Case 17774

Eurorad

Synovial Chondromatosis mimicking PVNS

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Section: Musculoskeletal system
Area of Interest: Musculoskeletal soft tissue
Musculoskeletal system
Imaging Technique: Conventional radiography
Imaging Technique: MR
Case Type: Clinical Cases
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Patient: 30 years, female

Clinical History:

A 30-year-old female presented following a distortion injury of the left knee during swimming. Physical examination revealed swelling of the medial compartment and a slight positive anterior drawer test. The patient was referred for Magnetic Resonance Imaging (MRI) of the left knee.

Imaging Findings:

T1-weighted image (WI) revealed a synovial-based mass, adjacent to the medial retinaculum of the patellar surface with a signal isointense to muscle (Fig. 1). On fat-suppressed T2-WI the lesion was heterogeneous with overall high signal intensity and multiple intralesional foci of low intensity (Fig. 2 A-B). A similar lesion was seen adjacent to the anterior intermeniscal transverse ligament (not shown). There was slightly increased fluid present in the suprapatellar recessus (Fig. 2 A-B). After administration of Gadolinium contrast, heterogeneous enhancement of both lesions was seen (Fig. 3 A-B). Gradient-echo images showed subtle blooming artefact of the low signal intensity foci on T2 WI (Fig. 4). On conventional radiograph, a focal increased attenuation of the mass adjacent to the inferomedial aspect of the patella was seen (Fig. 5). Arthroscopy revealed a synovial-based mass with some subtle area of bleeding at the surface (Fig. 6). Subsequently, biopsy was performed.

Discussion:

Primary synovial chondromatosis (PSC) is a benign neoplastic process of the synovium of joints, tendon sheaths or bursa. The disease follows three stages. First, a non-specific synovitis is seen with no loose bodies. In the transitional stage, loose bodies develop in addition to synovitis. Finally, synovial disease fades out and loose bodies detach, calcify and ultimately ossify [1-4]. PSC affects males 2-4 times more frequently than women in the third to fifth decade [1,2]. The knee and the hip joints are most affected, accounting for 80-90% [1,2]. Secondary SC is a nonneoplastic disorder due to underlying cartilage damage and mostly affects elderly patients [1,2].

Patients with PSC mostly presents with pain, swelling, restricted motion, articular crepitus, locking and rarely palpable nodules[1,2]. PSC is usually monoarticular. Polyarticular involvement may be associated with familial history and associated syndromes [2]. Malignant degeneration into chondrosarcoma is rare6].

Radiographs are negative in the initial stage. In the third stage, multiple small intraarticular calcified or ossified nodules of uniform shape are present. Other findings are ring-and-arc pattern and target appearance, consisting of a central focus and a single peripheral rim of calcification [2,3,5].

Ultrasound shows a heterogeneous mass containing hyperechogenic foci sometimes accompanied by acoustic shadowing in case of mineralization or enchondral ossification. The position of the (osteo)chondral nodules may change. On Power doppler ultrasound, the lesion is avascular [2,7].

Computed tomography may reveal nonmineralized nodules as low attenuation foci [2].

MRI findings differs along the disease stage. In the first stage non-specific lobulated synovial thickening is seen. Uncalcified nodules are isointense to muscle on T1 WI and hypointense to synovial fluid. On T2-WI calcified loose bodies show multiple signal voids on both sequences. Ossified loose bodies show a central area of bone marrow signal and a perilesional hypointense rim of cortical bone.

PSC should be differentiated from PVNS which may involve the same structures.

In contrast to PVNS, there is no blooming on gradient echo imaging, unless there is some bleeding like in our patient [2,3,5].

Although pressure erosion on the adjacent bone may occur, marrow infiltration is absent in PSC but occur in PVNS. Calcifications are absent in PVNS.

Preferred treatment is arthroscopic or open removal of the chondral fragments with or without synovial resection. The recurrence rate of intraarticular SC is very low but is higher in extraarticular lesions [1,2]. Biopsy is indicated in case of rapid increase in size, aggravating symptoms or diagnostic uncertainty.

Written informed patient consent for publication has been obtained.

Differential Diagnosis List: Primary synovial chondromatosis, Pigmented villonodular synovitis , Rheumatoid arthritis , Synovial chondrosarcoma , Synovial hemangioma , Secondary synovial chondromatosis

Final Diagnosis: Primary synovial chondromatosis

References:

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Evenski AJ, Stensby JD, Rosas S, Emory CL (2019) Diagnostic imaging and management of common intra-articular and peri-articular soft tissue tumors and tumorlike conditions of the knee. The journal of knee surgery 32(04): 322-330 (PMID: 30449023).
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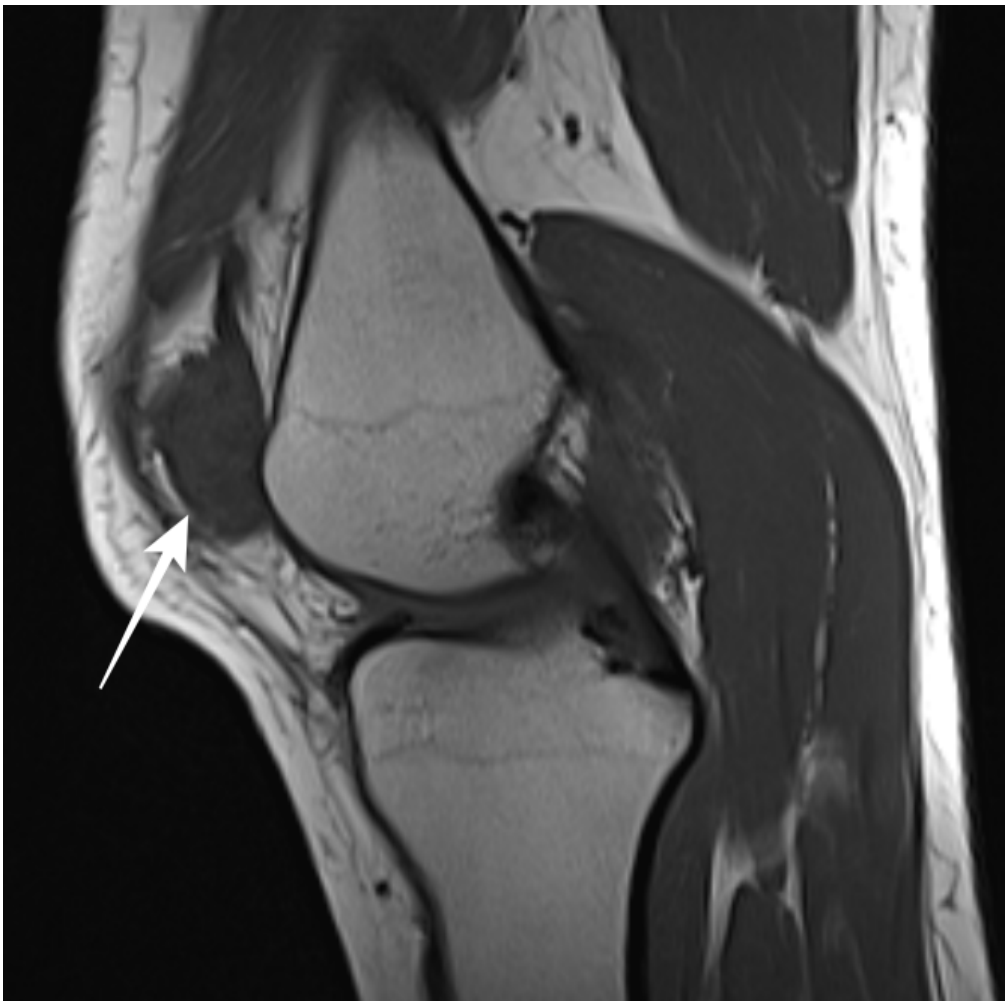
Jonckheere J, Shahabpour M, Willekens I, Pouliart N, Dezillie M, Vanhoenacker F, De Mey J (2014) Rapid malignant transformation of primary synovial chondromatosis into chondrosarcoma. JBR-BTR 97(5): 303-307 (PMID: 25597214)

Roberts D, Miller TT, Erlanger SM (2004) Sonographic appearance of primary synovial chondromatosis of the knee. Journal of ultrasound in medicine 23(5): 707-709 (PMID: 15154539).

Figure 1

a



Description: MRI: sagittal T1 WI shows a synovial lesion (arrow) with an isointense signal adjacent to the medial retinaculum of the patellar surface **Origin:** Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2021

Figure 2

a

Description: MRI: sagittal T2 fat suppressed WI revealed a heterogeneous lesion (arrow) with intralesional foci of low signal accompanied with a slightly increased amount of fluid in the suprapatellar recessus (arrowhead) **Origin:** Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2021

b

Description: MRI: axial T2 fat suppressed WI revealed a heterogeneous lesion (arrow) with intralesional foci of low signal accompanied with a slightly increased amount of fluid in the suprapatellar recessus (arrowhead) **Origin:** Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2021

Figure 3

a

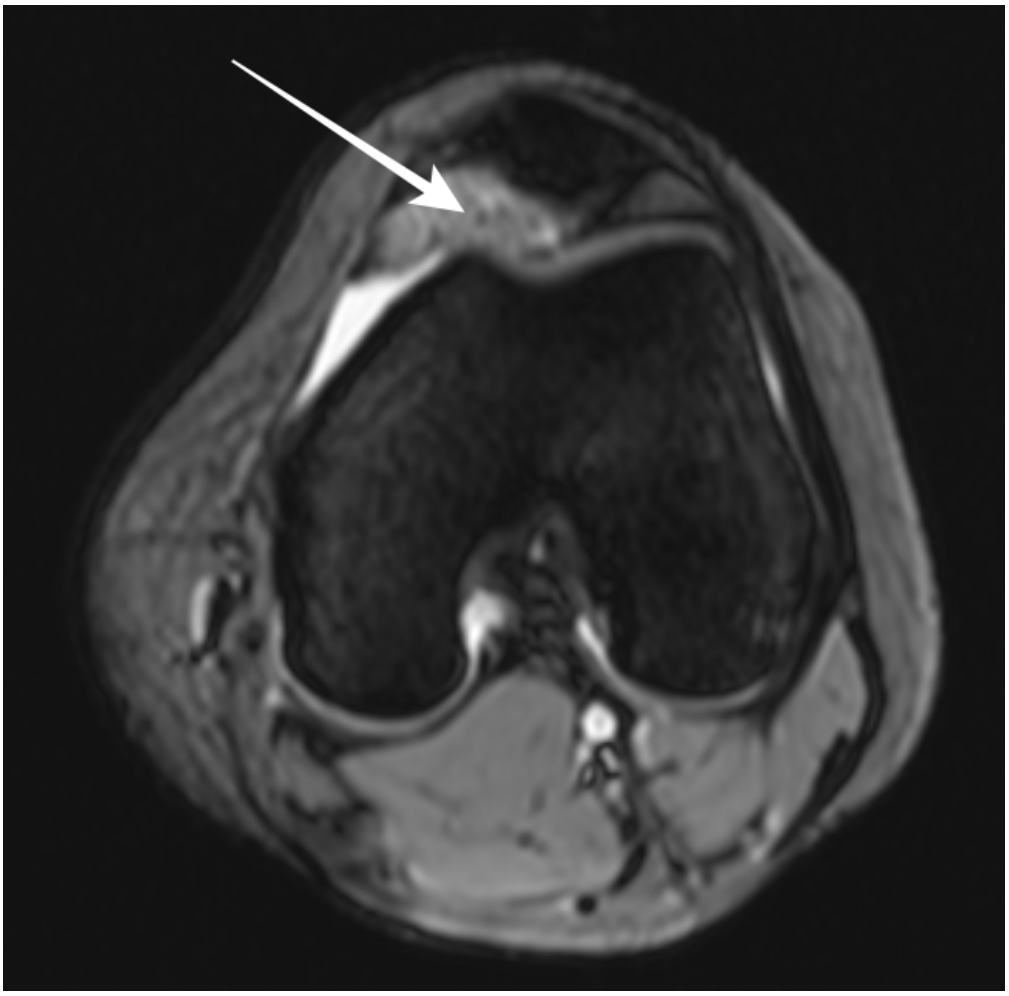
Description: Sagittal gadolinium contrast enhanced fat suppressed T1 -WI shows heterogeneous enhancement (arrow) **Origin:** Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2021

b

Description: Axial gadolinium contrast enhanced fat suppressed T1 -WI shows heterogeneous enhancement (arrow) **Origin:** Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2021

Figure 4

a

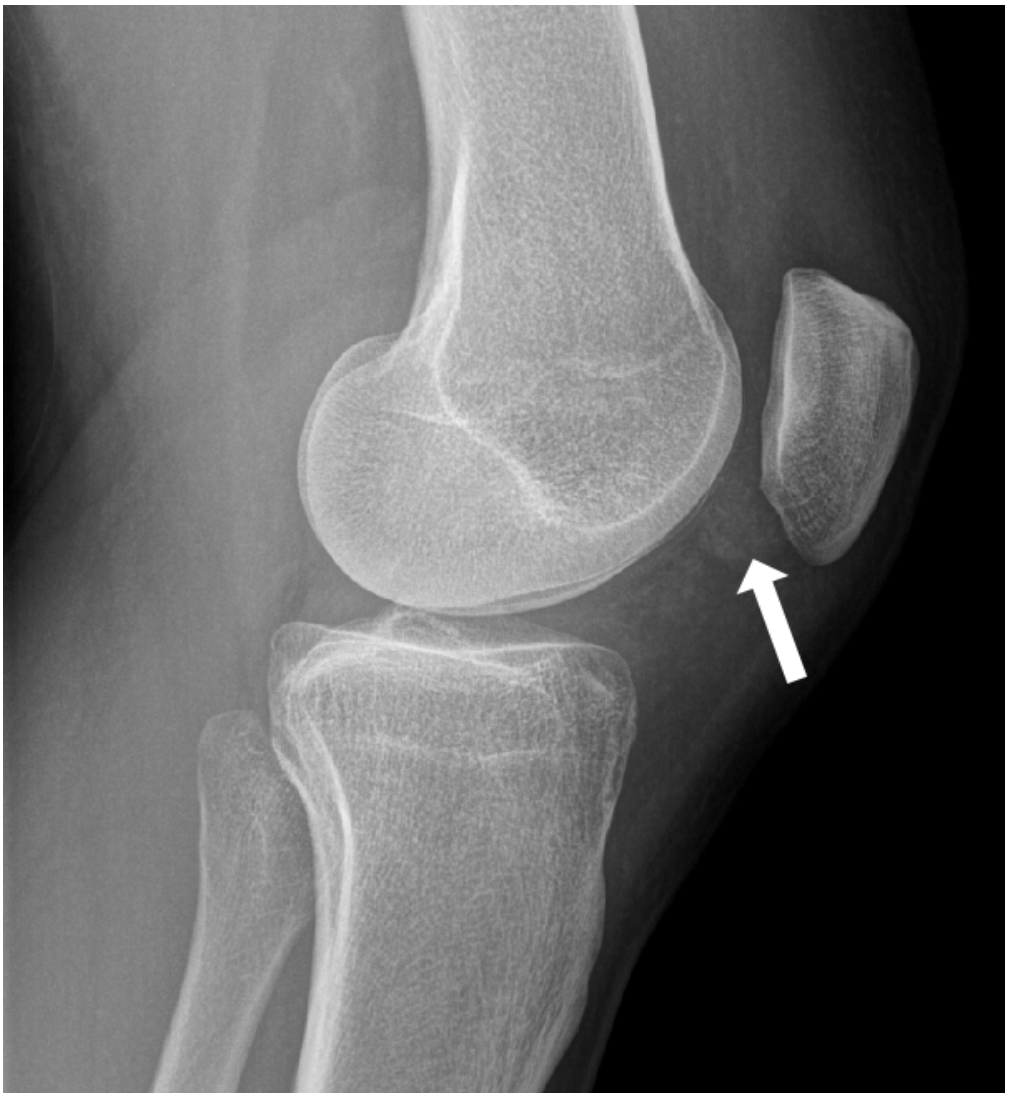


Description: Gradient echo-images reveals a subtle intralesional blooming artefact (arrow) in the lesion

Origin: Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2021

Figure 5

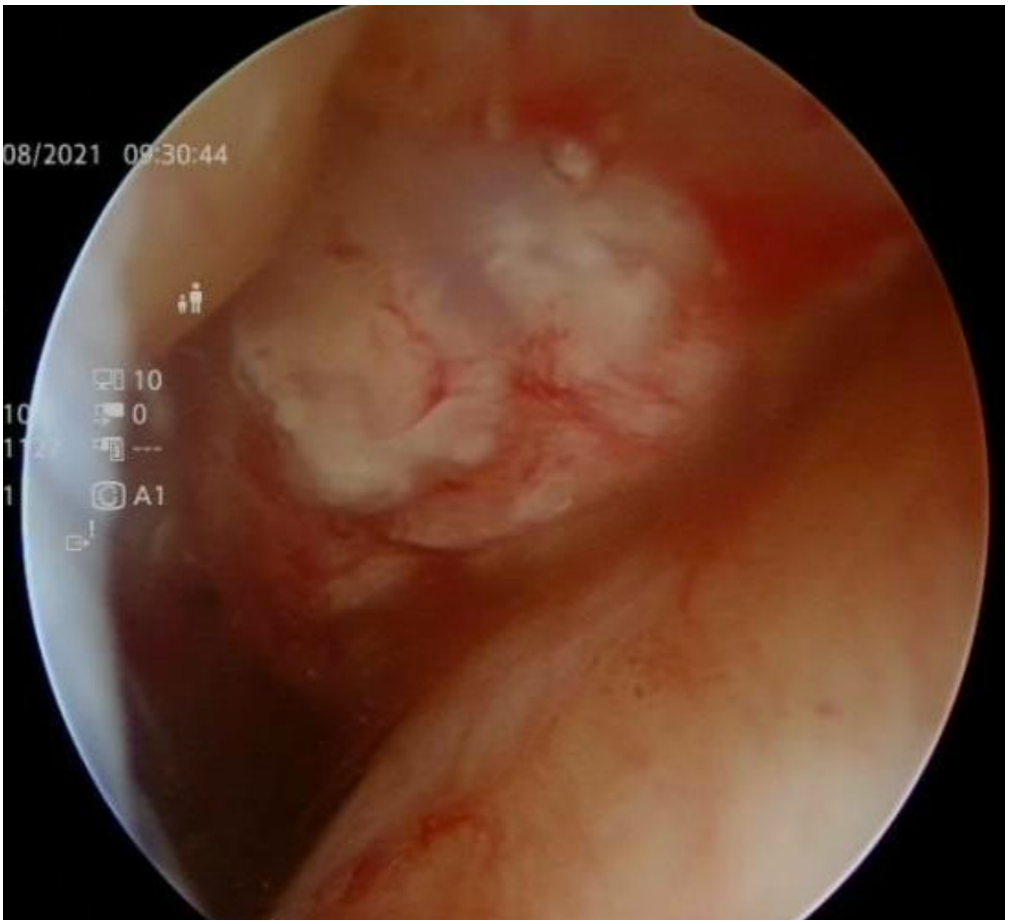
a



Description: Conventional radiograph shows a slightly increased attenuation of the lesion with focal obliteration (arrow)of the patellar fat pad **Origin:** Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2021

Figure 6

a



Description: Arthroscopy confirmed a synovial-based lesion with subtle superficial bleeding **Origin:** Department of Orthopaedic surgery, Hospital Imelda, Bonheiden, Belgium, 2021