Pigmented villonodular synovitis of the knee: A case report

E. Bassetti*, R. Candreva, E. Santucci

Department of Radiology, Umberto I Medical Center, "Sapienza" University of Rome, Rome, Italy

KEYWORDS

Pigmented villonodular synovitis;
Knee;
Ultrasound examination;
MRI.

Abstract Pigmented villonodular synovitis (PVNS) is characterized by hyperplasia of the synovial tissue in joints, of tendon sheaths, and of the mucous membranes, or fibrous tissue adjacent to the tendons. Its etiology is unknown. We report a case of diffuse intra-articular PVNS of the right knee in a 38-year-old man. Ultrasound and magnetic resonance imaging (MRI) features of the disease are described.

Sommario La sinovite pigmentosa villonodulare (PVNS) consiste in un'iperplasia della membrana sinoviale delle articolazioni, dei tendini, delle membrane mucose o dei tessuti fibrosi adiacenti ai tendini. La sua eziologia è sconosciuta. Il caso che presentiamo è quello di una forma diffusa intarticolare di PVNS a carico del ginocchio di destra in un paziente maschio di 38 anni descritto sia con ultrasuoni che con Risonanza Magnetica.

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Introduction

Pigmented villonodular synovitis (PVNS) is a benign disorder characterized by focal or, more frequently, diffuse villous proliferation of the intra-articular synovium. It usually strikes patients in the second and third decades of life, and both sexes are equally affected. The knee is the most common location for PVNS. Localized forms appear as a single intra-articular nodule with clinical features suggestive of a loose body or a torn meniscus. Diffuse forms

present clinically as a chronic monoarthritis. Hemarthrosis is a common finding in diffuse PVNS [1].

The cause of PVNS is unknown, although repetitive trauma, intra-articular hemorrhage, and inflammation are known to play major roles; its association with cytogenetic abnormalities and its potential for autonomous growth suggest that PVNS is a neoplastic process [2].

The case of PVNS described below is being reported with the informed consent of the patient.

Case report

A 38-year-old man presented with a 3-year history of non-traumatic pain in the right knee joint. The physical examination was negative for ligament instability, knee effusion, or pain with provocative meniscal testing. The symptoms

* Corresponding author. Dipartimento di Radiologia, Università "Sapienza" Roma, Azienda Policlinico Umberto I, Viale Regina Elena 324, 00162 Roma, Italy.

E-mail address: erica.bassetti@uniroma1.it (E. Bassetti).

Fig. 1 Transverse sonogram of the right knee reveals a hypoechoic intra-articular mass in the Hoffa fat pad.

were intermittent and fluctuating. Ultrasonography revealed heterogeneously hypoechoic masses in the Hoffa fat pad, hyperemia, and a markedly thickened synovium (Fig. 1). Subsequent magnetic resonance (MR) imaging

(0.2 T) revealed a mass that was heterogeneously hypointense on T1- and T2-weighted images. The focal areas of low signal intensity represent hemosiderin deposits, which are relatively characteristic findings in PVNS. The mass showed marked, diffuse, heterogeneous enhancement on contrast-enhanced T1-weighted images. The MR images also demonstrated an additional mass in the same knee. It was located in the posterior compartment along the posterior cruciate ligament, which was hypointense on the T1-weighted images. Magnetic resonance imaging was useful for evaluating the extension of the lesion, which is important for treatment planning and for ensuring that surgical resection is complete. MRI also allowed the detection of related injury in the internal femoral condyle (Fig. 2).

Open mass excision was performed on the right knee, and the pathology report confirmed the presence of PVNS.

Discussion

PVNS is an uncommon benign proliferative disease. When the disease involves the synovium of a joint (diffusely or focally), it is referred to as PVNS; when it occurs in the extra-articular synovium of a bursa or a tendon sheath, it is referred to as PVNB or PVNTS, respectively. The hypertrophic synovium is

Fig. 2 a, b. Axial T1-weighted MR images—precontrast (a) and postcontrast (b)—show a hypointense mass with heterogeneous enhancement in the Hoffa fat pad (arrows). c, d. Sagittal T1-weighted MR images—precontrast (c) and postcontrast (d)—show a hypointense, heterogeneously enhanced mass in the Hoffa fat pad (arrows). The MR images also reveal a hypointense area in the posterior compartment along the posterior cruciate ligament (arrowhead). (e) Axial T2-weighted MR image demonstrates bone erosion in the internal femoral condyle (arrow).

typically villous, nodular, or villonodular, and it contains variable amounts of hemosiderin. Hemosiderin deposition occurs in the majority of cases, but it is especially prominent in the diffuse intra-articular form of the disease. Intra-articular PVNS usually affects the knee [3]. Clinical symptoms vary greatly and depend on the location of the lesion (intra-articular versus extra-articular). Extra-articular PVNB or PVNTS generally presents as a soft-tissue mass (83%–99% of cases) associated with pain (22%–71%). Joint dysfunction and swelling are unusual (0%–4%) [4,5]. Common clinical symptoms associated with the intra-articular type of PVNS include pain (79%–90% of cases) and swelling (72%–79%) [6,7]; joint dysfunction is a less frequent finding (26%–28%), and a soft-tissue mass is present in only 6%–19% of all cases [8]. The duration of symptoms also varies widely, from 1 to 120 months: the mean duration is 19 months for localized extra-articular disease and 15 months for diffuse intra-articular disease. In most cases, however (88% of those characterized by localized extra-articular disease and 93% of those with diffuse intra-articular involvement), the disease is chronic with a duration ranging from months to years. Ultrasonography can be used to detect the mass and define its solid or liquid components. The sonographic appearance of PVNS is nonspecific and does not permit correct characterization of the disease. The appearances of PVNS, PVNB, or PVNTS on MR imaging are often characteristic, with low to intermediate signal intensity in all pulse sequences. Gradient-echo pulse sequences can be used to confirm the presence of hemosiderin, which is manifested by the presence of a prominent low signal-intensity “blooming” artifact. MR imaging is optimal for identifying the extent of synovial disease in patients with diffuse intra-articular involvement (PVNS), for demonstrating the relationship to the tendon sheath in PVNTS, and for revealing its bursal involvement in PVNB. Definition of disease location and extension is important for diagnosis and for treatment planning [9].

Conflict of interest statement

The authors have no conflict of interest to declare.

Supplementary material

Supplementary data associated with this article can be found in online version at [doi:10.1016/j.jus.2011.02.001](https://doi.org/10.1016/j.jus.2011.02.001).

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