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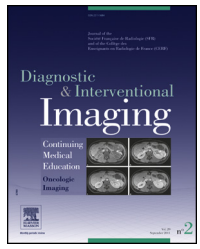

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Tumors and pseudotumors of the hand: The role of imaging

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Abstract The assessment of a swelling or mass of the wrist or the hand is commonly performed by radiologists. Because cysts on the wrist are, by far, the most frequent pathology. Diagnosis is usually based on standard radiography and ultrasound alone. Additional imaging techniques, and in particular MR imaging, are necessary to assess tumors, although malignant tumors of the hand are rare. Some benign cysts have pathognomonic characteristics visible on imaging. By understanding them, treatment planning may be improved.

A swelling in the hand is a frequent reason for radiological examinations. The role of the radiologist is to guide and prioritize the types of imaging techniques and to suggest a course of action, thereby helping the clinician to plan treatment.

The location explains the symptoms and the variety of etiologies [1] :

- the location is superficial: clinical signs appear early due to the deformity caused by the mass and are therefore directly visible upon examination. The superficial location makes the clinical examination easy and enables the radiologist to evaluate the lesion's aggressive behavior and how it may further evolve;
- anatomically, the location is very complex: a hand tumor or pseudotumor may originate from any anatomic structure, whether nervous, vascular, osseous, articular, muscle or joint [2]. The role of radiology, at the diagnosis stage, is first to clarify from which anatomical region the lesion is developing.

Etiologies are varied and therefore there is little literature available for an epidemiological analysis of the lesions [1,3].

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The objective of this article was two-fold: First, we wished to clarify the contribution of various radiological techniques in assessing a swelling in the hand. Second, we wanted to suggest a diagnostic approach.

Imaging techniques

Standard radiography

Standard radiography enables the radiologist to answer the following three questions.

Did the lesion develop from osseous elements?

Standard radiography can help determine whether the lesion is a pseudotumor, such as a hypertrophic bone callus, an anatomic variant or a true tumor originating in the bone. Standard radiograph is essential to characterize an osseous tumor (Fig. 1). It helps identify the epiphysis, metaphysis or diaphysis location of the lesion, as well as whether the lesion is centered. It also detects signs of aggressive behavior, such as cortical rupture or periosteal appositions. And finally, by analyzing the tumor matrix standard radiography also provides information on the nature of the lesion [4].

Is there arthropathy?

Digital arthropathy, whether degenerative, inflammatory or microcrystalline, may cause pseudotumoral deformities in the fingers (Fig. 2). Radiography indicates the etiology based on whether one or several joints are affected, their location, and whether there is erosion or bone production.

Figure 1. Chondroma. Twenty-six-year-old man with swelling of the proximal phalanx of the middle finger on the right hand. (a) Radiograph shows well-circumscribed osteolytic lesion, centered, in the diaphysis, without periosteal appositions. (b) CT image in the sagittal plane shows no signs of aggressiveness and shows calcification centered in the lesion indicating a cartilaginous matrix (arrow). (c), (d) and (e) MR image in the coronal plane shows cartilaginous matrix hypo-intense on T1-weighted image (c), hyper-intense on T2-weighted image (d), with peripheral enhancement pattern of rings and arcs after IV administration of gadolinium chelate (e).