Case 8074

Focal Pigmented Villonodular Synovitis
Published on 21.04.2011

DOI: 10.1594/EURORAD/CASE.8074
ISSN: 1563-4086
Section: Musculoskeletal system
Imaging Technique: MR
Case Type: Clinical Cases
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Patient: 41 years, male

Clinical History:
A 41-year-old male patient had persistent complaints of pain in the right knee during the last months.

Imaging Findings:
A 41-year-old male patient with persistent complaints of pain in the right knee during the last months was studied with magnetic resonance (MR). No history of trauma was known.

The MR of the right knee documented a solid mass (see arrow) in the dorsal aspect of the posterior cruciate ligament, in close relation with the knee capsule (see Fig. 1). The mass was well-defined, ovoid, predominantly of intermediate signal on T1-weighted images (WI) and on STIR, enhanced avidly, and measured 2.7 x 2.9 x 1.3 cm. It contained several small areas markedly hypointense on all pulse sequences that become more apparent on gradient echo T2-WI, related to susceptibility artefact due to the presence of blood products (see *). Minimal joint effusion was also shown. No other significant abnormality was visible.

The intra-articular location and the tissue characteristics of the mass were consistent with a localised intra-articular form of pigmented villonodular synovitis (PVNS).

Discussion:
Pigmented villonodular synovitis (PVNS) is a benign proliferation of the synovial lining. The cause of the abnormality is not completely understood, some authors consider it an inflammatory reactive process and others a benign neoplastic process. Specific genetic alterations recently discovered seem to favour the latter possibility.

PVNS may comprise the lining of a joint (focal or diffuse PVNS), of a bursa (pigmented villonodular bursitis), or of a tendon sheath (pigmented villonodular tenosynovitis or giant cell tumour of the tendon sheath). Among this spectrum, PVNS of the tendon sheath is the most common and focal PVNS is the least frequent form.

PVNS diagnosis is clinically challenging. It can be manifested by intermittent joint swelling, pain, or occasionally by stiffness.

PVNS is typically a monoarticular process that involves the knee (80% of cases), the hip or the ankle, being rare in other joints.

The most common locations of focal PVNS are the infrapatellar fat pad and the suprapatellar pouch. The
intercondylar notch is an unusual location but when present the posterior cruciate ligament is more often implicated, as in the present case.

Plain films findings are neither specific nor sensitive, varying from absent to soft tissue swelling, subchondral cysts, and erosions. There is often associated joint effusion. Preservation of the joint space and of bone density are important hallmarks, and osteophytes and calcifications are characteristically absent.

MR allows accurate diagnosis of PVNS and excludes alternative diagnosis. Typical findings are synovial masses of intermediate to low signal intensity on all sequences with intratumoral areas of “blooming” artefact on gradient echo sequences due to the paramagnetic effect of haemosiderin. The latter feature is related to PVNS propensity to bleed. Postgadolinium images demonstrate intense synovial enhancement.

MR has a pivotal role in accurate pre-operative planning and postoperative follow-up. Contrast administration optimises disease’s extent assessment and provides a highly accurate map of joint involvement, which is particularly helpful in the evaluation of recesses or other areas that may be missed on arthroscopy.

Focal PVNS differential diagnosis includes cyclops lesion, chondroma, osteochondroma, tophus, intraarticular haemorrhagic conditions, synovial sarcoma and synovial chondromatosis.

PVNS major complication is joint degeneration. Focal PVNS can be treated with simple excision with a negligible risk of recurrence. In contradistinction, diffuse PVNS requires extensive synovectomy and possibly radiotherapy, and has a high risk of recurrence.

In the case presented the role of MR in PVNS diagnosis and management is demonstrated. MR allows confident diagnosis of PVNS, distinction among the different forms of PVNS, and accurate pre-operative assessment of disease’s extent.

**Differential Diagnosis List:** Focal pigmented villonodular synovitis

**Final Diagnosis:** Focal pigmented villonodular synovitis

**References:**


**Description:** T1-WI axial: a mass well-defined, ovoid, and predominantly intermediate is shown, dorsal to the posterior cruciate ligament (see arrow). **Origin:**
Description: STIR sagittal image: the mass is predominantly intermediate, the close relation with the posterior cruciate ligament is nicely demonstrated (see arrow). Origin:
Description: T2-WI fat-saturated gradient echo sagittal image: demonstrates multiple and small markedly hypointense areas within the mass (blooming artifact - see *). Origin:
**Description:** T1-WI axial image after gadolinium: demonstrates intratumoral intense and homogeneous enhancement (see arrow). **Origin:**