SAS Journal of Medicine
Abbreviated Key Title: SAS J Med
ISSN 2454-5112
Journal homepage: https://saspublishers.com

OPEN ACCESS

Surgery

Langerhans Histiocytosis of Bone: About a Case

Gomes, P[1*], Nidal, A. M[1], Benyass, Y[1], Boukhriss, J[1], Benchebba, D[1], Bouchaib, C[1], Boussouga, M[1]

[1]Surgery Department B of the Children's Hospital-Rabat, Morocco

DOI: 10.36347/sasjm.2024.v10i07.023 | **Received:** 08.06.2024 | **Accepted:** 20.07.2024 | **Published:** 30.07.2024

***Corresponding author:** Gomes, P
Surgery Department B of the Children's Hospital-Rabat, Morocco

Abstract **Case Report**

Langerhans histiocytosis is a non- malignant proliferative disease that involves Langerhans dendritic cells. It is an orphan disease mainly affecting children and young adults. Its etiology still remains unknown, its clinical aspect quite broad. We report a case of multifocal pauci sign involvement in a 5-year-old child having affected the humerus, femur and left frontal bone. The diagnosis was confirmed by histological examination. The evolution was favorable after surgical treatment associated with polychemotherapy. Based on this observation, we will review the literature to focus on the clinical, histological, radiological, therapeutic and progressive aspects of this orphan disease.

Keywords: Histiocytosis, granuloma, eosinophil, Langerhans disease.

Copyright © 2024 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution **4.0 International License (CC BY-NC 4.0)** which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Langerhans histiocytosis (HL) is a group of conditions having in common tissue infiltration by Langerhans cells or dendritic cells originating from the reticuloendothelial system and organized into granulomas. It is a systemic disease of children and young adults, with a peak frequency between one and four years and a male predominance [1]. Its clinical spectrum is very diverse, ranging from simple eosinophilic granuloma to severe multivesical form with organ dysfunction. It is characterized by granulomatous infiltrative lesions, comprising CD1a histiocytes carrying S-100 proteins in immunohistochemistry [2].

The main locations of the disease are the bone, skin, lymph nodes, bone marrow, lungs, hypothalamic-pituitary axis, spleen and liver. They present in several clinical forms: isolated bone granuloma, Hand-Schuller-Christian syndrome, Letterer-Siwe syndrome and Hashimoto- Pritzker disease [3]. The prognosis of the disease depends on the age of the patient, the extent of the disease and the existence of signs of organ dysfunction [4].

The bone is the organ most frequently affected by this condition. The craniofacial location represents 30 to 50% of cases and involvement of the peripheral skeleton is rare, classically located in the long bones (femur, humerus). The definitive diagnosis is histological and is based on the demonstration of CD1a antigens on the surface of pathological cells and intracytoplasmic Birbech granules by electron microscopy. Treatment varies depending on the location and severity of the damage.

The aim of this work is to illustrate the interest of surgical treatment associated with polychemotherapy in the management of multifocal bone HL regarding an observation and to recall, through a review of the literature, the characteristics of this pathology and the different treatments in the treatment process.

OBSERVATION

This is a male child, aged five, who has been presenting for eight months before his first consultation with a palpable mass at the level of the lower 1/3 of the right arm, painful on palpation, closed and adherent on the deep plane, without local signs, presence of axillary lymphadenopathy.

The expansion report includes:

Antier skeleton: x-ray of the right arm showed a ringed lytic image, peripheral sclerosis and unillamilar periosteal reaction at the lower 1/3 level of the right humerus (Figure 1). The x-ray of the pelvis shows a circled lacunar image at the level of the left femoral neck (Figure 2). The X-ray of the skull and face revealed a benign-looking lacunar image at the forehead (Figure 3). Chest x-ray shows no evolving focus (Figure 4).

Unilamillary periosteal reaction with respect to the soft tissue, absence of fracture line, appearance to be compared with MRI data (Figure 5).

MRI of the right arm is in favor of an intraductal diaphyseal lesion process of the middle 1/3 and lower 1/3 of the humerus accompanied by a rupture of the antero - external cortex and a continuous unilamillary periosteal reaction, measuring 122mm tall x 16mm x 20mm. There remains 8mm of growth cartilage and 24mm of articular cartilage. Presence of edematous infiltration of adjacent soft tissues, particularly the triceps brachii. This infiltration comes into contact with the radial nerve. Presence of axillary adenomegaly, the largest of which measures 13.9mm x 4.5mm (Figure 6).

Bone scintigraphy: which showed a focus of intense hyperuptake next to the lower 1/3 of the right humerus (Figure 7).

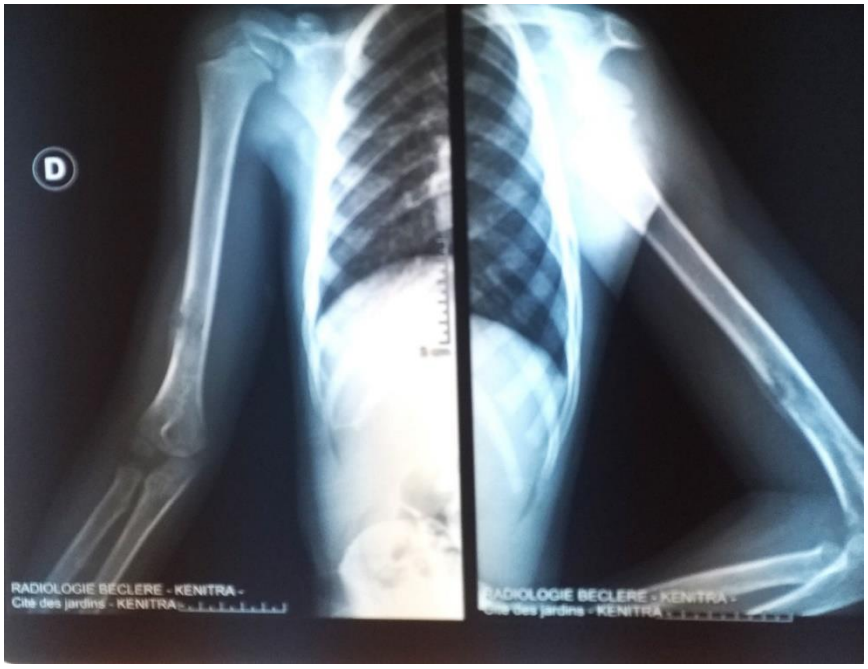

Figure 1: The benign-looking lytic image at the lower 1/3 of the right humerus

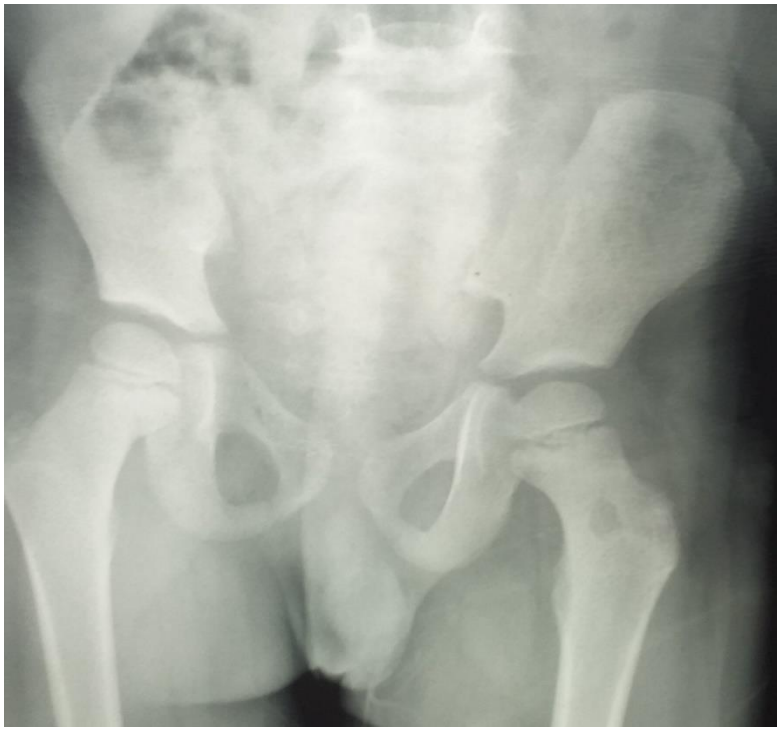

Figure 2: The lacunar punch image at the level of the left femoral neck

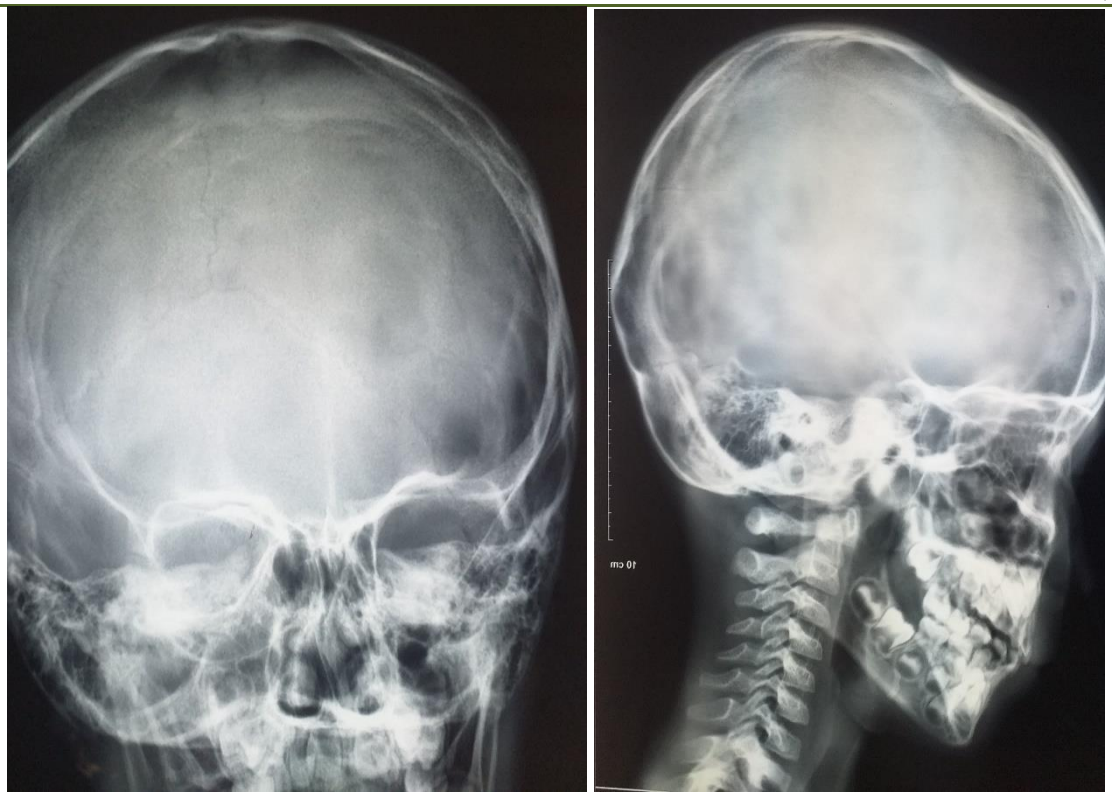

Figure 3: The circled lacunar image at the level of the left supra-orbital region

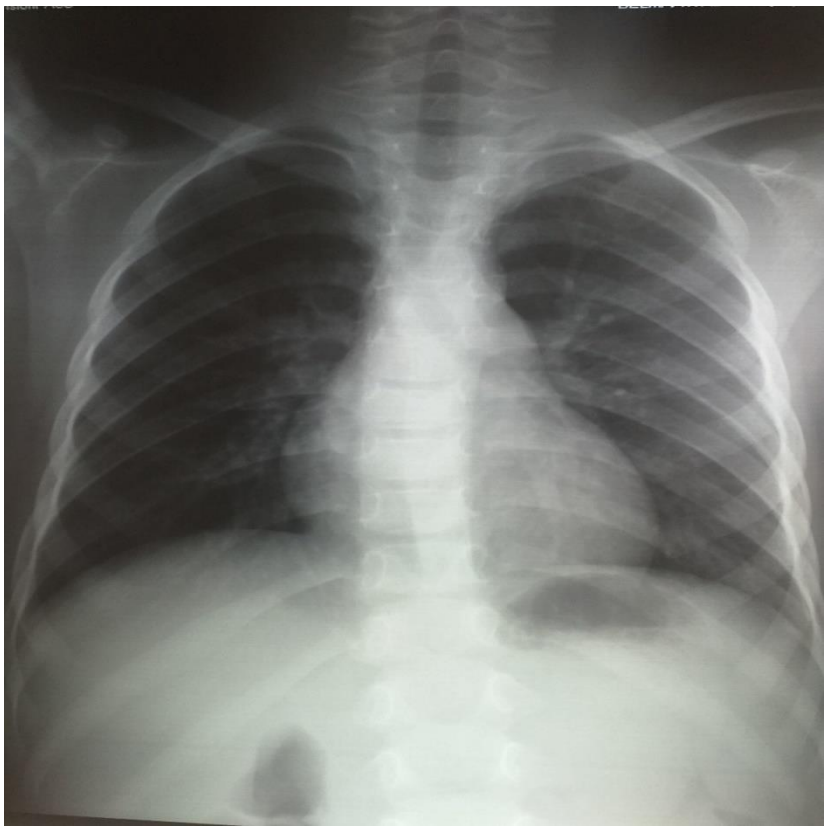

Figure 4: Chest x-ray, no active focus

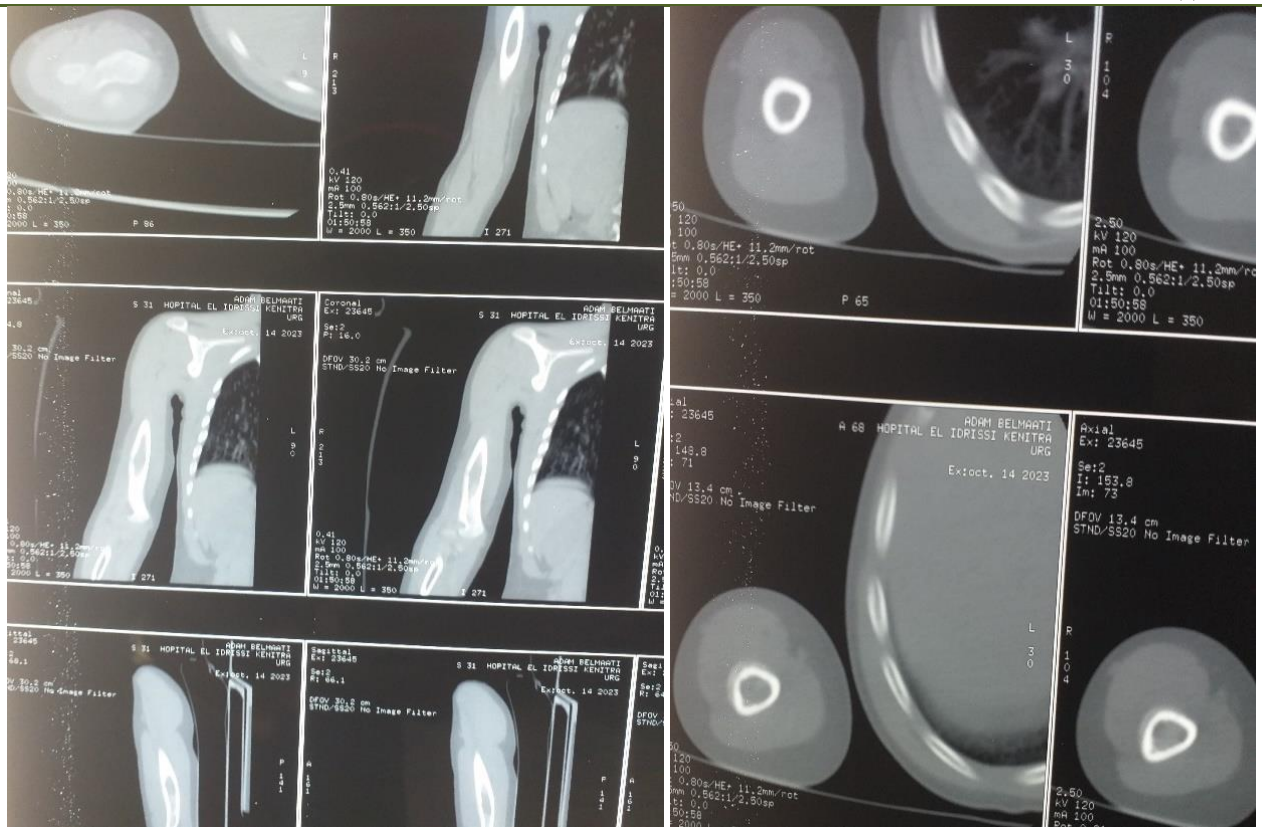

Figure 5: CT of the arm showed a mid-external diaphyseal cortical defect with unilamillary periosteal reaction

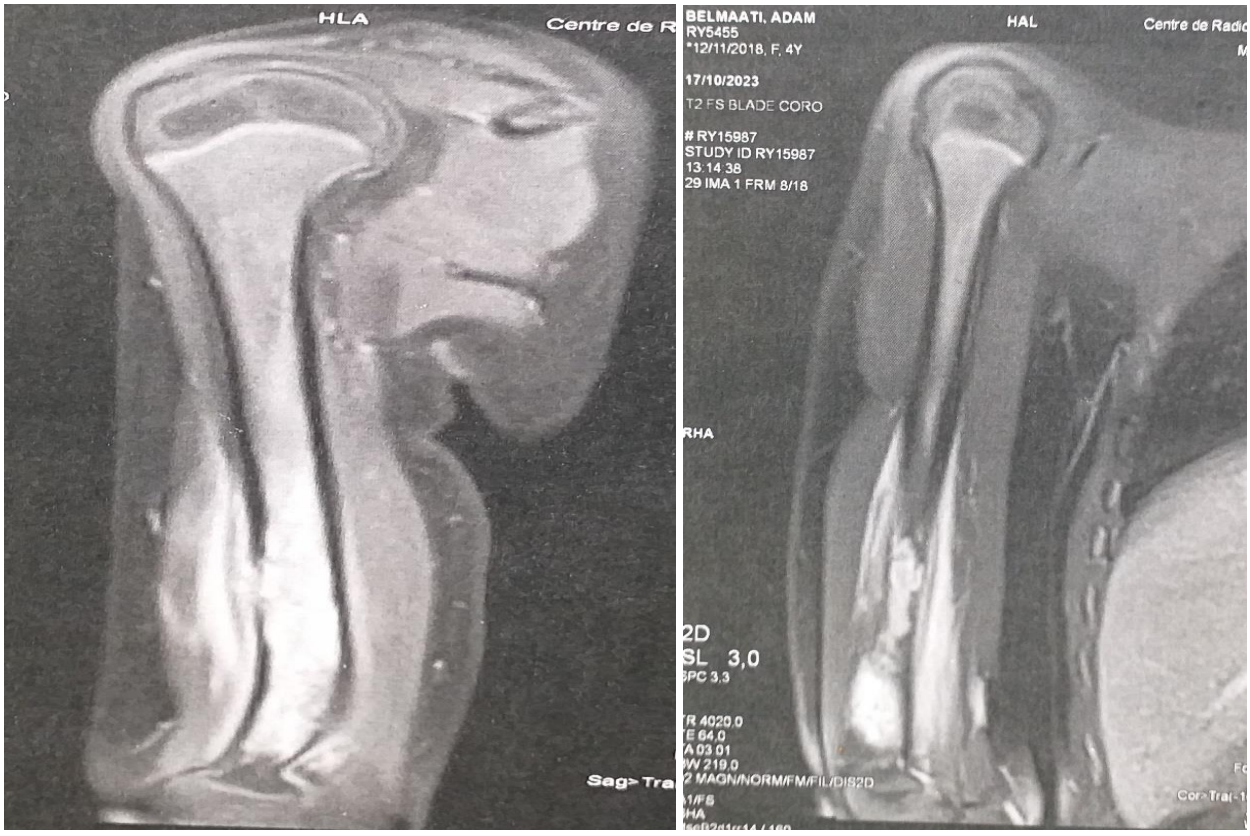

Figure 6: MRI image of peripheral intraductal diaphyseal lesion of the middle and lower 1/3 junction of the right humerus accompanied by a rupture of the antero -external cortex and a continued unilamillary periosteal reaction

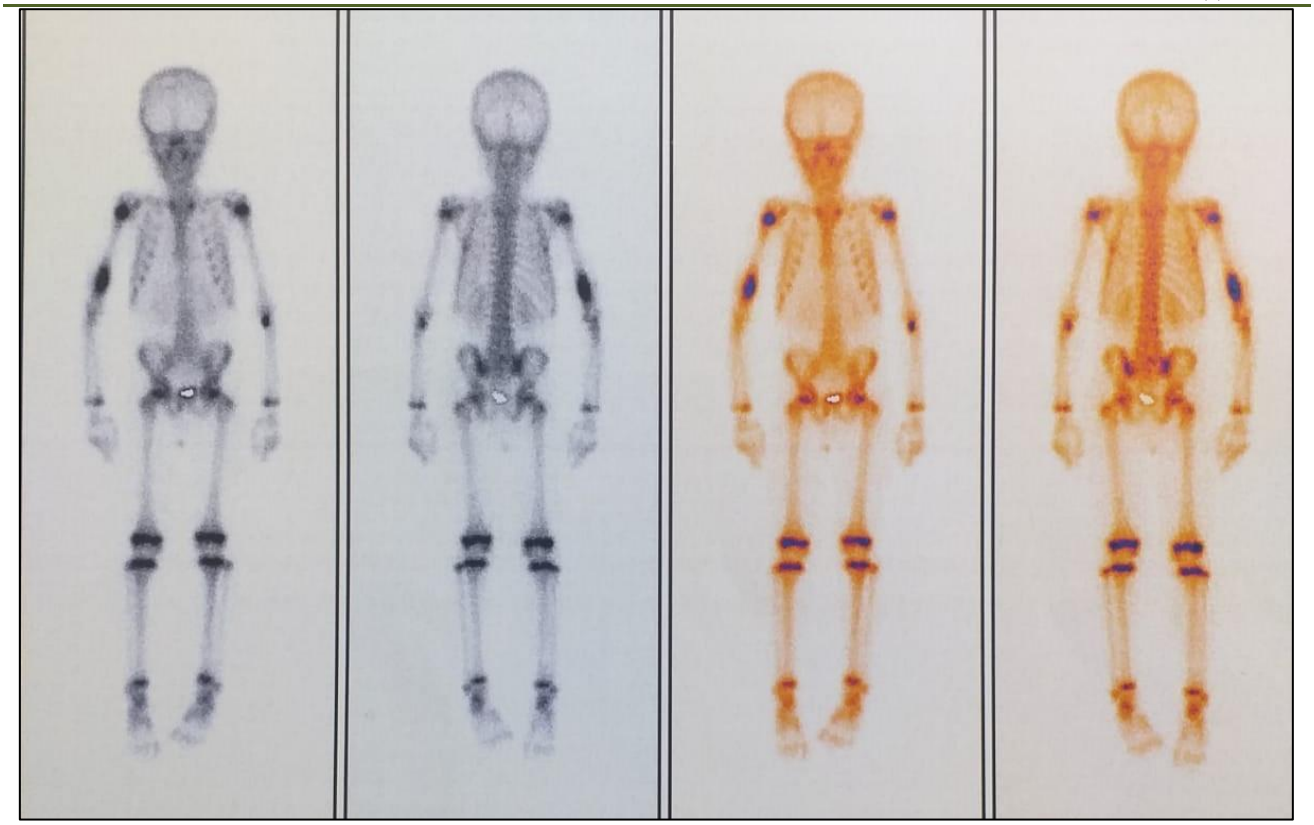

Figure 7: SC showed a focus of intense hyperfixation next to the lower 1/3 of the right humerus

Abdominal ultrasound: unremarkable
Biology report:

Hb = 11.2
GB= 6400
Na+= 139
K+= 4.1
Cl= 108
Urea= 0.11
Create = 4.6
Pt= 72
TP= 83%
INR= 1.09

Histological confirmation for biopsy which finds Langerhans cells organized into granulomas. The patient benefited from surgical treatment by curettage associated with polychemotherapies initiated according to the LCH-III protocol based on prednisolone 40 mg /m²/s in 2 doses; vincristine 6mg/m²/s; PSL 4.5 mg/s IV and symptomatic treatment with analgesics and anti-inflammatories. The evolution was favorable with a reduction in the volume of the humeral granuloma and gradual disappearance of pain and good healing of the lesion sites.

DISCUSSION

In 1950, Lichtenstein grouped three different clinical entities under the term histiocytosis: eosinophilic granuloma, Hand-Schuller-Christian syndrome and Letterer-Siwe disease [3]. It was in 1987 that the Histiocyte Society Writing Group replaced the term Langerhans histiocytosis with histiocytosis X [4].

Eosinophilic granuloma is the most common form of HL (50%). It mainly affects the bone in 82% of cases. It can be single (90%) or multiple (10%), with simultaneous or successive attacks [5, 6].

While the unifocal form can occur at any age, giving rise to isolated bone lesions, the multifocal form is particularly common in children and young adults.

The craniofacial location is the most common (30-50% depending on the series), followed by locations in the spine and long bones (10% for each). There is involvement of the pelvis (especially the iliac bone) and the ribs, each in 8% of cases [6].

The observation that we report is that of an eosinophilic granuloma of the lower 1/3 of the right arm, the cranial vault and neck of the left femur.

Wilman *et al*., showed that HL is the consequence of clonal proliferation of Langerhans cells which may be secondary to the somatic mutation of a gene [7]. The clonal nature of this disease is not synonymous with malignancy. However, some authors have reported the association of HL with various malignant processes (lymphoma, leukemia, breast cancer), without providing formal proof of a link between these two entities [8]. Furthermore, if such a

link existed, it could be explained by a carcinogenesis effect induced by certain HL treatments.

HL involves the proliferation of cells related to mononuclear phagocytes whose main role is phagocytosis and/or antigen presentation. These cells are identified by the expression of the S100 protein and the CD1a antigen on their surface and by the presence of intracytoplasmic "Birberks granules" or "X bodies" giving, in electron microscopy, a classic tennis racket appearance or slide [4, 5].

Eosinophilic granuloma of bone remains asymptomatic for a long time. When it becomes symptomatic, it mainly manifests itself as bone pain, sometimes as bone deformities, pathological fractures or neurological signs related to spinal cord or radicular compression [6]. Imaging of the bone lesion typically presents in the form of a rounded gap, of variable size, without peripheral condensation [5, 6]. Spine lesions usually occur at the level of the vertebral body and spare the intervertebral disc. They can be single or multiple, extending to adjacent or distant vertebrae. At the mandibular level, damage to the basilar bone manifests itself in most cases in the form of a well-defined, circular or oval gap, without reactive bone condensation. At the level of the alveolar bone, we find rather gaps destroying the intra-alveolar septa, thus creating basket images. The teeth appear to be suspended in space, we then speak of floating teeth. Cranial lesions produce images of rounded or polycyclic osteolysis, with clear boundaries, often devoid of peripheral borders. Whole-skeletal radiographs are the primary investigation for bone involvement. Tc99 bone scintigraphy is less sensitive but sometimes complementary to standard images. Computed tomography is useful for topographical diagnosis, monitoring progression and monitoring response to treatment. MRI is even more.

Efficient for the visualization of lesions and their extension to bone and neighboring tissues. Solitary or multiple bone granuloma, without visceral involvement, like the case of our patient, remains a benign condition, most often self-limiting [5]. Poor prognostic factors are:

- Young age at the time of initial diagnosis, less than 2 years;
- The high number of locations;
- The speed of progression of the lesion
- Damage to the lungs, liver, spleen and bone marrow;
- Poor response to initial treatment.

The treatment is still poorly codified. In the case of simple bone granuloma or few bone lesions, as is the case of our patient, the majority of authors recommend a simple analgesic treatment with indomethacin, the installation of a corset or a neck brace in a analgesic purpose. A non-aggressive surgical treatment can be considered, it consists of curettage with possible osteosynthesis at the level of the epiphyses of the vertebrae or the metaphyses of the long bones, in order to reduce the risk of fracture. Neurological complications by extension to the spinal cord and nerve roots can be prevented by infiltration of corticosteroids into the lesions with anti-inflammatory purposes [3, 5, 6]. In the event of multifocal bone damage with numerous locations, treatment involves chemotherapy (vinblastine, etoposide, vincristine, cyclophosphamide, etc.) alone or combined with corticosteroid therapy as is the case in our patient.

Radiography should in principle be avoided due to the risks of secondary complications; a new therapeutic strategy is currently being studied, using anti-CD1a monoclonal antibodies. Our case benefited from surgical treatment by curettage associated with polychemotherapies initiated according to the LCH-III protocol based on prednisolone 40 mg /m²/s in 2 doses; vincristine 6mg/m²/s; PSL 4.5 mg/s IV and symptomatic treatment with analgesics and anti-inflammatories. The evolution was favorable with reduction in volume of humeral granuloma and gradual disappearance of pain and good healing of lesion sites.

CONCLUSION

Langerhans histiocytosis is a rare entity with variable clinical presentation. Eosinophilic granuloma is the most common form. It mainly affects the bone, in this case the extremity and craniofacial bones.

Only histology can confirm the diagnosis. Single or multifocal bone involvement often has a good prognosis. The treatment is controversial. However, for bone lesions, single or few in number, many authors opt either for therapeutic abstention, or for non-aggressive surgery (curettage), and possibly a local injection of corticosteroid or anti-inflammatory treatment in cases of pain.

REFERENCES

1. Nguyen, K., & Tazi, A. (2006). Histiocytose langerhansienne de l'adulte. *Rev Prat*, *56*, 1863-1871.
2. Favara, B. E., Feller, A. C., Pauli, M., Jaffe, E. S., Weiss, L. M., Arico, M., ... & Pritchard, J. (1997). Contemporary classification of histiocytic disorders. *Medical and Pediatric Oncology: The Official Journal of SIOP—International Society of Pediatric Oncology (Societé Internationale d'Oncologie Pédiatrique*, *29*(3), 157-166.
3. Lichtenstein, L., & Jeffe, H. L. (1940). Eosinophilic granuloma of bone: with report of a case. *The American Journal of Pathology*, *16*(5), 595-604.
4. Chu, T., d'Angio, G. J., Favara, B., Ladisch, S., Nesbit, M., & Pritchard, J. (1987). Writing Group of the Histiocyte Society. Histiocytosis syndromes in children. *Lancet*, *1*(8526), 208-209.

5. Feugier, P., Guerci, A., Nafissi, S., & Lederlin, P. (1996). Uni-and multifocal eosinophilic granulomas in adults. Diagnostic and therapeutic approaches. Apropos of 3 cases. *La Revue de Medecine Interne*, *17*(11), 924-928.
6. Ghanem, I., Checrallah, A., Kharrat, K., & Dagher, F. (2001). Langerhans cell histiocytosis. Locomotor device. Encycl Med Chir. Elsevier SAS, Paris, 14-776, 1-14.
7. Willman, C. L., Busque, L., Griffith, B. B., Favara, B. E., McClain, K. L., Duncan, M. H., & Gilliland, D. G. (1994). Langerhans'-cell histiocytosis (histiocytosis X)--a clonal proliferative disease. *New England Journal of Medicine*, *331*(3), 154-160.
8. Egeler, R. M., Neglia, J. P., Puccetti, D. M., Brennan, C. A., & Nesbit, M. E. (1993). Association of Langerhans cell histiocytosis with malignant neoplasms. *Cancer*, *71*(3), 865-873.
9. Lallement, B., Fayoux, P., Nelken, B., Leroy, X., & Vaneecloo, F. M. (2003). From diagnosis to management of ENT locations of Langerhans histiocytosis in children. *Ann Otolaryngol chir Cervicofac*, *120*(1), 30-39.