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Macroscopic and Microscopic Mismatch in Ulnar Nerve Tumours: A Case Report

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Abstract

Background: Neurological symptoms, particularly pain, resulting from ulnar nerve tumors can be severely debilitating. Accurate diagnosis and appropriate management of these tumors are crucial, as discrepancies between macroscopic and microscopic findings can significantly impact therapeutic decisions and patient outcomes.
Case Description: A 65-year-old man presented with a lump on his left elbow, first noted in March 2024. Initial pathological analysis suggested a neurofibroma; however, following surgical intervention, the patient developed new symptoms, including pain and weakness in the left hand. MRI scans subsequently diagnosed a schwannoma of the ulnar nerve. A second tumor excision was performed, leading to microscopic confirmation of a neuroma. Post-surgery, the patient experienced gradual relief from his neurological complaints. This case highlights a striking discrepancy between macroscopic and microscopic findings, initially leading to a misdiagnosis of neurofibroma, which was later corrected to neuroma. It emphasizes the importance of comprehensive evaluation methods, including MRI, to achieve an accurate diagnosis that informs appropriate treatment strategies. A multidisciplinary approach is essential for optimizing patient outcomes.
Conclusion: Effective treatment necessitates careful consideration of differences between macroscopic and microscopic findings. This case underscores the critical need for ongoing evaluation and diagnostic refinement to enhance clinical outcomes for patients suffering from ulnar nerve tumors. Continuous learning and adaptation in diagnostic practices are vital for improving patient care in such complex cases.

Keywords: Ulnar Nerve Tumors, Neurofibroma, Neuroma, MRI Diagnosis, Multidisciplinary Approach

INTRODUCTION

The ulnar nerve, a critical component of the upper limb's neuroanatomy, plays an essential role in motor and sensory functions of the hand. Its anatomical course is complex, often making it susceptible to various pathologies, including tumors. Ulnar nerve tumors can present a significant clinical challenge due to the potential for both macroscopic and microscopic mismatches in diagnosis and treatment [1]. Macroscopically, these tumors may appear as palpable masses or cause noticeable symptoms such as pain, weakness, or sensory deficits. However, the microscopic characteristics of these tumors can vary widely, complicating the clinical picture and necessitating a thorough understanding of the underlying pathology.

Recent literature has highlighted various types of tumors affecting the ulnar nerve, including intraneural lipomas, schwannomas, and ganglion cysts, each presenting unique challenges in diagnosis and management. For instance, intraneural lipomas, although rare, can lead to significant compression of the ulnar nerve, resulting in neuropathy and functional impairment. [2], [3] Similarly, schwannomas, which are benign tumors arising from Schwann cells, can also cause similar symptoms and may be misdiagnosed due to their subtle presentation on imaging studies. [4], [5] The complexity increases when considering the anatomical variations of the ulnar nerve, which can lead to aberrant branching patterns that may mimic or obscure the presence of tumors. [6], [7]

The interplay between macroscopic and microscopic findings in ulnar nerve tumors is critical for accurate diagnosis and effective treatment. Macroscopically, a tumor may present as a discrete mass, but histological examination may reveal a spectrum of cellular changes that inform the prognosis and therapeutic approach. For example, while a palpable mass may suggest a benign process, microscopic evaluation could uncover malignant characteristics, necessitating a more aggressive treatment strategy. [8] The presence of surrounding scar tissue or other compressive factors can further complicate the clinical picture, as these factors may not be readily apparent on imaging but can significantly impact nerve function and recovery. [9], [10]

Ulnar nerve tumours are quite uncommon, and patients who present with such lesions pose interesting problems to surgeons. Peripheral nerve tumour diseases affect pain, Senators and motor dysfunction, and often lead to severe disability; one such and examples of clinical examples of this category include neurofibromas, schwannomas, and traumatic neuromas. In this case, distinguishing between peripheral nerves tumour is critical when addressing a tumour at the ulnar nerve is critical as it controls the fine motor function in the hand. Consequently, a failure to diagnose headache correctly is associated with a poor prognosis that may include chronic pain, the inability to use the affected limb, and recurrence of tumours. [11] So occasionally one becomes quite surprised about the discrepancy between what one sees during surgery at the macroscopic level and the subsequent histopathological findings. It can change the therapeutic strategy and select the long-term outcomes, as overridden in the case report. In this manuscript, we report a case of an elderly patient with ulnar nerve tumour that on clinical presentation and initial histopathological assessment was diagnosed as neurofibroma, but histopathology result revealed Neuroma.

CASE REPORT

In March 2024, a 65-year-old male patient presented to our clinic with a growing lump on his left elbow, which he had first noticed four months prior. Initially, the lump caused some discomfort that gradually intensified over time. Importantly, the patient reported no history of trauma to the area and denied experiencing any systemic symptoms such as weight loss, fever, or night sweats. Upon physical examination, a palpable, firm, non-tender mass was observed over the posteromedial aspect of the left elbow. The examination also revealed decreased sensation in the fourth and fifth digits of the left hand, along with difficulty in performing fine motor tasks, such as buttoning shirts and gripping objects. Furthermore, motor strength in the left hand was diminished, and there was marked atrophy of the intrinsic muscles of the hand, indicating possible nerve involvement. Given the clinical findings, surgical excision of the mass was performed at the local hospital to which the patient was initially referred. Macroscopic examination of the tumor suggested the possibility of a neurofibroma, and subsequent histopathological analysis confirmed this diagnosis. The tumor was excised in its entirety, and the patient was discharged postoperatively. However, two weeks after the operation, the patient returned with increased pain (rated 6 out of 10 on the Visual Analog Scale), paraesthesia, and stiffness in the left hand. Alongside the sensory deficits, he developed progressive weakness that increasingly affected the fourth and fifth digits of the affected hand. These alarming symptoms prompted further diagnostic imaging, specifically an MRI of the left upper extremity.

The MRI revealed a recurrent mass that involved the ulnar nerve, extending from the proximal forearm to the medial epicondyle. Radiological features suggested that the tumor likely originated from the ulnar nerve, with characteristics favoring a diagnosis of schwannoma. Unfortunately, the standards required for an accurate histopathological assessment were not met in this instance, leaving the definitive nature of the tumor unclear. Given the findings, a second surgical excision was planned to address the recurrent mass. In August 2024, the patient underwent a second surgical procedure. During the operation, the tumor was found to be closely associated with the ulnar nerve, necessitating careful dissection to preserve nerve integrity. The surgical team performed an en bloc excision of the mass, which was then sent for histopathological examination.

The results of the histopathological analysis revealed that the tumor was not a neurofibroma or schwannoma, but rather a traumatic neuroma. This finding aligned with the patient's history of previous surgery, which is consistent with nonneoplastic proliferation of nerve tissue, known as neuromas. Neuromas are not classified as true neoplasms; instead, they consist of disorganized nerve regeneration following trauma, similar to neurofibromas and schwannomas. Postoperatively, the patient experienced an uneventful recovery. At the six-week follow-up appointment, he reported a significant reduction in pain, now rated at 1 out of 10 on the Visual Analog Scale. Additionally, he noted improvements in hand function, although recovery was still partial. Strengthening in the fourth and fifth fingers showed marked improvement, and motor function in the left hand was gradually returning. To maximize functional recovery, a comprehensive rehabilitation program was initiated, incorporating both physiotherapy and occupational therapy. This multidisciplinary approach aimed to enhance the patient's motor skills, improve strength, and facilitate the performance of daily activities that had been compromised due to the neurological deficits.

The case of this patient underscores the importance of careful diagnostic evaluation and surgical management in cases of soft tissue masses associated with nerve structures. Initial misdiagnosis can lead to recurrent symptoms and complications, as seen in this patient. The distinction between various types of nerve-related tumors—such as neurofibromas, schwannomas, and traumatic neuromas—requires thorough histopathological examination and clinical correlation.

DISCUSSION

Ulnar nerve tumors present a significant challenge, especially when there is a discrepancy between gross and microscopic findings during diagnosis and management. In the case of our patient, an initial diagnosis of neurofibroma was made based on the macroscopic appearance of the tumor. However, this diagnosis was ultimately revised following a second surgery, where histopathological examination revealed the tumor to be a traumatic neuroma. This misdiagnosis underscores the critical need for incorporating advanced diagnostic modalities, such as imaging techniques and histopathology, to achieve accurate diagnoses and effective treatment plans. [12]

Peripheral nerve tumors that involve critical areas, such as the ulnar nerve, require thorough preoperative evaluation. Advanced imaging modalities like MRI are invaluable for delineating the anatomical extent of the tumor and its relationship to surrounding structures. In this particular case, the MRI findings suggested a schwannoma, which was later ruled out by histopathological examination. This highlights the complexity of diagnosing peripheral nerve tumors, where imaging may not always correlate with the underlying pathology. [13]

Traumatic neuromas are characterized by the disorganized proliferation of nerve fibers that occurs following local injury or surgical hemorrhage. [14] These lesions are reactive in nature, arising from failed nerve regeneration rather than being true neoplasms. As seen in our patient, traumatic neuromas are often associated with persistent pain and sensory disturbances, which were notably significant following the first surgery. The patient's postoperative symptoms, including increased pain and sensory deficits, illustrated the challenges posed by misdiagnosis and the importance of recognizing the nature of these lesions.

The successful management of this case was made possible through the collaborative efforts of a multidisciplinary team, including neurosurgeons, radiologists, and pathologists. Each specialty played a vital role in the patient's care, contributing their expertise to ensure a correct diagnosis and implement an appropriate treatment plan. This collaboration is essential in complex cases involving peripheral nerve tumors, where accurate diagnosis and tailored management strategies can significantly impact patient outcomes. [15]

In summary, this case emphasizes the importance of advanced imaging and histopathological evaluation in the diagnosis of ulnar nerve tumors. The initial misdiagnosis of neurofibroma, followed by the identification of a traumatic neuroma, illustrates the complexities involved in managing peripheral nerve tumors. A multidisciplinary approach is crucial for achieving accurate diagnoses and effective treatment plans, ultimately leading to improved patient outcomes. As the field of neurosurgery continues to evolve, the integration of advanced diagnostic techniques and collaborative care will remain essential in addressing the challenges presented by peripheral nerve tumors.

CONCLUSION

A discrepancy between macroscopic and microscopic findings can complicate the diagnosis of peripheral nerve tumors, necessitating a comprehensive approach that combines clinical evaluation, imaging studies, and histopathological analysis. In cases of traumatic neuroma, prompt recognition and surgical intervention are crucial to prevent recurrence and enhance patient outcomes. The identification of the recurrent tumor in this case was achieved through MRI, which, along with histopathological examination, confirmed the diagnosis. To provide the best possible outcomes for patients with peripheral nerve tumors, a multidisciplinary approach is essential, ensuring that all aspects of diagnosis and treatment are effectively addressed.

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Ethical approval

Institutional Review Board approval is not required.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

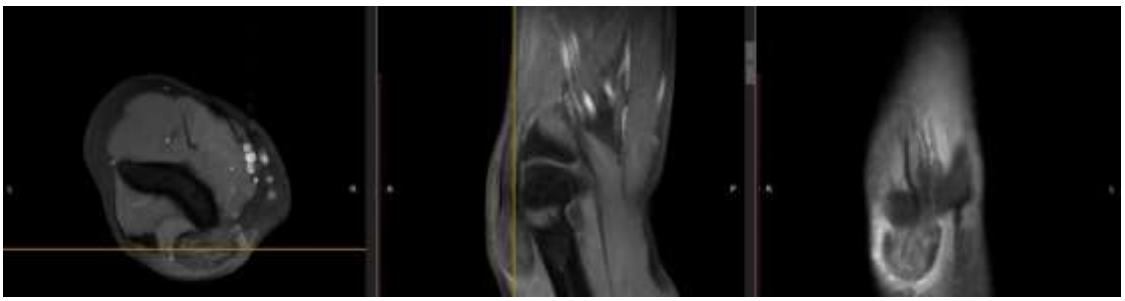

Figure 1. MRI Radiological Examination

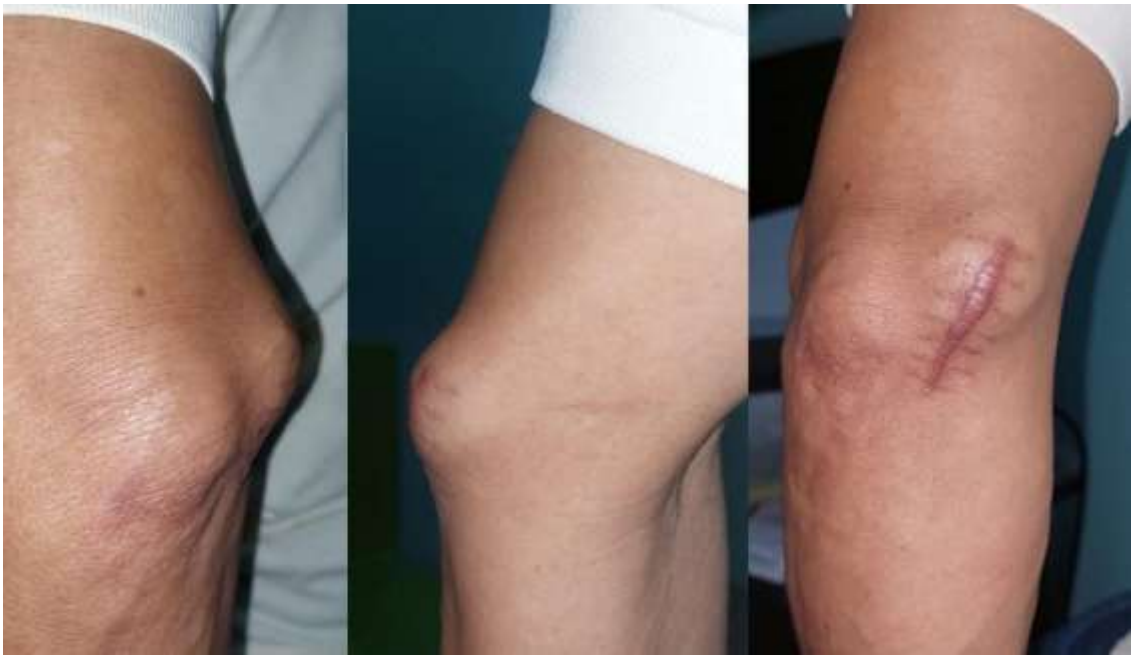

Figure 2. Clinical Condition of the Left Elbow Before Surgery

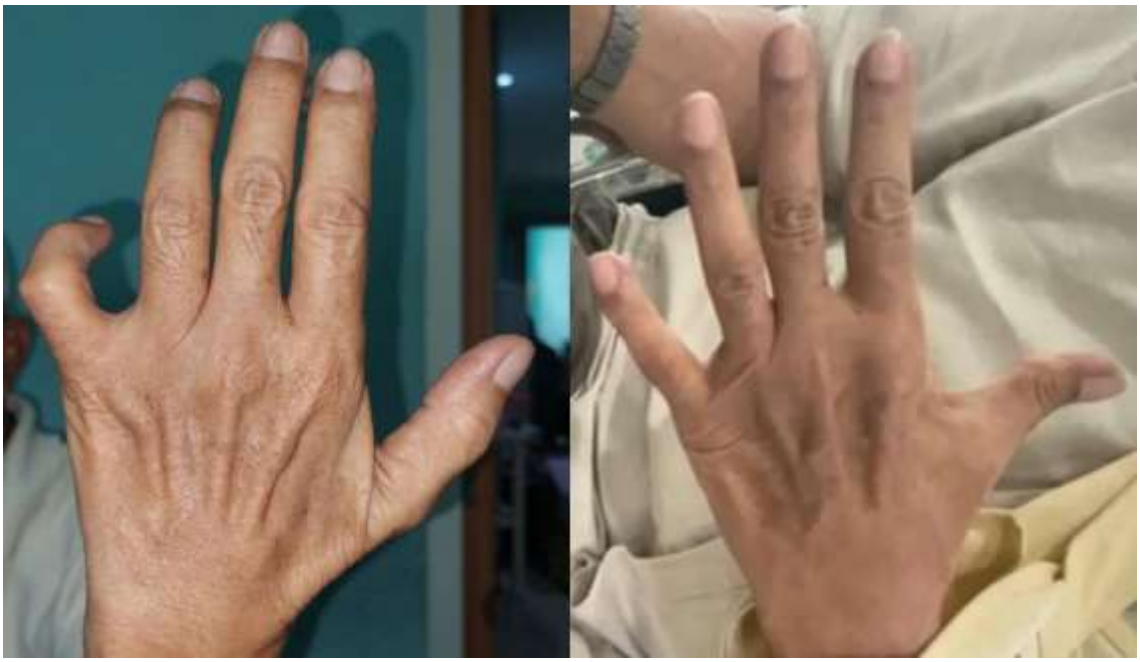

Figure 3. A (Left) Clinical Condition Before Surgery and B (Right) After Surgery

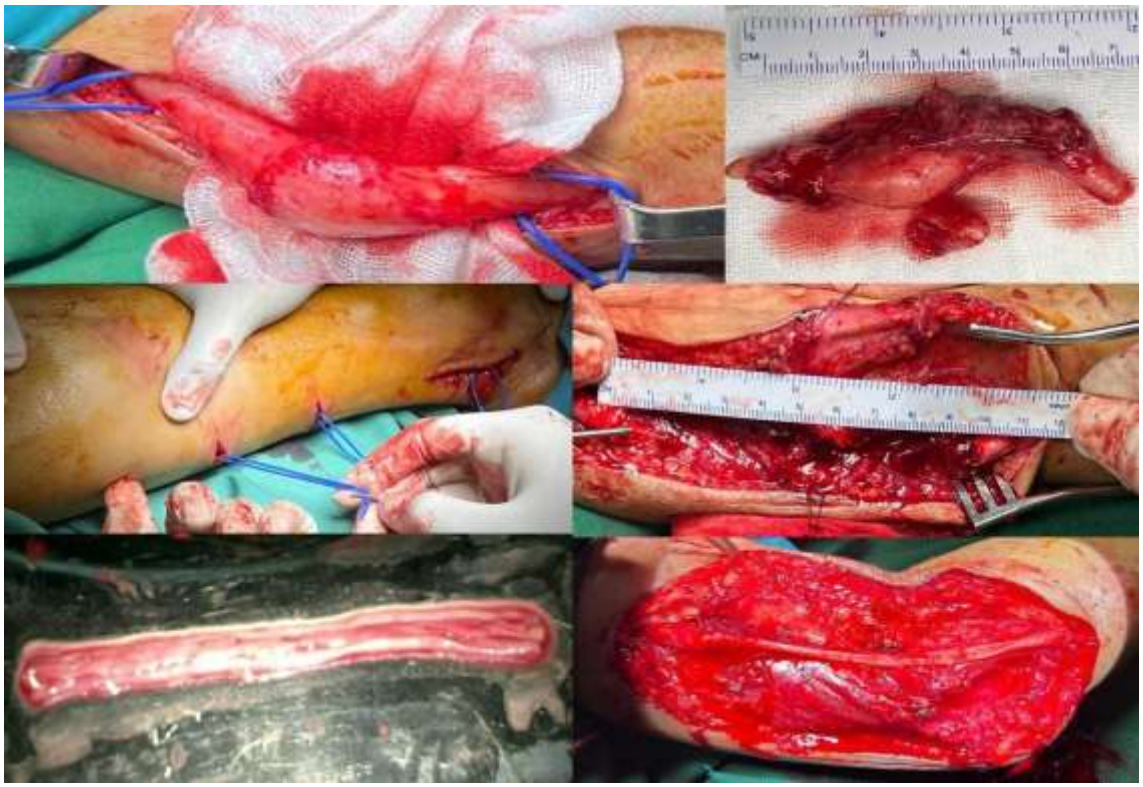

Figure 4. Intraoperative View During Tumour Excision and Nerve Transfer