(International Print/Online Journal)

SJIF IMPACT FACTOR: 5.565
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 7, Issue 5 , Page No: 197-200
September-October 2024

IJMSCR

Chondroblastoma In The Proximal Humerus: Insights From A Case Report And Literature Analysis

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Type of Publication: Original Research Paper
Conflicts of Interest: Nil

Abstract

Background: Chondroblastoma is a rare, noncancerous tumour that often develops in growth plates of long bones among young adults and adolescents. Although it accounts for less than 1% of all bone tumours, it can exhibit aggressive behaviour and has a notable recurrence rate.

Case Report: An 18-year-old female patient came with a three-month complaint of left shoulder pain The radiograph demonstrated a lytic lesion located on the metaphysis in the proximal humerus. MRI findings suggested chondroblastoma, which was confirmed by biopsy after extended curettage and autologous bone grafting.

Conclusion: This case emphasizes the need of timely identification and immediate surgical intervention in the management of chondroblastoma, resulting in a positive prognosis after therapy. It is crucial that one possess a high level of expertise and acknowledgment of this uncommon tumour in order to provide effective treatment and reduce the likelihood of its recurrence.

Keywords: Chondroblastoma, lytic lesion, benign bone tumour, proximal humerus

Introduction

Chondroblastoma is an uncommon, non-cancerous bone tumour that primarily impacts the ends of the epiphyses or apophyses of the long bones. It accounts for less than 1% of all bone tumours in skeletally immature patients[1]. It typically occurs in adolescents and young adults, with a male predominance. The proximal humerus is most often affected anatomical region by chondroblastoma, then followed by the distal femur & proximal femur[2]. The clinical presentation can vary, but symptoms usually include localized pain, swelling, and sometimes joint effusion, which may be mistaken for other conditions such as osteomyelitis or giant cell tumour. While the tumour is benign, it may exhibit histological aggressiveness and have a high recurrence rate ranging from 5% to 38%[3]. Surgical procedure, often including curettage and bone grafting, is commonly used. This approach aims to avoid recurrence and maintain joint function. In this case report, we detail the treatment of an 18-year-old girl who had been diagnosed with Chondroblastoma of the proximal humerus. The treatment included extended curettage as well as bone grafting..

Case Report

An 18-year-old girl presented with chronic left shoulder pain for the past three months. There was no documentation of any previous incidents involving injury or fall. The pain was non-radiating, characterized by a dull sensation, and did not vary

during the course of the day. It gradually worsened with time. The pain was intermittent and alleviated with medications. A brief history of the phenomenon of weight reduction is available. The patient never had a history of fever, muscular atrophy, limited range of motion in her left shoulder, or nocturnal discomfort. Palpation of the proximal humerus elicited discomfort. No warmth noticed. There is no evidence of any impairment in the neurological or vascular systems. The range of motions shown by the individual was complete but accompanied with pain. No signs of sinuses, scars, dilated veins, apparent oedema, or muscle atrophy were seen.

Figure 1: Radiograph showing lytic lesion, with well-defined border over the proximal humerus metaphysis

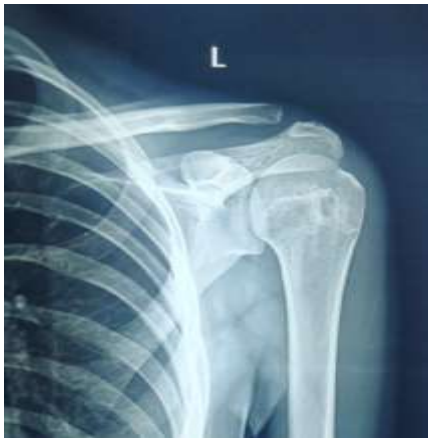

Figure 2: MRI showing low signal intensity foci within the tumour corresponding to areas of calcification and bone marrow oedema.

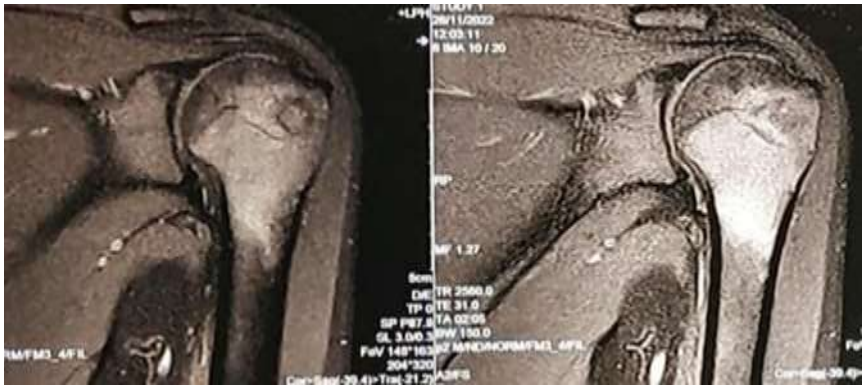

Figure 3: Histopathology slide showing A- chicken wire calcification, B- osteoclast like giant cells.

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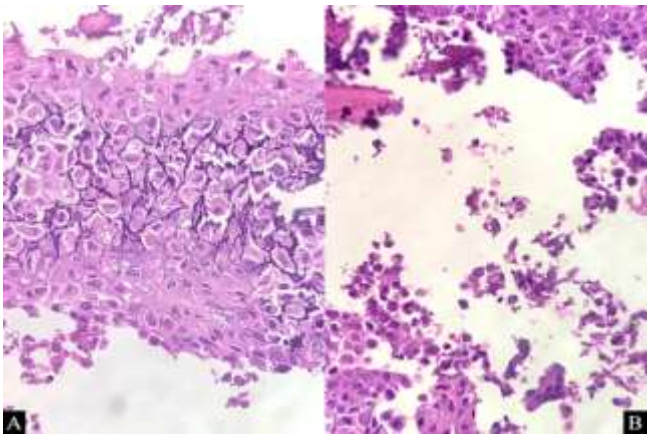

Plain radiograph of left shoulder showed lytic lesion, with well-defined border over the proximal humerus metaphysis near the bicipital groove (Figure 1). MRI revealed lobulated regions with decreased signal intensity adjacent to the lesion, bone marrow swelling, and areas of decreased signal intensity inside the tumour that correlate to calcification, indicating the presence of chondroblastoma (Figure 2). The patient was taken up for surgical intervention, which included an extensive curettage of the tumour and subsequent autologous bone grafting. The procedure was performed under general anaesthesia. Intra-operative sample taken and sent for biopsy which revealed characteristic osteoclast like giant cells, chicken wire calcification, confirming it as chondroblastoma (Figure 3). Post-operatively, patient was put on a broad arm sling and immobilised for two weeks. Serial follow up were carried out. Throughout the 3-month follow-up period, the patient experienced full recovery of functionality without any signs of recurrence.

Discussion

Chondroblastoma, a benign cartilaginous lesion, is most often seen in the epiphysis of long bones such as humerus, tibia, and femur. It is a rare form of primary bone cancer, accounting for less than one percent of cases[4]. In 1942, Jaffe and Lichtenstein provided a clear distinction amongst chondroblastoma and giant cell tumour and coined the name "benign chondroblastoma"[5]. While the majority of chondroblastomas are benign, there are instances when they may display aggressive traits. The recurrence rate of this condition varies from 2% to 10%, mostly owing to the insufficient effectiveness of the first surgical technique. However, this may be addressed by further surgical interventions[6].

The first factor in determining a diagnosis of illness is the exact geographical location. Chondroblastoma often grows toward the distal ends of long bones epiphyses. At early stages, the clinical presentation aids in excluding other disorders. In order to make a diagnosis, it is important to take into account the dimensions and scope of the lesion. Giant cell tumors often originate in the epiphysis but may spread across the metaphysis and extend beyond the growth plate. Additionally, the boundaries of these tumors are not always well-defined. Chondroblastoma does not have any identified risk factors. Some individuals in this group have p53 mutations, whereas others display chromosomal anomalies involving chromosomes 5 and 8[7].

Chondroblastoma often affects just the epiphysis A CT scan is useful for providing a distinct demarcation of the tumor's boundaries and its proximity to the growth plate. Furthermore, it enhances the detectability of calcifications inside the central region of the tumor, which indicate the presence of chondroid matrix[8]. Chondroblast cells and large osteoclast cells are seen, along with early cartilage-like cells and calcification islands resembling chicken wire. The mitotic rate is less than 4 per high power field. These are the fundamental microscopic characteristics[9]. Chondroblastoma has a significant amount of oedema around the tumour, as shown on MRI. The signal intensity in T1- as well as T2-weighted MRI scans is contingent upon the concentrations of different constituents present in the lesion. The majority of cases exhibit varying levels of intensity on T2-weighted imaging[10].

Surgery is the preferred treatment for chondroblastoma. The procedure involves performing a thorough surgical excision using a curette, with or

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without the addition of bone grafting. In certain cases, the entire involved region may be excised and in rare instances, amputation may be indicated. Surgical removal of the tumour alleviates pain, avoids the spread of the tumour into the joint itself and surrounding soft tissues, decreases the likelihood of the tumour reverting back, and firmly verifies a diagnosis of chondroblastoma. Malignant chondroblastoma, an exceptionally uncommon condition, has been associated with an unfavorable prognosis. Recurrences may be treated by performing repeat curettage, which might or might not involve bone graft or cementation. Additionally, any soft-tissue component can be removed using marginal excision[11]. En-bloc excision and rebuilding is a suitable approach for treating aggressive metastatic lesions that would result in a significant bone defect if treated with intralesional curettage[12].

Conclusion

The majority of chondroblastoma are benign bone tumours. Individuals exhibiting symptoms such as bone discomfort, bone or joint swelling, the presence of any detectable mass on the bones, or fractures unrelated to injury should promptly seek medical attention. The primary therapeutic approach for chondroblastoma is surgical intervention. The prognosis is often favourable after treatment. While there have been few cases of malignant transformation, it is possible for local recurrence to happen after surgery. Timely identification and immediate appropriate treatment, post-operative serial follow up may effectively minimize the occurrence of recurrence and the need for repetitive surgical procedures.

Conflict of Interest: The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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