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Case Report

Carpal Tunnel Syndrome Caused by a Lipoma of Chance Discovery: A Case Report

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Abstract

Hand lipoma is a rare lesion, which can imitate symptoms of tumor syndrome and signs of compression of the median and ulnar nerves. Surgical resection is recommended to relieve the neurological manifestations of this disease. The surgeon must always suspect liposarcoma before considering large, atypical or recurrent tumors. We report the case of a 55-year-old woman with carpal tunnel syndrome. During the operation, it was found that the lipoma compresses the median nerve. We performed an anterior section of the annular ligament of the wrist carpus and removed the lipomas and median neurolysis. The histopathological study of the resected mass is consistent with lipoma. Two and a half months after the operation, the patient recovered all the functions of the hand and the symptomatology disappeared completely. Carpal tunnel syndrome caused by lesions occupying space is rare. Usually based on clinical research, the diagnosis of electrophysiology and magnetic resonance imaging (MRI) is difficult. The release of the transverse carpal ligament and the elimination of the lipoma can allow an excellent functional recovery.

Keywords: *Lipoma; Carpal Tunnel Syndrome; Median Nerve; Nerve Compression*

Introduction

Soft tissue lipoma is the most common benign tumor in the limbs although the appearance of lipomas in the hand remains rare: between 1 and 3.8% of benign hand tumors [1]. The clinical and therapeutic characteristics force physicians to consider each condition in a

specific way. The rich neurovascular environment and the low compliance of the hand tissues are the basis of this specificity. Indeed, from the expansion of the tumor, the absence of dead spots in the compartment of the hand causes rapid compression of the neurovascular end. This oppression produces atypical clinical manifestations which can imitate carpal tunnel syndrome (CTS). This peripheral compression neuropathy is the most common, although CTS caused by a lesion occupying a space is rare and causes more complications than idiopathic CTS. We report an exceptional case of a 55-year-old woman presenting a CTS due to a compression of the median nerve by a lipoma discovered incidentally during the intervention.

Case Report

A 55-year-old right-handed woman has no obvious history of trauma or microtrauma. The numbness and tingling of the left hand affects the thumb, index and middle fingers and the grip strength is reduced. Appeared a year ago. The interrogation revealed a progressive evolution of nocturnal acroparesthesia over several months. On physical examination, a decrease in epicritic sensitivity with the Weber test, without any soft tissue mass was found on palpation and the range of motion of the wrist was normal (extension 70°, flexion 75°). Compared to the contralateral hand without signs of dyskinesia, the sensitivity of the median nerve area is reduced. There was a sign Tinel's was positive on the wrist. The electrophysiological study confirmed the diagnosis of STC because it showed a slowdown in sensory conduction velocities in the carpal tunnel. Standard radiography found no abnormalities. The operation was performed under local anesthesia, the axillary conduction was blocked and the tourniquet controlled hemostasis during the intervention.

The patient was supine. The traditional palm method leading to the carpal tunnel was chosen. Cut the transverse ligament of the wrist. A lipoma occupying the carpal tunnel space was found during the procedure. The careful dissection was facilitated by the non-invasive nature of the lesion with a well-defined border of 1.5 x 1 x 1 cm (Figure 1 and 2). Carefully identify the median nerve, which has been flattened by the mass, which is suffering and has been compressed (Figure 3) and at the end of neurolysis of the median nerve. The histopathological study of the excised mass was consistent with a lipoma (Figure 4), without any sign of malignancy, the skin was closed with non-absorbable sutures. There is no immobilizer connection. Postoperatively, the patient returned home with healing care every other day and prophylactic treatment of vitamin C algoneurodystrophy in combination with vitamin B12 for one month. No fixed assets were used. During the clinical evaluation, 75 days after the surgical procedure, the patient noted that full function of the hand is recovered (complete mobility of the fingers and normal grip strength) linked to the complete disappearance of the acroparesthesia.

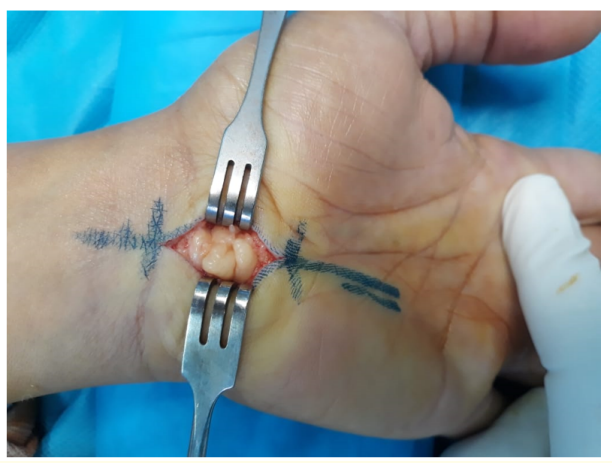

Figure 1: *Fat mass after the opening of the anterior annular ligament.*

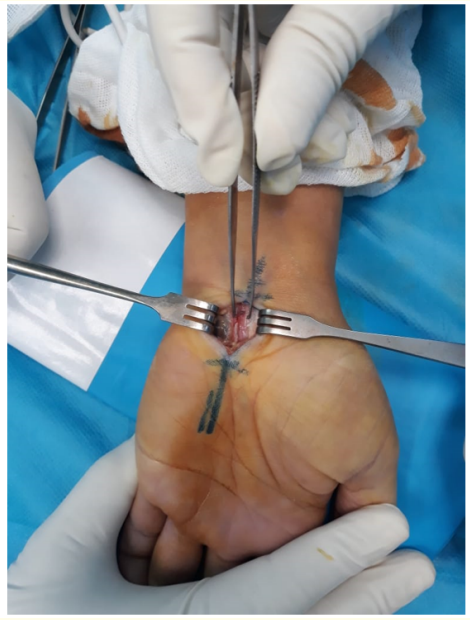

Figure 2: *After section of the anterior annular ligament and resection of the lipoma.*

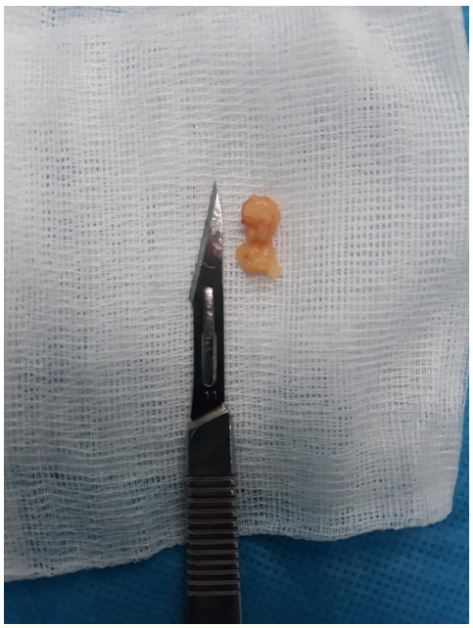

Figure 3: *Lipoma.*

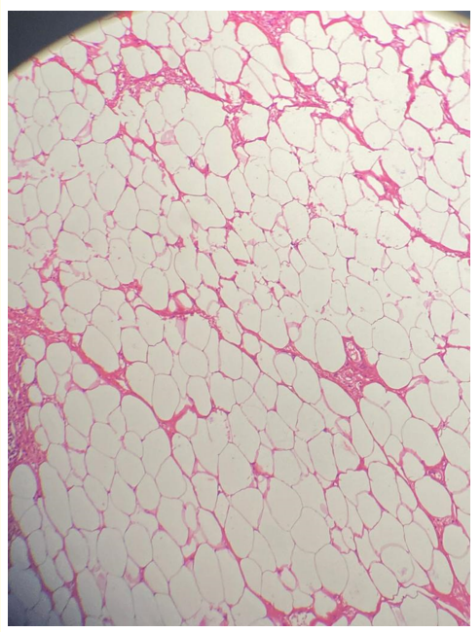

Figure 4: *Microscopic appearance confirms a lipoma.*

Discussion

Lipoma is a benign tumor, developed from mature adipocyte cells, usually encapsulated and sometimes infiltrated [2]. Localization on the palm of the hand is still rare: in 5% of cases, depending on its location, it can cause compression of the interosseous nerve of the forearm [3], carpal tunnel syndrome, compression of the ulnar nerve in the Gyon tunnel [4] and even compression of the digital nerve [5] or even a jumping finger [6]. No case of vascular compression with distal ischemia has been reported in the literature. It can be supra-or sub-fascial, exceptionally intramuscular [3,7]. Lipoma is usually painless and usually results in the palpation of a soft, regular, mobile tumor. Posch [8] described the clinical test of adding ice to tumors which, in the case of lipomas, can cause clotting of the mass. It usually develops slowly, which explains its often large size at the time of diagnosis, especially in deep areas, which can stabilize spontaneously. There is no apparent link between the tumor size and the patient's symptomatology [7]. In the series studied, compression of the median nerve by small tumors has sometimes been observed. In these cases, nerve compression can be explained by the discovery of intraoperative tumors attached to the nerves or tumors that cross the nerve branches [7].

It is well known that cases of idiopathic CTS generally occur bilaterally. 66% of patients with unilateral CTS have anomalies in the results of nerve conduction tests on the contralateral side [10]. When the patient's symptoms and nerve conduction test show unilateral abnormalities, in addition to idiopathic CTS, other reasons should be considered. Lipoma is a very rare cause of CTS, and only a few cases have been reported in the literature [5,10,11]. Of the 779 patients with CTS, Chen found 3 lipomas in 23 lesions occupying the space [12]. In a series of 568 cases of CTS, Ho Jung Kang reported no case of lipoma [11]. The secondary CTS of the lesions and occupying the space has an atypical expression and should require ultrasound examination. Besides its low cost and high availability, it is effective in detecting any mass in the hand.

Normally, standard radiological examinations do not facilitate the diagnosis because they only show a homogeneous opacity in the tissues; however, in the case of paraosseous lipomas, they sometimes show calcification or cortical bone aggregation in the tumor body [13].

Ultrasound is an effective tool for exploring any substance in the hand. If carpal tunnel syndrome has atypical symptoms, doctors can easily request an ultrasound. Ultrasound can provide anatomical images of nerves and surrounding structures, and can assess painful trauma to the median nerve in real time. Typical signs associated with nerve compression are the enlarged nerve near the site of compression, decreased echogenicity, and dilated blood vessels [13]. Ultrasound can accurately assess the space where the lesions causing compression of the median nerve [14]. Lipoma generally presents as an elongated lesion with a maximum diameter parallel to the skin and an anteroposterior length-diameter ratio is approximately 3: 1. The lesions generally appear as homogeneous hyperechoic structures with clear edges and no posterior improvement or color Doppler signal.

MRI has become the benchmark for soft tissue tumors due to its high sensitivity. It specifies the nature of the lesion, local expansion and its relationship to the neurovascular elements. The characteristic image of the lipoma is a limited hypersignal image on the T1 and T2 sequences, while reducing the signal on the fat suppression sequences. In some cases, the image presents a spacing (septas) of the fibers or a calcification. After the gadolinium injection, the signal from the fibrous septum will be moderately enhanced, but the fat keeps the same signal [16,17]. For a series of 134 cases of MRI of wrist tumors and pseudotumors, the preoperative MRI diagnosis of a benign lipoma was confirmed by histological examination. Caplastegui., *et al*. compared MRI scans with histological results. They concluded that MRI had a positive predictive value, close to 94% [16].

We recommend a thorough imaging examination of all clinical manifestations of atypical carpal tunnel syndrome, including unilateral symptoms, sudden onset, unusually young patients, and clinical mass syndrome.

The differential diagnosis of these tumors mainly includes:

- The fibrolipoma of the median nerve [16]. It is a benign tumor, developed from fibroblasts and fat cells from the outer nerve membrane. It is always purely neurological [17]. It represents only 2% of tumors of this type [16]. In MRI, it appears as a well-differentiated mass with clear limits and a signal composed of a mixture of fat and fibrosis. The pathological feature of this disease is the signal fat swelling through which the low signal nerve fibers pass [20]. Surgical treatment is difficult because it is impossible to separate the tumor and the regular nerves with resection.
- Low grade liposarcoma is a differential diagnosis which presents the greatest risk to the patient. It is the most common soft tissue sarcoma in adults, with a frequency ranging from 1.1 to 2.5/1,000,000, with a peak between 50 and 70 years [18,21]. It develops from subcutaneous fat or intercellular spaces, sometimes even from anterior or relapsing lipomas [22]. Clinically, they are highly variable, and appeared from lipomas following smooth oval tumors with an irregular heterogeneous appearance characteristic of malignant tumors. During the first consultation, liposarcoma is usually already large [17]. MRI can help distinguish lipoma from liposarcoma by analyzing the fat content of tissues. Lipomas always contain more than 75% pure fat, the most common being 95 to 100%. Liposarcoma contains less than 75% fat or contains several non-fatty nodules. Finally, the MRI analyzed the appearance of the internal division of the tumor: the septa of the lipid tumor was very thin, slightly enhanced with gadolinium, with a histological correspondence to fibrosis, slightly improved. On the other hand, inside liposarcoma, there are thickened septum-like separators, most often enhanced by gadolinium, corresponding to muscle fibers [17,21,23]. Liposarcoma can be more or less differentiated. The histological type ranges from the deceptive aspect of lipoma-like sarcoma (this well-differentiated tumor is diagnosed only by abnormal chromatin) to the most differentiated form which contains immature adipose tissue and a large number of adipoblastic cells [17]. In the hand, complete removal of lipomas is a treatment option that allows the release of compressed nerves. It is recommended to use conventional open surgery when endoscopy is prohibited. The dissection and identification of the neurovascular components must be done with care to avoid iatrogenic damage.

- The release of the transverse carpal ligaments and the elimination of lipomas generally produce excellent results. After the procedure, the patient quickly recovered all the functions of the hand and the pain and acroparesthesia disappeared completely. The exception is local recurrence.
- There are few other differential diagnoses, which may be another tumor of the tissue, such as lymph node cysts or giant cell tumors [13]. Leiomyoma is a rare cause of carpal tunnel syndrome caused by lesions occupying space. Leiomyoma seems to preferentially affect the young population, as described by Chalidis., *et al* [22].

The size of 5 cm is the classic limit that defines giant lipomas [7,9,24-26]. This definition is based on the rarity of lipid tumors beyond this size. Tumors larger than 5 cm should always cause suspicion of malignant tumors. All the authors agree that before a lipoma larger than 5 cm, a biopsy or a fine-needle aspiration must be performed to exclude liposarcoma [17]. Fine needle aspiration cytology can make a differential diagnosis of 95% of lipomas and liposarcoma for Kooby., *et al*. [21], which is an advantageous alternative to biopsy, which involves the risk of local tumor spread. In the clinical study of 1,331 cases of benign soft tumors by Myhre-Jensen, 640 of them had lipomas, and the size of the tumor was less than 5 cm in 95% of the cases. At the same time, more than 50% of the 72 malignant soft tissue sarcomas diagnosed during the study were 5 cm or more [25]. Similarly, in a retrospective analysis of 428 lipomas, Rydholm and Berg found that for tumors smaller than 5 cm, the isolated lipoma/sarcoma ratio was 150/1 and for tumors larger than 5 cm was 20/1 [26].

In terms of treatment, surgical removal of the liposomes is the only treatment that can release compressed nerve endings and effectively remove tumors. The surgeon should perform a one-piece resection and carefully dissect the neurovascular branch safely to minimize the risk of iatrogenic damage. Histology has confirmed that for the benign nature of lipoma, local recurrence is rare. However, some authors claim that the risk of recurrence is linked to the degree of heterogeneity observed during the first MRI examination [7].

Conclusion

Lipoma is rare in the hands and wrists, and even the cause of secondary CTS is rare, but it should be suspected. A thorough clinical examination, a functional exploration of the EMG is essential and in terms of predictive value, MRI is the best morphological method for exploring tumors of the hands and wrists. The size of 5 cm should be the limit to define a giant lipoma in the hand. Beyond 5 cm, a biopsy or a fine needle aspiration is necessary in order to eliminate in the first row a liposarcoma. A complete and successful surgical resection allows excellent functional recovery. For endoscopic surgery, it is absolutely contraindicated, but conventional open methods are recommended. The main risk remains the iatrogenic risk during surgical resection, which is caused by the close proximity between the lipoma and the neurovascular end. An anatomopathological examination after complete resection of the tumor remains necessary to confirm the diagnosis and to eliminate the malignant tumor.

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