

DIAGNOSTIC CHALLENGES IN DORSAL HAND MASSES: RHEUMATOID NODULES WITH CONCOMITANT RADIAL NERVE NEUROMA

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Abstract

Soft-tissue masses of the dorsal hand present a diagnostic challenge because they may originate from inflammatory, vascular, tenosynovial, or neoplastic conditions with similar clinical manifestations. Rheumatoid nodules are the most common extra-articular manifestation of rheumatoid arthritis; however, involvement of the dorsum of the hand associated with extensor tendon structures is uncommon and may mimic benign or malignant soft-tissue tumors. We present a rare case of concomitant rheumatoid nodule and radial nerve neuroma in a 62-year-old patient with two slowly enlarging masses on the dorsum of the left hand and lateral forearm. The patient experienced progressive difficulty with hand movement due to the size of the dorsal lesion and pain on percussion over the forearm mass. Clinical examination revealed a firm, immobile dorsal hand lesion and a painful forearm tumor-like formation, creating a preoperative diagnostic dilemma regarding surgical management. Both lesions were surgically excised and evaluated histopathologically. The dorsal hand mass was identified as a rheumatoid nodule characterized by inflammatory infiltrates, fibrinoid deposits, and synovial hyperplasia, while the forearm lesion was confirmed as a radial nerve neuroma. At one-year follow-up, no recurrence was observed, and the patient maintained full, painless hand function. This case emphasizes the importance of considering rheumatoid nodules in the differential diagnosis of dorsal hand masses and highlights the essential role of histopathological evaluation in establishing accurate diagnosis and guiding treatment.

Keywords: rheumatoid nodule, dorsal hand mass, radial nerve neuroma, soft-tissue tumor, histopathology, rheumatoid arthritis

Introduction

Soft-tissue masses of the hand represent a heterogeneous group of lesions arising from synovial, tendon, vascular, neural, and connective tissues. Although many of these lesions are benign, their clinical presentation may resemble malignant tumors, making accurate diagnosis difficult. The dorsum of the hand is an uncommon location for tumor-like formations, and the differential diagnosis includes giant cell tumor of the tendon sheath, tenosynovial chondromatosis, osteochondroma, synovial hemangioma, and, more rarely, sarcomatoid tumors of synovial origin. Because of the complex anatomy of the hand and the functional importance of surrounding structures, appropriate preoperative evaluation and surgical planning are essential [2,4,6].

Soft tissue tumors of the hand are relatively frequent, with more than 15% of all soft tissue tumors occurring in this region, and the majority being benign in nature [2,4]. However, their overlapping imaging and clinical features often make diagnosis challenging, and histopathological confirmation is frequently required for definitive classification [6].

Rheumatoid nodules are the most common extra-articular manifestation of rheumatoid arthritis and occur in approximately 20–30% of seropositive patients. They are usually located over pressure points such as the olecranon, extensor surface of the forearm, and Achilles tendon. Involvement of the dorsum of the hand, especially in close relation to extensor tendon structures, is uncommon and may clinically mimic other soft-tissue tumors. In some cases, these lesions may lead to tendon irritation, limitation of movement, or tendon rupture [2].

Neuromas of the radial nerve are also rare lesions and are most commonly associated with trauma, chronic compression, or previous surgical intervention. Clinically, they may present with pain, tenderness, or neurological symptoms, which can further complicate diagnosis when occurring simultaneously with other tumor-like lesions [10].

The concomitant presence of rheumatoid nodules and a radial nerve neuroma in different anatomical regions represents a rare diagnostic and therapeutic challenge. In this report, we present a case of rheumatoid nodules located on the dorsum of the left hand associated with a radial nerve neuroma of the forearm, emphasizing the importance of histopathological evaluation in establishing an accurate diagnosis and guiding appropriate surgical management.

Case Report

A 62-year-old patient presented with two slowly enlarging masses located on the dorsum of the left hand and lateral aspect of the left forearm. (Fig. 1). Past medical history included arterial hypertension, benign prostatic hyperplasia, and cholelithiasis. The patient reported progressive enlargement over several months. Before surgery, the patient experienced difficulty with hand movement due to the size of the dorsal hand mass. Additionally, he reported pain on percussion over the lateral forearm lesion.

Clinical examination revealed a firm, immobile mass on the dorsum of the left hand in relation to the extensor tendon structures. A second lesion on the lateral forearm was painful on palpation and percussion, suggesting possible neural involvement.

Computed tomography (CT) of the left forearm and hand demonstrated a heterogeneous predominantly hypodense mass with areas of cystic degeneration located dorsally in the projection of the second, third, and fourth metacarpal bones, extending toward the carpal bones and adjacent extensor tendon group. The lesion showed extension into the radiocarpal and distal radioulnar joint spaces and was radiologically suggestive of a neurofibromatous lesion. Marked osteoarthritic degenerative changes of the carpal and metacarpal skeleton were also present without evidence of traumatic bone lesions. Ultrasound examination additionally confirmed a soft-tissue tumorous lesion in close relation to the extensor tendon apparatus.

Fine-needle aspiration biopsy (FNAB) was performed preoperatively and was classified as cytological Group I.

The presence of two tumorous formations in different anatomical regions posed a surgical challenge. Preoperatively, the biological behavior of the dorsal hand lesion remained uncertain, and malignancy could not be excluded. This created a dilemma regarding the extent of surgical excision, whether to perform radical tumor resection with wider margins or simple extirpation with preservation of surrounding structures, particularly the extensor tendons.

The procedure was performed under local anesthesia utilizing the WALANT (Wide Awake Local Anesthesia No Tourniquet) technique in combination with monitored anesthesia care (MAC). [3] The patient was positioned supine, and both operative fields were prepared and draped in a standard sterile fashion. Attention was first directed toward the dorsum of the hand, where a longitudinal skin incision was made directly over the palpable lesion. Sharp and blunt dissection through the subcutaneous tissue was performed with meticulous hemostatic control. Intraoperatively, a well-circumscribed, firm, gelatinous soft-tissue mass was identified. (Fig. 2). Circumferential dissection allowed complete mobilization of the lesion from the surrounding tissues. Particular care was taken to preserve the extensor apparatus; the extensor tendons and associated dorsal structures were identified and remained entirely intact throughout the procedure without evidence of iatrogenic injury. The lesion was excised and submitted for histopathological evaluation. (Fig. 3.)

Attention was subsequently directed to the lateral aspect of the forearm, where a longitudinal incision was performed over the palpable mass. Careful dissection through the subcutaneous

tissue was carried out using combined sharp and blunt techniques. Intraoperative exploration revealed a tumorous mass of the radial nerve. (Fig. 4.) Surgical dissection was undertaken to isolate the lesion while preserving the continuity of the radial nerve. The radial nerve was meticulously protected throughout the procedure, without evidence of mechanical, traction, or thermal injury. Complete extraction of the mass was achieved and the specimen was submitted for histopathological analysis. (Fig. 5.)

Following excision of both lesions, the operative fields were copiously irrigated with sterile saline solution and meticulous hemostasis was achieved. Layered wound closure was performed using 3-0 Vicryl sutures for the subcutaneous tissues and 4-0 Prolene sutures for skin approximation. Sterile compressive dressings were subsequently applied. The patient tolerated the procedure well, and no intraoperative complications were encountered.



Figure 1. Preoperative clinical photograph showing a firm, well-defined mass on the dorsum of the left hand.



Figure 2. Intraoperative photograph showing the dorsal hand mass in situ during surgical exposure.

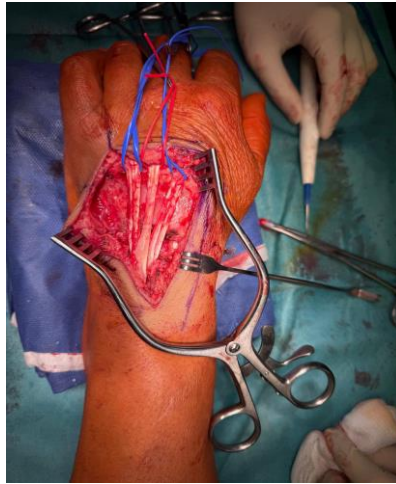


Figure 3. Intraoperative photograph following removal of the dorsal hand mass, showing a preserved extensor apparatus with exposed extensor tendons.



Figure 4. Intraoperative view: round, well-defined neuroma mass of the radial nerve at the lateral forearm — characteristic smooth, pearly-white appearance.



Figure 5. Lateral forearm: radial nerve isolated with yellow vessel loops for safe neuroma excision.

Histopathological Findings

Histopathological examination of the dorsal hand lesion revealed nodular aggregates composed of inflammatory infiltrate with central fibrinoid necrosis surrounded by palisading histiocytes and synovial hyperplasia. Congo red staining was negative, while PAS staining was positive. These findings were consistent with a rheumatoid nodule. Histopathological evaluation of the lateral forearm lesion confirmed a radial nerve neuroma.

The two tumor-like formations originated from different tissues and demonstrated distinct histopathological features.

Results / Follow-up

The postoperative course was uneventful. At one-year follow-up, there was no recurrence of either lesion. (Fig. 6). The patient maintained full, painless flexion and extension of the affected hand, with preserved neurological function. Following surgical management, the patient was referred to the Department of Rheumatology. Further evaluation confirmed rheumatoid arthritis, and long-term treatment was started and is ongoing.



Figure 6A.



Figure 6B.

Figure 6. One-year postoperative photographs of the hand showing a well-healed surgical site with no clinical evidence of recurrence. (A) Anterior aspect; (B) Lateral aspect.

Discussion

Soft-tissue masses of the hand and forearm are diagnostically challenging due to the wide spectrum of possible etiologies, including inflammatory, vascular, neural, and neoplastic conditions. Clinical and radiological overlap often limits preoperative diagnostic accuracy, particularly in anatomically complex regions such as the dorsum of the hand [4,11].

Rheumatoid nodules are the most common extra-articular manifestation of rheumatoid arthritis but are typically located over pressure points. Dorsal hand involvement is uncommon and may closely mimic benign or malignant soft-tissue tumors, especially when associated with tendon

structures. Their firm consistency and deep location can further obscure clinical differentiation from neoplastic lesions [8].

Radial nerve neuromas are rare and usually post-traumatic or compressive in origin. They commonly present with localized pain and hypersensitivity; however, these features are non-specific and may overlap with other soft-tissue pathologies, particularly when multiple lesions coexist, as in this case [10].

Imaging modalities such as CT and ultrasound are useful for defining lesion extent but are often non-specific in differentiating inflammatory from neoplastic processes. Similarly, fine-needle aspiration may be inconclusive, as demonstrated in this case, highlighting its limited diagnostic value in fibrotic or necrotic lesions [4,7].

Definitive diagnosis relies on histopathological examination, which in this case clearly distinguished a rheumatoid nodule from a radial nerve neuroma. This emphasizes the necessity of tissue diagnosis in atypical or multifocal soft-tissue presentations [11,12].

Surgically, careful dissection with preservation of extensor tendons and neurovascular structures is critical, particularly when malignancy cannot be excluded preoperatively. The favorable functional outcome in this case supports complete excision as an effective and safe approach when guided by intraoperative findings and anatomical preservation principles [13]. Overall, this case highlights the importance of considering rheumatoid nodules in the differential diagnosis of dorsal hand masses and reinforces the essential role of histopathology in guiding definitive diagnosis and management.

Conclusion

This case demonstrates the diagnostic challenges of soft-tissue masses of the hand and forearm, especially when inflammatory and neural lesions coexist. Rheumatoid nodules in atypical locations may closely mimic tumors, while radial nerve neuromas can present with non-specific pain, making preoperative diagnosis difficult.

Imaging and cytology are often inconclusive, so histopathological examination remains essential for definitive diagnosis. Careful surgical excision with preservation of vital structures allows good functional outcomes.

Importantly, preoperative surgical evaluation may also reveal previously undiagnosed internal medical conditions, which can significantly affect overall patient management.

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