clinical issues related to the pathology of the common peroneal nerve and its branches[6,12].

Among the various intrinsic masses associated with the peroneal nerves, ganglionic cysts and focal hypertrophic neuropathy (onion bulb disease) are relatively common[1,13]. Schwannomas, neurofibromas and neurogenic sarcomas are uncommon peroneal nerve lesions, and in more than 50% of cases these occurs in association with NF-1, or follow radiation therapy for malignant lesions of other soft tissues[1,6]. These latter lesions especially involve the common peroneal nerve in the thigh or at the knee, rather than the deep or superficial peroneal nerves in the legs.

Benign solitary neurinomas, also called neurilemmomas, neurofibromas or schwannomas on the basis of their histology, usually develop in the head and neck region accounting for 40% to 50% of cases[3]. In decreasing frequency, the upper and lower extremities, and trunk are the sites of nearly all-remaining cases. They are usually small, but can reach diameters of more than 10cm[17]. Their distribution is quite different from neurofibromas developing in NF-1, which are essentially scattered over the body, including cutaneous and subcutaneous tissues. In locations where even a small schwannoma arises from a peripheral nerve, such as the superficial peroneal nerve under a firm fascia, there is a greater likelihood of neuraligic pains and sensory deficits. However, benign solitary neurinomas often raise problems of recognition and, hitherto, diagnostic delays when located in the lower extremities[17]. This is partly due to their rarity, partly to ill-defined symptoms of pain, generally of long duration as these tumors grow very slowly. The symptoms are usually initially ascribed to lumbar disc degeneration or hernia, not to a peripheral nerve origin.

The diagnosis can be suggested by the absence of any past

history of LBP, and a normal radiologic examination of the lumbosacral spine, or at least, one that does not explain the *site of irradiation of the pain.*

Occasionally, a lateral disc herniation at L4-L5 can mimic peroneal entrapment neuropathy[6]. EMG study will show a paraspinal denervation in this type of radicular involvement[5]. In addition, L5 radiculopathy produce a foot drop, but the foot invertors (spared with peroneal lesions) are also weak. L5 radiculopathy are usually associated with low back pain and L5 dermatomal sensory changes, rather than a peroneal nerve distribution of sensory loss[9].

EMG is useful to localize the lesion and determine if the foot drop is due to an L5 radiculopathy or a peroneal neuropathy[9,15].

So, if lesions in the thigh are suspected on EMG, then MRI or ultrasonographic scanning of the lower thigh or popliteal fossa (evaluating for cysts or tumors) is indicated. Plain radiography, isotope scanning, CT can be performed to rule out bony involvement, to delineate the extent of the lesion, to detect the presence of other lesions in the body, and to evaluate the biological nature and differential diagnosis, especially when a malignant growth is suspected.

Schwannoma can be completely excised without major loss of function and without recurrence. Microsurgical technique and intraoperative NAP monitoring are helpful in dissecting the tumor and preserving the nerve of origin[6]. The peroneal nerves appear to be straightforward structures, but care must be taken in the clinical management, including during microsurgery, to obtain qualitative results.

Conclusion

An occult or a small schwannomas of the superficial peroneal nerve may present with neuralgia mimicking sciatica due to a L4-L5 lumbar disc prolapse. Attention to the details of clinical examination may reveal a focal tender spot or a swelling along the nerve distribution may save the patient from unnecessary diagnostic delay or even exploratory microdiscectomy. Microsurgical techniques and intraoperative NAP monitoring for excision of superficial peroneal nerve schwannoma are curative.

References

1. Campbell R : **Youmans Neurological surgery**, ed 3. Philadelphia : WB Saunders Co, 1990, pp3667-3670
2. Esselinckx W, Trigaux JP, Maldague B, Malghem J, Knoops P, Thauvoy C : Sciatic neuropathy at the popliteal fossa : clinical, ultrasonographic and computed tomographic diagnosis. **Clin Rheumatol 5** : 107-111, 1986
3. Houshian S, Freund KG : Gigantic benign schwannoma in the lateral peroneal nerve. **Am J Knee Surg 12** : 41-42, 1999
4. Kabukcuoglu Y, Kabukcuoglu F, Kuzgun U, Ozturk I : Compression neuropathy of the peroneal nerve caused by a ganglion. **Am J Orthop 26** : 700-701, 1997
5. Katirji B : Peroneal neuropathy. **Neurol Clin 17** : 567-591, 1999
6. Kim DH, Kline DG : Management and results of peroneal nerve lesions. **Neurosurgery 39** : 312-319, 1996
7. Lacour-Petit MC, Lozeron P, Ducreux D : MRI of peripheral nerve lesions of the lower limbs. **Neuroradiology 45** : 166-170, 2003
8. Laurencin CT, Bain M, Yue JJ, Glick H : Schwannoma of the superficial peroneal nerve presenting as web space pain. **J Foot Ankle Surg 34** : 532-533, 1995
9. Levin KH, Stevens JC, Daube JR : Superficial peroneal nerve conduction studies for electromyographic diagnosis. **Muscle Nerve 9** : 322-326, 1986
10. Levy M, Seelenfreund M, Maor P, Lotem M : Neurilemmoma of peripheral nerves. A report of fourteen cases, including three of the lateral popliteal nerve. **Acta Orthop Scand 45** : 337-345, 1974
11. Liebau C, Baltzer AW, Schneppenheim M, Braunstein S, Koch H, Merk H : Isolated peripheral neurilemoma attached to the tendon of the flexor digitorum longus muscle. **Arch Orthop Trauma Surg 123** : 98-101, 2003
12. Lowenstein J, Towers J, Tomaino MM : Intraneural ganglion of the peroneal nerve : importance of timely diagnosis. **Am J Orthop 30** : 816-819, 2001
13. Oh JI, Park YK, Lim DJ, Chung HS, Lee KC, Lee HK : MRI diagnosis of a ganglion cyst of the peroneal nerve. **J Korean Neurosurg Soc 26** : 1723-1726, 1997
14. Rawal A, Ratnam KR, Yin Q, Sinopidis C, Frostick SP : Compression neuropathy of common peroneal nerve caused by an extraneural ganglion : A report of two cases. **Microsurgery 24** : 63-66, 2004
15. Sourkes M, Stewart JD : Common peroneal neuropathy : A study of selective motor and sensory involvement. **Neurology 41** : 1029-1033, 1991
16. Spinner RJ, Atkinson JL, Tiel RL : Peroneal intraneural ganglia : the importance of the articular branch. A unifying theory. **J Neurosurg 99** : 330-343, 2003
17. Thiebot J, Laissy JP, Delangre T, Biga N, Liotard A : Benign solitary neurinomas of the sciatic popliteal nerves CT study. **Neuroradiology 33** : 186-188, 1991