

CASE REPORT

**Cytologic Diagnosis of Chondrosarcoma on Fine Needle Aspiration Cytology:
A Challenge!**

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Abstract:

Chondrosarcoma is a malignant tumour of cartilage, usually named and classified by anatomic location. Primary chondrosarcoma is the third most common primary tumour of bone, after myeloma and osteosarcoma. Commonest sites of presentation are pelvic bones, long bones and relatively rare in ribs. Here we report a case of 75 year old male who presented with a swelling over the left lower lumbar region, which increased gradually in size in three months. The swelling was not associated with pain or trauma. After initial clinical workup, he was referred to the Radiology Department, for Computerized Tomography (CT) scan. On correlating the findings in the CT scan report, he was further referred to the Histopathology Department for Fine Needle Aspiration Cytology (FNAC) in view of definite diagnosis. Initial diagnosis on FNAC was given as chondrosarcoma in favour of the location of the swelling. Furthermore excision biopsy was done. The definitive diagnosis was given as dedifferentiated chondrosarcoma. FNAC of dedifferentiated lesions due to its rarity and limited experience poses a challenge to many histopathologists.

Keywords: Chondrosarcoma, Fine Needle Aspiration Cytology, Lumbar Region

Introduction:

The true frequency of musculoskeletal neoplasms is difficult to estimate because most of the benign neoplasms are not excised. The benign neoplasms are 100 times more common as compared to the malignant tumours. Sarcomas of the bone and soft

tissue are relatively rare tumours and account for less than 1% of all malignant tumours [1]. Chondrosarcoma comprises of 10-15% of all primary bone tumours and forms 20% of all malignant bone tumours. It is the third most common primary malignant tumour of bone after myeloma and osteosarcoma [2].

They arise either as primary tumours or secondary to underlying neoplasm such as enchondroma or osteochondroma. The incidence of chondrosarcoma peaks in the 5th to 6th decade. It involves most commonly the femur, humerus, pelvis, and scapula but rarely involves rib [3]. It is important to differentiate chondrosarcoma from benign chondroma and other malignant bone tumours like chondroblastic osteosarcoma and metastatic tumours [2]. Variants of chondrosarcoma are dedifferentiated, mesenchymal, myxoid and clear cell tumours [3-4]. While core needle biopsy is the time-honored gold standard for diagnosis of these challenging tumours, Fine Needle Aspiration Cytology (FNAC) has its value in certain scenarios [5].

Case Report:

A 75 years old man came to the surgery outpatient department with swelling over the lower left lumbar region. The swelling was initially lemon sized and gradually progressed to the present size in 3 months. There was no history of pain or trauma.

On clinical examination, swelling was seen over the left lumbar region, 12×10×10 cms, bony hard and non tender. Preliminary diagnosis of primary bone tumour was made clinically and the patient was referred to Radiology Department for CT scan. CT scan showed 12×9.6×9.2 cm size, heterogeneously enhancing, expansile, osteolytic lesion epicentered over the lateral part of left 11th rib. Also retroperitoneal extension into the left paracolic gutter was noted.

FNAC was done, which yielded thick and gelatinous aspiration. Smears were prepared and stained with both Papanicolau and Giemsa stains. On microscopy, cellular smear showed tissue

fragments enmeshed in chondromyxoid stroma. The cells had well defined eosinophilic or bubbly cytoplasm and rounded nuclei with one or two prominent nucleoli. Focal nuclear atypia was noted. The diagnosis of chondrosarcoma over chondroma was preferred considering the site. Excision biopsy was performed. Grossly, the tumour measured 12.2 × 12.2 × 0.4 cm and cut section was lobulated and myxoid. On microscopy, it revealed well differentiated chondrosarcoma with focal areas of abrupt transition into high grade pleomorphic sarcoma. The final diagnosis was given as differentiated chondrosarcoma.

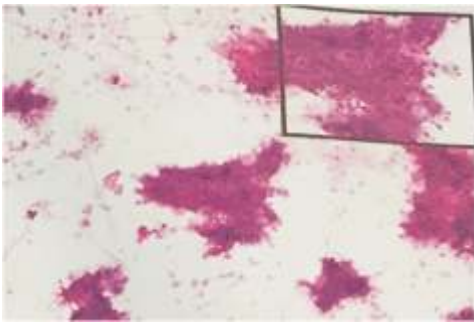


Fig. 1: FNAC: H&E 10X: Cellular Smear with Clusters of Chondroid Cells Over a Myxoid Background, Inset 40X View

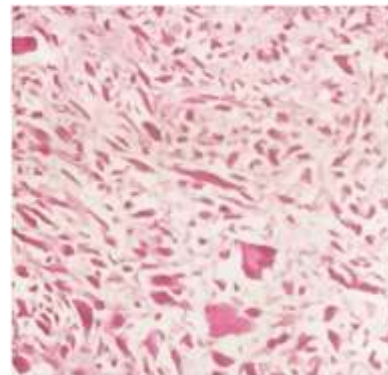


Fig. 3: H&E 40X : Areas of Dedifferentiated Chondrosarcoma

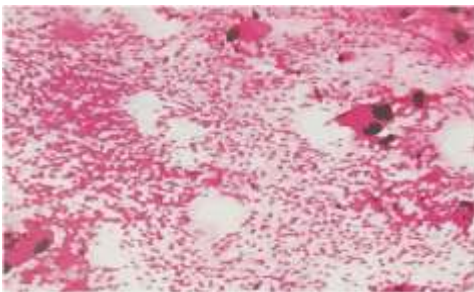


Fig. 2: FNAC H&E 10X: Pleomorphic and Multinucleated Cells



Fig. 4: H&E 40X: Cellular Areas of Low Grade Chondrosarcoma

Discussion:

Most chondrosarcomas are well-differentiated low-grade tumours. However, up to 11% of these tumours undergo anaplastic transformation, resulting in a high-grade noncartilaginous sarcoma arising within a preexisting, typically low- to intermediate-grade chondrosarcoma [6]. Dahlin *et al.* in 1971 first coined the term dedifferentiated for chondrosarcoma containing areas of fibrosarcoma and osteosarcoma. It is diagnosed when low grade chondrosarcoma is juxtaposed with high grade spindle cell carcinoma. About 10% of low grade chondrosarcoma are expected to evolve into dedifferentiated component [4].

The closest differential diagnosis is chondroblastic osteosarcoma but in differentiated chondrosarcoma the change from low grade chondrosarcoma to high grade sarcoma is abrupt. Chondroblastic osteosarcoma generally occurs in younger patients, whereas dedifferentiated chondrosarcoma is a disease of older population. FNAC of dedifferentiated lesions due to its rarity and limited experience poses a challenge to many histopathologists [7]. Most dedifferentiated chondrosarcomas have imaging features indicative of a high-grade cartilage tumour. CT and MR Imaging also commonly demonstrated features suggestive of chondrosarcoma with evidence of chondroid matrix and cortical destruction [6]. In our study, on CT, we saw a mass with poorly differentiated margins, with destructive erosions of cortex with permeation into surrounding soft tissue and fluffy calcifications.

FNAC revealed rich cell yield with tissue fragments of tumour cells having well defined cytoplasm and rounded nuclei with one or two nucleoli. Binucleation and anisonucleosis were also seen with the abundant myxoid material in the background. Chordoma should be considered in

differential diagnosis in spinal or sacral tumours. Since chordoma is a low to intermediate grade malignant tumour, differentiation from high grade carcinomas and sarcomas is relatively easy because of low Nucleus : Cytoplasm (N:C) N:C ratio, and lack of nuclear atypia and mitoses in chordoma [8]. Low grade chondrosarcoma reveals tissue fragments with hyaline or chondroid background and relatively bland cells situated in lacunae which are not a feature of chordoma.

On histopathology, the characteristic feature of chondrosarcoma is to produce coalescent lobules of cartilage of varying sizes with cystic and necrotic areas [9]. Low grade chondrosarcoma are moderately cellular with minimal atypia. High grade chondrosarcoma have increased cellularity, nuclear atypia and increased mitotic rate. Pleomorphism is a feature of dedifferentiated chondrosarcoma [3]. The term dedifferentiated refers to the presence of poorly differentiated sarcomatous component at the periphery of an otherwise typical low grade chondrosarcoma [10]. In our case the histopathologic diagnosis was well differentiated chondrosarcoma with transition to dedifferentiated component.

Conclusion:

FNAC when employed in the diagnosis of chondrosarcoma necessitates the following requirements - adequate clinical and radiographic data, the cytopathologist should be well versed with low grade, high grade, and dedifferentiated chondrosarcoma and other variants. Differential diagnosis should be considered and ruled out in view of clinical and radiological findings. Thus, FNAC is a useful initial method of choice for evaluation of bony lesions in most clinical settings especially when working in a resource- challenged area.

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