

Eosinophilic Granuloma in Shaft of Tibia: A Rare Entity

Vivek Sharma¹, Ravinder Singh¹, Ashwani Ummat¹, Amit Mittal², Mahesh Gupta³

¹ Assistant Professor, Department of Orthopaedics, M.M. Institute of Medical Sciences and Research, Haryana, India.

² Associate Professor, Department of Radiodiagnosis, M.M. Institute of Medical Sciences and Research, Haryana, India.

³ Assistant Professor, Department of Surgery, M.M. Institute of Medical Sciences and Research, Haryana, India.

ABSTRACT

BACKGROUND- Eosinophilic granuloma is a rare tumor of flat bones usually presenting in children. The clinical manifestations as well as radiological features of eosinophilic granuloma are highly variable and are often a diagnostic dilemma. We present here a case of eosinophilic granuloma localized to the tibial shaft, which was managed successfully by excision and curettage without bone grafting.

CASE REPORT- An eight-year-old girl presented with swelling and pain in the left tibia. On tibial X-ray, a well demarcated 5 to 6 centimeter oval radiolucency within the shaft of upper third of left tibia with sclerosis of medial cortex was seen. Magnetic Resonance Imaging (MRI) showed a 6

centimeter hypointense lesion in the medulla of the medial aspect of tibial shaft on T1W sequence. This lesion was hyperintense on T2 and STIR sequences with surrounding bone marrow edema and mild cortical thinning. In addition, there was no soft tissue involvement outside the bone. Patient was taken to the operation theatre for excision and biopsy. Histopathological examination was consistent with eosinophilic granuloma. Postoperatively, wound and bony defect healed completely, both radiologically and clinically.

CONCLUSION- Eosinophilic granuloma is usually diagnosed on histopathology, and open biopsy along with curettage is the preferred form of treatment. However, recurrence can occur even after treatment.

Keywords: Eosinophilic Granuloma; Langerhans cell histiocytosis; Tibia

INTRODUCTION

Eosinophilic granuloma (EG) is a form of Langerhans cell histiocytosis (LCH), a rare disease involving clonal proliferation of Langerhans cells derived from bone marrow and capable of spreading from skin to lymph nodes. These tumours form less than 1% of bone tumors [1]. It usually presents during the first ten years of life. Histopathologically, it is the mildest form of LCH and may appear as solitary or multiple lesions. It commonly involves flat bones of skull, pelvis or vertebral body and has a variable clinical course [2]. EG involving only the shaft of tibia is rare [3] and we are presenting one such solitary lesion that was managed successfully by excision and curettage without requiring bone grafting.

CASE REPORT

An eight-year-old girl presented with complaints of pain and swelling over the upper shin of her left leg for six weeks. The swelling had grown slowly. The pain was mild with occasional

exacerbation during night. She was seen at another healthcare facility and was diagnosed with osteomyelitis. She was treated with injectable and oral antibiotics for six weeks. Due to poor response to therapy, she presented to our hospital. On examination, there was diffuse swelling over the subcutaneous surface of the left tibia at the junction of middle and upper one-third. It was tender and warm to touch. There was no erythema. On tibial X-ray, a well demarcated 5 to 6 centimeter oval radiolucency within the shaft of upper third of left tibia with sclerosis of medial cortex was seen. MRI showed a 6 centimeter hypointense lesion in the medulla of medial aspect of the tibial shaft on T1W sequence. This lesion was hyperintense on T2 and STIR sequences with surrounding bone marrow edema and mild cortical thinning [Figure 1]. In addition, there was no soft tissue involvement outside the bone and no additional lesions were noted. Although clinical findings suggested a diagnosis of subacute osteomyelitis, radiological findings did not favor such diagnosis. We decided to take the patient to the operation theatre for excision and biopsy of the

Conflict of Interest:
None Declared

This article has been peer reviewed.

Article Submitted on: 5th
April 2012

Article Accepted on: 9th
July 2012

Funding sources: None
declared

Correspondence to:
Dr Vivek Sharma

Address: Department of
Orthopaedics, M.M.
Institute of Medical
Sciences and Research,
Mullana, Distt -Ambala,
Haryana, India

E-mail Address:
sharmavivek1979@yahoo.com

Cite this Article: Sharma
V, Singh R, Ummat A,
Mittal A, Gupta M.
Eosinophilic granuloma in
shaft of tibia: a rare
entity. *J Pak Med Stud.*
2012;2 (4): 140-143

Figure 1: MRI showing hypointense lesion in the medulla of the shaft of tibia with surrounding bone marrow edema and mild cortical thinning



lesion. Intraoperatively, a cavity filled with reddish soft cellular tissue was noted. Wide decortication was performed and the lesion was curetted meticulously. Histopathological examination of the curetted material revealed proliferation of Langerhans cells mixed with eosinophils, compatible with LCH. Culture of the specimen was sterile. Postoperative recovery was uneventful and the patient was allowed to bear partial weight after six weeks and full weight after twelve weeks. She is doing well at one year follow-up with evidence of complete healing on X-rays [Figure 2].

DISCUSSION

EG is a rare bone tumor, representing less than 1% of all bone tumors. In 90% of the reported

Figure 2: X-ray of tibia and fibula suggestive of complete healed lesion after one year



cases, it afflicts children under the age of 10. There is a predilection for males (2:1) [4]. Any bone of the body can be involved. The skull, long bones of upper extremities and the flat bones are affected in descending order of frequency [3]. It has a highly variable course with partial or complete healing of the lesion, recurrence after treatment, or progression or spontaneous remission without treatment [5-7].

The aetiology of EG remains unknown but recently there has been some progress. The prevailing hypothesis suggests that this may be an inflammatory process, an autoimmune disorder or an out of control proliferation of the Langerhans cells [8]. Efforts to define a viral cause have not been successful [9, 10]. One study has shown that 1% of the patients have a positive family history of LCH [11]. It is now known that the pathognomonic cell, the Langerhans cell, excretes IL-1 and PG-E2 to damage the

surrounding tissues.

EG can be asymptomatic or can present as local swelling, pain or tenderness. Depending on the location of the tumor, it may cause neurological symptoms such as numbness, limping, fracture, loosening of teeth, otitis media [12] or exophthalmos. If the tumour is involving the skull, then hematoma after a mild injury is a common presenting symptom [13]. No fever or other signs of inflammation have been reported. The blood tests show an elevation of leucocytes and eosinophils in approximately 7% of the cases [14]. Erythrocyte sedimentation rate is above the normal range. The tumor's material is sterile but there have been reports of the presence of staphylococcus and streptococcus [7].

Histopathologically, EG is characterized by clonal proliferation of Langerhans type histiocytes, which are diagnostic [15, 16]. These contain Birbeck granules whose role is yet unknown. Eosinophils, lymphocytes, fibroblasts and foam cells may be also found but none of them are pathognomonic. Morphologically the key feature is the identification of Langerhans cells with characteristic grooved, folded, indented nuclei in the appropriate milieu that includes variable numbers of eosinophils and histiocytes including multinucleated forms, often appearing similar to osteoclasts or touton like giant cells, neutrophils and small lymphocytes [3, 17].

Immunologically, the Langerhans cell is a primary presenter of antigen to naïve T-lymphocytes. However, in LCH, the Langerhans cell does not efficiently stimulate primary T-lymphocyte responses [18]. Antibody staining for the dendritic cell (DC) markers, CD80, CD86, and class II antigens has been used to show that in LCH, the abnormal cells are immature DCs that present antigen poorly and are proliferating at a low rate [18-20]. Transforming growth factor-beta (TGF-beta) as well as interleukin (IL)-10 are possibly responsible for preventing Langerhans cell maturation into LCH [19]. The expansion of regulatory T cells in LCH patients has been reported [20]. The population of CD4-positive CD25 (high) FoxP3 (high) cells was reported to comprise 20% of T cells and appeared to be in contact with Langerhans cells in the lesions. These T cells were present in higher numbers in the peripheral blood of LCH patients than in controls and returned to a normal level when patients were in remission [20]. The only reliable immunological marker is OKT6 while the common S-100 protein is usually positive too [21]. Specific associations of LCH with distinct HLA types and extent of disease have been

reported. In a study of 84 Nordic patients, those with only skin or bone involvement, HLA-DRB1*03 type was more common than those with multisystem disease [22]. In 29 patients and 37 family members in the United States, the Cw7 and DR4 types were significantly more prevalent in Caucasians with single-bone lesions [23].

Radiological investigations include X-ray of the bone, color Doppler, CT scan and MRI. Radiological depiction of eosinophilic granuloma is necessary as to determine the activity and nature of the tumor. Plain radiograph depicts its size and borders. The cortex of the affected bone may present as thin, eroded or thickened due to new bone formation [24]. There may be an onion skin appearance due to periosteal reaction in diaphyseal lesions [25]. CT and MRI demonstrate the exact size and borders of the tumor as well as the situation of the surrounding tissues and a probable hematoma. EG appears with intense signal on CT while on T2 weighted images this signal surpasses that of bone marrow. Radionuclide bone scans with technetium, gallium or thallium reveal an enhancing mass and these modalities can easily detect other foci or recurrence points. Ultrasound is only used for guided biopsies. The clinical and radiographic findings are often not specific enough to determine the diagnosis. Cytology is very helpful in arriving at the diagnosis of EG of the bone [11]. Diagnosis is set by histological examination.

Osteomyelitis and Ewing's sarcoma in children, and metastatic carcinoma and other benign and malignant primary tumors of the bone in adults constitute the differential diagnosis of EG [26]. The treatment options for solitary EG of bone include observation, injections of steroid, chemotherapy and irradiation, excision and curettage with or without bone grafting. A recurrence rate of less than 20% has been reported in the literature with any form of treatment [27, 28]. However, we have successfully managed our case with excision and curettage without bone grafting with no recurrence at one-year follow-up.

CONCLUSION

EG is a rare entity, which poses difficulty in its diagnosis and management due to its variable clinical presentation and course. Biopsy is usually required to confirm its diagnosis and excision and curettage with or without bone grafting gives satisfactory results although chances of recurrence remain in any form of the treatment.

REFERENCES

1. Sweasey TA, Dauser RC. Eosinophilic granuloma of the cervicothoracic junction: Case report. *J Neurosurg* 1989;71:942-944.
2. Islam N, Hasan S. Eosinophilic Granuloma in Shaft of Femur: *TAJ* 2001;14(2):88-89.
3. Anshu J, Kiran A, Veena M, Vivek J, Roobina K. Solitary eosinophilic granuloma of the ulna: Diagnosis on fine needle cytology. *Journal of cytology* 2008;25(4):153-156.
4. Ando A, Hatori M, Hosaka M, Hagiwara Y, Kita A, Itoi E. Eosinophilic granuloma arising from the pelvis in children: a report of three cases. *Upsala J Med Sci.* 2008;113(1):209-216.
5. Chacha PB, Khong BT. Eosinophilic granuloma of bone: A diagnostic problem. *Clin. Orthop.*1971;80:79-88.
6. Herder D: Changing views on eosinophilic granuloma of bone. *Radiol. Clin. Biol.* 1973;42:218-221.
7. Fowels JV, Bobechko WP. Solitary eosinophilic granuloma in bone. *J Bone and Joint Surg Br.* 1970; 52(2):238-243.
8. Haouimi AS, Al-Hawsawi ZM, Jameel AN. Unusual location of eosinophilic granuloma. *Saudi Med J.* 2004;25(10):1489-1491.
9. McClain K, Jin H, Gresik V, Favara B. Langerhans cell histiocytosis: lack of a viral etiology. *Am J Hematol* 1994;47(1):16-20.
10. Jeziorski E, Senechal B, Molina TJ, Deveze F, Leruez-Ville M, Morand P, et al. Herpes-virus infection in patients with cell histiocytosis: a case-controlled sero-epidemiological study, and in situ analysis. *PLoS One* 2008;3(9):e3262.
11. Aricò M, Nichols K, Whitlock JA, Arceci R, Haupt R, Mittler U, et al. Familial clustering of Langerhans cell histiocytosis. *Br J Haematol* 1999;107(4):883-8.
12. David R, Oria RA, Kumar R, Singleton EB, Lindell MM, et al. Radiologic features of eosinophilic granuloma of bone. *AJR.* 1989;153:1021-1026.
13. Martinez-Lage JF, Bermudez M, Martinez-Barba E, Fuster JL, Poza M. Epidural from a cranial eosinophilic granuloma. *Child's Nerv Syst.* 2002;18(1-2):74-76.
14. Dundon CC, Williams HA, Laipply TC. Eosinophilic Granuloma of Bone. *Radiol.* 1946;47(5):433-444.
15. Lichtenstein L. Histiocytosis X (eosinophilic granuloma of bone, Letterer-Siwe disease, and Schuller-Christian disease). Further observations of pathological and clinical importance. *J Bone Joint Surg Am.* 1964;46:76-90.
16. Sai S, Fujii K, Masui F, Kida Y. Solitary eosinophilic granuloma of the sternum. *J Orthop Sci.* 2005;10:108-111.
17. Mukhopadhyay S, Mitra PK, Ghosh S. Touton like giant cell in lymph node in a case of langerhans cell histiocytosis. *J Cytol.* 2007;24:191-2.
18. Yu RC, Morris JF, Pritchard J, Chu TC. Defective alloantigen-presenting capacity of 'Langerhans cell histiocytosis cells'. *Arch Dis Child.* 1992;67(11):1370-2.
19. Geissmann F, Lepelletier Y, Fraïtag S, Valladeau J, Bodemer C, Debré M, et al. Differentiation of Langerhans cells in Langerhans cell histiocytosis. *Blood* 2001;97(5):1241-8.
20. Senechal B, Elain G, Jeziorski E, Grondin V, Patey-Mariaud de Serre N, Jaubert F, et al.: Expansion of regulatory T cells in patients with Langerhans cell histiocytosis. *PLoS Med* 2007;4(8):e253.
21. Huvos AG. Bone tumors: Diagnosis, treatment and prognosis. 2. Philadelphia: W.B. Saunders; 1991. pp. 695-706.
22. Bernstrand C, Carstensen H, Jakobsen B, Svejgaard A, Henter JI, Olerup O. Immunogenetic heterogeneity in single-system and multisystem langerhans cell histiocytosis. *Pediatr Res.* 2003;54(1):30-6.
23. McClain KL, Laud P, Wu WS, Pollack MS. Langerhans cell histiocytosis patients have HLA Cw7 and DR4 types associated with specific clinical presentations and no increased frequency in polymorphisms of the tumor necrosis factor alpha promoter. *Med Pediatr Oncol.* 2003;41(6):502-7.
24. Hunter T. Solitary eosinophilic granuloma of bone. *J Bone Joint Surg.* 1956;38:545-557.
25. Harpreet S, Satnam K, Yuvarajan P, Nishant J, Lalit M. Unifocal Granuloma of Femur due to Langerhans' Cell Histiocytosis: A Case Report and Review of the literature. *Case Reports in Medicine.* 2010, 3 pages.
26. Shetty S, Kumar A, Irshenavar SS. Eosinophilic Granuloma of Ilium: a case report. *J Orthopaedics.* 2007;4(2):e25.
27. Postovsky S, Militianu D, Bialik V, Vlodaysky E, Elhasid R, Peled M, Arush MW. Concomitant focal fibrocartilaginous dysplasia of the tibia and eosinophilic granuloma of the jaw in a child. *J Pediatr Orthop B* 2002;11(2):172-5.
28. Plasschaert F, Craig C, Bell R, Cole WG, Wunder JS, Alman BA. Eosinophilic granuloma-A Different behavior in children than adults. *J Bone Joint Surg Br.* 2002;84:870-2.