Case report

A 34-year-old man was referred to the radiology department by his generalist because of the presence of a hard lump on the ulnar side of the fourth finger of the right hand. The patient had felt this lump a couple of weeks after suffering a crush injury of his finger.

A radiography (Fig. 1) showed the presence of a parosteal flamelike bony proliferation or calcification, extending from the middle phalanx of the fourth digit on the ulnar aspect. The bony proliferation or calcification was surrounded by a nodular soft tissue swelling.

A control radiography (Fig. 2) was performed after 3 months and showed that the bony proliferation had clearly enlarged and had grown out into a mature bony mass.

An MRI (Fig. 3) was performed to evaluate the soft tissue component of the mass.

Because the lump was bothering the patient, it was surgically excised.

Pathological analysis (Fig. 4) confirmed this lesion was a bizarre parosteal osteochondromatous proliferation.

Discussion

General features

Bizarre parosteal osteochondromatous proliferation (BPOP) is part of a spectrum of reactive lesions. Florid reactive periostitis, one can consider the first stadium, followed by BPOP and turrex exostosis (reactive osteochondroma) as end stage (1).

BPOP was first described by Nora in 1983 and is frequently referred to as Nora’s lesion (2).

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NORA’S LESION OR BIZARRE PAROSTEAL OSTEOCHONDROMATOUS PROLIFERATION — RAPPAPORT et al

Patients in the fourth decade tend to be more affected. In contrary osteochondromas appear more commonly in the second and third decades. The age range can be quite large, so age can’t be used as a correct discriminator (4).

Imaging features

On radiography, the appearance of BPOP is dependant on the stage of evolution of the lesion. The first stage presents as a periosteal soft tissue swelling with or without the presence of small amount of calcifications. In later stages the soft tissue mass progressively calcifies and finally ossifies. This evolution from soft tissue mass to ossified mass takes approximately 6 months (3).

As mentioned above, the mass arises from the periosteal aspect of the intact cortex of diaphysis or metaphysis and generally there isn’t continuity with the medulla. The mass can be pedunculated or sessile and usually there is a cleavage plane between the lesion and the underlying cortex. Periosteal reaction is absent (5).

CT is better than plain radiograph in detecting the possible traumatic origin of the lesion (3).

Men are more frequently affected than women by BPOP and this feature could support the theory of possible traumatic origin of the lesion (3).

BPOP is most frequently found in the hand, more specifically at the diaphysis of the phalanges (proximal phalanges more affected than distal phalanges). Since these lesions are also more often found at the right hand side, some authors expect traumatic events could be at the origin of BPOP (3).

Fig. 3. — MRI shows that the lesion (arrowhead) is nodular and has no contact with the medullary bone. Coronal T1 weighted images show the lesion is T1-hypointense (A). This lesion shows marked, especially peripheral, contrast enhancement (B). Axial T2 weighted images with fat suppression show that the lesion is homogeneous T2-hyperintense (C).
and are frequently accompanied by cortical invasion, soft tissue invasion and periosteal reaction (3).

Juxtacortical chondromas mostly arise metaphysically whereas BPOP mostly arise diaphysally, but this is not considered a reliable discriminator. A juxtacortical chondroma shows a soft tissue component and matrix calcifications as seen in early stage BPOP, but usually cortical scalloping, cortical irregularities and periosteal reaction are present, that are not found in BPOP (5).

Myositis ossificans appears in contrary to BPOP in larger muscles and ossifies from peripheral to central (5).

Pathological analysis

Pathological appearance reflects the radiographic appearance of the BPOP lesion. It can perfectly depict all the components of the lesion: cartilage, fibrocartilaginous tissue, calcification and immature bone.

Florid reactive periostitis, considered as the first stage of "reactive lesions", is composed of spindle cells with minimal osteocartilaginous proliferation. When bone and metaplastic cartilage become a prominent factor, the lesion is considered a BPOP.

The cartilage can be regular or irregularly arranged and can show variable grade of bony mineralization. As the ossification matures and a cartilage cap is formed, the lesion is considered a Turret exostosis (acquired osteochondroma). Typically for BPOP is that the cartilaginous layers are hypercellular and that the chondrocytes are disorganised and show cytologic atypia (enlarged nuclei,...). Histologically, the appearance of these chondrocytes can mimic the histologic appearance of a chondrosarcoma.

The fibroblastic spindle cells can also show atypia.

The bone appears also disorganized and can present spindle shaped fibroblasts in the intertrabecular spaces

Fibroblastic tissue and the chondrocyte atypia is not present in an osteochondroma (4).

Management/therapy?

BPOP has a characteristic radiologic appearance, so differentiation with malignant lesions is not difficult. Biopsy therefore is rarely indicated.

If resection is not immediately considered, a control radiography is suggested after 6 months to evaluate the natural evolution.

Golden standard for the treatment of BPOP is surgical excision. BPOP has a high recurrence rate (20-55%). For decreasing the recurrence rate, wide excision including excision of the underlying peristomal tissue and pathological cortex is advised (4).

Conclusion

BPOP or Nora’s lesion is part of a spectrum of reactive lesions. It is a rare entity with a characteristic radiologic appearance. Especially plain radiograph gives the clue to the diagnosis.

Radiologists should know this entity because correct diagnosis and differentiation with osteochondroma is important for the surgical approach.

References