Subperiostal osteoid osteoma of the foot
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Section: Musculoskeletal system
Case Type: Clinical Cases
Authors: Hatem F, Jans L, Verstraete K, Defreyne L.
Patient: 27 years, male

Clinical History:
A 27 year-old farmer was referred to our hospital for orthopaedic investigation of the right foot. He complained of tenderness over the dorsal region of the foot at night and with activity. The onset of the pain was one year before initial presentation. The pain was relieved easily with NSAID.

Imaging Findings:
There was no prior medical history.
Conventional radiography of the feet showed no lesions.
An MR examination was performed. T1-weighted, T2-weighted and T2 STIR-weighted sequences in coronal, sagittal and transverse planes were acquired. T2 STIR-weighted images demonstrated bone marrow edema of the intermediate and lateral cuneiform bones with involvement of the surrounding soft tissues.
On the T2 STIR-weighted MRI images, a small mass with intermediate to hypointense signal was seen adjacent to the intermediate cuneiform bone. A small, dot-like signal void in the center of this lesion is in keeping with calcification.
Because of the nidus-like structure of the subperiostal lesion, osteoid osteoma of the midfoot was suspected.
The presence of a nidus with central calcification was confirmed by CT examination. A small hypodense nidus with a central calcification was seen adjacent to the cortex of the intermediate cuneiform bone. Retrospectively, the conventional radiography demonstrated subtle erosion and discrete scaffolding of the cortex of both cuneiform bones.
The patient was treated with CT-guided laser ablation of the osteoid osteoma. Recovery was uneventful.

Discussion:
Osteoid osteoma (OO) is a benign skeletal neoplasm that consists of an ovoid or spherical nidus of osteoid tissue and interconnected bone trabeculae, superimposed on a background of highly vascularized connective tissue. The amount of osseous and osteoid tissue varies within the nidus and is reflected in its density. The average size of the nidus varies between 0.5-2 cm, but the lesion is usually smaller than 1.5 cm in diameter.
OO account for 11% of all benign bone tumours and 3% of all primary bone tumours. The prevalence of the tumour is highest in the second and third decades of life.
OO is mostly found in the diaphysis or the metaphysis of the long tubular bones. The proximal femur is the most common location followed by the tibia, the posterior elements of the spine and the humerus. Locations in the hands and the feet are less common.
The classic clinical presentation is that of focal bone pain at the site of the tumour. The pain worsens at night, increases with activity and is easily relieved by use of non-steroidal anti-inflammatory medication.
OO are classified as cortical, cancellous or subperiosteal and may occur extra- or intra-articular.

Typical radiographic findings of OO include a nidus which may display a variable amount of mineralization,
accompanied by cortical thickening and reactive sclerosis. The nidus is seen as a radiolucent focus, located in the center of an area of reactive sclerosis.

On CT imaging, the nidus is well defined and round or oval with low attenuation. An area of high attenuation may be seen centrally, a finding that represents mineralized osteoid. Reactive sclerosis around the nidus can easily be depicted by CT.

MR imaging does not only demonstrate the nidus and accompanying sclerosis but also the adjacent bone marrow. The nidus has a low to intermediate signal intensity on T1-weighted images and variable signal intensity on T2-weighted images, depending on the amount of mineralization present in the center of the nidus. Edema in the adjacent bone marrow and soft tissue can easily be depicted by MRI.

Intra-articular OO, irrespective of their subperiostal, cortical or cancellous origin, are poorly seen on conventional radiography since intra-articular periosteum is less active and thus reactive sclerosis is not seen. Intra-articular osteoid osteoma may be associated with joint-space widening as a result of joint effusion or synovitis.

Tarsal OO display a lesser degree of reactive sclerosis compared to lesions in the long bones. Because of the proximity of the bones in the feet, an inflammatory reaction that originates from one tarsal lesion often spreads to adjacent bones and joints. Moreover, soft tissue swelling may be prominent in OO of the feet, and this finding may resemble infection or inflammatory arthritis.

Current management of OO is surgical resection or CT-guided percutaneous treatment with radiofrequency ablation or laser photocoagulation.

**Differential Diagnosis List:** Subperiostal osteoid osteoma of the foot

**Final Diagnosis:** Subperiostal osteoid osteoma of the foot

**References:**

Description: Subtle erosion and discrete scaffolding of the cortex of intermediate and lateral cuneiform bone is seen. Origin:
**Description:** Transverse T2 STIR sequence demonstrates the nidus with dot-like central calcification (arrow), and the surrounding soft tissue edema. **Origin:**
Description: Sagittal T2 STIR image demonstrates the nidus (arrow). Origin:
Description: Coronal T2 sequence demonstrates the nidus (arrow), adjacent to the intermediate cuneiform bone. Origin:
Description: Axial CT image demonstrates the nidus (arrow) as a hypodense lesion with a central dot-like calcification. Origin:
Description: Sagittal CT image demonstrates scaffolding of the cortex of cuneiform bones (arrow).
Origin:

Description: Coronal CT image demonstrates scaffolding of the cortex of cuneiform bones (arrow).
Origin:
Figure 4

a

**Description:** Coronal CT image during CT-guided percutaneous laser photocoagulation demonstrates position of the needle tip in the nidus of the lesion. **Origin:**

b

**Description:** Sagittal CT image during CT-guided percutaneous laser photocoagulation demonstrates position of the needle tip (arrow) in the nidus of the lesion. **Origin:**