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Diaphyseal Osteosarcoma: - A Case Report

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Case report:

Eighteen-year-old boy presented with swelling and pain in left midshaft femur. Radiograph showed a long segment lesion showing permiative bone destruction(Fig 1a,1b). With possibility of malignant bone lesion CT(Fig 2a,b,c) and MRI(Fig 3a,b,c,d) of the left thigh were done. Radiograph of Chest was normal. Biopsy report from the lesion was Osteogenic sarcoma.

Fig1a,1b: Radiograph of left femur AP and LATERAL showing a lesion in midshaft femur showing permeative destruction pattern and thinning of cortex anteriorly. Multiple ill-defined increased density fields seen within medullary cavity. No periosteal reaction seen.

INTRODUCTION:

Osteosarcoma is most common primary malignant tumor of bone in adolescents and young adults. It accounts for approximately 15% of all primary bone tumors confirmed by biopsy. There are numerous types of primary osteosarcoma, including intramedullary (High grade, small cell, osteosarcomatosis, telangiectatic, low grade and gnathic) surface (parosteal, intracortical, periosteal and high-grade surface) and extraskeletal. Osteosarcoma is also seen as a secondary lesion in association with underlying benign conditions. [1] Most bone tumors demonstrate predictable "location" in the skeleton. This "location" is determined by "laws of field behavior and developmental anatomy" of the affected bone a concept first popularized by L C Johnson.Various imaging modalities like radiographs, CT or MRI will delineate which segment of bone is affected. (Diaphysis, epiphysis or metaphysis} and whether the intramedullary region or cortex is affected. Because of skeletal remodelling (with its associated osteoblastic activity) in the adolescent predominates in metaphysis most osteosarcomas occur in that location. Eccentric location in the long bone is the hallmark but the entire width can be affected when the patient comes to clinical attention. [2] Purely diaphyseal (10-20%) or epiphyseal (<1%) location may occasionally be encountered. [3]

Fig2A) Scano showing expansile midshaft lesion in femur. No adjacent soft tissue mass seen.

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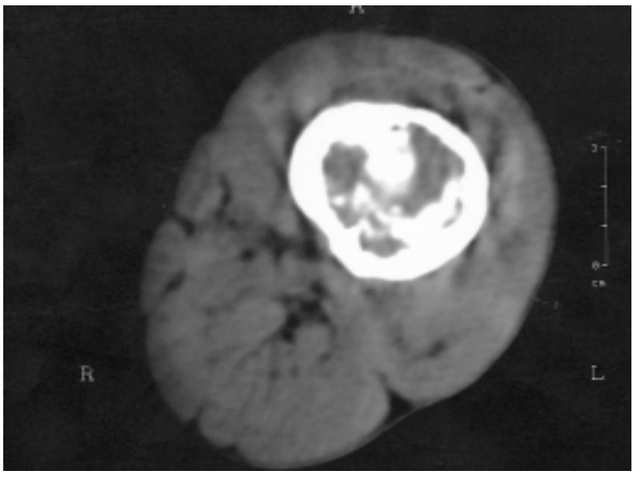


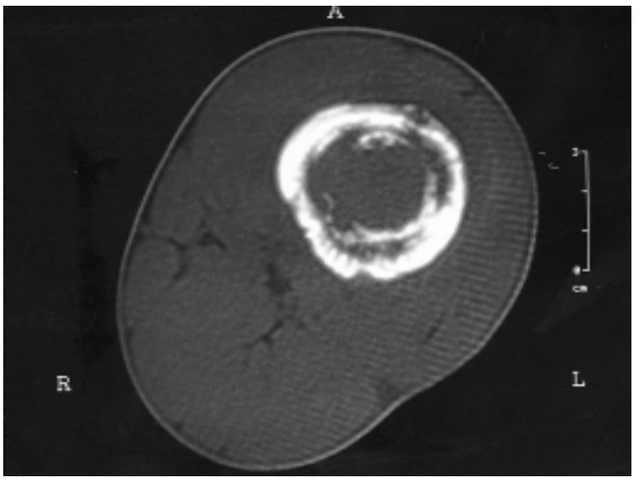
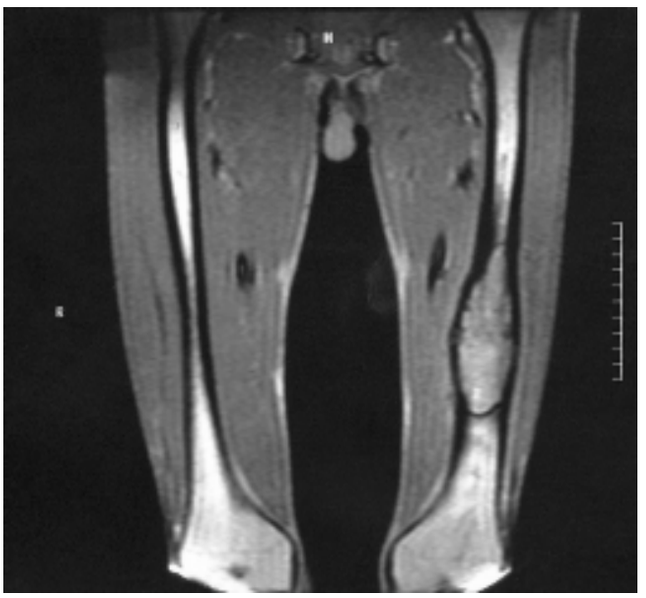


Fig2B, C) Axial NECT Through lesion in soft tissue and bone window show mineralization of tumor matrix and irregularity of anterior cortex. No perilesional soft tissue mass seen.

DISCUSSION:

Conventional osteosarcoma accounts for 75-85% of all osteosarcomas. Typically the patient presents during adolescence. (Median age 17,range 2-92 years) with swelling, pain and pyrexia. In flat bones average age is 25 yrs.some what higher than seen in lesions with tubular bones. Knee is affected in about 66% of patients with distal femur twice as frequently as proximal tibia. Commonly tumor is large at clinical presentation. Radiographically it may be predominantly osteosclerotic (25%) or osteolytic (25%) but more frequentely mixed (50%). Characteristically (90%) radiographs reveal cloudlike densities representing tumor bone. Bony destruction is normally (80%) of moth-eaten or permiative type. Cortical bone is destroyed in disorderly fashion. Attempts to confine the tumor results in deposition of periosteal new bone (90%) in the form of codmans triangle interrupted lamellae and spicules. In contrast to cortical bone articular cartilage is a formidable barrier which is not violated until late in the course of disease A coexistent soft tissue mass is usually present and is a major sign of malignancy. It is sometimes absent in diaphyseal osteosarcoma. [3] CT of primary bone tumors is useful in localizing the lesion, determining the extent of the tumor and defining the relationship with vital structures, distinguishing a solid from cystic lesion, demonstrating cortical destruction or revealing an exophytic mass, thereby suggesting malignancy and defining its extent .In the preoperative assesment of exophytic masses, [4] Identification of mineralization of the matrix of the tumor is often achieved by the use of CT [5] the extent The soft tissue component may be detected on radiographs but MR is the most sensitive imaging modality for visualizing the extension of tumor into adjacent fat,muscle,ligaments or tendons.Ligaments (Cruciate ligaments)and tendons can serve as a scaffold for growth of tumor a feature which is particularly well visualized. With MR images obtained parallal to these.structures. [3] A complete preoperative



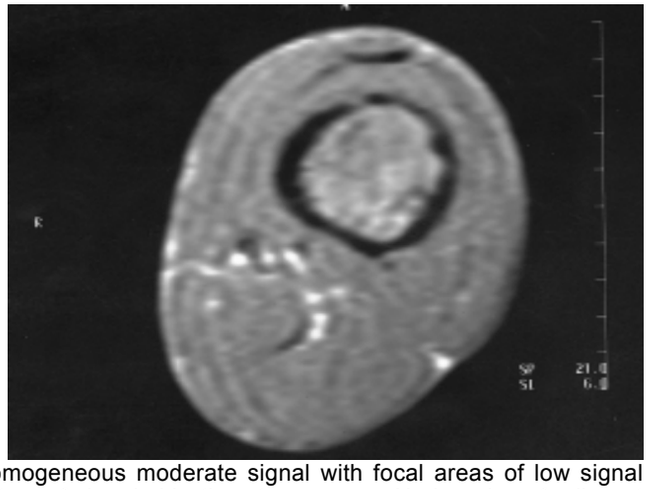


Fig3A, B) Coronal and axial T1weighted images showing inhomogeneous moderate signal with focal areas of low signal intensity corresponding to the extent of cartilage calcification feature of chondroblastic osteosarcoma. No invasion of adjacent soft tissue seen. Cortex is intact.

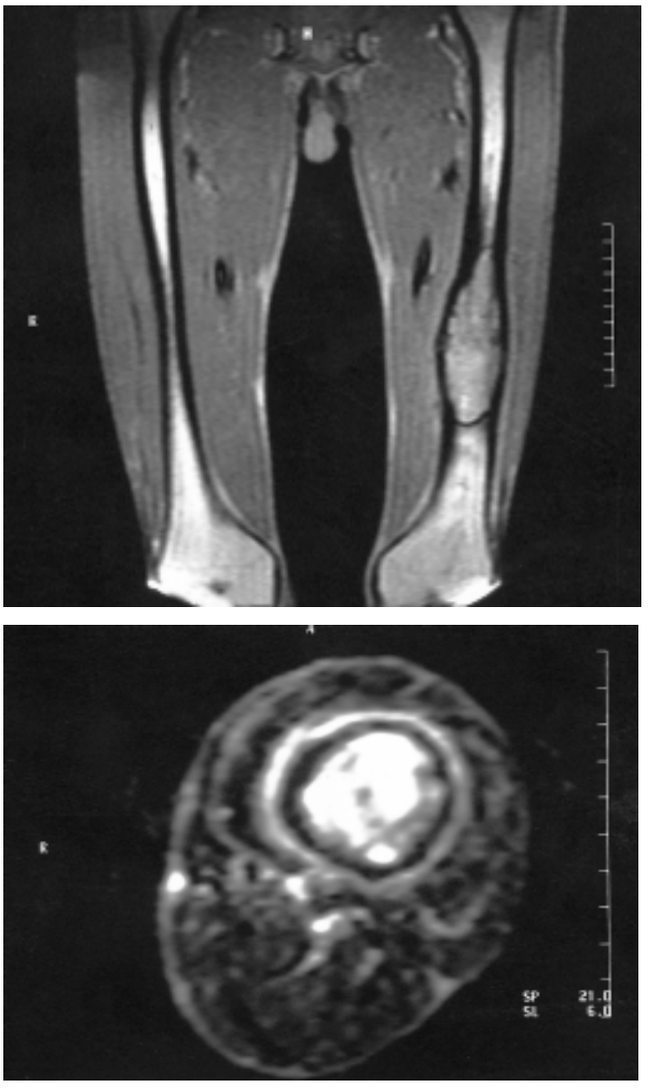


Fig3C,D: Coronal and Axial T2weighted images showing inhomogeneous high signal intensity results from chondroid matrix with focal areas of low signal intensity corresponds to extent of cartilage calcification, a feature of chondroblastic osteosarcoma. No invasion of adjacent soft tissue seen. Cortex is intact.

evaluation of osteogenic sarcoma of the extremity should at minimum include large field of view T1 W Longitudinal images through the whole host bone and Axial T1 and T2 WI through the tumor. If there is a possibility of involvement of an adjacent joint, high resolution thin section images through the joint are necessary. T1W longitudinal images depict the intramedullary extent of the tumor, identify skip lesions and allow measurements to be made of the distance between the tumor margins and adjacent joints. Partial volume averaging can be avoided with the use of thin sections. [6] On the basis of histological composition, osteosarcoma can be divided into subtypes as osteoblastic, chondroblastic, fibroblastic and telangiectatic type. The MR characteristics reflect the predominant cellular component. Thus a fibroblastic osteosarcoma generally is characterized by short T1and T2 relaxation times of fibrous tissue. A chondroblastic osteosarcoma typically has increased signal intensity on T2 weighted images in areas of uncalcified cartilage with focal areas of low signal intensity corresponding to the extent of cartilage calcification. Osteoblastic reveal cloudlike areas of low signal intensity on both T1and T2 weighted images depending upon degree of osteoblastic reaction. Telangiectatic osteosarcoma is an angiomatous form of sarcoma containing large cystic blood spaces. These lesions contain focal areas of high signal intensity on T1 and T2 weighted images. [7]

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