ROLE OF FINE NEEDLE ASPIRATION CYTOLOGY IN THE DIAGNOSIS OF MALIGNANT BONE TUMORS

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INTRODUCTION

- Malignant bone tumors (MBT): 0.2% of all the neoplasms; comprises of 3-5% of tumors in children (<15 years) and 7-8% in adolescents.
- Most MBT in younger age are Osteosarcoma (OS) and Ewing’s Sarcoma (ES) and, in adults Chondrosarcoma (CS) is the second most common primary MBT after OS.

AIMS AND OBJECTIVES

1. To study the cytomorphological spectrum of MBT and its correlation with clinico-radiological findings and histopathology; 2. To assess the utility of immuno-histochemistry (IHC) i.e. S100, CD 99 and osteocalcin (OC) in their diagnosis.

MATERIALS AND METHODS

- Prospective study - 18 months (Oct 2015 - March 2017).
- Patients with bony mass lesions, clinico-radiologically suspected of BT were referred for FNAC. Detailed clinico-radiological findings were recorded.
- FNAC - performed from the lesion with /without radiological guidance.
- Air-dried, Giemsa stained smears were studied for cytomorphological features.
- Cell Blocks (CB) were attempted wherever possible with excess of aspirate.
- Extra air-dried smears were fixed in cold Acetone-Methanol (1:1) for IHC.
- IHC on fixed-smears- performed using the same technique as for histopathology & CB.
- Cytodiagnostic was correlated with histopath.(core bx, resected specimen), IHC.
- Cases with the final diagnosis of MBT (22) were included in study, rest with other diagnosis were excluded after initial workup: TB (4), GCT (6), ABC (3), osteoma (1).

OBSERVATIONS AND RESULTS

- Age, gender: 4 -70 years, M: F ratio - 4.5 : 1
- Site- Extremity: lower (11), upper (5), rib (3), vertebra, scapula, mandible (1 each)
- 19 / 22 cases were correctly diagnosed on FNAC as OS (7), ES (10) and CS (2); all of these had histological correlation.
- 3/22 cases, because of marked pleomorphism on FNAC, could not be subtyped and were diagnosed as high grade tumor (NOS); however, their histological diagnosis was OS (2) and CS (1).
- There was no statistical difference in IHC expression on smears and biopsy for S100 for CS (>0.99) and CD 99 for ES (0.473).
- Expression of OC (for OS) on smears was poor as compared to sections (p=0.0152).

DISCUSSION

- In the present study, no false negative case of malignancy was reported on cytology.
- Sensitivity and specificity was nearly 100%, due to selection criteria; however, other studies have reported sensitivity of 74-100% and inadequacy rate of 18-25%. False negativity is a well known limitation of FNAC, which could be attributed to inadequate / non representative sampling, sclerotic lesion or intra osseous location.
- For ES and CS, expression of IHC (CD99, S100) showed nearly same results on cytology and histopathology, although the proportion of cells showing positivity were lower on cytology as compared to histopathology.
- For OS, expression of OC on cytology was poor with significant statistical difference when compared with histopathology.

CONCLUSION

- FNAC is a fairly accurate diagnostic modality with a high sensitivity for MBT.
- IHC on FNAs may help in the diagnostic confirmation (ES, CS); except HG tumor.
- However, Osteocalcin on FNAC smears was not of much help in the diagnosis of OS.
- The present study was a pilot study, larger studies are required to substantiate the accuracy of FNAC and role of IHC on smears in the initial diagnosis of MBT.

REFERENCES

3) Mohammed Aly A, Shaaban H, Abou Sinna I. Accuracy of fine needle aspiration cytology in the diagnosis of bone lesions with radiological assistance: Experience from the National Cancer Institute, Cairo University, Egypt Egyptian J Radiol Nuclear Med 2014; 45: 127-35