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## Synovial chondromatosis – diagnostic pitfalls

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### Summary

#### Background:

Synovial chondromatosis is a rare, benign disorder characterised by neoplastic proliferation of numerous chondral nodules in joint synovium, bursae or tendon sheaths. The disease is usually diagnosed in the third, fourth and fifth decades of life and is twice as common in men. In most cases, it affects one joint but may appear bilaterally (in up to 10% of patients). The most common location is the knee joint.

Computed tomography (CT) is the best method for detection of calcified intraarticular bodies. Magnetic resonance imaging (MRI) may also implicate presence of synovial chondromatosis – on T2-weighted images calcifications are visible as focal areas of signal void within hyperintense fluid, with hypertrophic synovium. In addition, this technique may show possible extraarticular disease involvement. Ultrasound examination is an alternative method of imaging of synovial chondromatosis.

#### Case Reports:

In this article, we present two cases of synovial chondromatosis. The first patient was a 14-months-old girl with multiple cartilaginous loose bodies in the knee joint detected in ultrasound and MRI examinations. The other patient was a 68-years-old woman with calcification within the shoulder joint demonstrated in CT and MRI examinations.

#### Conclusions:

Diagnostic imaging plays an essential role in the diagnosis of synovial chondromatosis, although the final diagnosis is still based on histopathological examination.

#### MeSH Keywords:

**Joint • Magnetic Resonance • Chondromatosis, Synovial**

#### PDF file:

<http://www.polradiol.com/download/index/idArt/890559>

### Background

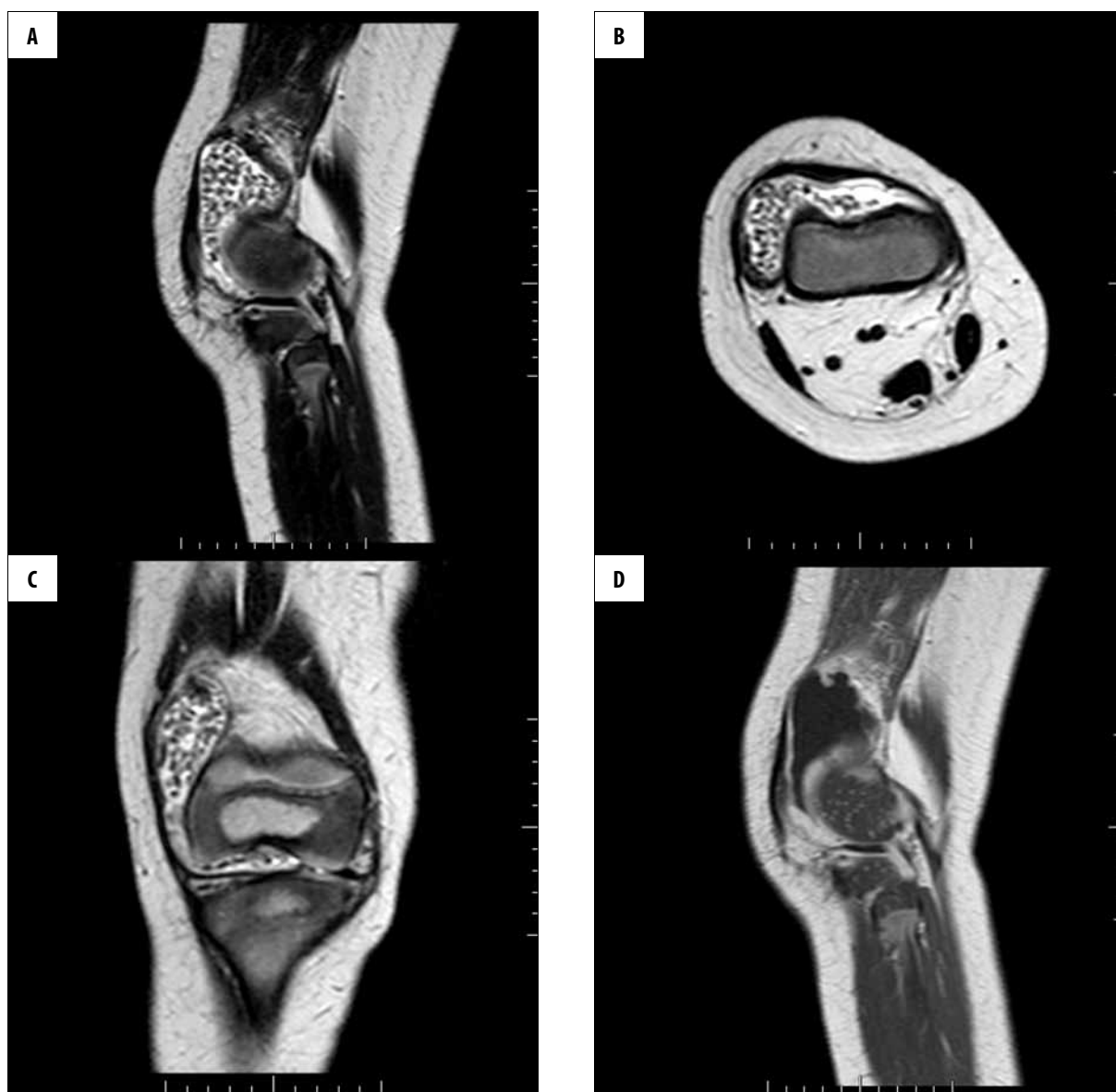
Synovial chondromatosis is a rare, benign disorder characterized by neoplastic proliferation of numerous chondral nodules located in joint synovium, bursae and tendon sheaths. Disease etiology is unknown [1]. Chondral foci may be pedunculated or detach completely, forming free intraarticular bodies that may undergo central calcification [2]. The disease is usually diagnosed between the third and fifth decade of life, being twice as common in males [3]. In most cases it involves one joint, although in some cases (up to 10%) it may occur bilaterally. The knee is the most common location, but the disease may affect any

other joint [4]. Patients usually complain of joint pain and edema. Tenderness, joint effusion and limitation of movement lasting up to several years are the most typical findings in physical examination. Transformation into chondrosarcoma occurs in less than 5% of cases [1].

### Case Reports

#### Case 1

A 14-month-old girl was referred to the Pediatric Department due to right knee inflammation. Medical history revealed that the child has had a limp in the right leg for about 3

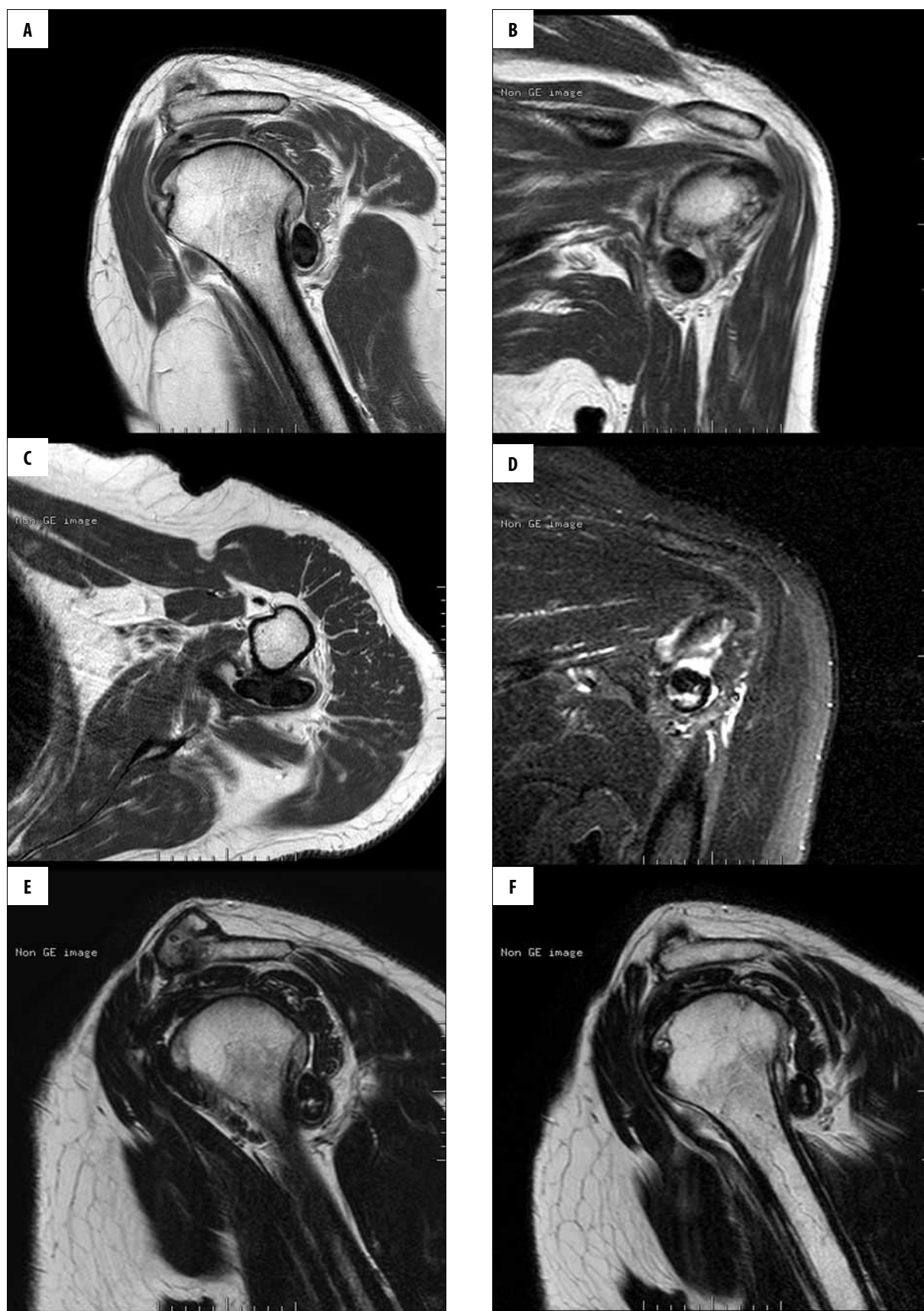


**Figure 1.** MRI of the knee. T2-weighted images. (A) Sagittal plane. (B) Transverse plane. (C) Frontal plane. Numerous small foci devoid of signal – loose chondral bodies within joint cavity, located mainly in the suprapatellar bursa as well as medial and lateral patellofemoral recesses. (D) T1-weighted + CM image, sagittal plane. Contrast enhancement of thickened synovial membrane.

weeks. On admission, physical examination revealed edema, effusion, enlarged contour and contracture of the right knee. Laboratory examinations showed low concentrations of inflammatory markers, somewhat elevated LDH and anemia. Studies were negative for boreliosis, CMV and hepatotropic virus infections, as well as parasitic infestation and tuberculosis. Plain X-ray of the right knee did not reveal any structural changes in the bony parts of this joint. US examination of the right knee showed intraarticular fluid containing numerous, minute free bodies. MRI examination was performed in order to broaden the diagnostics. Two months later the girl was readmitted to the Pediatric Department with disease exacerbation for a planned MRI study. It revealed the presence of an area, sized  $25 \times 29 \times 37$  mm, hypointense in T1-weighted images, hyperintense and containing numerous, minute foci of signal void in T2-weighted images, containing intensively enhancing thickened joint synovium (Figure 1).

## Case 2

A 68-year-old woman was referred to a surgical outpatient clinic by a family doctor due to a palpated protrusion on the anterior surface of left shoulder. Moreover, the patient has been complaining of left shoulder pain and limited range of shoulder movement for two months. She denied any previous trauma. Ultrasound examination visualized an intermuscular, hyperechogenic, clearly demarcated focal lesion, sized  $30 \times 35 \times 45$  mm, which corresponded to a lipoma. The diagnostics was broadened to include MRI examination because of pain symptoms. It revealed a presence of a spindle-shaped, signal void area sized  $12 \times 31 \times 19$  mm, located in the posterior part of the axillary recess at the margin of a region characterized by heterogeneous signal, not exhibiting apparent contrast enhancement or signs of shoulder osteoarthritis (Figure 2). Further diagnostics



**Figure 2.** Shoulder MRI. T1-weighted images + CM: (A) Sagittal plane. (B) Frontal plane. (C) Transverse plane. T2-weighted images: (D) Frontal plane. (E, F) Sagittal plane. Synovial chondromatosis in the axillary recess of glenohumeral joint.

included CT examination, which confirmed the diagnosis of high-grade osteoarthritis of the left shoulder and moreover, the presence of heterogeneous calcification sized 11×30×18 mm, within the posterior recess of shoulder joint cavity.

## Discussion

Synovial chondromatosis is a relatively well-studied disorder. However, its preoperative diagnosis poses great difficulty. Imaging diagnostics plays a key role in the diagnostic process. Signs of synovial chondromatosis may be noted on plain X-ray, CT and MRI examinations. In 70–95% of cases X-ray examinations may show calcifications, which are usually numerous, round, with smooth margins and of similar sizes. Rarely, changes such as articular gap narrowing, periarticular sclerosis of articular surfaces and osteophytosis appear in further stages of the disease. Computed tomography is considerably more sensitive in detection of chondromatosis and most precisely visualizes the intra-articular location of free bodies. The additional advantage of this study is that it shows non-calcified articular bodies [3]. In some cases MRI examination also rouses suspicion of synovial chondromatosis. In such study calcifications may be visible in T2-weighted images as foci of signal void against the background of hyperintense fluid and hypertrophic synovium. Moreover, this technique enables visualization of extracapsular spread of these lesions [1]. Ultrasound is an alternative for CT and MRI in the diagnostics of chondromatosis among patients who, for various reasons, cannot be subjected to these examinations [5].

In the first case a preliminary diagnosis of synovial chondromatosis was based on negative results of microbiological and serological studies, typical location of lesions and numerous signal void intraarticular foci as well as synovial hypertrophy visible in T2-weighted MRI images. The patient described in our first case report is significantly younger than any other patients with knee chondromatosis previously described in literature [6].

On the other hand, our second patient also exceeds the statistical age of occurrence of synovial chondromatosis symptoms. Moreover, secondary osteochondromatosis should be also included in the differential diagnosis due to features of advanced osteoarthritis. However, the presence of a large number of rice bodies of similar sizes evidenced against such diagnosis [7]. Also, chondromatosis rarely leads to development of secondary arthrosis, so it could not be the cause of advanced joint osteoarthritis by itself [8].

The treatment of choice in synovial chondromatosis is surgery involving removal of free bodies from articular cavity and complete or partial resection of synovium. Disease recurrence is seen in 3–23% of cases [1]. In both reported cases the diagnostics was further broadened to include histopathological examination of intraoperative biopsy specimens.

## Conclusions

Imaging diagnostics is important for the diagnosis of synovial chondromatosis. However, histopathological examination is still decisive.

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