A Rheumatoid Nodule of the Hand, an Important and Rare Differential Diagnosis of Swellings of the Hand: Case Report and Literature Review

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Abstract

Swellings of the hand are commonly encountered in a general practice setting and include a multitude of diagnoses. Although majority of these lesions are benign, a specific diagnosis should be achieved for an appropriate treatment. We present a case of a very unusual rheumatoid nodule on the palmar aspect of the hand, but without any rheumatological disease, which was initially misdiagnosed as a tendon sheath tumor. The nodule was successfully treated by surgical excision. The patient made an uneventful recovery, did not experience progression to rheumatoid arthritis (RA), and showed no recurrence during the one-year follow-up. We suggest that when dealing with patients with a hand mass, a rheumatoid nodule should be considered as a differential diagnosis. Understanding the cutaneous expressions of RA can enable early diagnosis, prompt treatment, and lower morbidity and mortality for the affected persons.

Keywords: Hand tumor, rheumatoid nodule, surgical excision

INTRODUCTION

Rheumatoid nodules are common extra-articular manifestations of rheumatoid arthritis (RA), presenting in up to 40% of patients with RA. About 90% of patients with RA and subcutaneous nodules test positive for rheumatoid factor. These non-tender benign nodules usually develop in the vicinity of areas exposed to repeated microtrauma or pressure, such as bony prominences, extensor surfaces, or adjacent to joints. Rheumatoid nodules are often observed in clinical practice and their sizes normally range from several mm to 4 cm.

CASE PRESENTATION

An otherwise healthy 46-year-old man presented to our outpatient clinic with a painless swelling on the palmar surface of the right hand that he had noticed about two years ago. It appeared to have grown larger in the past two months. Physical examination revealed a 13 cm fusiform mass extending from the middle digit pulp to the central palm of the right hand (Figure 1). It was attached to the deep tissues with no adhesion to the skin. There was no active flexion of the PIP or DIP joint. Active flexion of the MCP joint was limited to 10 degrees. His second finger was traumatically amputated from the distal to the proximal phalanx due to previous trauma eight years ago. Plain radiograph showed a minimal osseous destruction and soft tissue density. T1-weighted magnetic resonance image (MRI) showed low signal intensity and T2-weighted image showed high signal intensity, indicating the presence of a smooth cystic tumor surrounding the flexor tendons, containing a few septa (Figure 2). There were subchondral cysts on the distal part of the second, third, and fourth metacarpals, secondary to degenerative joint disease.

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Based on the patient’s history, the physical examination and imaging performed, the main differential diagnoses included fibroma of tendon sheath or synovial giant cell tumor and tenosynovial disease. Exploration and excisional biopsy were recommended and subsequently undertaken. A volar zig-zag Brunner incision was carried out in the digit and the palm, and extended proximally directly over the carpal canal, followed by a classic carpal tunnel incision at the wrist. Macroscopically, the lobulated specimen measured 13.5 x 2 cm and contained a few cystic elements in the mass (Figure 3). It was firmly adherent, both to the deep and superficial flexor tendons, and neurovascular bundles were laterally displaced. The neurovascular bundles were identified, isolated, and protected. During the excision of the tumor, it was found to have infiltrated both the tendons and extended along the bone. En bloc removal was performed by sacrificing both tendons (Figure 4). Minimal destruction of the underlying bone related to the tumor was observed. A suction drain was placed through a separate incision and the incisions were closed. A staged tendon reconstruction procedure was recommended, but the patient refused further treatment. The patient had no evidence of recurrence at one-year follow-up.

**Figure 1.** The right hand demonstrating a fusiform mass on the palm and on the volar aspect of the third finger.

**Figure 2.** a, b. (a, b) Preoperative MRI demonstrating a well-defined mass adjacent to the flexor tendons.

**Figure 3.** a-c. (a) Intraoperative view showing a large lobulated mass on the distal phalanx of the middle finger, extending into the carpal tunnel throughout the palmar surface. (b) Fifteen days after surgery. (c) Excised operative specimen measuring 13.5 x 2 cm in size.
Rheumatoid nodules are common extra-articular findings of RA and their reported incidence varies from 20% to 40% of patients with RA in different series.\textsuperscript{4} Rheumatoid nodules are most frequently found on the extensor surfaces of the proximal interphalangeal joints, occiput and sacrum, and the proximal ulna and olecranon, metacarpophalangeal and proximal interphalangeal joints, occiput and sacrum, and generally do not exceed 4 cm in size.\textsuperscript{1,3} They are usually located near the bony structures close to a joint, and multiple lesions are often observed.\textsuperscript{4} The lesions are primarily located in the subcutaneous tissue as a firm, non-tender, and movable mass; however, they could also be attached to underlying structures, such as the periosteum, fascia, and tendons.\textsuperscript{7}

Our patient was a middle-aged man with no systemic complaints or joint pain. He presented with a two-year history of a painless mass on the palm. He had no family history, biochemical abnormalities, or underlying medical condition known to promote an arthritic disease.

Given the characteristics of this entity, it demands a differential diagnosis with benign tumors of the hand. The most frequently seen masses include fibromas of the tendon sheath, synovial giant cell tumors of the tendon sheath, lipomas, ganglions, hemangiomas/vascular malformations, and inclusion epidermoid cysts.\textsuperscript{8,9}

In our patient, the localization, symptoms, and macroscopic appearance of the lesion, as well as the radiographic and MRI findings were more consistent with a fibroma of the tendon sheath or giant cell tumor of the tendon sheath. Because the patient showed no symptoms consistent with RA, the tumor was primarily misdiagnosed as a tendon sheath tumor and lesser consideration was given to the possibility that it might be a rheumatoid nodule. However, the presence of subchondral cystic lesions and the size of the mass were reasonable causes to doubt the correct diagnosis. In particular, in the literature reviewed there are no reports about the coexistence of a tendon sheath tumor with any subchondral cystic lesions. Additional literature review revealed that the size of the fibromas of the tendon sheath is usually small, measuring between 1 and 2 cm in greatest diameter; the largest was 7 cm in diameter, as reported by Pinar.\textsuperscript{10} Similarly, giant cell tumors of the tendon sheath usually range from 0.5 to 4 cm in diameter. Our case revealed an exceptional size, reaching 13.5 cm in the largest dimension.

Regarding the treatment of this case, we agreed to perform a complete surgical excision. Surgical incisions were planned in a manner that allowed the surgeon to reach the tumor extensions both proximally and distally. The tumor itself was dissected gently to ensure that all pathological tissue was removed. Since the tumor was firmly adhered to the flexor tendons, it was necessary to sacrifice the flexor tendons. Evaluation of the excisional biopsy distinguished the benign rheumatoid nodule from other hand masses.

A diagnosis of rheumatoid nodules carries a good prognosis. However, on rare occasions, patients seroconvert and become rheumatoid factor positive or even develop full systemic joint disease.\textsuperscript{11} The diagnosis of RA is based on a spectrum of clinical criteria according to the American College of Rheumatology/European League Against Rheumatism classification, as listed in Table 1. Application of these criteria provides a score of 0–10, with a score of ≥6 being indicative of the presence of definite RA.\textsuperscript{12} A complete history and physical examina-

Multiple sections of the entire specimen were obtained for pathologic evaluation. The histological examination revealed a granulomatous reaction composed of palisading epithelioid histiocytes surrounding a central necrotic zone of collagen. PAS-positive fibrinoid material was also observed. These findings were same in all sections and consistent with a rheumatoid nodule.

The histological examination was repeated by a qualified pathologist to make an accurate diagnosis. Since this examination confirmed the diagnosis of a rheumatoid nodule, laboratory testing and rheumatologic assessment became essential. The baseline physical examination at the initial internal medicine consultation and the results of the laboratory investigations, including full blood count, erythrocyte sedimentation rate, serum C-reactive protein level, and serological tests for rheumatoid factor, anti-citrullinated protein antibody (ACPA), and antinuclear antibodies, were unremarkable. As a result of the rheumatologic consultation, follow-up after three months was advised.

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

**DISCUSSION**

Rheumatoid nodules are common extra-articular findings of RA and their reported incidence varies from 20% to 40% of patients with RA in different series.\textsuperscript{4} Rheumatoid nodules are relatively frequent in Caucasians aged between 30 to 50 years, and occur somewhat more frequently in men as compared to women.\textsuperscript{5} About 90% of patients with RA and subcutaneous nodules test positive for rheumatoid factor and 40% of all seropositive patients with RA have subcutaneous nodules, while only 6% involvement is seen in seronegative patients.\textsuperscript{13}

They are most frequently found on the extensor surfaces of the proximal ulna and olecranon, metacarpophalangeal and proximal interphalangeal joints, occiput and sacrum, and
Rheumatoid nodules typically present asymptptomatically as a cosmetic complaint. If they are symptomatic, there are some treatment options for rheumatoid nodules. Injecting corticosteroids directly into the lesion sometimes reduces its size.14 Indications for surgery include areas exposed to repetitive trauma and nodules on weight-bearing prominences that might cause progressive erosions and severe pain, neuropathy, limitation of motion, or deformity and damage to underlying structures.15,16 Oral corticosteroids, nonsteroidal anti-inflammatory drugs, and hydroxychloroquine can also be used, but their effects on rheumatoid nodules vary, as most patients with RA already receive these medications for their chronic condition.16

A diagnostic problem occurs for the clinician in patients with subcutaneous nodules without RA. Benign rheumatoid nodules are usually found in healthy people without presenting the clinical or serological signs of an associated rheumatologic or other disease.17 Our patient was free of arthritic symptoms with a low level of rheumatoid factor. To the best of our knowledge, the literature contains no report of a rheumatoid nodule measuring 13.5 cm on the upper extremity. Our patient is an exceptional case of a rheumatoid nodule not only because of its unusually large size and location, but also of the challenges it presents in establishing the correct diagnosis. There are no clinical clues that would lead to the preoperative diagnosis of a rheumatoid nodule unless suspicion is present.

CONCLUSION

We suggest that this rare condition be considered when a case of subcutaneous nodule is encountered, even in aged males without joint symptoms or deformities.

The authors declare that they have no conflict of interests regarding the publication of this paper.

Informed Consent: Written informed consent was obtained from patient who participated in this case.

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Conflict of Interest: No conflict of interest was declared by the authors.

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REFERENCES


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<tr>
<th>Table I. The 2010 American College of Rheumatology/European League Against Rheumatism Classification criteria for rheumatoid arthritis</th>
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<tr>
<td><strong>A. Joint involvement</strong></td>
</tr>
<tr>
<td>1 large joint</td>
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<tr>
<td>2-10 large joints</td>
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<tr>
<td>1-3 small joints</td>
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<tr>
<td>(with or without involvement of large joints)</td>
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<tr>
<td>4-10 small joints</td>
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<tr>
<td>(with or without involvement of large joints)</td>
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<tr>
<td>&gt;10 joints (at least 1 small joint)</td>
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<td><strong>B. Serology</strong></td>
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<td>(at least 1 test result is needed for classification)</td>
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<tr>
<td>Negative RF and negative ACPA</td>
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<td>Low-positive RF or low-positive ACPA</td>
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<td>High-positive RF or high positive ACPA</td>
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<td><strong>C. Acute-phase reactants</strong></td>
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<td>(at least 1 test result is needed for classification)</td>
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<td>Normal CRP and normal ESR</td>
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<td>Abnormal CRP or abnormal ESR</td>
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<td><strong>D. Duration of symptoms</strong></td>
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<td>&lt;6 weeks</td>
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<td>≥6 weeks</td>
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CRP: C-reactive protein; ESR: erythrocyte sedimentation rate; ACPA: anti-citrullinated protein antibody; RF: rheumatoid factor


