

Rheumatoid or tubercular: Flexor tenosynovitis of the wrist with rice bodies

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ABSTRACT

Rice bodies are formed mainly in tenosynovitis and bursitis of rheumatoid or tubercular origin. It rarely presents with compressive ulnar neuropathy. A 35-year-old female presented with painful swelling in the volar aspect of the left wrist and incomplete flexion of the little finger. The laboratory tests revealed ESR 10 mm/1st hr and C-reactive protein, rheumatoid factor, and anti-cyclic citrullinated peptide tests were negative. Thickened and distended ulnar bursa with rice bodies was seen on magnetic resonance imaging (MRI). Thorough drainage, debridement, and synovectomy were done. Epithelioid cell granulomas with multinucleated giant cells on microscopy and the strongly positive Mantoux test prompted us to start anti-tubercular treatment. The wound healed uneventfully with good recovery of range of motion of the little finger at one-year follow up. Rice bodies can be a diagnostic dilemma in the absence of classical signs of their rheumatoid or tubercular origin.

Keywords: Millet or melon seed bodies, rheumatoid, rice bodies, tenosynovitis, tubercular

Introduction

Isolated tubercular tenosynovitis, along with rice bodies formation, presenting as a mass in the volar wrist with compressive ulnar neuropathy, is an uncommon entity in itself and is often misdiagnosed in its early stages, leading to unfavorable outcomes.

Rice bodies formation has traditionally been equally attributed to rheumatoid arthritis, tuberculosis infection and various other etiologies, causing the microinfarction and shedding of synovium and its further encasement by fibrin.^[1,2] Determining the etiology becomes tricky in the absence of classical laboratory

and histopathological findings of either rheumatoid or tubercular synovitis, especially in monoarticular involvement in the upper limb.^[3]

Besides surgeons, an increased awareness is desired among primary care and family physicians regarding its clinical, radiographic, and histopathological features because they are the first point of contact for patients presenting with swelling or mass. The purpose of this case report is to add to the scarce literature relevant to rice bodies in tenosynovitis and its management, and to impress upon the readers that the radiological and histopathological examination is indispensable in even benign-looking swellings of the wrist like a humble ganglion.

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Case Report

A 35-year-old female presented in the outdoor clinic of our hospital with complaints of painful swelling in the volar aspect of the left wrist, altered sensations, motor weakness, and

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incomplete flexion of the little finger. It was first noticed by the patient around one year back and had been growing insidiously since then. It was diagnosed as a ganglion cyst upon fine needle aspiration cytology (FNAC) by the index surgeon, and a conservative trial was advised. The patient was referred to our institute when the sensory-motor symptoms in the little finger began to bother the patient considerably.

There was no history of local trauma, fever, loss of weight or appetite, chronic cough, morning stiffness, or pain in other joints of the hands. She had no co-morbidities and had been vaccinated with BCG in childhood. On examination, the swelling was doughy in consistency, non-compressible, about 6 cm × 3.5 cm with ill-defined margins, and no distended veins or redness of the overlying skin. The slip sign was negative. Though there was no rise in local temperature and no significant change in the size of swelling with clenching and unclenching of the fist, the mass became prominent with dorsiflexion of the hand at the wrist [Figure 1]. The natural concavity of the palm appeared lost. Full extension of the little finger could be done but only about 30° of active flexion was possible at both proximal and distal interphalangeal joint of the little finger [Video 1]. There were no sensory-motor symptoms in the distribution of the median nerve.

The laboratory tests revealed hemoglobin of 13.8 gm %, total leucocyte count at 6800/cu mm, ESR at 10 mm/1st hr, CRP negative, RA factor negative, and anti- CCP negative. A soft tissue shadow was seen on X-ray [Figure 2] which was provisionally diagnosed as a compound palmar ganglion on ultrasound.

Magnetic resonance imaging (MRI) revealed [Figure 3] a well-defined fluid intensity collection distending the ulnar bursa which was hypointense to isointense on T1W1 and heterogeneously hyperintense on T2W1 with oval-shaped foci of T2 hypointensity within the collection: rice bodies/millet/melon seed bodies. In post-contrast images, there was the peripheral enhancement of the thickened bursal walls. The collection



Figure 1: Preoperative image of the volar aspect of the left wrist joint in (a) dorsiflexion and (b) neutral position

continued into the mid-palmar space and thenar space in the ulnar bursa.

Laboratory and imaging findings were unable to precisely determine the etiology behind the rice bodies which could be either tubercular or rheumatoid. Mantoux test was performed which was strongly positive. The chest radiograph was normal. Because of the ambiguous diagnostic findings along with the compressive neuropathy, we decided to go for acute decompression and histopathological examination of the mass.

Under regional anesthesia, the incision was made over the most prominent part. Confirming the findings of the MRI, the distended sac was found to be present in a dumbbell shape formed on either side of the flexor retinaculum. The cross fluctuation sign could be elicited easily with the contents increased in the wrist portion of the sac when the palm was pressed and vice versa. It is worth mentioning that the proximal sac was further compartmentalized by fibrous adhesions into a massive sac hidden deep into the flexor digitorum profundus (FDP) tendons and a comparatively smaller superficial one. All the tendons were intact and healthy-looking.

Thorough drainage, debridement, and synovectomy were done. Innumerable pearl-like large melon/millet seed/rice bodies were removed directly from the wrist portion and indirectly from the palm by repeated milking maneuvers to our satisfaction [Figure 4]. Tissue and rice bodies samples were sent for microbiology and pathological examination. The wound was closed over a drain. Below elbow splint till metacarpophalangeal joints was given till stitch removal at two weeks after which gradual range of motion exercises was initiated.

In addition to the negative cartridge-based nucleic acid amplification test (CBNAAT), both acid fast bacilli (AFB) smear and culture were negative. However, epithelioid cell granulomas with multinucleate giant cells were abundant upon microscopic examination of the tissue specimens [Figure 5]. Synovial hyperplasia with fibrin deposition was also present.

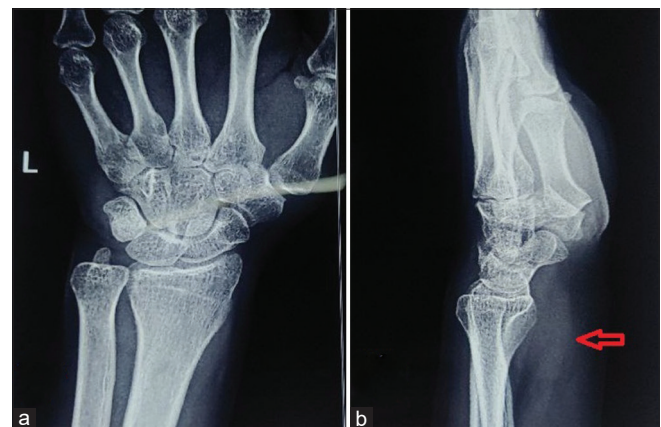


Figure 2: Preoperative X-ray of left wrist (a) and (b) lateral view of left wrist showing the soft tissue shadow (red arrow)



Figure 3: a) T2W TSE image in a coronal plane at the level of the carpal tunnel shows a well-defined fluid intensity collection seen distending the ulnar bursa, continuing along with the flexor group of tendons, and containing oval-shaped hypointense foci (red arrow), suggestive of tenosynovitis with rice bodies secondary to mycobacteria. The collection is also extending to mid palmar and thenar spaces. b) Fat-suppressed T1-weighted post-contrast (b. 1) axial and (b. 2) sagittal images reveal avid synovial enhancement (yellow arrows) of the ulnar and radial bursae engulfing flexor tendons. c) Short tau inversion recovery (STIR) sagittal image demonstrates numerous hypointense foci, consistent with rice bodies within a markedly distended ulnar bursa (blue arrows). d) A fat-suppressed T2-weighted axial image at the level of the proximal wrist reveals distension of the palmar bursae by a horseshoe-shaped abscess containing rice bodies (white arrow). Ulnar and radial bursae are thickened with entrapment of flexor digitorum profundus (red arrows), flexor digitorum superficialis (yellow arrows), and flexor pollicis tendons (green arrowhead) by the abscess



Figure 4: Intraoperative images showing the a) superficial sac, b) pearl-sized rice bodies, c) thick bursa engulfing the tendon itself, d) deep and much larger sac emerging under the tendon, which becomes clearer on e) retraction of tendon and f) dorsiflexion of the wrist

Based on the radiology and pathology findings and the strongly positive tuberculin test, anti-tuberculosis treatment (ATT) was initiated. The patient responded beautifully with uneventful healing of the wound [Figure 6], complete recovery of range of motion of the little finger, and no residual neurosensory symptoms related to the ulnar nerve in hand at almost one year follow up [Figure 7]. The ATT was stopped at 6 months.

Discussion

In the hand, laterally the common flexor synovial sheath is limited to the middle of the palm, whereas medially, it extends without interruption on the tendons of the little finger.

The ulnar bursa has three infoldings around the flexor tendons at the level of the flexor retinaculum: (1) the superficial fold is between the flexor retinaculum and the flexor digitorum superficialis tendons, (2) the middle one is between the flexor digitorum superficialis tendons and the flexor digitorum profundus (FDP) tendons, and (3) the deep fold lies behind the FDP tendons.^[4]

Isolated tubercular infection of the flexor synovial sheath is a rare sub-form of tuberculosis. Its origin may be via direct inoculation from outside or adjacent osteoarticular infection or hematogenous seeding from a distant pulmonary or genitor-urinary source. Local trauma, low socioeconomic status, undernutrition, or immunosuppression with steroids are among the common predisposing factors.

Most of the cases presenting in the earlier phase of the disease are often misdiagnosed as inflammatory tenosynovitis, bursitis, ganglion cyst, lipomatous swelling, neurofibroma, hemangioma, etc., because of non-specific generalized clinical findings like pain and swelling and lack of systemic symptoms. Sometimes the patients may present with carpal tunnel syndrome. To the best of our knowledge, no case of tubercular tenosynovitis presenting with features of compressive neuropathy of the ulnar nerve has been reported till date.^[5-7] This rarity can be attributed to the fact that anatomically, the ulnar nerve lies outside the carpal tunnel. In our case, the external pressure on the Guyon's canal was the probable cause of ulnar neuropathy.

The broken villi and the fibrinous exudate of the infected synovium and the granulation tissue of the tuberculosis-inflicted tendon sheath coalesce together to form pearly white bodies which are interchangeably called rice bodies/millet/melon seed

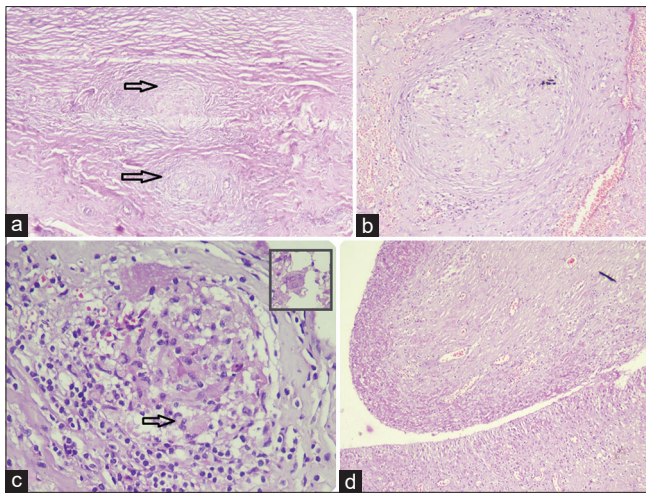


Figure 5: Photomicrographs. a) Microscopic image shows granulomas on scanner view (arrow) (H&E). b) Low power image shows epithelioid cell granuloma (H&E). c) High power image shows granuloma with multinucleated giant cells (inset) some of them are Langhans type (arrow) (H&E). d) Microscopic image showing synovial hyperplasia with fibrin deposition (H&E)



Figure 6: At six months the incision at the wrist/hand (a) and (b) healed well under the cover of anti-tubercular treatment (ATT)

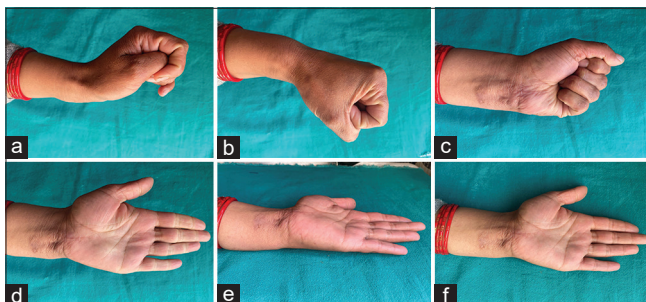


Figure 7: At one year, the scar at the wrist/hand has faded and good function of the hand is maintained, with a near-normal range of motion (a-f), and without any recurrence

bodies, depending on their size and shape. These are also found in rheumatoid arthritis, so their presence alone cannot be the basis for starting ATT.

Tuberculosis is a clinical, microbiological, and cyto/histopathological diagnosis, sometimes even based upon the response to treatment. The diagnosis of extrapulmonary tuberculosis is often based on the presence of granulomatous inflammation with or without caseation as the demonstration of AFB in histopathological specimens and recovery by culture have variable sensitivity.^[8]

In their influential article on bone and joint tuberculosis evaluating 74 patients, Newton P *et al.*^[9] had highlighted long ago that there was a subset of patients (5 out of 74, i.e., 6.75%) in whom the tubercle bacilli could not be isolated, but the biopsy of the affected site showed granulomas without central caseation necrosis. The bone/joint lesions in these patients responded to anti-tubercular therapy.

They also suggest that practically, the histological appearance of granulomatous synovitis is sufficient grounds for treating a patient with full chemotherapy, even in the presence of a negative culture. In two such patients in that series who were left untreated, a more extensive infection occurred later on and treatment was started many months later.

The same view is reiterated by SM Tuli that epithelioid cells surrounded by lymphocytes in the configuration of a tubercle are adequate histological evidence of tuberculous pathology in a clinico-radiologically diagnosed patient, even without central necrosis or peripheral foreign-body giant cells.^[10]

A large study by Lawn SD and Zumla AI found that when testing a range of non-respiratory sample types from both adults and children suspected of having extra pulmonary tuberculosis (EPTB), Xpert[®] MTB/RIF had a sensitivity of 81.3%.^[11] Similar figures were found by Vadwai *et al.* (80.6%)^[12] and Hillemann *et al.* (77.3%).^[13] This again supports the argument that the negative CBNAAT cannot be the sole basis for denying ATT if other features are supportive of the diagnosis.

Tubercular tenosynovitis can be managed conservatively with ATT alone, but the presence of compressive neuropathic symptoms warranted urgent decompression and debridement followed by ATT in our case. The extent of surgery is still debatable, with surgeons showing good results with both extensive surgeries involving complete excision of sac along with its content as well as with decompression alone, each combined with ATT.

Conclusion

We should keep a high index of suspicion even in benign-looking swellings. The role of radiological and pathological investigations cannot be overstated as the two closest differentials in this case of swelling with rice bodies, tubercular tenosynovitis and rheumatoid arthritis, have stark opposite management.

Key points

- The broken villi and the fibrinous exudate of the infected synovium and the granulation tissue of the tuberculosis or rheumatoid-inflicted tendon sheath coalesce together to form pearly white bodies which are interchangeably called as rice bodies/millet/melon seed bodies depending on their size and shape.
- We present a case of tubercular tenosynovitis with rice bodies formation in an adult female with a benign ganglion-like swelling on the volar aspect of the wrist and signs of ulnar compressive neuropathy. Total leucocyte count was 6800/cumm, ESR was 10 mm/1st hr and CRP, RA factor and anti- CCP were all negative.
- MRI revealed distended ulnar bursa in a dumbbell shape formed on either side of flexor retinaculum and filled with oval-shaped foci of T2 hypointensity, that is, rice bodies.
- The patient was managed with thorough drainage, debridement and synovectomy followed by ATT based on histopathology. She responded beautifully with uneventful healing of wound, complete recovery of range of motion of little finger and no residual neurosensory symptoms related to ulnar nerve in hand at more than one year follow up.

Take home message

Don't shy away from getting radiology and histopathology of the humble ganglion cyst-like swelling in the wrist region. Tubercular tenosynovitis with rice bodies or melon/millet seed bodies may be unveiled.

Statement of informed consent/ethical statement

Written informed consent regarding the use of data concerning the case for publication was collected from the patient. All procedures performed in the study involving the human participant were in accordance with the ethical standards of the institutional ethical committee and with the 1964 Helsinki declaration and its later amendments.

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Conflicts of interest

There are no conflicts of interest.

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