Case 1776

Eurorad ••

Brown tumours simulating

neoplasia

Published on 17.12.2002

DOI: 10.1594/EURORAD/CASE.1776 ISSN: 1563-4086 Section: Musculoskeletal system Imaging Technique: MR Imaging Technique: CT Imaging Technique: CT Case Type: Clinical Cases Authors: A. H. Karantanas, A. H. Zibis, T. Karachalios, K. Malizos Patient: 20 years, female

Clinical History:

The patient was admitted with a fracture of the left upper arm after a minor fall. Plain radiography and MRI revealed an expansile benign lytic lesion in the proximal left humerus. One month after conservative treatment, the patient was readmitted because of persistent pain not responding to analgesics. The imaging procedures suggested an aggressive lesion. A bone scintigram showed multiple lesions. The complete biochemical workout revealed increased serum calcium (3.46mmol/l).

Imaging Findings:

The patient was admitted to hospital because of a fracture of the left upper arm after a minor fall. The clinical examination and her medical history were unremarkable. The plain radiograph (Fig. 1a) revealed an expansile lytic lesion in the proximal left humerus. An MRI was requested for further investigation. This revealed on both T1-weighted spin echo (Fig. 1b) and T2-weighted TSE (Fig. 1c) fluid-fluid levels with haemorrhagic components. A benign tumour was diagnosed and conservative treatment was suggested.

One month later, the patient was again admitted to hospital because of persistent pain not responding toanalgesics. A plain radiograph showed an aggressive expansile lytic lesion of the proximal humeral metadiaphysis (Fig. 2) and a pathological fracture. Axial CT showed a lytic lesion involving the cortex and the medulla (Fig. 3). On MRI scan, T2-weighted TSE images with fat-suppression showed increased signal intensity in the humerus and the surrounding soft-tissues (Fig. 4a). T1-weighted spin echo (Fig. 4b) and enhanced T1-weighted spin echo with fat suppression (Fig. 4c) showed that in a one-month period the lesion had changed, exhibiting intense contrast enhancement and soft tissue extension. These appearances were suggestive of an aggressive lesion. A bone scintigram showed multiple lesions at the left proximal humerus, left proximal femur, left tibia and right iliac bone. An axial CT scan of the pelvis showed multiple lytic lesions involving the cortex and the medulla (Fig. 5), with erosion of the outer cortical bone in one of them. The complete biochemical workout revealed increased serum calcium (3.46mmol/l).

Discussion:

The original radiological diagnosis (Fig. 1) was aneurysmal bone cyst (ABC) because the lesion was expansile, well defined and showed fluid-fluid levels with haemorrhage. One month later, the radiological findings (Figs 2-4) suggested an aggressive lesion, probably telangiectatic osteosarcoma associated with ABC. An open biopsy was performed and the complete histological study showed a high grade giant cell tumour (GCT). After the CT scan and the bone scan (Fig. 5), revealed multiple lesions, a diagnosis of multiple GCT was considered and the patient was

scheduled for surgery of the humeral lesion. A review of the original histology in another centre suggested a differential diagnosis of solid ABC and GCT.

The preoperative biochemical analysis showed elevated serum calcium and a subsequent PTH measurement showed 1057 (normal 10-60). A diagnosis of primary hyperparathyroidism was established and the patient underwent surgery. A 5.3g parathyroid ademona was removed. The serum calcium decreased and follow-up radiographs of all lytic lesions showed progressive healing.

The commonest lesion showing fluid-fluid levels with haemorrhage on CT and/or MRI is primary or secondary ABC (1,2). The presence of fluid-fluid levels in an osseous lesion is not pathognomonic of a specific lesion (3). The association of fluid-fluid levels and brown tumours has recently been reported (4). Although not previously reported, it is not unexpected to find fluid-fluid levels in brown tumours since these tumours often contain haemorrhage (4).

Differential Diagnosis List: Brown tumours

Final Diagnosis: Brown tumours

References:

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Fluid-fluid level: a nonspecific finding in tumors of bone and soft tissue. Radiology 1990 Jun;175(3):779-82. (PMID: 2160676)

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MR imaging of brown tumour with fluid-fluid levels: a report of three cases. Eur Radiol 2001;11(8):1445-9. (PMID: 11519556)



Description: An expansile lytic lesion, well demarcated, is obvious in the epiphysis and proximal metadiaphysis of the left humerus. The lesion results in thinning of the cortex and contains thick and irregular septa. **Origin:**



Description: Axial T1-weighted spin echo image shows fluid-fluid levels. **Origin:**



Description: Axial T2-weighted TSE image shows fluid-fluid levels. **Origin:**



Description: An aggressive expansile lytic lesion of the proximal humeral metadiaphysis is shown, along with pathological fracture. **Origin:**



Description: A lytic destructive lesion is shown, involving the medulla and the cortex. Origin:



Description: MR Imaging. Axial T2-weighted TSE image with fat-suppression shows nonhomogenous increased signal intensity of the lesion. The lesion has increased in diameter in comparison with the initial examination. **Origin:**



Description: MR imaging. Axial T1-weighted SE image demonstrated that in a one-month period the lesion had become more aggressive with progression of invasion of the cortex. **Origin:**



Description: Axial contrast-enhanced T1-weighted SE with fat suppression shows intense contrast enhancement and soft tissue extension. **Origin:**



Description: CT. Axial CT scan of the pelvis shows multiple lytic lesions involving the cortex and the medulla, with destruction of the outer cortical bone in one of them. **Origin:**