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Cytodiagnosis of Chondromyxoid Fibroma of the Metatarsal Head: A Case Report

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KEY WORDS

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ABSTRACT

Chondromyxoid fibroma (CMF) is a rare benign cartilaginous tumor with a predilection for the bones of lower extremities and about one fourth of the tumors involve the foot. Radiologically, an eccentric lytic lesion with well defined margins is seen in the metaphysis of the bone. We hereby, report an 18 yr old young male who presented to Orthopedic Outpatient Department, JN Medical College, Aligarh Muslim University, India diagnosed with giant cell tumor of the third metatarsal bone of right foot on radiography but on fine needle aspiration cytology (FNAC) the diagnosis of CMF was made. Preoperative diagnosis of this benign condition helped in doing minimum surgical intervention in the form of curettage along with bone grafting. Histopathology further confirmed the diagnosis of CMF. The case is being discussed to highlight the importance of FNAC to diagnose these uncommon benign bone lesions.

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Introduction

Fine-needle aspiration cytology (FNAC) is a reliable and cost-effective means of diagnosing lesions of the skeletal system in conjunction with clinical and radiological findings (1). There are several studies on FNAC of bone tumors, but there are only very few case reports regarding cytological diagnosis of Chondromyxoid fibroma (CMF) (2, 3).

CMF is the rarest benign cartilaginous tumor, constituting around 0.5% of all bone tumors characterized by incomplete cartilage differentiation

(4). It usually presents in second and third decade of life. Jaffe and Lichtenstein described this tumor for the first time in 1948 (5). CMF is usually an intra-medullary eccentric lesion located in the metaphyseal region of the distal femur and proximal tibia but sometimes it can also be seen at unusual sites like flat bones of the skull, pelvis, ribs, hands and feet where it can cause diagnostic difficulties (6).

Owing to the paucity of published literature about the cytodiagnosis of chondromyxoid fibroma which is one of the rarest primary bone tumor, this case is being reported here.

Case Report

An 18 yr old young male of average build presented to Orthopedic Outpatient Department, JN Medical College, Aligarh Muslim University, India with complaints of pain, tenderness and swelling over the dorsum of right foot for the past 1 year. There was no significant past medical history or any history of trauma. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Radiograph of the right foot was suggestive of a lytic lesion with well defined margins in the region of head of the third metatarsal (Fig. 1). A presumptive diagnosis of giant cell tumor of the bone was made. FNAC was done and smears were prepared and stained with hematoxylin and eosin (H & E).

Cytological examination

On cytological examination of the stained smears there was moderate cellularity with round to ovoid cells having moderate amount of cyto-

plasm, benign appearing nuclei and bland chromatin. Many scattered dense, fibrillary chondromyxoid tissue fragments were appreciated but there was no mature cartilaginous tissue or foci of calcification. Stellate cells and spindle-shaped fibrocytoid cells along with few osteoclastic giant cells were also seen on a myxoidstroma. The overall cytological picture favored the diagnosis of CMF (Fig. 2).

Preoperative diagnosis of this benign condition helped in doing minimum surgical intervention in the form of curettage and grafting.



Fig. 1
Radiograph of the right foot suggestive of a lytic lesion in the region of head of third metatarsal.

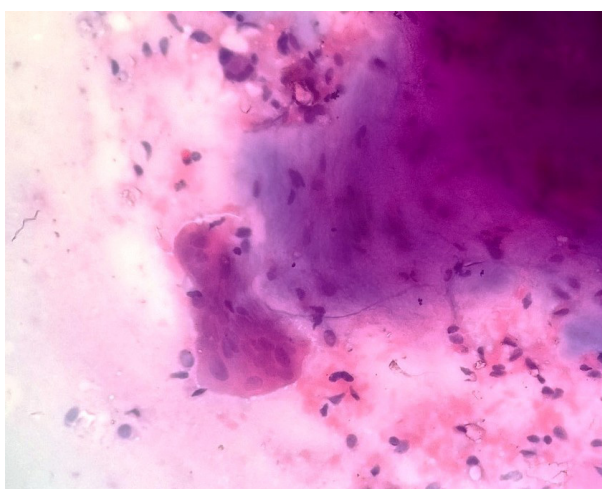


Fig. 2
FNAC smear showing chondromyxoid tissue fragments, fibrocytes and osteoclastic giant cells (hematoxylin & eosin 400X)

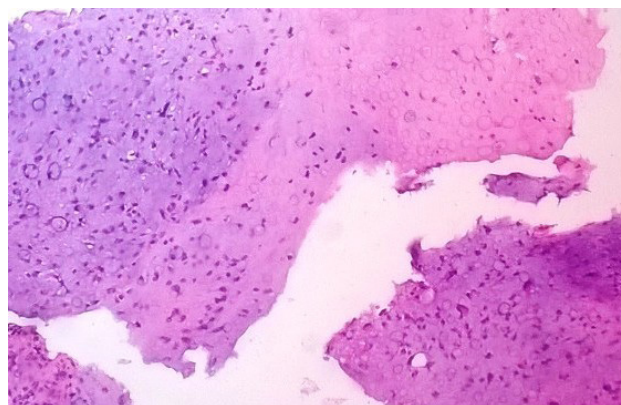


Fig. 3
Section showing hypocellular lobules of myxochondroid appearance separated by cellular tissue composed of fibroblast like spindle cells (hematoxylin & eosin 400X)

Histopathological examination of the resected specimen showed hypocellular lobules of myxochondroid appearance separated by more cellular tissue composed of fibroblast like spindle cells having ovoid nuclei and moderate cytoplasm along with osteoclastic giant cells in places (Fig.3). There was mild nuclear atypia. No mitoses, necrosis or calcifications were seen. The findings were consistent with the diagnosis of CMF.

The post-operative period was uneventful. Currently, the patient is in follow up and doing well 6 months after the surgery.

The differential diagnosis includes giant cell tumor, aneurysmal bone cyst, chondroma, chondroblastoma and nonossifying fibroma. It may be confused at times with chondrosarcoma on histology. The zonal and lobular pattern of CMF with nodules of chondroid tissue separated by fibromyxoid areas along with osteoclastic giant cells differentiates it from other probable diagnoses.

Discussion

CMF is the rarest benign chondroid neoplasm and represents less than 0.5% of all bone tumors. It usually presents in patients during their second and third decade and has a slightly higher incidence in males (7). The tumor has a predilection for the metaphyseal region of the distal femur and proximal tibia with some unusual locations like metatarsals as in our case. Patients usually complain of a slow growing painful swelling. Pathological fracture can also occur in about 5% of cases of chondromyxoid fibroma (8). Radiologically CMF shows an expansile radiolucent lesion with well defined sclerotic margins (9).

Feit et al. reported a case of chondromyxoid fibroma of fourth metatarsal and Goldenharet al. reported a similar case in first metatarsal and

medial cuneiform bone. Both patients were diagnosed on histopathological examination after resection of the tumor (10, 11). Pre-operative diagnosis is very important so as to avoid unnecessary radical surgical procedures which increase the morbidity of the patient. The cytological features of CMF are distinctive enough to make a pre-operative diagnosis on FNAC after clinico-radiological correlation (12, 13).

Our patient was a young male who presented with a painful swelling in his right foot diagnosed as giant cell tumor of the third metatarsal of the right foot on radiological examination. However, FNAC was done which revealed scattered dense, fibrillary chondromyxoid tissue fragments, stellate cells and spindle-shaped fibrocytoid cells along with few osteoclastic giant cells in a myxoid stroma which favored the diagnosis of CMF.

On cytological study of CMF, there are varying combinations of chondroid, myxoid and fibroid elements (2). The chondroid and myxoid elements form the irregular fragments of matrix in the background. The cellular elements comprise a variable mixture of spindle cells, stellate cells and chondroblasts with nuclear pleomorphism but with uniformly bland, smudgy chromatin and no mitotic figures (6, 12). Cytologically it may be confused with benign lesions like chondroblastoma or at times even with myxoid chondrosarcoma but cellular pleomorphism, nuclear atypia and mitoses seen in the latter help to distinguish the two. Chondroblastoma shows chondroblasts, giant cells and chondroid matrix (4, 7).

The histopathological picture of CMF is characteristic with lobular arrangement of myxoid and chondroid tissue surrounded by zones of hypercellular fibrous tissue. No well formed cartilage or bone is seen (2). Some cases of malignant transformation of CMF have been reported (8). In our patient histopathological examination showed hypocellular lobules of myxochondroid tissue separated by fibroblast like spindle cells along with osteoclastic giant cells. There was

mild nuclear atypia and no mitoses, necrosis or calcifications were seen. These findings were consistent with the diagnosis of CMF.

The ideal treatment for CMF is curettage combined with bone grafting, and hence a correct pre-operative diagnosis is very helpful in selecting this line of management (13).

CMF is the rarest benign tumor of cartilaginous origin which sometimes poses a great diagnostic challenge especially when it is located at rare sites. Preoperative diagnosis is also very important so as to avoid any radical surgical procedures owing to the benign nature of the condition. Radiological investigations may sometimes be misleading, as in our case therefore cytology plays an important role here.

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The authors declare that there is no conflict of interests.

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