

Fine Needle Aspiration Cytology In Bone Lesions

Wahda M. Al- Neaimy, Kassim S.Ibrahim

OBJECTIVE:

To assess the efficiency of fine needle aspiration cytology (FNAC) in the diagnosis of bone/lesions

PATIENT AND METHODS

This Prospective study was conducted in the orthopedic surgical wards at Al- Zahrawi teaching hospital of the Mosul city over one year period from 2003-2004. Thirty seven patients presented with bone lesions were included in this study. The lesions were provisionally diagnosed by clinical and radiological methods.

RESULTS:

The results of the aspirated lesions include 20 malignant lesions, 8 tumour like lesions, 5 benign and potentially malignant lesions and 3 inflammatory lesions . In one aspirate the materials was inadequate The results were compared with the histopathological diagnosis.

CONCLUSION:

FNAC of bone lesion is safe, quick, easy, economical and helpful in planning the correct therapy.

KEY WORDS: Bone, FNAC, Lesion.

INTRODUCTION:

FNAC of bone lesions was introduced in 1930s. Experience in this field has revealed high rate of accuracy. The high rate of accuracy of FNAC of bone lesions ^(1,2,3,4,5) has resulted in recommending the use of this technique as the first line of investigation of bone lesions ⁽⁶⁾ The technique has not been tried in our locality. Therefore this study was planned to assess the efficiency of this technique in our locality.

METHODS:

FNAC was performed on 37 patients presented with bone lesions diagnosed on clinical and radiological bases. The age of the patients ranged between 5 and 70 years. They included 9 children and 28 adults. There were 25 males and 12 females. The technique was performed by the pathologists using 10 ml disposable syringe and a fine needle 21-22 gauge. No local anaesthesia or other premedication was used. The overlying skin was cleaned by iodine and alcohol. The needle was introduced percutaneously into the lesion blindly without any imaging technique. Using maximum amount of suction the lesion was aspirated. While suction was still applied, the tip of the needle was moved back and forth within the lesion. The aspirated materials were smeared on 2-4 slides, fixed in 95% alcohol for 10 minutes and stained by haematoxylin and eosin. The cytological diagnosis was made on the aspirated materials within 30-60 minutes and the results were compared with

the histological diagnosis which was considered as the conclusive diagnosis.

RESULTS:

FNAC was adequate in 36/37 lesions . The cytological results included 20 malignant lesions, 8 tumour like lesions, 5 benign and potentially malignant lesions and 3 inflammatory lesions . The malignant lesions

included 7 osteogenic sarcoma, 2 chondrosarcoma, 2 lymphoma, 2 Ewing's sarcoma, 2 malignant fibrous histiocytoma and 5 secondaries. The benign and potentially malignant lesions included 3 osteoid osteoma and 2 osteoclastoma. The tumour like lesions included 6 bone cysts and 2 eosinophilic granuloma (table). The cytological diagnosis was specific in the diagnosis of 3/3 inflammatory lesions, in 2/2 osteoclastoma, in 5/6 bone cyst, in 2/2 eosinophilic granuloma, in 5/7 osteogenic sarcoma, in 1/2 chondrosarcoma, in 2/2 lymphoma in 2/2 Ewing's sarcoma, in 1/2 MFH, and in 5/5 secondaries. The rest of the cases were correctly diagnosed as benign or malignant without specific diagnosis. In osteogenic sarcoma the smears were cellular and contain pleomorphic cells, giant cells and osteoid materials. Mitosis was frequent. In chondrosarcoma, the smears were cellular and contain chondroblast, chondroid matrix forming amorphous background in the smear.

Smears from lymphoma were very cellular and contain monomorphic lymphoid cells scattered singly and in loose clusters.

Smears from Ewing's sarcoma were cellular and the

Dept. of Pathology, College of Medicine
University of Mosul, Mosul – Iraq.

cells tend to form clusters of cells with hyperchromatic nuclei and granular chromatin pattern.

Although PAS stain is useful in differentiation of Ewings sarcoma from lymphoma, however it was not available at the time of the study.

In MFH the smears contain pleomorphic cells, spindle cells and few giant cells. The smears from secondaries were characterised by the presence of malignant cells which were odd to the aspirated tissue. Their cytological picture depends on the site of the primary tumour. In our cases they were all adenocarcinoma. The cells were in clusters, their nuclei were vesicular and their cytoplasm contained mucus vacuoles. In osteoid osteoma the smears were hypocellular containing few osteoblasts and occasional osteoclasts. In osteoclastoma the smears contain large number of osteoclasts mixed with stromal cells having ample cytoplasm and fibrillary process. In bone cyst the smears contain fresh blood, haemosiderin laden macrophages, few osteoclasts and fragments of fibrous tissue. In eosinophilic granuloma the smear contains large number of eosinophils and few osteoclasts.

In the inflammatory lesions the characteristic picture was the presence of large number of polymorphs, together with few lymphocytes and plasma cells.

DISCUSSION :

FNAC of bone lesions faces two main difficulties, the first one is the difficulty of obtaining adequate sample and this depends on the type of lesion, the

type of needle and the experience of the aspirator. The second

difficulty results from loss of the architecture of the aspirated lesion leaving the pathologist with the cellular changes only^(7,8,9). In this study the aspirated materials were adequate in 36/37 lesions. A diagnosis of benign and malignant lesions was possible in all the adequate samples giving a sensitivity rate of 100% as far as the adequate sample is concerned, however if the inadequate aspirate is included the sensitivity rate is 97%.

The clinical picture, the age, the site of the lesion and the radiological picture were of great help in interpretation of the smears. No false negative or false positive diagnosis was made. The results of this study are similar to other studies^(3,5,9,10,11,12,13,14,15). The technique proved to be simple and easy, it can be performed in the out patient clinic without the need for anaesthesia or hospitalisation. The technique is fairly painless like any other injection provided that the needle used is not wider than gauge 18. It is quick as the result can be issued in 30-60 minutes. It is economical when compared with the cost of histopathological examination further more it may cut down other expensive investigation. Added to that it may eliminate the need for surgery when the appropriate treatment is chemo or radiotherapy.

CONCLUSION:

It is concluded from this study that FNAC of bone lesions is simple, safe, economical, quick and fairly painless. It is helpful in planning the correct therapy as it may provide a preoperative diagnosis.

Table : Lesions ,number of cases and percentages of total 37 cases of bone lesions .

Percentage	Number of cases	Lesions
54	20	Malignant
22	8	Tumour like lesions
13	5	Benign and potentially malignant
8	3	Inflammatory
3	1	Inadequate
100	37	Total

REFERENCES :

1. Akerman M, Berg NO, Person BM. Fine needle aspiration in the evaluation of tumour like lesions of bone. *Acta Orthop.Scand.* 1976,47: 129-136.
2. Stormby N, Akerman M. Cytodiagnosis of bone lesions by mean of fine needle aspiration biopsy. *Acta Cytol.* 1983,17:1 66-172.
3. White VA, et al. Osteosarcoma and the role of fine needle aspiration. A study of 51 cases. *Cancer.* 1988,26:1238-1246.
4. SchuLtenover SJ, et al. Needle aspiration biopsy :Role and limitation in surgical decision making. *Am J Clin Path.* 1984,82:405-415.
5. Al-Hashimi A, Hamdan S. Fine needle aspiration biopsy of bone tumours. *J Fac Med Baghdad.* 1999,40:297-3 02.
6. Dollahne RA, et al. Aspiration of primary neoplasms of bone. *J Bone and Joint Surg.* 1989,7:1166-1169.
7. Simon AM. Current concepts in the biopsy of musculoskeletal tumours. *J Bone and Joint Surg.* 1982,64:1253-1257.
8. Watchel EG, Hudson BA. The usefulness of cytology. *British. J of Hospital Medicine.* 1985,23:25d-265.
9. Agarwal PK, Wahal KM. Cytopathologic study of primary tumours of bone and joints. *Acta Cyto1.* 1983,27:23-27.
10. El-Khoury GY, et al. Fine needle aspiration of bone. *J Bone and Joint Surg.* 1983,56:522-525.
11. Nada M et al. Fine needle aspiration cytology in malignant bone tumours. *Indian J Pathol Microbiol.* 1994,37 :247-253.
12. Konto Zoglout, Krabauer K, Gizibash AH. Ewing's sarcoma cytological features in fine needle aspiration in two cases. *Acta Cytol.* 1986,30:513-518.
13. Hazarika D, Kumar RV, Rao CR, et al. Fine needle aspiration cytology of chondroblastoma and chondromyxoid fibroma. A report of two cases. *Acta Cytol.* 1994,38:592-596.
14. Rios-Martin JJ, et al. Fine needle aspiration diagnosis of aggressive giant cell tumour of bone . A case report. *Acta Cytol.* 1995,39:550-554.
15. Debdata B, Bhawana A, Ghotekar L. H, et al. Malignant melanoma metastatic to bone marrow. *Indian J Pathol Microbiol.* 2002 45 : 107-109.