A 42-year-old woman suffered from repeated episodes of inflammatory right knee pain with associated swelling for ten years.

The therapeutic effect of joint aspiration was transient.

Clinical examination showed a painful knee on the medial and inferior aspect of the patella at the femoro-patellar joint, and associated swelling.
**Imaging Findings:**

Knee radiographs revealed a joint effusion with a mass in the Hoffa's fat pad (Fig. 1a, 1b).

MRI showed a lobulated intra-articular mass in the infra-patellar pouch, hypointense on T1WI without intralesional fat (Fig. 2a) and homogeneously hyperintense on T2WI (Fig. 2b), with hypointense linear structures throughout the mass in keeping with vascular structures. No haemosiderin deposits were identified (Fig. 2c).

After injection of gadolinium contrast medium, marked enhancement was seen (Fig. 2d).

The lesion invaded the inferior aspect of the patella.

There was associated synovial enhancement and joint effusion.

CT confirmed invasion of the patella by the lesion (Fig. 3a, 3b) and subsequent CT guided percutaneous biopsy revealed a vascular malformation (Fig. 3c).

The patient underwent surgical arthroscopic excision of the lesion and histological examination confirmed a cavernous haemangioma with venous malformation.

**Discussion:**

Soft-tissue haemangiomas are commonly encountered benign vascular tumours. Children and adolescents are most frequently affected [1, 2].

Haemangiomas involving the synovium are rare compared to other localisations (cutaneous, subcutaneous, intramuscular), representing only 1% of all haemangiomas. The knee is the most commonly affected joint (60%), especially on the supra-patellar aspect [3].

In contradistinction to cutaneous haemangiomas, which are readily diagnosed because they cause discolouration of the skin [1], diagnosis of deep-seated haemangiomas is difficult to make without imaging [2, 4].

Patients with joint haemangiomas present with pain, swelling, spontaneous haemarthrosis [1, 2, 5], and occasionally limitation of movement. They can, however, be asymptomatic [3].

Plain film findings are not specific [5], including joint effusion, mass effect, occasional phleboliths and bone erosion in advanced stages [6]. In some cases, plain films can also be normal [2, 3, 7].

MRI is the modality of choice for diagnosing joint haemangiomas. Typical imaging findings include intermediate signal on T1WI [2, 4, 5, 6], and heterogeneous signal on T2WI with multiple areas of high-signal representing vascular structures containing slow-flowing or stagnant blood that resemble a bunch of grapes [2, 3, 4, 5, 6]. After injection of gadolinium contrast, there is usually heterogeneous enhancement [6].

Sometimes, a peripheral high-signal-intensity is observed on T1WI, corresponding to intra-lesional fat [2, 4]. Intra-lesional fluid-fluid levels can be seen on T2WI, as well as thrombosis, appearing as a round low-signal-intensity resembling a phlebolith [4, 6].

Our case was atypical, showing hypointense linear structures on T2WI, representing high flowing blood.

MR imaging can also detect osseous changes such as periostal, cortical or medullary reaction [1, 3], as well as invasion of the menisci and surrounding tissues [3].

Careful analysis of the lesion extent on MR imaging is very useful to decide which surgical approach should be
chosen (arthroscopic or open excision).

Percutaneous biopsy is usually not required before surgery if MRI findings are characteristic [8]. However, in more atypical cases, the decision to perform a pre-surgical biopsy is often made at a multidisciplinary team meeting.

Histopathology findings are variable ranging from cavernous/venous/or mixed synovial haemangioma to nonspecific synovitis. Fibrofatty septa are often seen [2].

In conclusion, synovial haemangiomas are rare benign tumours that most commonly affect the knee joint. MRI imaging is key to the diagnosis, permitting characterization of the lesion and to delineate disease extension. The final diagnosis is made by histological examination of the biopsy or surgical specimen.

**Differential Diagnosis List:** Synovial haemangioma of the knee., Pigmented villonodular synovitis, Synovial (osteo)chondromatosis, Lipoma arborescens, Synovial sarcoma

**Final Diagnosis:** Synovial haemangioma of the knee.

**References:**

Description: Frontal knee radiograph shows no bone lesion. Origin: Natacha Jouven, department of radiology, ESR academy, Geneva, Switzerland.
Description: Lateral knee radiograph reveals a small joint effusion (small arrow) with a mass in the Hoffa's fat pad (long arrow). Origin: Natacha Jouven, department of radiology, ESR academy, Geneva, Switzerland.
**Figure 2**

a

**Description:** Sagittal non-contrast enhanced CT image, in soft tissue window, shows the intra-articular mass in the infra-patellar pouch (white arrow). **Origin:** Natacha Jouven, department of radiology, ESR academy, Geneva, Switzerland.

b

**Description:** Sagittal non contrast enhanced CT image, in bone window, confirms erosion of the inferior aspect of the patella (white arrow). **Origin:** Natacha Jouven, department of radiology, ESR academy, Geneva, Switzerland.
Description: Sagittal T1W MR image shows a hypointense intra-articular lobulated mass in the infrapatellar pouch, with no evidence of fat components (white arrow). Origin: Natacha Jouven, department of radiology, ESR academy, Geneva, Switzerland.
Description: Sagittal proton-density fat-saturated MR image shows a homogeneously hyperintense intra-articular lobulated mass in the infra-patellar pouch (long arrow), and a synovial effusion (small arrow).
Origin: Natacha Jouven, department of radiology, ESR academy, Geneva, Switzerland.
Description: Axial T2* GRE MR image shows an intra-articular mass in the infra-patellar pouch, containing hypointense linear structures, without haemosiderin deposit (white arrow). Origin: Natacha Jouven, department of radiology, ESR academy, Geneva, Switzerland.
Description: Sagittal T2W MR image shows marked enhancement of the lesion after injection of gadolinium contrast (long arrow), and a synovial effusion (short arrow). Origin: Natacha Jouven, department of radiology, ESR academy, Geneva, Switzerland.