Compression of the Median Nerve by a Lipoma in the Distal Forearm Associated with Bilateral Carpal Tunnel Syndromes

Seu-ryang Jang¹, Jin-gyu Choi¹, Byung-chul Son¹,²

¹Department of Neurosurgery, Seoul St. Mary’s Hospital, College of Medicine, The Catholic University of Korea, Seoul, ²The Catholic Neuroscience Institute, College of Medicine, The Catholic University of Korea, Seoul, Korea

Although lipomas are benign fatty tumors that are common in humans, lipomas causing compressive neuropathy are rare. Furthermore, compressive neuropathy of the median nerve in the distal forearm just proximal to the carpal tunnel has never been reported. We report a very rare case of symptomatic lipoma causing median neuropathy in the distal forearm, associated with bilateral carpal tunnel syndromes.

Key Words: Carpal tunnel syndrome ㆍ Lipoma 申博 Median nerve 申博 Median neuropathy

INTRODUCTION

Lipomas are the most common benign tumors in limbs⁴,¹⁹). Although lipomas can occur in the vicinity of the peripheral nerve and occurrence of lipoma causing carpal tunnel syndrome has been sporadically reported, symptomatic compression of the median nerve by lipoma in the distal forearm is extremely rare. The authors report a rare case of lipoma compressing the median nerve in the distal forearm associated with bilateral carpal tunnel syndromes.

CASE REPORT

A 56-year-old, right-handed female patient presented with a 3-year history of progressively worsening paresthesia, numbness, and tingling in the lateral three digits and radial palm of both hands, with the right hand more severely affected. She described complete right-hand numbness after peeling potatoes, which was to some extent relieved by shaking the hand. She also described nocturnal numbness and frequent awakening during early morning for numbness. There was no neck pain or radicular symptom in her arms. Her medical history was unremarkable. Physical examination showed bilateral thenar muscle atrophy and muscle weakness of the abductor pollicis brevis, which was more prominent in the left hand. Tendon reflexes were normal and symmetric. Decreased sensation to light touch and pinprick was evident in the lateral three digits of both hands. Tinel’s sign was positive at both wrists, and a positive Phalen’s test was present on the left. In addition to the typical pictures of median neuropathy, there was a solitary palpable mass with a doughy feel in the left distal forearm (Fig. 1A).

The electrodiagnostic findings were compatible with bilateral median entrapment neuropathy around the wrist, clinically carpal tunnel syndrome, severe degree on both sides by American Association of Electrodiagnostic Medicine (AAEM) classification¹). A magnetic resonance imaging (MRI) disclosed a round, well-marginated, homogeneous, high intensity mass on both T1- and T2 weighted images (Fig. 1B). The mass was about 3 cm-in size and displacing the median nerve in the distal forearm just proximal to the left carpal tunnel. Considering the medical intractability and severe degree of the electrodiagnostic findings, bilateral carpal tunnel release and tumor removal were attempted.

After incision of the skin and superficial fascia of the distal forearm, the underlying lipoma, which was densely adherent to the bulged median nerve, and the median nerve were identified proximally and distally to the lipoma (Fig. 1C). After finding a cleavage plane between the lipoma and the median nerve under the microscopic vision, the lipoma was sharply dissected and resected under the microscopic vision (Fig. 1D). Because the lipoma was located just proximal to the classical entrapment site (carpal tunnel), the flexor retinaculum of the left carpal tunnel in the left hand was also decompressed. An open carpal tunnel release was also performed in the right hand because the patient had bilateral carpal tunnel syndromes and markedly hypertrophied flexor retinaculum was found and cut
in the subcutaneous tissue. They are subclassified according to the anatomic site of the fat cells into dermal, subcutaneous, and subfascial. The subfascial type is also denominated parosteal lipoma. In general, there are 4 conditions wherein these tumors can affect a peripheral nerve: (1) solitary lipomas can eventually compress a nerve; (2) encapsulated lipomas can be located in the nerve (an intrinsic lesion); (3) lipofibromatous hamartoma, in which there is a fatty fibrous mass within the nerve; and (4) macrodystrophia lipomatosa, which produce an overgrowth of the extremities, especially the hand and fingers.

The most frequent clinical presentation of lipoma is a solitary lipoma. Two situations have been suggested for compression of a peripheral nerve by lipomas: (1) the nerve can be compressed by a subcutaneous lipoma on the point which it runs superficially, or (2) the lesion can be derived from deeper-seated fatty tissues (subfascial, parosteal lipomas), compressing nerves in more profound locations. The deep-seated, subfascial lipomas has been reported to have a preponderance of their association with radial nerve compression. The frequency of the affected nerve is variable. The most reported nerve affected by lipoma is the radial nerve, which is usually affected with subfascial, parosteal lipomas, followed by the median and ulnar nerves. Involvement of the nerves in the upper extremity is more common than those in the lower extremity and the reports regarding involvement of the median nerve by a lipoma within carpal tunnel are now increasing.

As shown in the present case, identification of a mass during the physical examination is important as tumors outside the typical points of nerve entrapment. Positive Tinel's sign over the lesion was suggested to facilitate identification of the tumor as the source of the nerve compression. Ultrasound is a simple and useful imaging method in the diagnosis of these tumors, especially in those cases wherein the lesion was superficially located. However, MRI could provide more information in those situations in which greater number of structures may have been affected by the lesions, such as brachial plexus or popliteal fossa involvement.

Not all lipomas of the wrist and hand are preoperatively diagnosed, and their diagnostic rate in the hand region is not known. The risk of neurologic deficit and iatrogenic sever-
ing of the flexor pollicis longus tendon has been reported in a patient with giant lipoma of the hand who was not ade-
quately investigated and treated with two carpal tunnel re-
leases\textsuperscript{18}. In the present case, bilateral idiopathic carpal tunnel
syndromes were found to be associated with median nerve
compression in the left distal forearm just proximal to the
carpal tunnel, according to physical examinations, an electro-
diagnostic study, and a preoperative MRI scan.

Marginal resection with preservation of the neurovas-
cular structure is the procedure of choice for lipomas, and
more aggressive surgery is required in cases of malignant tu-
mors\textsuperscript{8,13,19}. The surgical treatment of lipomas demonstrated
good outcomes in pain relief and neurological recovery in most
of the cases\textsuperscript{8,15,19}. The importance of proper exposure of the
involved nerve proximal and distal to the lesion to ensure safe
resection has been emphasized. The neural elements should
be identified and protected proximally and distally to the tu-
ror itself prior to attempting direct resection\textsuperscript{17}.

\section*{CONCLUSION}

Compressive neuropathy of the median nerve by a lipoma
is very rare. We present a case of compression of the median
nerve in the distal forearm associated with typical carpal tunnel
syndrome. The need for a high index of suspicion in conjunc-
tion with detailed clinical examination and appropriate inves-
tigational studies is evident.

\section*{REFERENCES}

1. American Association of Electrodiagnostic Medicine, American
Academy of Neurology, American Academy of Physical Medicine
and Rehabilitation: Practice parameter for electrodiagnostic
studies in carpal tunnel syndrome: summary statement. Muscle
Nerve 25:918-922, 2002
2. Barbour JR, Boyd KU. Tumors of the peripheral nervous system.
In: Mackinnon SE, Yee A eds. Peripheral nerve surgery. New
York, NY: Thieme, 2014, pp530-571
3. Bieber EJ, Moore JR, Weiland AJ: Lipomas compressing the
I, Larena JA, Merino A: Masses and pseudomas of the hand
and wrist: MR findings in 134 cases. Skeletal Radiol 28:498-507,
1999
5. Chen CH, Wu T, Sun JS, Lin WH, Chen CY: Unusual causes of
carpal tunnel syndrome: space occupying lesions. J Hand Surg
Eur Vol 37:14-19, 2012
nerve compression in carpal tunnel caused by a giant lipoma.
Case Rep Orthop 2014:654934, 2014
nerve palsy due to parosteal lipoma. J Hand Surg Br 27:535-
537, 2002
8. Flores LP, Carneiro JZ: Peripheral nerve compression secondary
secondary to lipoma of the hypothenar region. Ann Plast Surg
46:83-84, 2001
10. Goldstein LJ, Helfend LK, Kordestani RK: Postoperative edema
after vascular access causing nerve compression secondary to
the presence of a perineural lipoma: case report. Neurosurg-
exy 50:412-413, 2002
11. Harrati Y, Miller S, Moore S, Hausman M, Flatow E: Supraep-
cular nerve entrapment secondary to a lipoma. Clin Orthop
12. Henrique A: A high radial neuropathy by parosteal lipoma com-
13. Higgins PE, Young VL, Schuster R, Weeks PM: Giant lipomas
unusual case of carpal tunnel syndrome. Pan Afr Med J 9:29,
2011
15. Kline DG, Hudson AR: Tumors involving nerve. In: Kline DG,
Hudson AR eds. Nerve injuries: Operative results for major
nerve injuries, entrapments and tumors. Philadelphia, PA: W.
B. Saunders, 1995, pp525-574
16. Lidor C, Lotem M, Halil T: Parosteal lipoma of the proximal
radius: a report of five cases. J Hand Surg Am 17:1095-1097,
1992
17. Nicklas BJ, Schwein J: Juxtamalleolar lipoma with intermediate
dorsal cutaneous nerve entrapment. J Am Podiatr Med Assoc
81:564-566, 1991
18. Pagonis T, Givissis P, Christodoulou A: Complications arising
from a misdiagnosed giant lipoma of the hand and palm: a case
19. Phalen GS, Kendall JJ, Rodriguez JM: Lipomas of the upper
extremity. A series of fifteen tumors in the hand and wrist and
1971
20. Resende LA, Silva MD, Kimaid PA, Schiavao V, Zanini MA,
Faleiros AT: Compression of the peripheral branches of the
sciatic nerve by lipoma. Electromyogr Clin Neurophysiol 37:
251-255, 1997
nerve neuropathy caused by a lipoma in Guyon's canal--case
22. Shai MA, Benzarti S, Moeck H, Boussen M, Khorbi A: Carpal
tunnel syndrome caused by a lipoma: a case report. Pan Afr
23. Sergeant G, Gheyens O, Seynaeve P, Van Cauwelaert J, Ce-
penns H: Neurovascular compression by a subpectoral lipoma.
A case report of a rare case of thoracic outlet syndrome. Acta
Chir Belg 103:528-531, 2003
tunnel syndrome and trigger wrist caused by a lipoma arising
from a misdiagnosed giant lipoma of the hand and palm: a case
26. Strickland JW, Steichen JB: Nerve tumors of the hand and fore-
27. Valbuena SE, O’Toole GA, Roulot E: Compression of the
median nerve in the proximal forearm by a giant lipoma: A