Case 16265
Panner's disease

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Section: Musculoskeletal System
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Patient: 7 year(s), male

Clinical History

A 7-year old youth soccer player presented with periodic pain and slight swelling of his right elbow since two months, without previous trauma. There was a limited range of motion in the elbow.

Imaging Findings

Conventional radiography showed joint effusion, irregular contours of the capitellum, increased bone density and a thin radiolucent line in the subchondral bone (Figures 1a and 1b). Follow-up with Cone Beam CT 2 months later depicted a crescent with vacuum phenomenon in the subchondral bone (Figures 2a and 2b), corresponding to the radiolucent line seen on radiographs. Subsequent MRI revealed intact articular cartilage of the capitellum, predominantly low signal of the capitellum on both T1- and PD weighted images in keeping with sclerosis, and bone marrow edema in the adjacent humeral bone on FS PD weighted images (Figures 3a, 3b, 3c and 3d).

Discussion

Panner's disease represents an osteochondrosis of the humeral capitellum. Osteochondroses affect epiphyses or epiphyseal equivalents and their progression ceases with skeletal maturity of the affected part [1]. Panner's disease occurs most frequently in boys under the age of 11 [2, 3].
Microtraumata from repetitive valgus stress and increased axial load are incriminated as the main pathogenetic factors, typically occurring in throwing sports and gymnastics respectively [2].
This may lead to disruption of vessels that supply the nucleus of the capitellar ossification centre, leading to ischemia, resulting in disturbed endochondral ossification [2].
Clinical presentation consists of pain, stiffness, swelling and a limited range of motion - especially an extension deficit, flexion deficit is less common [2]. The pain is activity-related [2].
Conventional radiographs may show an irregular contour, sclerosis, subchondral radiolucency, fragmentation and flattening of the capitellum [2, 3].
As the radiographical changes may be subtle, a low dose (Cone Beam) CT may be beneficial because of its greater sensitivity for detection of subtle changes and characterization of a subchondral vacuum phenomenon [4].
The radiolucent subchondral crescent represents gas accumulation in a subchondral fissure, which indicates osteonecrosis and impending articular collapse [4, 5]. This vacuum-phenomenon disappears when repair and re-ossification occurs [4].
MRI shows heterogeneous signal intensity due to a variable degree of sclerosis, vacuum phenomenon and bone marrow edema in the ossified part of the capitellum, while the overlying cartilage is normal [2, 4]. The vacuum phenomenon has a similar low signal as the sclerotic changes and is therefore difficult to detect on MRI.
The majority of patients can be successfully treated conservatively, without serious morbidity [2].
The differential diagnosis of Panner's disease consists of osteochondrosis dissecans (OCD), which is seen in the second decade of life, when the ossification of the capitellum is complete [3, 5]. OCD affects both bone and overlying cartilage and may be complicated by intra-articular loose body formation and has an overall poorer outcome [2, 3]. MRI may detect cartilage defects, therefore it will be useful for distinguishing between Panner's disease and OCD.
Our patient was treated conservatively, with rest, avoidance of weight bearing and of leaning upon the right arm, promotion of passive movement and antiphlogistic medication. After six months there was a significant clinical improvement and a partial regression of radiological abnormalities.
Written informed patient consent for publication has been obtained.

Final Diagnosis

Panner's disease.

Differential Diagnosis List

Osteochondrosis dissecans., Ossification variant of the capitellum

Figures

Figure 1 Conventional radiograph of the right elbow, lateral and anteroposterior view

The capitellum has a slightly irregular articular contour (white arrow) and there is a radiolucent crescent in the subchondral bone (black arrows). Note slight joint effusion with displacement of the elbow fad pads (white asterisks).

Area of Interest: Bones; Extremities; Musculoskeletal bone;
Imaging Technique: Conventional radiography;
Procedure: Diagnostic procedure;
Special Focus: Athletic injuries;

The capitellum has a slightly irregular articular contour (white arrow) and there is a radiolucent crescent in the subchondral bone (black arrows).

Area of Interest: Bones; Extremities; Musculoskeletal bone;

Imaging Technique: Conventional radiography;
Procedure: Diagnostic procedure;
Special Focus: Athletic injuries;

Figure 2 Cone Beam CT of the right elbow

Coronal image:The capitellum has an increased density and is slightly irregularly delineated (white arrow). There is a subchondral crescent-shaped vacuum phenomenon (black arrow).

Area of Interest: Bones; Musculoskeletal bone; Musculoskeletal joint;
Imaging Technique: CT;
Procedure: Diagnostic procedure;
Special Focus: Athletic injuries;

Sagittal image: The capitellum has an increased density and is slightly irregularly delineated (white arrow). There is a subchondral crescent-shaped vacuum phenomenon (black arrow).

Area of Interest: Bones; Musculoskeletal bone; Musculoskeletal joint;
Imaging Technique: CT;
Procedure: Diagnostic procedure;
Special Focus: Athletic injuries;

Figure 3 MRI of the right elbow,T1 and FS PD

Coronal T1-weighted image: the capitellum is of heterogeneous signal intensity with areas of low signal anteriorly (white arrow). The overlying articular cartilage is intact (small white arrowheads).

Area of Interest: Bones; Musculoskeletal bone; Musculoskeletal joint;
Imaging Technique: MR;
Procedure: Diagnostic procedure;
Special Focus: Athletic injuries;

Sagittal T1-weighted images: the capitellum is of heterogeneous signal intensity with areas of low signal anteriorly and high signal posteriorly (white arrow). The overlying articular cartilage is intact (small white arrowheads).

Area of Interest: Bones; Musculoskeletal bone; Musculoskeletal joint;
Imaging Technique: MR;
Procedure: Diagnostic procedure;
Special Focus: Athletic injuries;

Coronal FS PD images: the capitellum is of low signal (white arrow). The overlying cartilage is intact (white arrowheads). Note bone marrow edema in the distal humerus (black arrow).

Area of Interest: Bones; Musculoskeletal bone; Musculoskeletal joint;
Imaging Technique: MR;
Procedure: Diagnostic procedure;
Special Focus: Athletic injuries;

Sagittal FS PD images: the capitellum is of low signal (white arrow). The overlying cartilage is intact (white arrowheads). Joint effusion (black asterisks). Note bone marrow edema in the distal humerus (black arrow).

Area of Interest: Bones; Musculoskeletal bone; Musculoskeletal joint;

Imaging Technique: MR;
Procedure: Diagnostic procedure;
Special Focus: Athletic injuries;

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Citation

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Panner's disease {Online}
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