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21 Cases of Giant Cell Rich Lesions of Bone- Cytologic Analysis of Imprint Smears

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Abstract
Introduction: *There are many bone lesions rich in osteoclastic giant cells(GC). FNAC and Trucut biopsies are increasingly being used to diagnose bone lesions. . In our centre, imprint smears are also made at the time of trucut biopsies which often provide better cytological details. Here we have analyzed the cytological features of giant cell rich lesions diagnosed over a three year period which included GCT,ABC and CB.*
Materials and Methods*: The following features were evaluated in smears from each case diagnosed during three years: 1) Presence of double population of GC and mononuclear cells 2)Presence of cohesive cell groups 3)GC attached to the periphery of mononuclear cell groups 4)oval-spindle mononuclear cells 5)Round mononuclear cells with nuclear folds 6) Background material if any.*
Results: *there were 21 lesions which included 14 giant cell tumors (GCT) of bone, 5 aneurismal bone cysts (ABC), and 2 cases of chondroblastoma (CB).*
Conclusion: *GCT, ABC and CB are bone lesions containing GC. Although there are similarities, there are enough distinctive features in cytologic smears to allow their distinction with confidence and thus provide an easy and less expensive way of preoperative diagnosis.*
Keywords: *giant cell rich lesions, giant cell tumor, aneurismal bone cyst, chondroblastoma, imprint cytology.*

Introduction

Osteoclastic giant cells are large multinucleate giant cells with upto100 nuclei. They are of monocyte macrophage lineage and are concerned with bone resorption. There are many bone lesions rich in GC. They include giant cell tumor of bone, chondroblastoma, chondromyxoid fibroma, aneurysmal bone cyst, brown tumor of hyperparathyroidism and many more.

FNAC and Trucut biopsies are increasingly being used to diagnose bone lesions so that definitive treatment can be planned and unnecessary mutilating surgeries can be avoided. In our centre, imprint smears are also made at the time of trucut biopsies which often provide better cytological details. Here we have analyzed the cytological features of giant cell rich lesions diagnosed over a three year period which included GCT, ABC and CB.

Materials and methods

All the giant cell rich lesions received at the histopathology-cytology laboratory during the years 2010, 2011, and 2012 were retrospectively identified and imprint cytology smears reviewed. The following features were evaluated in smears from each case: 1) Presence of double population of GC and mononuclear cells 2)Presence of cohesive cell groups 3)GC attached to the periphery of mononuclear cell groups 4)oval-spindle

mononuclear cells 5)Round mononuclear cells with nuclear folds 6) Background material if any.

Results

There were 21 cases of giant cell lesions of bone reported during three years which included 14 cases of GCT, 5 cases of ABC and 2 cases of CB [Diagram 1].Diagram 2 shows the cytologic features in the different categories. Double cell population was seen in 13 cases of GCT, one case of ABC and both cases of CB. 13 cases of GCT showed clusters of plump mononuclear cells with oval nuclei and GC with similar nuclear features. Cohesive cell groups were seen in GCT and CB but was absent in ABC.GC attached to the periphery of mononuclear cells could be seen in 8 cases of GCT and both cases of CB. This feature was not noted in any case of ABC where the mononuclear cells were spindly with elongated nuclei. Oval – spindle cells were found in GCT and ABC but the cells of CB were round. Both cases of CB showed nuclear indentation or folds which were absent in the other categories. Focal chondroid material was noted in both cases of CB and one case of ABC. In addition siderophages were noted in 2 cases of GCT and 3 cases of ABC.

Age range of GCT was 20-47 years. All cases of ABC were in the 4th decade except one case at 6 years of age. The two patients with CB were 11 and 32 years of age.

Diagram 1

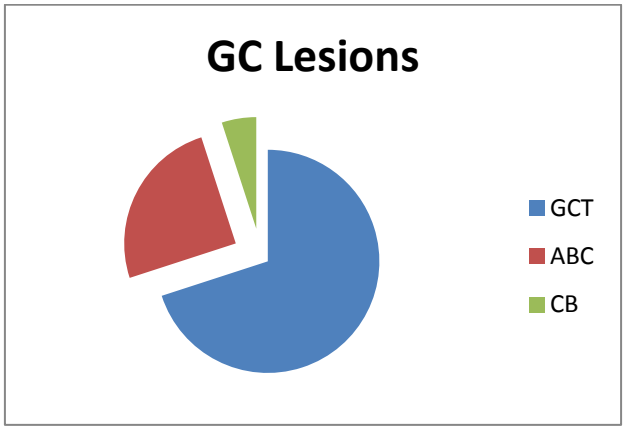

Diagram 1: There were 21 cases of giant cell lesions of bone which included 14 cases of GCT, 5 cases of ABC and 2 cases of CB

Diagram 2

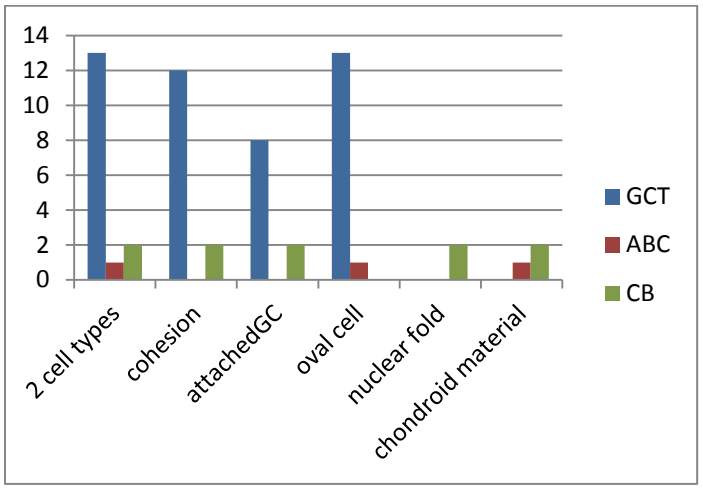

Diagram 2:

Two cell types: GCT- 13,ABC-1, CB-2
Cohesion: GCT- 12, ABC- nil, CB- 2
Attached GC: GCT-8, ABC- nil, CB-2
Oval cells: GCT-13, ABC,1,CB- nil
Nuclear fold: GCT-nil, ABC-nil, CB-2
Chondroid material: GCT-nil, ABC-1, CB-2

The final picture was as follows:

GCT- Consistent features were double cell population of GC and cohesive clusters of plump oval-spindle cells, both groups showing similar nuclear features. GC were seen attached to the periphery of mononuclear cell clusters which was helpful in differentiating it from ABC.

ABC- smears showed dispersed GC and discohesivespindle cells with one case showing chondroid material.

CB- both cases showed cohesive round cells with folded or grooved nuclet and GC, some being attached to the cell clusters. Both showed chondroid material in the background.

Discussion

Bone tumors comprise a diverse spectrum of morphologic and behavioral entities. There are many tumor like lesions also in the bone. Correct diagnosis is important in choosing therapeutic modalities. Preoperative diagnosis depends on good clinical examination and radiologic assessment. However tissue diagnosis is essential before starting definitive treatment especially in cases where radical surgery or chemotherapy is indicated.

Open biopsy is a common method, the advantage being the availability of ample material for evaluation. Many consider this as the gold standard but there can be significant contamination of the surrounding tissue by tumor cells .The advantage of Trucut biopsies and FNAC in this context is that they provide a safe and accurate technique with good sensitivity and specificity that can be performed in less specialized centers.[1,2]

Imprint smears are made in bone marrow biopsies almost routinely. Trephine biopsies can provide information about the structure of of marrow. At the same time morphological features of individual cells may be identified by making imprint from the material obtained.[3] This concept has been tried in many areas with success such as in lung tumors and prostatic lesions.[4,5]The imprint method permits collection of cells of excellent quality for analysis and more refined visualization of cellular aspects than in biopsy material, considering that the cells suffer modifications during the process of decalcification of the material.[6]

Osteoclastic giant cells can be found in both neoplastic and non neoplastic diseases of bone. A study on Fine needle aspiration cytology of bone lesions from Cairo University concluded that FNAC could differentiate various giant cell rich lesions and other bone tumors .[7]

In this study we have tried to analyze the cytologic features of giant cell rich lesions of bone based on imprint smears of tru cut biopsies done over a three year period.

GCT is a tumor of the bone which gets its name due to the presence of GC in varying proportions. It's histogenesis is unknown. Most cases occur in the third and fourth decades of life. The most frequent sites are the epiphysis of long bones. Radiographically it presents as a lytic lesion without sclerotic rim or periostial reaction. Jain et al recommends FNAC as a primary tool in diagnosis of GCT .[8]

Cytology smears from GCT show two cell populations- spindle to avoid mononuclear cells with bland chromatin and indistinct nucleoli as well as GC. The nuclei of giant cells and mononuclear cells are similar in appearance. In the study by Khan and Mir they could diagnose GCT by cytology in 11 cases out of 13 cases. Sensitivity was 92.4% and specificity 88.4%. [9]

ABC is an expansile, destructive bone lesion. Historically they have been considered as non neoplastic cystic lesions. They have been divided into primary and secondary types, the latter arising in relation to primary bone tumors like GCT, osteosarcoma etc. Radiological appearance is that of an eccentric lytic lesion with thin peripheral reactive bone. It can affect any bone but metaphysis of long bones are commonly affected. Histology shows blood filled spaces lined by fibrous septae that usually contain an underlying layer of GC. Osteoid, woven bone and chondroid matrix material may also be seen. [10]

Chondroblastoma is a rare tumor with a predilection for the epiphysis of long bones and appear before the epiphyseal plate disappears. In X- rays they are seen as lytic lesions often with a sclerotic rim. Dispersed mononuclear chondroblasts, nuclear grooves, GC with nuclei different from those of the chondroblasts and chondroid matrix are diagnostic of this neoplasm in cytologic smears.[11,12]

Cytologic material from FNAC and imprint smears are similar and gives good cytologic details. However The touch preparations tend to contain much larger and more cohesive cell groups revealing more architectural details.[13]

In the present analysis we found a double population of mononuclear and GC consistently in GCT and CB. Peripheral adherence of giant cells to mononuclear cell groups as said to be a feature of diagnostic significance in GCTs. [14] This feature was seen in both cases of CB but the round cell groups with grooved nuclei helped in their differentiation from GCT along with the presence of chondroid material. The former two features distinguished CB from the one case of ABC with chondroid material.

Conclusion

GCT, ABC and CB are bone lesions containing GC. Although there are similarities, there are enough

distinctive features in cytologic smears to allow their distinction with confidence and thus provide an easy and less expensive way of preoperative diagnosis.

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