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Chondroblastoma of Diaphysis of Tibia; Case Report

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Abstract ***Background***: Chondroblastoma is a rare benign cartilaginous neoplasm that considered for approximately 1% of all bone tumors and characteristically emerges in the epiphysis of a long bone, especially the hummeros, femurand tibia.Only rare cases have been reported in the diaphyseal region. ***Case Report***: We report a case of diaphyseal one in a 13 years old girl that admitted ith brief pain and deformities in left leg. Radiographic examinations disclosed a multiloculated osteolytic lesion in left tibia. ***Conclusion***: Histologicak findings revealed proliferation of polygonal cells in the cartigenous background with few Giant cells.

Keywords: *Chondroblastoma, Diaphysis, chondroblasts*

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1. Background

Chondroblastoma is a rare benign cartilaginous neoplasm that accountsfor approximately 1% of all bone tumors and characteristicallyarises in the epiphysis of a long bone, particularly the hummeros, femurand tibia. [1]

The tumor has a higher incidence in males than females [2] and occurs predominantly in males under 20 years [3]. The tumor presents in a child, teenager or young adult with pain and swelling around joint, usually, the shoulder, knee or around hip [4].

Typically it is defined as a lytic bone lesion with a predilectionfor the epiphyseal region of long bones of skeletallyimmature individuals, although 50% of the tumors also involve the metaphysis [5].

Numerous studies have shown that chondroblastoma overwhelmingly arises from the epimetaphyseal region. Only rare cases have been reported in the diaphyseal region [6].

The neoplastic cells (chondroblasts) are generally arranged in sheets without alobular architecture, a feature which can help differentiate it from chondromyxoid fibroma, which generally exhibits a lobular architecture. The chondroblastsare generally intermediate-sized, round to polyhedral, and display round to oval nuclei, often with grooves. Perhaps, the most recognizable feature is the presence, albeit sometimes focal, of chicken-wirecalcification. Giant cell density varies from lesion to lesion [5].

The purpose of this study is to present a case of pure diaphysealchondroblastomas in a 13 years old girl.

2. Case Report

A 13-year-old girl was referred to our hospital because of pain and swelling over the proximal region of her left leg for 4 years. There was no historyof previous trauma. On examination, there was pain on pressure over the left leg, which was painless at rest.

The patient was afebrile. Anteroposterior and lateral x-rays demonstrated a lesion with these characteristics: aneccentric, multiloculated, expansil ,osteolytic and well defined lesion in the diaphysis of the left tibia(see Figure 1).

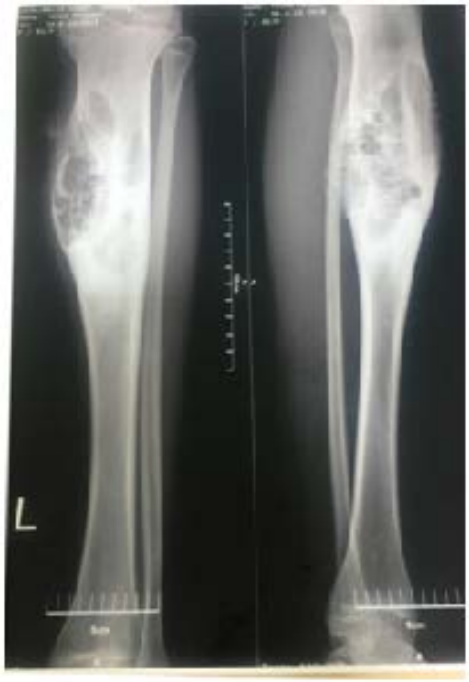

Figure 1. sharply delineated lytic appearance of chondroblastoma

Physical examination was remarkable for a brief pain uponpalpation of the proximal left leg and deformities.

After decalcification an aggregate of red-tan soft tissue wasroutinelyprocessed to hematoxylin and eosin (H&E)

glass slides. Microscopy showed proliferation of polygonal cells in the cartigenous background.

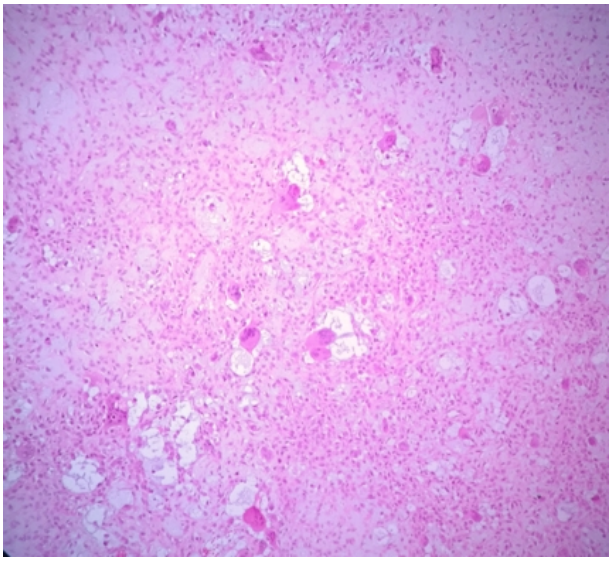

Figure 2. Small tumor cells of round shape are accompanied by scattered osteoclasts

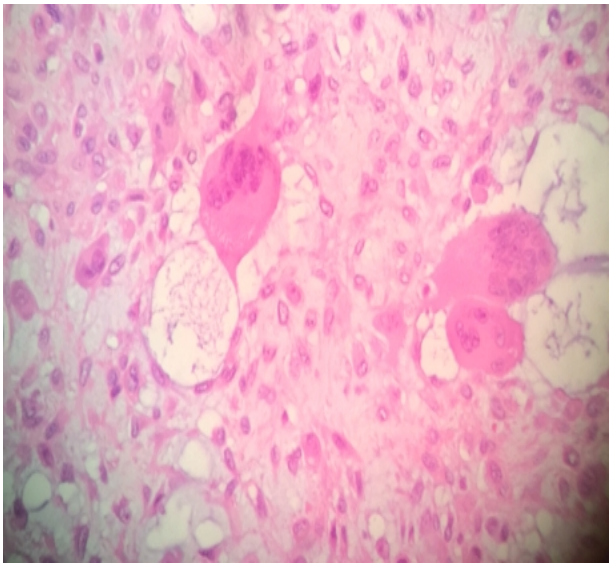

Figure 3. Small tumor cells of round shape are accompanied by scattered osteoclasts (Closer view)

Giant cells were few in numberand scattered.

Based on the findings, the diagnosis was chondroblostom.

3. Discussion

In 1927, Kolodny was the first to describe a bone tumor presenting as a "giant cell variant." Ewing called it a "calcifying giant cell tumor," and later, in 1931, Codman termed it as "epiphyseal chondromatous giant cell tumor." The term benign "chondroblastoma" was proposed by Jaffe and Lichtenstein in 1942 to describe this rare, benign, and distinctive tumor composed of immature chondroblasts with a scant chondroid matrix [7].

According to the WHO 2002 definition, "chondroblastoma is a benign, cartilage-producing neoplasm usually arising in the epiphyses of skeletally immature patients." [4]

Chondroblastomas usually show round or oval, geographic, lucent lesions with sharply marginated borders on radiograph. CT scans can depict matrix mineralization, soft tissue extension, and cortical erosion. The signal intensity characteristics of chondroblastoma on MRI reflect the prominent cellular stroma of the tumor, which has low signal intensity on T1-weighted images and high or variable signal intensity on T2-weighted images. [5]

Resemble those of Langerhanscells. Mitoses are exceptional. Intracytoplasmicglycogen granules are present, sometimes in large numbers. Reticulinfibers surround each individual cell. Recurrent lesions may showsome degree of atypia, a feature that should not be interpreted as asign of malignant transformation. A distinctive microscopic changeis the presence of small zones of focal calcification. These zonesrange from a network of thin lines ('chicken wire') to obviousdeposits surrounded by giant cells. [3]

Mostly, authors describe CB as an eccentric, oval or round well-defined lesion mostly seen in epiphyseal region of the long bones, predominantly in the proximalfemur, proximal tibia, and proximal humerus.

The lesion's epiphyseal location is an important diagnostic radiological feature. It is well known that the contiguous involvement of the metaphyseal region occursfrequently, but purely metaphyseal and diaphyseal tumors are extremely rare. [4]

In Table 1 [7] the purely metaphyseal and diaphysealchondroblastoma cases that has been reported till 2008 is listed.

A valid clarification for this unusual location was offered by Brien et al. who reported that chondroblastoma is derived from amultipotential mesenchymal cell of the tendon sheaththat, and within an osseous environment, would have atendency to chondroid formation. [1]

Possibly the source of the tumor in our patient was from an embryonic rest of the primitive cartilage prior to its endochondralossification.

Chondroblastoma does not undergo spontaneous resolution if left untreated; therefore, intervention is necessary to stop progression and alleviate pain [8].

The goals for the treatment of patients with chondrosarcoma include minimizing the risks of local recurrence, metastatic disease, and death from disease, all the while maximizing the function of the patient. Because of the relative inefficacy of adjuvant therapies, adequate surgical management of chondrosarcoma is the mainstay of treatment. [9]

The accepted treatment method for chondroblastoma is curettage and filling of the bone defect. [10]

Radiofrequency ablation for chondroblastoma provides an alternative to surgical curettage, and have demonstrated both a clinical improvement in symptoms and the follow-up MRI appearances in some cases. [11]

Radiation therapy is not preferred owing to the tumor's low sensitivity to radiation and the possibility of inducing a secondary sarcoma, [10] but this therapy is appropriate for the treatment of positive surgical marginsor palliation of disease-related symptoms.

The role for chemotherapy in the treatment of patients with local and advanced chondrosarcoma remains undefined. Although its use in conventional chondrosarcoma has been largely ineffective, recent data have suggested a possible role in certain subtypes of chondrosarcoma, specifically the dedifferentiated and mesenchymal variants. [9]

Table 1.

Previous documented cases, including metadiaphyseal equivalent of small, tubular, and flat bones				
Report Number	Year Authors	Case	Age (y) gender	Location
1	2012 Kamal balia et al	1	6	Metaphyseodiaphyseal chondroblastoma of proximal femur
2	2012 Jilong yong et ai	1 1	15/M 21/F	Diaphysis of the left tibia Right humerus
3	2009 Sailhan et al	4	NS	Metaphysis, ND
4	2009 Kim et al	1	29/M	Ilium with aneurismalchanges(metadiaphyseal equivalent of long bone)
5	2008 Ma et al	1	18/M	Left tibial diaphysis
6	2007 Clapper and DeYoung	1	17/M	Left distal femoral diaphysis
7	2007 Znati et al.	1	15/M	Left distal femoral Metadiaphysis
8	2007 Bousdras et al.	1	30/M	Right proximal tibial metaphysis, cortical based
9	2006 Hameed et al.	1	24/M	Medial cortex of right distal femoral metaphysic
10	2006 Azorin et al.	1	13/F	Right distal femoralDiaphysis
11	2000 Ramappa et al.	1	ND	Metaphysis of longbone, ND
12	2000 Peh et al.	1	13/M	Left metadiaphysis of firstproximal phalanx
13	1995 Brien et al.	1	24/M	Right fourth metatarsalBase
14	1992 Rana and Bohrer	1	16/M	Left second metacarpal
15	1992 Dwaik and Devlin	1	17/F	Left distal tibialmetadiaphysis
16	1989 Pignatti and Nigrisoli	1	10/F	Left femoral neck
17	1989 Kurt et al	5	ND	ND
18	1986 Sotelo-Avila et al.	1	11.5/F	Left Femoral neck and proximal metadiaphysis
19	1986 Ippolito et al	1	ND	Metaphysis , ND
20	1985 Bloem and Mulder	5	25/F 70/F Other 3cases / ND	Proximal left humeral metadiaphyseal Second metatarsal metadiaphyseal Metaphysis of long bones,ND
21	1985 Springfield et al.	1	ND	Metaphysis, NS
22	1985 Bliss and Mann	1	25/M	Left fourth metacarpal base
23	1981 Kumar et al.	1	14/M	Middle phalanx,fourth finger
24	1980 Nimbkar et al	1	17/F	Right femoral neck
25	1978 Aggrwal et al.	1	28/M	Diaphysis of radius
26	1976 Aronsohn et al	1	18/M	Right femoral neck
27	1976 Schwinn et al	1	14/M	Metadiaphysis of radius,ND
28	1974 Fechner and Wilde	1	13/F	Right femoral neck
29	1973 McLeod and Beaboutb	2	ND	Distal femoral metadiaphysis,ND
30	1972 Dahlin and Ivinsb	2	14/F	Distal femoral metadiaphysis, ND
31	1972 Neviaser and Wilson	1	9/M	Entire middle phalanx, left second finger
32	1970 Schajowicz and Gallardo	3	13/F 15/M 32/ M	Right distal femoral metaphysis Left distal femoral metaphysis Femoral neck, ND
SS	1968 Salzer et al	1	18/M	Left distal tibial metaphysis
34	1966 Sundaram	1	20/M	Third right metacarpal shaft
35	1959 Lichtenstein and Bernstein	1	10/M	Proximal phalanx Proximal
36	1956 Kunkel et al	1	8/M	Distal femoral metaphysis, ND
37	1956 Sherman and Uzel	1	9/F	Right proximal tibial metaphysis
38	1951 Hatcher and Campbell	1	8/M	Right proximal tibial metaphysis
ND : not determined				

4. Conclusions

To bring to an end, chondroblastoma should be considered as a differential diagnosis of any primary diaphyseal lesion in a patient presenting with constitutional symptoms.

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