OPEN ACCESS

Saudi Journal of Medical and Pharmaceutical Sciences
Abbreviated Key Title: Saudi J Med Pharm Sci
ISSN 2413-4929 (Print) | ISSN 2413-4910 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article **Orthopedic Trauma**

Localized Hemopigmented Villonodular Synovitis of the Knee

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DOI: https://doi.org/10.36348/sjmps.2024.v10i12.004 | **Received:** 28.10.2024 | **Accepted:** 26.11.2024 | **Published:** 07.12.2024

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Abstract

Pigmented Villonodular Synovitis (PVNS) is a joint disorder characterized by benign but locally aggressive proliferation of the synovial membrane. The localized form is rare, and its nonspecific symptoms make diagnosis challenging. We report a case of localized PVNS of the knee in a 47-year-old man. Arthroscopic resection resulted in complete recovery, with total and permanent resolution of symptoms and no recurrence.

Keywords: Knee, Pigmented Villonodular Synovitis, Localized Form.

INTRODUCTION

Pigmented Villonodular Synovitis (PVNS) is a rare benign proliferation of the synovial membrane in joints. Extra-articular forms can also occur, particularly affecting tendon sheaths or synovial bursae. PVNS is predominantly monoarticular and of unknown etiopathogenesis. Clinically, it presents with arthralgia and joint swelling. MRI is the radiological examination of choice, providing a reliable diagnostic approach, but confirmation requires histopathological examination. There are two forms of PVNS that are important to distinguish due to their differing prognoses. The localized form, which is rarer, involves proliferation in a single area of the synovium and is referred to as a *tenosynovial giant cell tumor* (TGCT). The diffuse form, on the other hand, affects the entire synovial membrane of the joint and is also known as a *diffuse-type giant cell tumor* (Dt-GCT) or *pigmented villonodular synovitis* (PVNS). Unlike the localized form, the diffuse form is characterized by a high recurrence rate, making treatment more challenging.

MATERIAL AND METHODS

The patient is a 47-year-old man with no significant medical history who has experienced right knee pain for two years. The pain is mechanical in nature and associated with episodes of locking and joint effusion during physical activity. Clinical examination revealed a limp while walking, without any restriction of right knee movement. Palpation of the external femorotibial joint line was painful, with a positive grinding test. There was no laxity in the frontal or sagittal planes, and no biological signs of inflammatory syndrome were observed. Radiologically conventional X-rays performed over the two-year period were entirely normal **(fig. 1)**.

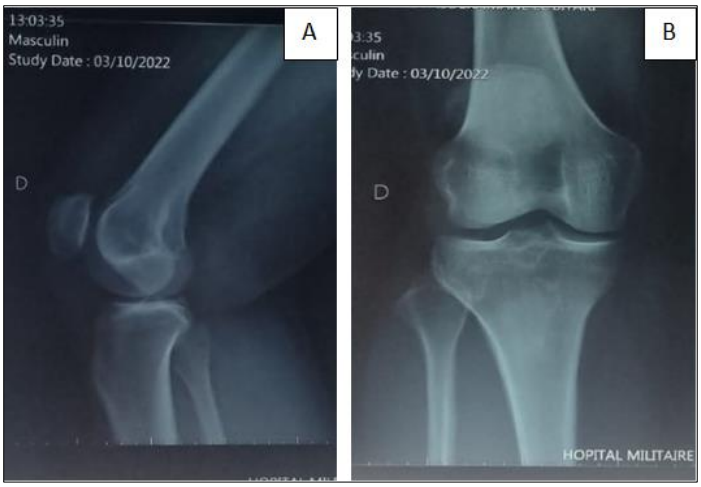

Figure 1: Standard X-ray of the knee in anteroposterior view (B) and lateral view (A).

To complete the assessment, Magnetic Resonance Imaging (MRI) was also performed. It revealed focal synovial thickening in the lateral recess of the suprapatellar pouch, with hemosiderin deposits suggestive of pigmented villonodular synovitis. These appeared as punctate areas of hypointensity on T2-weighted gradient-echo sequences **(fig. 2).**

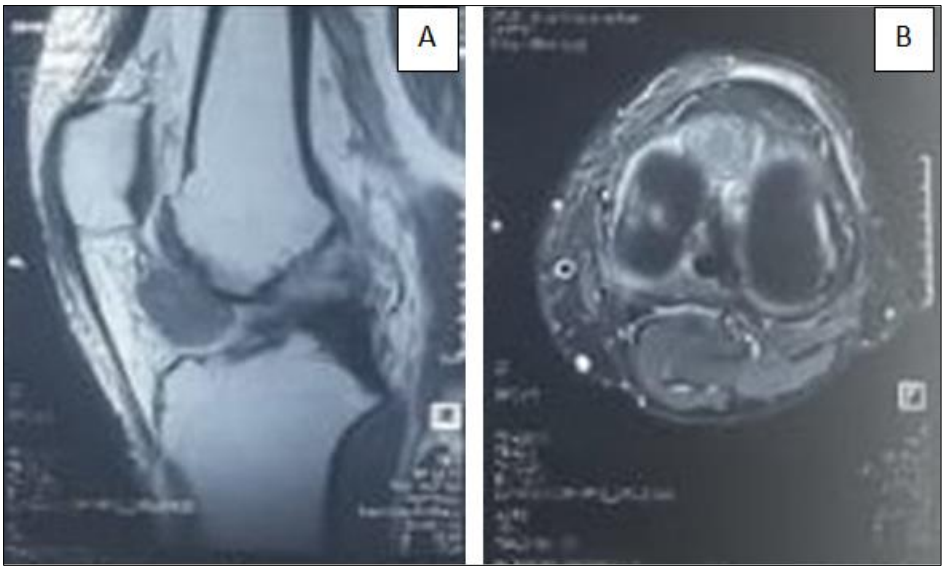

Figure 2: MRI scans in sagittal view (A) and axial view (B)

The patient underwent arthroscopic exploration under spinal anesthesia in the supine position. An intra-articular lesion was identified, appearing pedunculated, dark pink to purplish, and heterogeneous, arising from the synovium. Multiple biopsies were taken. Based on the typical appearance of pigmented villonodular synovitis, arthroscopic excision was performed using a basket forceps and a shaver (Fig. 3). Histological examination confirmed the diagnosis.

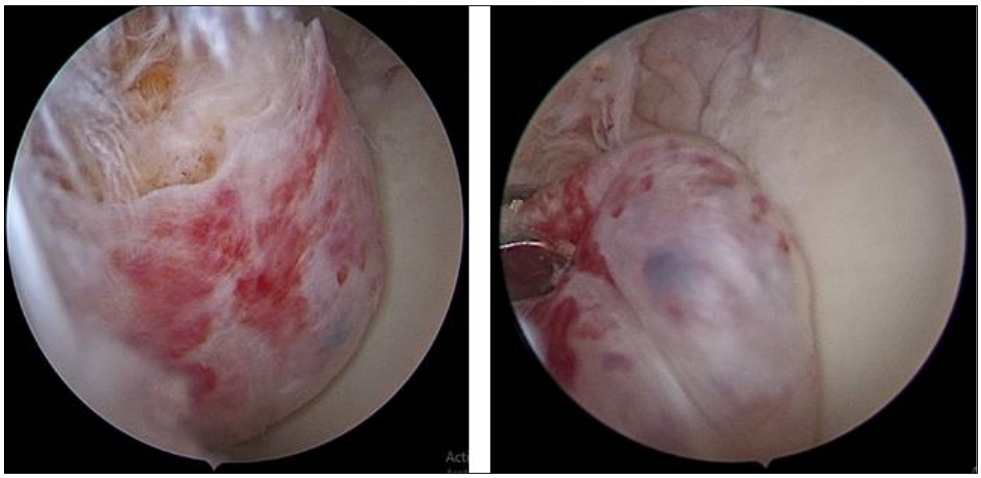

Figure 3: appearance of the lump on arthroscopy

After a two-year follow-up, the patient's outcome was marked by complete recovery, with total and permanent resolution of symptoms and no recurrence.

RESULTS AND DISCUSSION

PVNS is a rare condition with an unknown etiology. Its incidence is approximately 1.8 per million inhabitants (Myers *et al*., 1980). The average age of patients with PVNS is often between 30 and 50 years (Rhee *et al*., 2010), which corresponds to our case. However, a few cases have been reported in individuals over 70 years old, as well as in those under 20 or even 10 years old (Cupp *et al*., 2007). In the vast majority of cases, PVNS is monoarticular, although oligoarticular and even polyarticular presentations have been described (Möller *et al*., 2008). The most commonly affected joint is the knee (63 to 75% of cases). In this joint, all locations are possible: the meniscosynovial junction, the intercondylar notch, the medial and lateral condylar ramps, the Hoffa's fat pad, and the posterior compartment (Calmet *et al*., 2003). The hips and ankles are the next most frequently affected, accounting for the majority of the remaining cases. In rare instances, involvement of the fingers, temporomandibular joints, spine, or sternoclavicular joints has been reported. The elbow is also an exceptionally rare site of involvement, with only 25 cases reported in the literature (Ramos *et al*., 2016). Patients with PVNS typically complain of arthralgia with functional impairment and joint swelling. The time between the onset of symptoms and diagnosis is often long, ranging from 2.9 to 4.5 years (Cupp *et al*., 2007). For some diffuse forms, and especially for localized forms, the presence of nonspecific symptoms makes diagnosis challenging. Discomfort is constant, but the clinical presentation can be variable: locking (30 to 100%), effusion (53 to 90%), diffuse pain (66 to 100%), reduced mobility (45%), palpation of a mass (11 to 80%), or pain along the joint line, which may mimic a meniscal injury (10 to 34%). Therefore, as early as 1967, Granowitz and Mankin emphasized the need to consider localized PVNS in cases of mechanical knee derangement with episodic pain or locking (Granowitz *et al*., 1967).

MRI is very helpful for diagnosis, especially for localized forms, where the imaging typically shows a heterogeneous soft tissue mass with low signal intensity on both T1 and T2-weighted images. The signal may be intermediate if the hemosiderin deposits are minimal (Ozalay *et al*., 2005). The use of gradient-echo sequences enhances the detection of these hemosiderin deposits (Murphey *et al*., 2008). The MRI appearance can be confused with that of a hemangioma, fibroxanthoma, synovial chondromatosis, or amyloid or hemophilic arthropathy.

Localized PVNS represents 15 to 25% of cases (Myers *et al*., 1980). The distinction between localized and diffuse forms is crucial from a therapeutic perspective, as the localized form has a favorable prognosis after surgical treatment alone (Moskovich *et al*., 1991).

CONCLUSION

The diagnosis of localized PVNS should be considered in cases of knee derangement to guide the use of appropriate MRI sequences, which is the diagnostic imaging of choice. However, a definitive diagnosis can only be made after histopathological analysis.

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