



## Water melon seed bodies in wrist? An unusual and rare case of tuberculous arthritis with water melon seed bodies

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**Abstract:** Tuberculosis primarily affects lungs, though involvement of extra-pulmonary sites is on a relative rise in the backdrop of increased incidence of immune compromised disorders such as HIV/AIDS. The extra-pulmonary sites which are most commonly involved are lymph nodes, genitourinary tract, bone marrow, CNS and musculoskeletal system. Tuberculosis of musculoskeletal system includes bones, joint, bursas and tendons or tenosynovium, the incidence of which is rare. Though tuberculosis involves various parts of musculoskeletal system, involvement of wrist and hand is quite rare. Since the involvement of joints of wrists by tuberculosis is very uncommon. Early diagnosis of tuberculosis of wrist is often difficult, in as much as clinical manifestations of other arthritides mimic tuberculous tenosynovitis. Many times, operative findings of melon seed bodies are characteristically suggestive of tuberculosis. The case being presented here is unique and unusual one, which characteristically presented with intraoperative finding of numerous water melon seed which are considered in literature to be helpful in diagnosis of tuberculous arthritis.

**Key words:** Tuberculosis; Arthritis; Watermelon seed bodies; Rice bodies; Tuberculous tenosynovitis

### Introduction

The incidence, prevalence and mortality due to tuberculosis, according to global tuberculosis (TB) report of 2015 by WHO, are steadily decreasing world over. Nevertheless, the incidence of tuberculosis is still very high, particularly in certain geographic areas of the world, with detection of 9.6 million new cases of tuberculosis leading to 1.5 million deaths in 2014<sup>[1]</sup>. Though tuberculosis affects mainly the lung the incidence of pulmonary and extra-pulmonary tuberculosis is on the rise due to emergence of new cases in the backdrop of immune compromised conditions such as HIV/AIDS<sup>[2]</sup>. Most commonly affected extra-pulmonary sites are lymph nodes, genitourinary tract, bone marrow, CNS and musculoskeletal system. Musculoskeletal tuberculosis generally comprises tuberculosis of the bone, joints, tendons and bursa of various joints, which forms a mere 1.3% of all cases of tuberculosis<sup>[2, 3]</sup>. Among various sites of bones and other musculoskeletal tissues involved, the following bones or joints of various regions of the body in order of the frequency of involvement are spine, hip and femur, knee and tibia and ribs<sup>[3]</sup>. The involvement of upper extremity and wrist as tuberculous involvement is very rare. The diagnosis of tuberculosis of wrist joint often becomes delayed because of slow disease progression and occult symptoms which are often confused with many non-tuberculous infectious or neoplastic conditions<sup>[3,5]</sup>. Being presented here is a rare case of tuberculosis of the wrist which presented in an unusual manner of in which

the synovial cavity showed the presence of numerous water melon seed bodies. Many complications of tuberculous arthritis have been reported due to delayed diagnosis and treatment. It can lead to destruction of underlying bone if left untreated.

### Case Report

The case being presented here is of a 55-year-old female who visited surgery OPD with chief complaints of pain and swelling over right wrist since the last three months, which was extending up to palmar region. On examination, the right wrist showed a swelling measuring 4x3cm in size and was tender with varying soft to firm consistency. The patient had previous history of being on anti-tuberculous therapy for pulmonary tuberculosis. The patient was treated with surgical exploration and excision of the swelling. Intraoperatively the swelling was soft to firm and the swelling, on cut-opening showed the presence of numerous grayish white oval structures with slightly flattened surface and of soft consistency, which resembled water melon seed bodies.

### Histopathologic examination

The histopathology laboratory received cut-opened portion of the swelling which was gray white and variably thickened with soft to firm consistency along with multiple oval structures resembling watermelon seed bodies which were soft in consistency (Figure 1).

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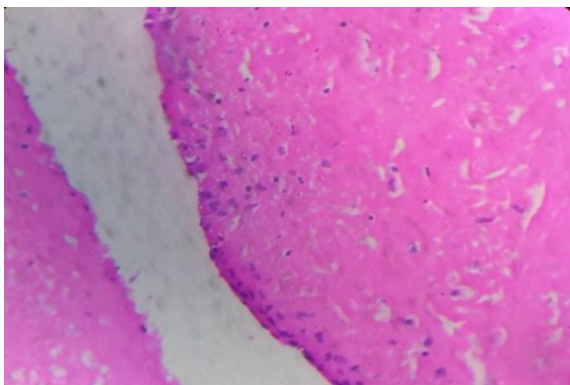


Some of the water melon seed bodies were apparently attached to inner surface of cut-opened swelling.

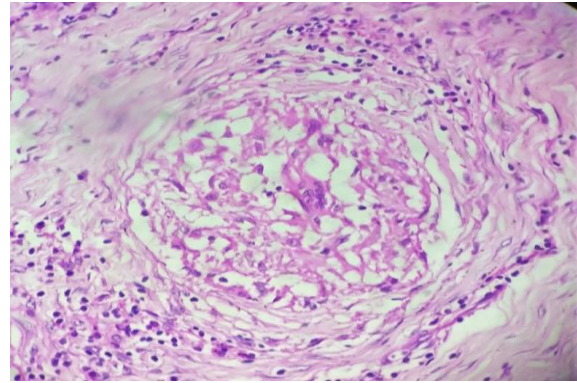
Microscopically, the sections showed the wall of the cystic swelling was synovial tissue lined by flattened synovial cells with extensive areas of fibrinoid change along with sparse infiltration by mononuclear inflammatory cells (Figure 2). Focal areas showed few isolated epithelioid granulomas with scattered Langhans giant cells (Figure 3 and 4). Sections from the gray white oval structures resembling water melon seed bodies were composed of amorphous fibrinoid material (Figure 5). Sections stained with modified Ziehl-Neelsen stain revealed the presence of occasional Acid-fast bacilli (Figure 6).



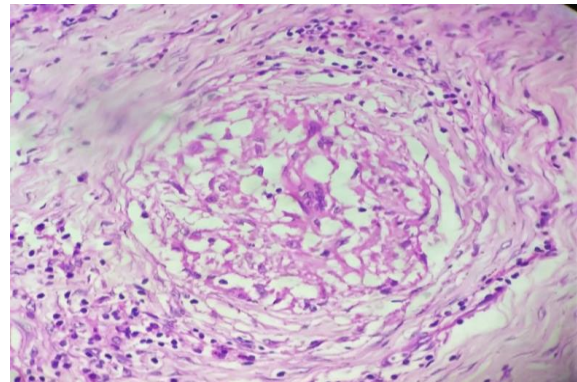
**Figure 1:** Photograph showing cut-opened synovial cavity along with multiple oval structures resembling water melon seed bodies.



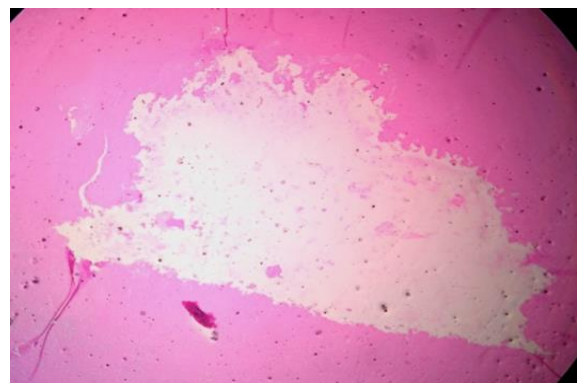
**Figure 2:** Photomicrograph showing the wall of the swelling composed of synovial tissue with sparse infiltration by mononuclear inflammatory cells (**H and E, 40 X**)



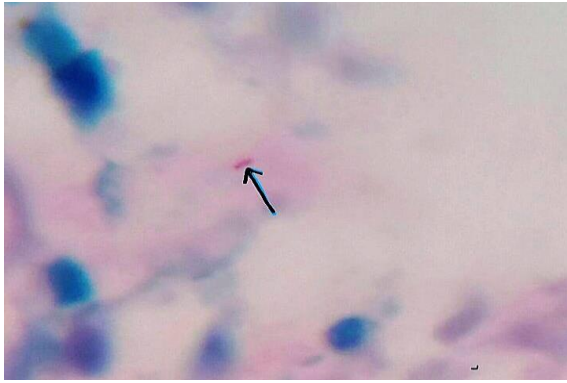
**Figure 3:** Photomicrograph showing epithelioid granuloma with scattered Langhans giant cells (**H and E, 10X**)



**Figure 4:** Photomicrograph showing epithelioid granuloma with scattered Langhans giant cells and chronic inflammatory cells (**H and E, 40X**)



**Figure 5:** Photomicrograph depicting a water melon seed body composed diffusely of amorphous fibrinoid material (**H and E, 10X**)



**Figure 6:** Photomicrograph showing an Acid-fast bacillus (ZN stain, 40X)

## Discussion

*Tuberculosis is caused generally by M. tuberculosis and rarely by other atypical mycobacteria, particularly the latter causing tuberculosis or atypical mycobacteriosis in immune compromised individuals. Tuberculosis affects mostly the lungs as primary tuberculosis. Extra-pulmonary tuberculosis occurs as a result of direct inoculation or as lymphohematogenous spread from pulmonary tuberculosis.*

Extra-pulmonary tuberculosis, the incidence of which is relatively low, varies from 10% to 14% of all cases of tuberculosis [3,6]. Extra-pulmonary tuberculosis generally occurs in various organ systems such as lymph nodes, genitourinary system, central nervous system and musculoskeletal system. Tuberculosis of the musculoskeletal system affects mainly bones, joints, tendons, bursa of spine, hip, femur, knee and tibia and ribs in that order of frequency. Tuberculous involvement of wrist joint is very rare. In many cases, the diagnosis of tuberculosis of the wrist is delayed due to slow disease progression and latent or non-specific clinical signs that might lead to a misdiagnosis of the condition as non-tuberculous infectious or neoplastic conditions. In literature, few cases of tuberculosis involving wrist are reported. Some of these cases presented in an unusual way of presence of water melon seed bodies in the affected musculoskeletal tissues. Water melon seed bodies are oval, gray white and sometimes slightly flattened structures which have been often referred with other names such as rice bodies and millet seed bodies [2,3,7]. The presence of water melon seed bodies is considered to be highly suggestive of tuberculous arthritis, though not entirely pathognomonic of tuberculous arthritis [8]. Water melon seed bodies or rice bodies are seen in 50% of tuberculous arthritis cases and for clinicians the presence of water melon seed bodies should always raise the suspicion of tuberculous arthritis [3,9,10]. There are many theories of formation of water melon seed bodies or rice bodies. According one of the theories, water melon seed bodies or rice bodies are formed as a result of aggregation of fibrin/fibronectin [11]. Another theory proposes that microinfarction of the synovium due to underlying pathologic process and its subsequent

shedding and encasement in fibrinous material. However, de novo formation and progression of fibrin due to possible alteration in viscosity of synovial fluid is also suggested as another mechanism of formation of water melon seed bodies [12].

Whatever may be the pathogenesis of water melon seed bodies or rice bodies, their presence at the site of arthritis of wrist or any suggested infectious lesion of wrist should raise the suspicion of tuberculosis, though it is subsequently observed that presence of water melon seed bodies, rice bodies or millet seed bodies could be seen in other pathological processes of joints such as rheumatoid arthritis, synovial chondromatosis, systemic lupus erythematosus (SLE), seronegative arthritis and osteoarthritis of wrist joint [12, 13]. The presence of water melon seed bodies and their accurate detection by image screening studies such as Magnetic Resonance Imaging (MRI) along with past medical history of tuberculosis may assist, to a certain extent, in early diagnosis and clinical management of the condition which could help in avoiding the prospective undesirable complications of tuberculous arthritis such as destruction of underlying soft tissues and bones along with unforeseen deformities caused due to fibrosis and contracture.

## Conclusion

Tuberculosis of the wrist and hand are rare and the diagnosis of tuberculous involvement of wrist is often delayed due to slow disease progression and latent clinical manifestations which might lead to an erroneous diagnosis of non-tuberculous infectious or neoplastic conditions. The case being presented here is an unusual and interesting one because of the fact the tuberculous lesion of the wrist joint presented as thickened synovial cavity filled with numerous water melon seed bodies. Water melon seed bodies, which are often referred to as rice bodies or millet seed bodies depending on size and shape of these structures, are seen in up to fifty percent of cases of tuberculosis of wrist. The presence of water melon seed bodies in the joint cavity could be strongly suggestive of tuberculous involvement of wrist, though they could be seen in other non-tuberculous inflammatory or infectious conditions. The early and meticulous detection of these water melon seed bodies by advanced imaging studies such as Magnetic Resonance Imaging (MRI) in correlation pre-existent medical history of pulmonary or extra-pulmonary tuberculosis could not only help in early diagnosis of tuberculosis of wrist or hand, but also go a long way in obviating the portent of prospective potential complications arising out of it.

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