Test yourself answer: multiple firm soft tissue masses

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Diagnosis

Multifocal tumoral calcinosis

Discussion

Whole body bone scintigraphy demonstrates intense increased radionuclide uptake at the left shoulder and left groin, with faint uptake in relation to the right greater trochanter (Fig. 1). The pelvic radiograph shows a focus of amorphous lobular calcification overlying the left obturator foramen and a further deposit in the right trochanteric region, corresponding to the areas of increased uptake on bone scintigraphy (Fig. 2). MRI of the pelvis shows two well-defined lobular masses which demonstrate heterogeneous low signal intensity on T1- and T2-weighted sequences in line with the diffuse calcified nature of the masses seen on the radiograph. One is located anterior to the left pectineus muscle without deeper extension into the pelvic cavity, and the other is found adjacent to the right sub-gluteus medius bursa (Fig. 3). MRI of the left shoulder demonstrates a mass located in the subacromial-subdeltoid bursal region displaying similar signal characteristics (Fig. 4). Regarding all the lesions, there is no adjacent soft tissue or osseous abnormality. A CT-guided biopsy of the left groin mass yielded purely calcific material with no evidence of malignant cells. A diagnosis of multifocal tumoral calcinosis was made.

Tumoral calcinosis involves the accumulation of calcium hydroxyapatite crystals typically in a peri-articular location in the anatomic distribution of a bursa [1, 2]. The calcium

deposition results in a foreign body granulomatous reaction with the formation of soft tissue masses comprised of fluid-filled cystic spaces, oedema and fibrosis [3]. The most classical sites of involvement are the hip, followed by the elbow and shoulder, with unifocal lesions predominating [3]. Smack et al. classified cases into three types: (1) primary normal phosphataemic tumoral calcinosis, (2) primary hyperphosphataemic tumoral calcinosis, and (3) secondary tumoral calcinosis [4]. The primary types typically present within the first two decades of life with no specific gender predilection, although a higher incidence is noted in patients of African ethnicity [2]. The secondary type is commonly seen in patients with chronic renal failure and secondary hyperparathyroidism [3]. Lesions in tumoral calcinosis can have varying imaging appearances. Typically, MRI demonstrates lobulated masses with low signal intensity on all pulse sequences due to the calcium content of lesions [5]. Increased signal intensity on T1W may be seen due to fatty tissue or haemorrhage, while blood-filled cystic spaces may be hyperintense on T2W. Fluid-calcium levels may be present and post-contrast images show enhancement within the cyst walls [3].

Several differential diagnoses can be considered. The soft tissue calcifications related to connective tissue diseases display characteristic diffuse sheet-like deposits in the muscles (calcinosis universalis) and are typically located in the subcutaneous tissues rather than in a peri-bursal location (calcinosis circumscripta), making these conditions distinct from tumoral calcinosis at imaging [6, 7]. Location of the lesion is a useful differentiator—as the names suggest, calcific tendonitis is centred on a tendon and calcific myonecrosis usually follows from a history of trauma and is intramuscular [6]. Synovial chondromatosis is usually distinguishable by demonstrating both ‘rings-and-arcs’ morphology of the calcifications and an intraarticular location [8]. Involvement of bone or calcification only involving a portion of the tumour can make osteosarcoma or synovial sarcoma distinct from tumoral calcinosis at imaging [9]. Myositis ossificans can be radiographically differentiated by a clinical history of trauma, its pattern of mineralisation and lack of lobular morphology and predilection for different anatomical locations [6].

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In our patient, presentation was late in adulthood with multifocal calcified soft tissue lesions, normal serum biochemistry, no active underlying condition and no relevant family history. To the best of our knowledge, a case of primary multifocal tumoral calcinosis in an adult with normal blood results has not been reported previously. The treatment of choice of symptomatic tumoral calcinosis lesions is surgical resection, but there is a risk of recurrence [6]. Phosphate deprivation has also had variable success rates in both normo- and hyperphosphataemic cases [10]. After a period of clinical and radiological follow-up, our patient remained asymptomatic so no surgical intervention was carried out, and a conservative management approach was followed.

The identification of a calcified soft tissue mass on imaging should prompt careful clinical and biochemical correlation given that a number of pathologies can be responsible. The radiologist plays a key role in guiding the clinical team to either performing invasive procedures for histological confirmation in atypical cases or avoiding such unnecessary procedures and instead selecting suitable interval follow-up imaging to reach a definitive diagnosis.

Declarations

Conflict of interest The authors declare no competing interests.

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