

Osteolytic lesion in tibial diaphysis in a child (ECR 2016 Case of the Day)

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Section: Paediatric radiology

Area of Interest: Bones

Procedure: Education

Procedure: Biopsy

Imaging Technique: Conventional radiography

Imaging Technique: MR

Imaging Technique: Percutaneous

Imaging Technique: Experimental

Special Focus: Inflammation Infection Case Type:

Clinical Cases

Authors: Gian Michele Magnano, Maria Beatrice
Damasio

Patient: 5 years, male

Clinical History:

A 5-year-old boy came to the emergency department for knee pain and functional impairment of the lower limb of recent onset. At first, because of frequent reflected symptoms originating from the hip, both an ultrasonography and radiography of the right hip joint were performed with negative results.

Imaging Findings:

The AP radiograph of the femur showed an osteolytic lesion associated with periosteal fusiform reaction in the diaphysis (Fig. 1a). Therefore, we decided to carry out both an MRI study of the right femur and a whole-body MRI study (STIR and T1W images) to exclude a multifocal skeletal involvement. The MR examination of the femoral region (Fig. 1b, 1c) showed that the focal lesion in the right femoral diaphyseal had a marked contrast enhancement (CE), associated with an extensive CE within the cancellous bone and adjacent soft tissue (Fig. 1c); MR confirmed also a marked fusiform homogeneous periosteal reaction.

Discussion:

EG is part of a family of diseases (also nominated Langerhans cell histiocytosis (LCH) or histiocytosis X) with aetiology and pathophysiology still undefined, whose common denominator is the Langerhans cell (cell of mononuclear bone marrow-derived dendritic type with peculiar ultrastructural and immunohistochemical features.) [1]

The term eosinophilic granuloma refers to a monostatic benign LCH, and is rather considered a disorder of immunoregulation than a neoplastic process. [2]

From the radiological point of view the lesion at the level of the shaft of long bones is presented as destructive osteolytic lesion with margins more or less defined, with associated periosteal reaction of lamellar type. These features can mimic those of a malignant tumour, such as Ewing's sarcoma and lymphoma [2]. The radiological appearance of the lesion can be time-varying depending on the developmental stage with a prevalence of sclerosis

and periosteal reaction in later stages. Even the appearance of the lesion on MRI, which usually involves an extensive alteration of signal with contrast enhancement of the cancellous bone and adjacent soft tissues, can simulate that of an aggressive lesion such as Ewing's sarcoma and osteomyelitis [1].

Differential Diagnosis List: Eosinophilic granuloma (EG), Lymphoma, Ewing sarcoma, Osteomyelitis

Final Diagnosis: Eosinophilic granuloma (EG).

References:

Greenspan A (2007) Greenspan A: Differential diagnosis in orthopaedic oncology. Second edition. Lippincott Williams & Wilkins

Mirra JM, Gold RH (1989) Eosinophilic Granuloma. In Mirra JM, Gold RH, PiccP eds. Bone tumors: clinical radiologic and pathologic correlations. Philadelphia: Lea & Febiger

Figure 1

a



Description: Anteroposterior radiograph of the right femur: osteolytic area without sclerotic margin in the cancellous bone, with "scalloping" of endosteal profile. Fusiform continuous periosteal reaction is present. **Origin:** G.M. Magnano, M.B. Damasio Department of Paediatric Radiology, G. Gaslini Children's Research Hospital; Genoa/IT

b



Description: MRI. T1-weighted TSE sequence coronal image of the right femur. Presence of a hypointense lesion associated with diaphyseal periosteal thickening with an extensive alteration of the signal of adjacent cancellous bone. **Origin:** G.M. Magnano, M.B. Damasio Department of Paediatric Radiology, G. Gaslini Children's Research Hospital; Genoa/IT

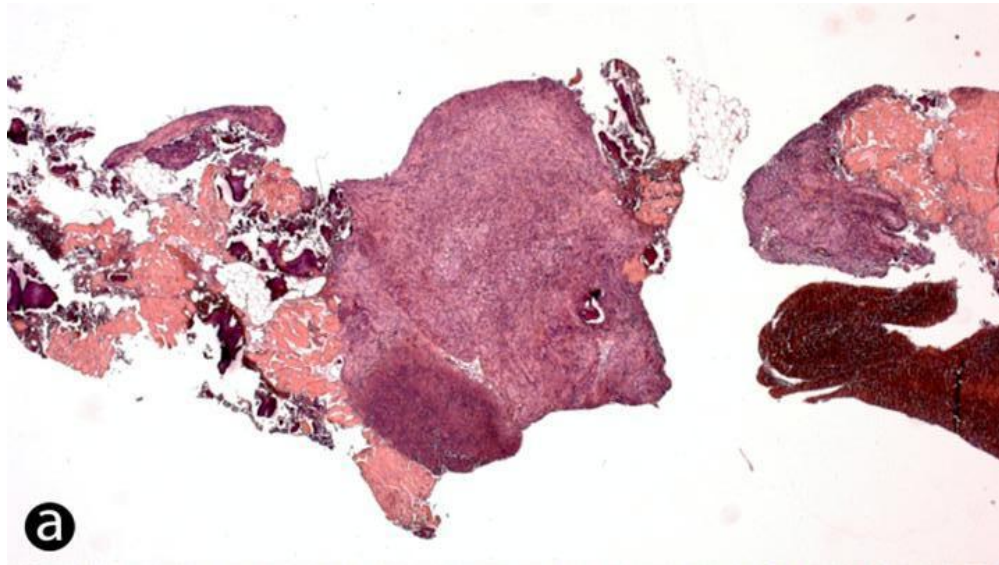
c



Description: MRI. 3D contrast-enhanced GRE sequence with fat saturation. Coronal image of the right femur. The femoral diaphyseal lesion, periosteal reaction, and adjacent soft tissues present strong contrast enhancement. **Origin:** G.M. Magnano, M.B. Damasio Department of Paediatric Radiology, G. Gaslini Children's Research Hospital; Genoa/IT

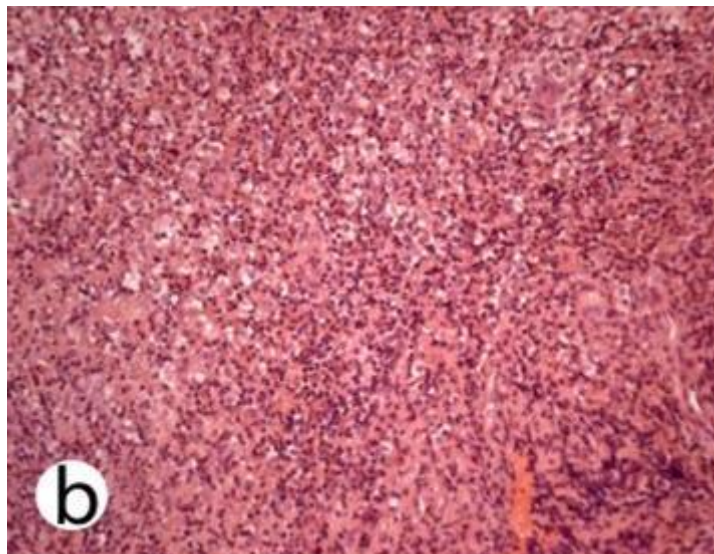
Figure 2

a



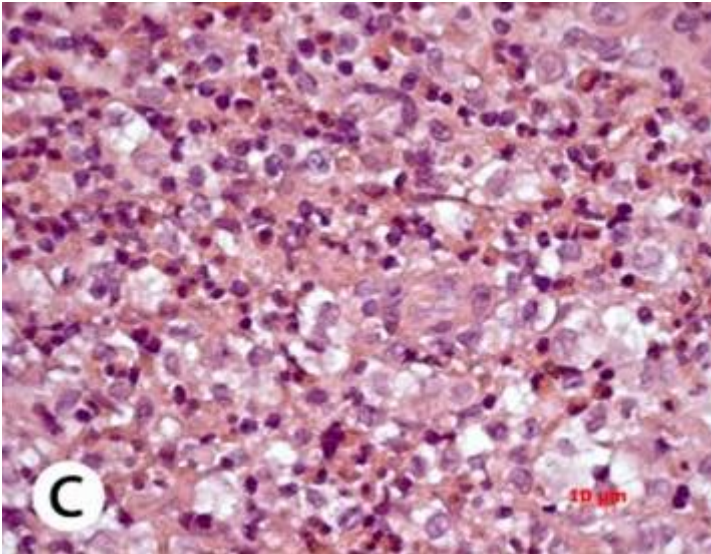
Description: Histological sections of bone biopsy with replacement by an infiltrative process. **Origin:** G.M. Magnano, M.B. Damasio Department of Paediatric Radiology, G. Gaslini Children's Research Hospital; Genoa/IT

b



Description: Proliferation of polymorphic histiocytic elements commingled with variable number of eosinophils, neutrophils, lymphocytes and plasma cells; few scattered giant multinucleated cells. **Origin:** G.M. Magnano, M.B. Damasio Department of Paediatric Radiology, G. Gaslini Children's Research Hospital; Genoa/IT

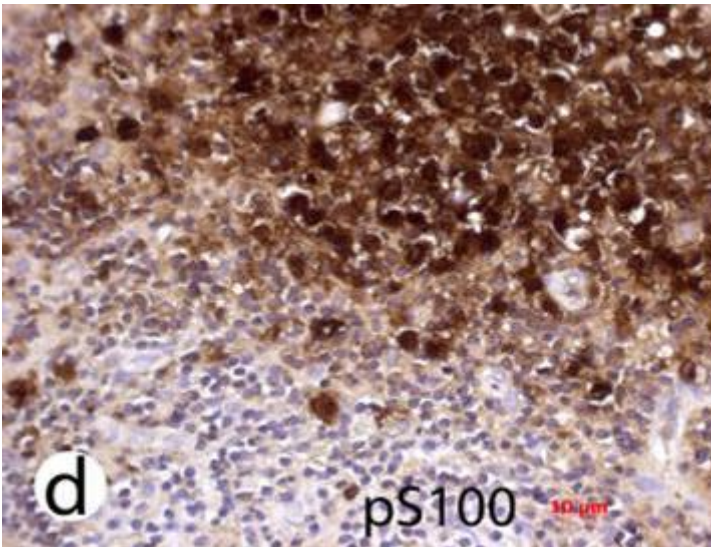
c



Description: Proliferation of the histiocytic elements, note the rich component of eosinophilic granulocytes. The histiocytes have indented or lobulated nuclei with large eosinophilic cytoplasm.

Origin: G.M. Magnano, M.B. Damasio Department of Paediatric Radiology, G. Gaslini Children's Research Hospital; Genoa/IT

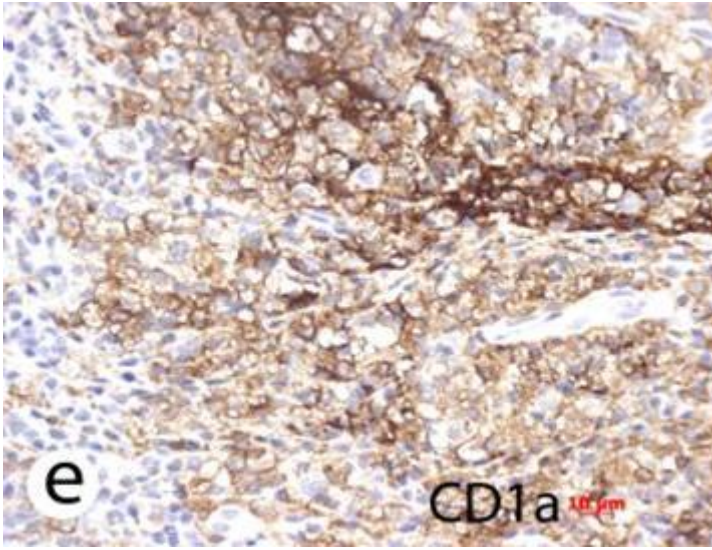
d



Description: IH PS100 40x: histiocytic elements have strong cytoplasmic positivity for S100 protein.

Origin: G.M. Magnano, M.B. Damasio Department of Paediatric Radiology, G. Gaslini Children's Research Hospital; Genoa/IT

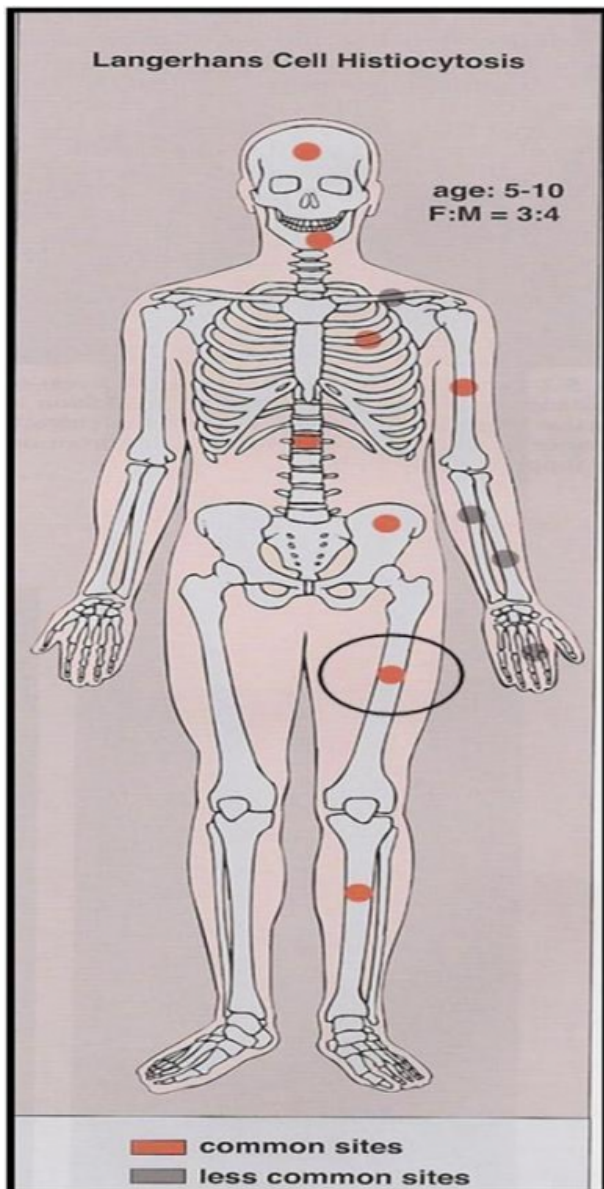
e



Description: IHCD1a 40 x: histiocytic elements have strong cytoplasmic positivity for the cluster of differentiation CD1a. **Origin:** G.M. Magnano, M.B. Damasio Department of Paediatric Radiology, G. Gaslini Children's Research Hospital; Genoa/IT

Figure 3

a



Description: Langerhans cell histiocytosis: skeletal sites commonly involved, age and incidence ratio F:M. The femoral region has been circled, showing the object of our case [1]. **Origin:** Greenspan A, G Jundt, Remagen W: Differential diagnosis in orthopedic oncology. Lippincott Williams & Wilkins