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Cytological Diagnosis Of Chondrosarcoma On Fine Needle Aspiration Cytology.

Shivali Soni[1]*, Anjali Bishlay[2], Sumiti Gupta[3], Renuka Verma[4], and Sunita Singh[5].

[1]Junior Resident, Pt. B.D. Sharma, PGIMS Rohtak, Haryana, India.
[2]Senior Resident, Pt. B.D. Sharma, PGIMS Rohtak, Haryana, India.
[3]Professor, Pt. B.D. Sharma, PGIMS Rohtak, Haryana, India.
[4]Professor, Pt. B.D. Sharma, PGIMS Rohtak, Haryana, India.
[5]Senior Professor And Head, Pt. B.D. Sharma, PGIMS Rohtak, Haryana, India.

ABSTRACT

Chondrosarcoma is a malignant cartilage-forming tumor and the third most common primary bone cancer, typically affecting the femur, pelvis, and scapula. Ankle involvement is rare, comprising only 1.5–2.97% of cases, and often presents as nonspecific swelling or pain, frequently misdiagnosed as soft tissue injury. We present a case of a 61-year-old male with a three-month history of painful left ankle swelling. Imaging showed a neoplastic lesion in the distal tibia. Fine Needle Aspiration Cytology (FNAC) revealed thick gelatinous material with atypical chondrocyte-like cells, and histopathology confirmed chondrosarcoma with S100 positivity. Diagnosing chondrosarcoma in uncommon sites requires a multidisciplinary approach, as features may overlap with benign conditions like enchondroma. FNAC, although valuable, must be interpreted with clinical and radiological findings. Early recognition is crucial, particularly in older patients, to differentiate from other entities like chondroblastic osteosarcoma. Persistent ankle swelling without trauma should raise suspicion for malignancy and prompt timely intervention.

Keywords: Chondrosarcoma, imaging, FNAC, histopathology

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Corresponding author

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INTRODUCTION

Chondrosarcoma is a malignant tumor that originates in cartilage [1]. It is the third most common primary bone tumor, following myeloma and osteosarcoma [1]. Although sarcomas of bone and soft tissue are rare accounting for less than 1% of malignant bone tumours, chondrosarcoma makes up 10-15% of primary bone tumours and about 20% of malignant bone tumours [1]. The most frequently affected sites include the femur, humerus, pelvis and scapula[1].Several histological variants of chondrosarcoma exists such as dedifferentiated, mesenchymal, myxoid and clear cell tumors [1]. Chondrosarcoma rarely occurs in the foot, with an incidence of approximately 1.5% to 2.97% of all cases [2]. When it involves the ankle joint, it typically presents as either a painful or painless swelling [2]. In some cases, ankle pain may be the sole symptom [2]. Delayed diagnosis is common, as these tumours are often mistaken for soft tissue injuries [2]. Therefore, a high index of suspicion is necessary, particularly when symptoms persist in the absence of trauma [2].

CASE REPORT

A 61 year old male came to Outpatient department with complaint of swelling left ankle for 3 months, which was progressively increasing in size. Swelling was soft, non tender associated with pain while walking. He was given treatment in the form of analgesics but failed to relieve symptoms. X-RAY in Anterioposterior and Lateral view showed lytic lesion. USG findings revealed a complex solid cystic area of size 7×7cm in medial aspect of left ankle. MRI showed A large T2/STIR heterogeneously hyperintense lesion in medullary cavity of distal tibia extending upto the articular surface with diffuse cortical thickening, cortical erosions with scalloping and large cortical defect in the medial and posterior cortex with associated large extraosseous cystic component, likely Neoplastic.

FNAC was done, yielded thick gelatinous aspirate. Smears were prepared and stained with Leishman and Papanicolaou stain. On microscopy cellular smear showed mainly chondromyxoid stromal material along with few large cells with vacuolated foamy cytoplasm with round nuclei revealing nucleolisation in some of them. Few macrophages, fibrocapillary fragments and occasional inflammatory cells were also seen. [Figure D and E].

Cell Block prepared revealed abundant myxoid vascular matrix containing chondroid tumor cells which contained eosinophilic to vacuolated cytoplasm and round to oval nuclei [Figure-F]. S100 was positive [Figure G].

DISCUSSION

Chondrosarcoma typically presents in the fourth or fifth decade of life, with a male predominance(2:1) [2]. Pain is the most common symptom, reported in approximately 95% of cases[2]. It usually has an insidious onset and gradually worsens over time, in some instances it may be accompanied by soft tissue swelling [2]. In cases where long bones are involved, pathological fracture may be the initial presentation.

Cytological assessment must be interpreted alongside clinical and radiological findings, as around 20% of enchondromas and grade 1 chondrosarcoma exhibit overlapping cytological features[3]. Chondrosarcoma is a malignant neoplasm derived from cartilage- forming cells and produces a chondroid extracellular matrix [3]. Involvement of the ankle is uncommon. Chondrosarcoma ranks as third most common primary bone tumor, with frequent involvement of axial skeleton [2]. The primary differential diagnosis is chondroblastic osteosarcoma. A key distinction lies in the abrupt transition from low grade to high grade components seen in dedifferentiated chondrosarcoma[1]. Chondroblastic osteosarcoma generally affects younger individuals, while dedifferentiated chondrosarcoma is more common in older population [1].

FNAC of dedifferentiated lesions poses diagnostic challenges due to their rarity and limited experience among pathologist [1]. Most dedifferentiated chondrosarcomas display radiological features characteristic of high-grade cartilage tumour[1]. Radiographically, chondrosarcoma appears as a lobulated lesion with lytic and sclerotic components[2]. MRI is useful for assessing marrow and soft tissue involvement [2].

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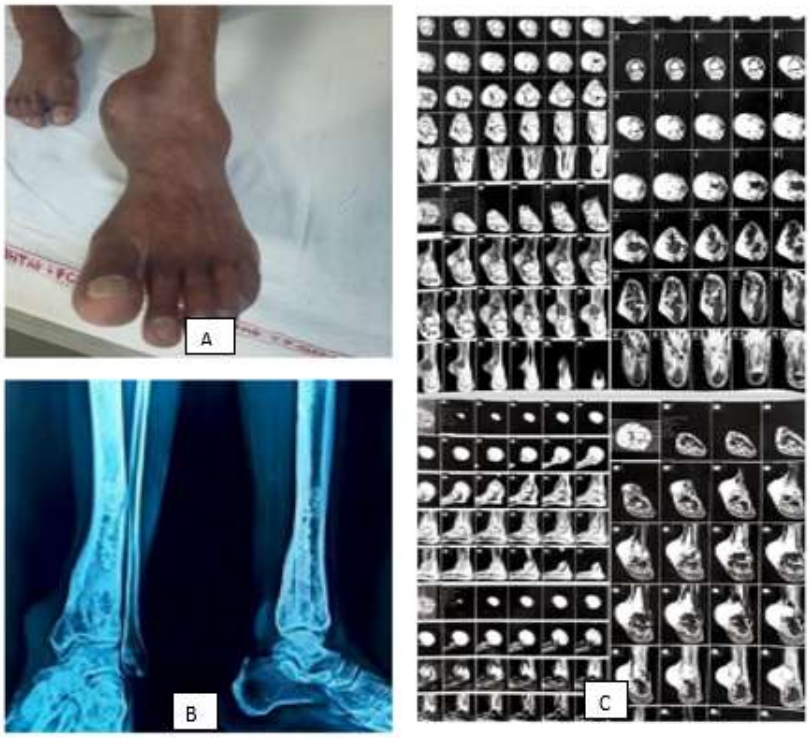
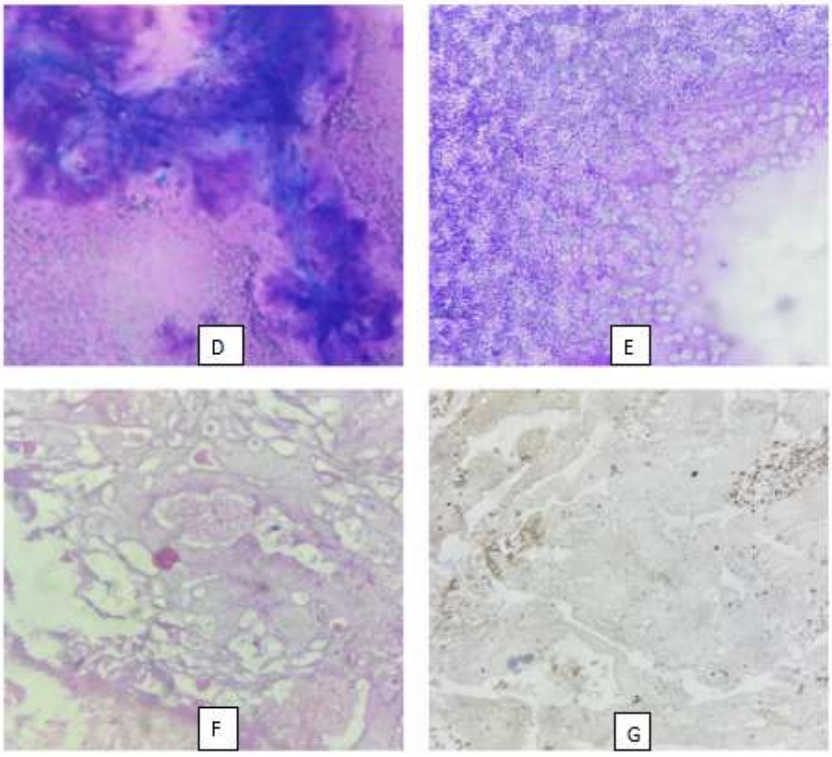


A. **Swelling medial aspect of ankle measuring 5×5cm.**
B. **Anterioposterior and lateral view of ankle joint showing lytic lesion.**
C. **A large T2/STIR heterogeneously hyperintense lesion in medullary cavity of distal tibia extending upto the articular surface with diffuse cortical thickening**



D. 40x showing chondromyxoid stromal material
E. 40x showing large cells with vacuolated foamy cytoplasm with round nuclei
F. Cell block in 40x
G. S100 positivity in cell block

FNAC of chondrosarcoma typically reveals a high cellular yield, showing clusters of tumour cells with well-defined cytoplasm, round nuclei and one or two nucleoli[1]. Binucleation and anisonucleosis and a myxoid background may also be observed [1].

Cytology smears of enchondromas typically reveal clusters of hyaline cartilage, which are often notably thick. There is frequently a prominent presence of metachromatic material. Identifying cellular or lacunar boundaries can be challenging. The cells generally contain a single, round nucleus with no prominent nucleoli, and binucleation is uncommon. Mitotic figures should be absent in chondromas; their presence may indicate a more aggressive or malignant process [4].

Chondrosarcoma must be distinguished from chondroma, chondromyxoid fibroma, and chondroblastic osteosarcoma. In chondroma, tumor cells are relatively sparse, the chondroid matrix is more abundant, and the cells are larger than normal chondrocytes but smaller than those seen in low-grade chondrosarcoma [3].

Chondromyxoid fibroma features enlarged cells with irregular nuclei and smudgy chromatin; however, it lacks the nuclear hyperchromasia and irregularity characteristic of chondrosarcoma.

Additionally, these tumors may include a mix of stellate, fibroblastic, and osteoclastic giant cells [3].

High-grade chondrosarcoma is marked by increased cellularity, minimal chondroid matrix, and significant pleomorphism. In contrast, chondroblastic osteosarcoma displays chondrocytes that are highly pleomorphic [3].

CONCLUSION

Utilising Fine Needle Aspiration Cytology [FNAC] for diagnosing chondrosarcoma requires comprehensive clinical and radiological information [1]. Additionally, the cytopathologist must be well-acquainted with the cytological features of low-grade, high-grade, dedifferentiated chondrosarcoma, as well as other variants [1]. Chondrosarcoma of the ankle is a rare malignant tumor that typically presents with ankle pain and swelling [2]. Due to nonspecific nature of these symptoms, the condition is often misdiagnosed as a simple ankle sprain and therefore easily overlooked [2]. Even after radiological evaluation, the diagnostic challenge remains battle as enchondroma and low-grade chondrosarcoma share many overlapping features on CT and MRI [2]. In this context, FNAC serves as a valuable diagnostic tool for assessing bone lesions in many clinical scenarios [1].

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