

Carpal Tunnel Syndrome Secondary to the Lipoma Mass: A Case Report and Review of Literature

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Abstract

Background: Lipomas are benign adipocyte proliferations and the most common tumors in soft tissue, although the appearance of this tumor in the hand is rare. The most common peripheral compressive neuropathy is carpal tunnel syndrome (CTS). CTS caused by a space-occupying lesion such as lipomas is rare and causes more complications than idiopathic CTS.

Case Report: This report was about a case of a 62-year-old woman with a giant painless mass on the first web of her right hand, with no systemic symptom and just a burning sensation in her fingers. After evaluations, CTS was diagnosed. Surgical dissection of the mass was performed, and the patient's symptoms improved. The pathology report indicated that the mass was a lipoma.

Conclusion: It is essential to examine the presence of different masses when the patient has neurological symptoms without justifying the history.

Keywords: Lipomas; Carpal Tunnel Syndromes; Peripheral Nervous System Diseases; Tomaculous Neuropathy

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Background

Lipomas are a benign proliferation of adipocytes (1) and the most common soft tissue tumors with a prevalence of about 2.1%. To date, no malignant cases of these masses have been reported. It should be noted that these tumors can affect anywhere in the body where adipose tissue is present, but hand is one of the organs that is less involved. Statistically, in a retrospective study of the incidence of hand masses in 402 patients, only 4.9% of these masses were diagnosed as lipoma (2). As mentioned earlier, the appearance of lipoma in the hand is rare, with an incidence rate of 1.0 to 3.8% among benign hand tumors (3).

The mass with gradually progressive growth, soft, and non-tender is the most common clinical presentation of lipomas (4). Giant lipoma is a term that is used for lipomas larger than 5 cm in the hand region. They can grow considerably, and their presence in hand is associated with various symptoms such as tenderness, paresthesia, and muscle atrophy (5). The reason for this feature is that the soft tissue has a rich neurovascular environment and poor compliance. In the absence of dead spaces in the hand compartments, from the beginning of the tumor spread, compressive effects on the neurovascular endings will occur, and these compressive effects will cause unusual clinical symptoms, such as carpal tunnel syndrome (CTS) (3). CTS is the most frequent peripheral compression neuropathy, although a CTS caused by a space-occupying lesion is rare and causes more complications than idiopathic CTS (6).

Here we report a 62-year-old woman who suffered from a huge non-tender mass in her right hand and also feeling burning in her fingers. Physical examination, besides necessary evaluations, revealed CTS secondary to the lipoma.

Case Report

The patient was a 62-year-old woman who had had a mass on the first web space of her right hand for six months prior to the visit. The mass had been gradually increasing in size in the last 6 months ago.

She complained of a burning sensation in the fingers, but she denied pain. The burning of her fingers had increased when doing certain tasks, such as sewing. There was no sign of systemic symptoms and any history of specific underlying disease was not mentioned.

On physical examination, both Phalen and reverse Phalen tests were positive. With high suspicion about CTS, Electromyography and Nerve Conduction Velocity (EMG/NCV) and also radiography of the hand were requested for further evaluation (Figure 1).



Figure 1. Antero-posterior (AP) and lateral hand radiographs showing soft tissue shadow in the first web space of her right hand (palmar region)

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In this experiment, the median nerve conduction velocity was reported to be 35 meters per second (m/s), and the difference of the conduction velocity of the wrist-to-digit segment compared to the palm-to-digit segment was reported 19 (m/s).

Since almost none of the predisposing factors and underlying diseases causing CTS could be found in this patient, it can be assumed that the symptoms of this syndrome were caused by the compressive effect of the tumor.

Due to the size of the mass and the problems it had created for the patient, she became a candidate for surgery at the earliest possible opportunity. During surgery, the involvement and compression effect on the median nerve was evident, and after removing the mass, the compressive effect was also resolved. Regarding the appearance characteristics of the resected mass, it was a yellow encapsulated mass with soft consistency measuring $4.6 \times 3.2 \times 2.3 \text{ cm}^3$ (Figure 2).



Figure 2. A yellow encapsulated mass with a soft consistency

Our clinical suspicion, given the appearance of the mass, was a lipoma. A benign mesenchymal neoplasm composed of mature adipocytes without atypia separated by thin fibrotic meshwork was reported by pathology. These findings showed the accuracy of our suspicion.

In the 3 months of follow-up, she had no complaints, and no recurrence of the tumor was seen.

Discussion

The most common soft tissue tumors are lipomas, while as mentioned earlier, the prevalence of this tumor in the hand is rare and less than 5% (6). Because these masses occur mainly in the lower limbs, their presence in the upper limbs, such as the hands, is clinically interesting (3).

About 90% of entrapment neuropathies are related to CTS, so it can be considered as one of the most common compressive neuropathies. Women are more commonly affected than men, and the highest incidence is seen in individuals aged 55-60 years. The systemic causes of CTS include diabetes mellitus (DM), obesity, hypothyroidism, pregnancy, and renal failure. Local causes such as inflammation in tenosynovitis, trauma from a distal radius fracture, and benign or malignant tumors have been described (7).

For a general definition of CTS, the American Academy of Orthopedic Surgeons (AAOS) clinical practice

guidelines on the diagnosis of CTS (2007) is as good as any. "CTS is a symptomatic compression neuropathy of the median nerve at the level of the wrist, characterized physiologically by evidence of increased pressure within the carpal tunnel and decreased function of the nerve at that level. CTS can be caused by many different diseases, conditions, and events. It is characterized by patients as producing numbness, tingling, hand and arm pain, and muscle dysfunction. The disorder is not restricted by age, gender, ethnicity, or occupation and is associated with or caused by systemic disease and local mechanical and disease factors" (8).

Clinically, the idiopathic form of CTS is the most common of neuropathies in patients. Although the occurrence of this syndrome secondary to other reasons is rare, the appearance of CTS because of tumors is much rarer. In general, two major groups of tumors can have a compressive effect on peripheral nerves, including the median nerve at the carpal tunnel: tumors with a neural sheath origin and those that have a non-neural sheath origin such as lipomas (9).

After clinical examination, radiographic studies should be used when there is a suspicion of the presence of a lesion that has caused compression symptoms on the nerve by occupying space. On direct radiographs, it is not possible to definitively diagnose small lipomas. Large lipomas can also show up by creating a radiolucent halo in the soft tissue. Magnetic resonance imaging (MRI) is the best available method for definitive diagnosis of the mass, its differentiation from other compressive causes, and the decision on how to perform the surgery. MRI can be very helpful in determining the characteristics of the mass and understanding the relationship of the mass with other anatomical structures (2). EMG/NCV measurements show prolonged sensory latency in the median nerve territory of the wrist (10).

In the literature, several cases of the CTS secondary to the lipoma were published. We searched Google Scholar electronic database from 2015 to 2021 and chose the most relative articles. Finally, we briefly described them in table 1.

Most patients were women, which is justified by the higher prevalence of CTS in women. None of them reported a recurrence of the tumor in their follow-up and also no further complaint after the surgery.

Sbai et al. reported a case of CTS which, despite all examinations and necessary imaging, could not diagnose the cause. Intra-operatively, they found a lipoma mass that explained the cause of CTS (6).

Conclusion

It is essential to examine the presence of different masses when the patient has neurological symptoms without justifying the history.

Conflict of Interest

The authors declare no conflict of interest in this study.

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Table 1. Summary of published observations

Author, Year	Age/Sex	Type of the injury	Treatment	Result
Sbai et al. (6), 2015	70/Female	A 2.5 × 1.5 × 1 cm ³ lipoma caused CTS, but before the surgery, despite the imaging and examination, the mass was not detected.	Incision of transverse carpal ligament and neurolysis of the median nerve	Elimination of all previous symptoms and return to normal hand function after 2 months There was no subjective discomfort, the scar healed properly and was in the maturation phase, while the function of the hand was normal, with the good neurocirculatory function of the IV and V fingers in one month.
Radivojcevic et al. (11), 2016	70/Female	CTS was caused by a 5.6 × 3.4 × 2.5 cm ³ lipoma	Surgical dissection of the mass	Not mentioned
Sayilir (12), 2017	44/Female	CTS was caused by a lipoma located near the flexor tendons beyond the transverse carpal ligament	The patient did not accept the surgery.	A marked improvement in his symptoms after 2 weeks
Clesham et al. (7), 2017	65/Male	CTS was caused by a 5 × 4 × 2.7 cm ³ lipoma that had a component extending into the distal aspect of the carpal tunnel, compressing the median nerve	Surgical dissection of the mass	Reversion of complaints of paresthesia and pain of the first three fingers of the hand after five months and no recurrence of the tumor
Ribeiro et al. (13), 2017	70/Female	CTS was caused by a 6.5 × 6.5 cm ² lipoma	Surgical dissection of the mass	Elimination of all previous symptoms and return to normal hand function after two months
Unal et al. (2), 2018	50/Female	Simultaneous median and ulnar compression neuropathy secondary to a 6 × 5 × 4 cm ³ palmar lipoma	Complete mass removal with surgery with an incision extending to both Guyon's canal and the carpal tunnel	Complete clinical improvement, without any symptoms relapse or local recurrence on the remaining year of follow-up
Barreira et al. (14), 2020	63/Female	Recurrence of CTS symptoms by a 5.1 × 3.5 × 2.5 cm ³ lipoma, six months after treatment of an idiopathic CTS	Surgical dissection of the mass	Elimination of all previous symptoms and return to normal hand function after four weeks and no recurrence of the tumor after six months
Salazar-Vizuet et al. (15), 2020	53/Female	CTS was caused by a 5 × 5.2 cm ² lipoma	Surgical resection of the thenar eminence tumor	Symptoms improved gradually and finally recovered one month after surgery. There was no recurrence after one year of follow-up.
Kim and Hwang (16), 2020	49/Male	CTS was caused by a 4.5 × 4.2 × 1.6 cm ³ lipoma	Surgical dissection of the mass	Elimination of neurological symptoms and no recurrence of the tumor after 12 months
Dahmani et al. (10), 2021	55/Female	Palmar lipoma fused into the carpal tunnel of the right hand with 5 cm in diameter and developed symptoms of CTS	Surgical dissection of the mass	Complete resolution of dysesthesia and improved thumb motion after three months
Stavrakakis et al. (17), 2021	49/Female	CTS was caused by a 5.7 × 2.4 × 2 cm ³ palmar lipoma between the palmar aponeurosis and underlying flexor tendons, occupying the thenar and hypothenar areas	Surgical dissection of the mass	Pain and numbness significantly decreased after two weeks.
Tellier et al. (18), 2021	62/Male	Palmar lipoma fused into the carpal tunnel of the left hand with 8.5 cm in diameter and developed symptoms of CTS	Surgical dissection of the mass	

CTS: Carpal Tunnel Syndrome; M: Male; F: Female

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