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Case Report

# Tenosynovitis With Psammomatous Calcification Preoperatively Diagnosed as Intra-Articular Free Body of the Young Male Wrist: A Case Report

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Tenosynovitis with psammomatous calcifications is a rare condition primarily affecting female patients in the distal extremities. This case report presents a unique instance of tenosynovitis with psammomatous calcification in a 31-year-old man presenting with wrist pain. Initial misdiagnosis and unsuccessful steroid injections prompted further investigation, leading to the discovery of an extra-articular calcified mass. Arthroscopic resection was attempted but found to be unnecessary because the lesion was located outside the joint. Histopathological examination confirmed the diagnosis of tenosynovitis with psammomatous calcification. After mass removal, the patient experienced relief from wrist pain and resumed work within a month. Subsequent follow-ups at 9 months showed no recurrence of pain, with full range of wrist motion and no grip power weakness. This case highlights the importance of differentiating tenosynovitis with psammomatous calcification from intra-articular lesions, particularly in atypical presentations, and demonstrates the effectiveness of surgical intervention in resolving symptoms.



Tenosynovitis with psammomatous calcification (TPC) is an extremely rare condition that was initially described by Gravanis and Gaffney in 1983.[1] TPC primarily affects young-to-middle-aged women and is characterized by pain and swelling in the distal extremities, such as the fingers and toes. It has been hypothesized to occur due to trauma or repetitive actions. Radiological imaging typically reveals a small, calcified mass surrounded by histiocytes and fibroblasts, known as a granulomatous psammoma body. Surgical treatment is often successful in curing the condition, highlighting the importance of an accurate diagnosis. Despite the limited number of reported cases of TPC,[1–7] its clinical features remain poorly recognized. In this report, we present a case of TPC initially diagnosed as an intra-articular free body but ultimately identified as an extra-articular TPC in the dorsal first compartment tendon sheath of a young male's wrist. Additionally, we discuss the therapeutic outcomes of the case.

## Case Report

A 31-year-old man, employed as a cook with no sports involvement or hobbies, presented with a 1-year history of right wrist pain without any apparent trauma. He had a history of loose body in the wrist and was treated with steroid injections at another hospital, initially providing relief but leading to a recurrence of pain. Consequently, the patient sought treatment at our hospital.

He had no history of metabolic disorders, autoimmune diseases, or chronic renal failure. The patient complained of pain on the radial side of the wrist, accompanied by swelling in the area.

Radiographic imaging revealed a 4-mm calcified mass on the radial side of the wrist (Fig. 1). Further assessment with a CT scan showed the lesion positioned between the radial styloid process and the scaphoid, appearing to be in the intra-articular space (Fig. 2). Blood tests revealed normal levels of inflammatory markers, calcium, phosphorus, and uric acid.

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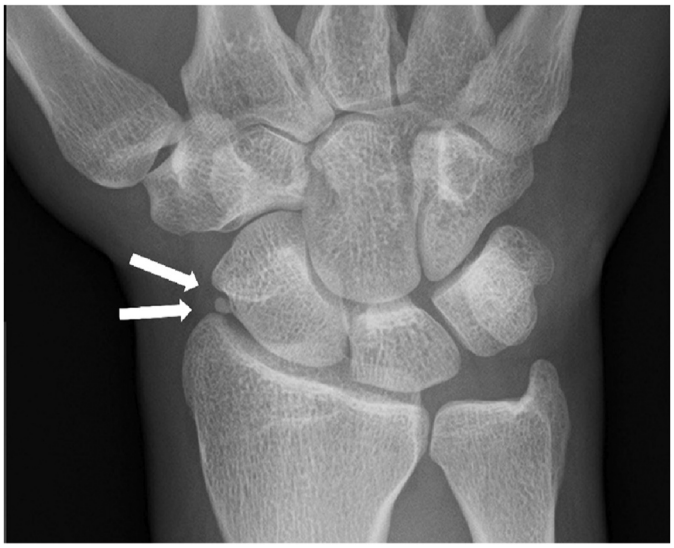

**Figure 1.** Radiographical image. A small, calcified lesion (white allow) was observed between the radial styloid process and scaphoid.

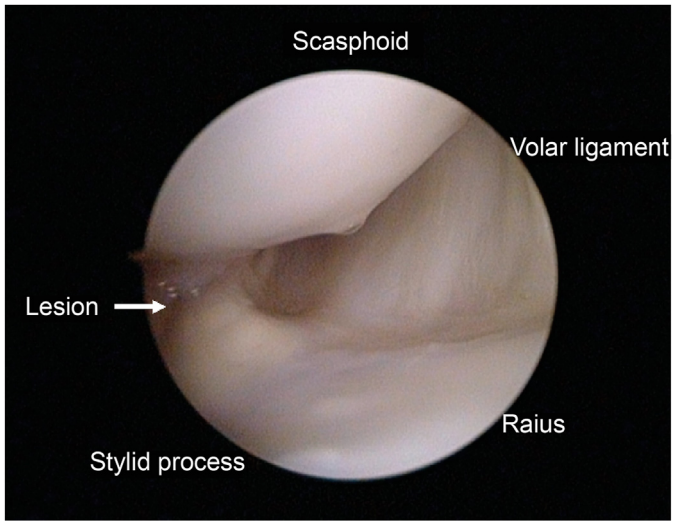


**Figure 3.** Wrist arthroscopy, view of 3–4 portal. A protruding yellow lesion was observed under the joint capsule, extending from the radial styloid process.

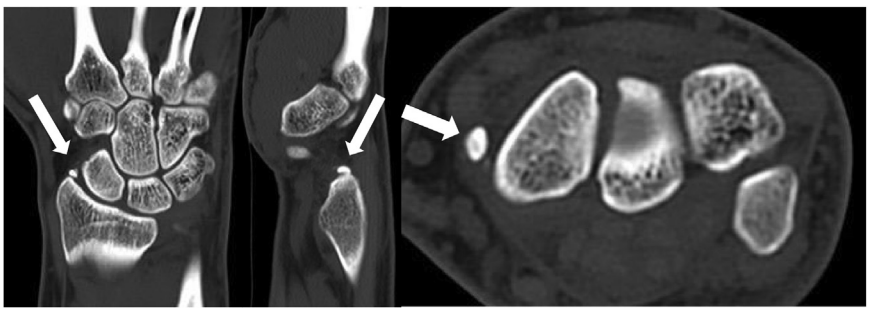

**Figure 2.** Computed tomography. The lesion (white arrow) was located between the radial styloid and scaphoid, and it appeared to be in the intra-articular space.

Conservative treatment was ineffective, leading to surgical intervention. As we initially suspected, an intra-articular lesion wrist arthroscopy was performed. Surprisingly, a protruding yellow lesion extending from the radial styloid process beneath the joint capsule was observed (Fig. 3). The mass was not palpable directly from the surface because of its location under the capsule. Fluoroscopy confirmed the preoperative localization of the lesion, indicating an extra-articular space, and an open technique was employed for resection. The resected mass measured 6 mm in diameter and exhibited a small, hard nodule.

On pathological examination, the lesion was found to be composed of calcified lobules surrounded by fibrous tissue, with myxoid and hyaline degeneration in the tenosynovium. Each calcified lobule displayed granular calcification with the formation of numerous small bodies of globular and spheroid concentric lamellated calcified structures representing the psammoma bodies. This finding confirmed the diagnosis of TPC (Fig. 4).

After surgery, the patient experienced complete resolution of wrist pain after 1 month, with no recurrence of pain or calcified lesion observed on radiography 9 months later. The patient regained full range of wrist motion without weakness of grip power, and the final follow-up at 9 months revealed a Mayo Wrist Score of 90 after surgery (Fig. 5).

## Discussion

TPC is an extremely rare condition and generally not well recognized. Since its initial report by Gravanis and Gaffney, only 34 cases have been documented.[1–7] In clinical practice, TPC is diagnosed when physicians encounter a small, calcified lesion in the distal extremities. TPC usually requires surgical treatment, and several diseases presenting with calcification can be managed conservatively; therefore, accurate diagnosis is particularly important. According to previous reports, TPC primarily occurs in young-to-middle-aged women with repetitive trauma or movement implicated as potential causes.[2,4] In the 23 reported cases of TPC, numerous psammomatous calcifications surrounded by a granulomatous reaction comprising a mixture of histiocytes and fibroblasts were distinctive pathological findings.[2] However, definitive pathogenesis remains unknown.

To date, only one case of TPC presenting at the wrist has been reported.[3] Aggregating the parameters available of the 34 cases from previous reports, 41% (14/34) of the participants were in their 30s and 40s; by sex, 88% were women (30/34); and 85% (23/27) complained of pain and swelling.[1–7] Shon et al[4] reported that in a review of six TPC cases, all had occupational or sports-related repetitive motion histories. Additionally, Michael et al[2] reported a history of trauma or repetitive occupational/sports-related activity in 6 of the 15 patients. In total, 48% (12/25) with descriptions of this

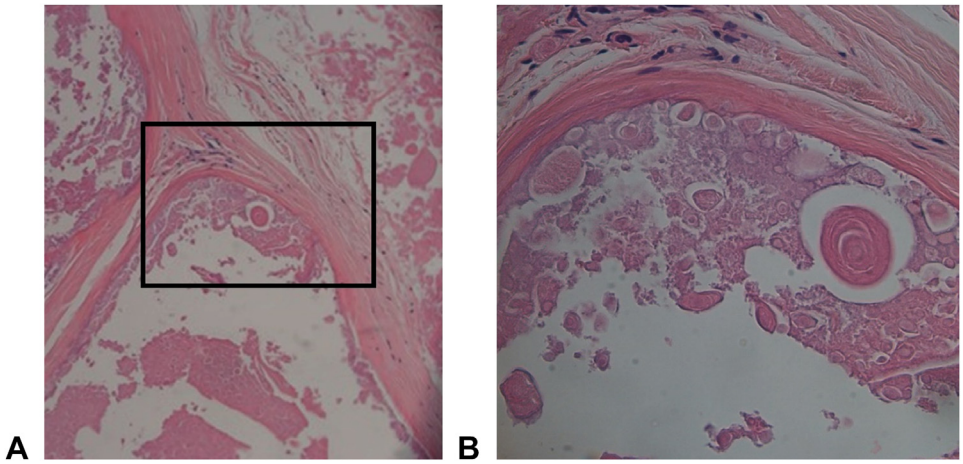


**Figure 4.** Pathological examination (hematoxylin and eosin [H&E] stain). **A** Calcified nodules (black square) were found in the synovium, and the calcification was formed by aggregates of psammoma bodies. **B** Magnification × 10.

**Figure 5.** Radiographical image and physical findings 9 months after surgery. Radiography revealed no recurrence and full range of wrist motion.

condition had a history of trauma or repetitive movement at the onset site. The most common site of onset was the finger (35%, 12/34), followed by the finger joint (21%, 7/34), foot (18%, 6/34), ankle joints (6 %, 2/34), and distal limbs (79 %, 27/34). It has been shown that trauma and overuse of tendon-derived cells may cause calcification via BMP expression,[8] and Miyasaka et al[3] suggested BMP-1 involvement in TPC development. These findings suggest a potential association between repeated tendon injuries and TPC. It is worth noting that the wrist, a site prone to tendinitis, should also be considered a potential location for TPC. However, no previous reports have shown a clear relationship between these clinical features and the pathology, and the etiology has not yet been fully elucidated. Further investigation is necessary to explore the relationship between TPC and trauma, repetitive movements, and sex hormones because TPC frequently develops in middle-aged women.

TPC should be differentiated from intra-articular free bodies or other small, calcified wrist lesions. Gravanis and Gaffney reported TPC as a subtype of idiopathic calcifying tenosynovitis/calcific tendinitis (ICT).[1,9] However, Michael[2] and Shon et al[4] emphasized that psammoma body-like calcification distinguishes TPC from ICT. Differentiating between TPC and ICT based on physical or imaging findings is challenging. Although ICT typically occurs in the shoulder, lower back, or hip joint, TPC affects the extremities. Additionally, conservative therapy is effective at treating ICT but not TPC. Histopathologically, dystrophic calcification is seen in ICT;[2] however, psammomatous calcification is distinctive in TPC. It has been hypothesized that psammomatous calcification may be formed by the increased secretory activity of hyperplastic synovial cells.[1,10] Miyasaka et al[3] reported that BMP-1 protein might be associated with the development of this condition, suggesting that TPC could be differentiated from ICT. Other differential diagnoses include gout, pseudogout, calcifying aponeurotic fibroma, tumor calcinosis, and free bodies. Patients with gout or pseudogout were excluded if no needle-like or rhomboidal crystals were observed on pathological examination. Calcifying aponeurotic fibromas were excluded because they do not usually present with psammomatous calcifications. Tumor calcinosis also presents as painful calcified masses in the joints of the extremities. However, this pain is due to the compression of nerves, blood vessels, and muscles, not due to an inflammatory reaction. Furthermore, affected patients typically present with hyperphosphatemia. A free body is typically diagnosed as an intra-

articular mass by radiological examination; however, when located near the joint capsule, it is difficult to distinguish it from extra-articular lesions.

In our case, chief complaints were radial side pain and swelling of the wrist, and localized symptoms in the distal extremities were consistent with previous reports.[1–7] Moreover, the patient was a right-handed cook, which we considered to correspond with a history of repetitive movements at the affected site. On pathological examination, encapsulation due to changes in mucus and hyalinization was observed around the numerous psammomatous calcifications, and these findings were characteristic of TPC. Plain radiographs and CT scans suggested the presence of an intra-articular free body; therefore, we planned to resect it using arthroscopic surgery. However, arthroscopic findings showed no free body at the assumed site, and a lesion was buried under the articular surface of the radial styloid process. Because the lesion adhered to the joint surface, it was believed that arthroscopic resection would be difficult; therefore, an extra-articular approach was used to excise the lesion. One of the 34 previously reported cases was clinically diagnosed as an abnormal bony fragment in the proximal interphalangeal joint of the finger,[2] which confirms that cases of TPC with findings suggestive of a free body exist. It is difficult to clearly visualize the joint capsule with CT or MRI in the distal extremities and determine whether the lesion is intra- or extra-articular when it is beneath the joint capsule, as in our case. Therefore, it is important to carefully plan the treatment for small, calcified lesions in the wrist joints, especially considering the possibility of TPC.

Our case mostly supports the clinical features described in previous reports, and it is considered to have new clinical significance necessary to differentiate TPC from the free body, even in the wrist joint of a male patient.

In conclusion, we report a rare case of TPC in the wrist of a young man that was difficult to differentiate. Unlike the features of previous reports, we found two important clinical suggestions: TPC may develop in the wrists of men, and physicians should keep this condition in mind when a calcified lesion is observed in the fingers, toes, and wrist and should differentiate it from an intra-articular free body or other diseases with small, calcified lesions.

Ethics approval: The research has been complied with all the relevant national regulations, institutional policies and in accordance the tenets of the Helsinki Declaration, and has been approved by the ethics committee of Nishi Omiya Hospital.

Consent to participate: Written informed consent was obtained from the patient for participating in this study.

## Acknowledgments

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