

Original Article

Diagnostic Value of Image Guided Fine Needle Aspiration Cytology in Assessment of Vertebral and Paravertebral Lesions

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Abstract

Fine needle aspiration cytology (FNAC) of radiologically detected vertebral and paravertebral lesions is now used extensively for diagnosis and further management of patients. In this study, we report our experience with image guided FNAC diagnosis of vertebral and para-vertebral lesions in a total of 150 cases. Out of a total of 150 patients, 34 (22.7%) cases were positive for malignancy, 61 (40.7%) cases were benign non neoplastic lesions, 23 (15.3%) had inadequate/ unsatisfactory material for diagnosis, 31 (20.7%) had normal cellular elements of bone marrow and 1 (0.6%) case was diagnosed as a benign nerve sheath tumour. Radiologically guided FNAC is a simple, cost effective procedure in vertebral and paravertebral lesions.

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Key Words: Vertebral and paravertebral lesions, fine needle aspiration cytology.

Introduction

Image guided fine needle aspiration cytology (FNAC) has emerged as the first line of investigation in the assessment of radiologically detected vertebral and para-vertebral lesions. FNAC is a safe, less traumatic, rapid and easy method compared to larger core or open biopsy.¹⁻⁶ Moreover this procedure is cost effective as well as easier to repeat, if necessary. In patients with vertebral lesions and a known history of malignancy, FNAC is performed to confirm or rule out metastasis. Further, in patients who have no previous clinical history of malignancy, FNAC provides the first indication of the same and thus helps in faster patient evaluation.⁷ FNAC can also provide material for ancillary studies such as immunocytochemistry (ICC), flow cytometry etc, which may be required in difficult cases, to reach at a correct diagnosis.⁸⁻¹⁰ In this study, we report the experience with image guided FNAC diagnosis of vertebral and para-vertebral

lesions in our center (PGIMER), which is a tertiary referral.

Materials and Methods

We reviewed and analyzed 150 cases of vertebral and para-vertebral lesions, in which ultrasound (USG)/ computed tomography (CT) scan guided FNAC was performed from January 1998- July 2004. Out of 150 patients, 26 had a clinical history of malignancy at another site. In these cases, FNAC was done to rule out or confirm metastases. In other cases, the vertebral and paravertebral lesions were detected on radiology and were hence subjected to FNAC as a part of workup. Two to three passes were made in each case with 0.7 – 0.9 mm lumbar puncture (LP) needle under USG/ CT guidance. The aspirated material was smeared on glass slides, air dried for MGG staining and fixed in 95% alcohol for H&E/ PAP staining.

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Results

Out of a total of 150 patients, 82 (54.7%) were males and 68 (45.3%) were females with their ages ranging from 1– 78 years (mean 47.4 years). The FNAC diagnoses are summarized in Table 1.

Out of a total of 34 (22.7%) cases, which were reported as positive for malignancy, there were 16 metastatic tumours including 15 metastatic carcinoma (including 13 cases of adenocarcinoma, 1 renal cell carcinoma and 1 case of small cell carcinoma) and 1 metastatic germ cell tumour. Other cases were plasmacytoma (10 cases), small blue round cell tumours (5 cases), non-Hodgkin's lymphoma (3 cases). Immunocytochemistry (ICC) was done in few diagnostically difficult cases and it helped in the diagnosis of three cases of non Hodgkin's lymphoma and 5 cases of small round cell tumours (Ewing's sarcoma [1 case], rhabdomyosarcoma [1 case] and 3 cases could not be classified further on FNAC).

The cytological diagnosis of the largest category (i.e. 61 [40.7%] cases) benign non neoplastic lesions is summarized in Table 2. There were a total of 44 (29.3%) cases of tuberculosis and 15 (10%) cases of acute/ suppurative inflammatory lesions, which together were the most common lesions encountered. Cytologically, the cases of tuberculosis showed granulomatous inflammation with or without necrosis. The Ziehl- Neelson stain for acid fast bacilli (AFB) was positive in 23 cases and negative cases (21 cases) were confirmed on mycobacterial culture. Out of the remaining 55 patients, 23 (15.3%) had inadequate/ unsatisfactory material for diagnosis, 31

(20.7%) had normal cellular elements of bone marrow and 1(0.6%) case was diagnosed as a benign nerve sheath tumour.

Discussion

Fine needle aspiration cytology (FNAC) of radiologically detected vertebral and paravertebral lesions is now used extensively for diagnosis and further management of patients.¹⁻⁷ It is an easy, rapid, relatively safe and cost effective diagnostic modality that can be used for both outpatients and inpatients. The most common pathological diagnosis in our set up was tuberculosis of the vertebral column (Pott's spine); this is consistent with earlier series from our country.¹¹

The prevalence of tuberculosis is around 30 million globally and approximately one- third of the cases are found in India. 1 to 3% of the 10 million have involvement of bone and joints. Vertebral tuberculosis is the commonest form of skeletal tuberculosis comprising about 50- 70% of all bone and joint tuberculosis.¹² It may present as bony vertebral pain or as paraparesis. Tissue diagnosis is required before initiation of therapy as sometimes; it is not possible to differentiate inflammatory lesions from a malignancy. Thus the role of FNAC is of utmost relevance in this setting as it avoids unnecessary open biopsy in these morbid patients.

In the present study, multiple myeloma (plasmacytoma) was the most frequently encountered primary malignancy. As stressed by Bommies et al¹³, the number of plasma cells, their cytological features ranging from normal to immature appearance and the presence of osteolytic lesions together with monoclonal gammopathy will prevent its misinterpretation as normal marrow elements.

The vertebral column is a common site of metastasis.¹⁴⁻¹⁵ FNAC is associated with a lower risk of tumour seeding as compared to open biopsy. One of the most important indications for FNAC of a radiologically detected vertebral lesion in a patient with a prior history of malignancy is to establish the presence of metastasis.¹⁶⁻¹⁷ In patients with no known primary tumour, FNAC can also be helpful in establishing an initial diagnosis of malignancy and initiate a search for the occult primary malignancy.³ In the present study, out of 150 patients, 26 had a clinical history of malignancy at another site and FNAC was performed to confirm metastasis. The common primary sites with vertebral metastasis were lung and breast. Immunocytochemistry (ICC) helped in the

Table 1 : Categories of cytological diagnosis of FNAC of 150 vertebral and paravertebral lesions

Cytological diagnosis	No.of cases	Percentage
Positive for malignancy	34	22.7
Unsatisfactory/inadequate for diagnosis	23	15.3
Normal cellular elements	31	20.7
Benign non- neoplastic conditions	61	40.7
Benign neoplastic conditions	1	0.6

Table 2 : Cytological diagnosis in 61 (40.7%) cases of inflammatory/ benign non-neoplastic lesions on FNAC

Cytological diagnosis	No. of cases	Percentage out of total cases
Tuberculosis	44	29.3
Acute/ suppurative inflammation	15	10
Cysticercosis	1	0.7
Cyst, NOS	1	0.7

diagnosis of three cases of non Hodgkin's lymphoma and 5 cases of small round cell tumours (Ewing's sarcoma [1 case], rhabdomyosarcoma [1 case] and 3 cases could not be classified further on FNAC).

Patients whose aspirates showed only normal bone marrow elements may not always require additional tissue biopsies. However, normal bone marrow elements may also be seen in association with malignant cells in positive smears.

Adequacy of cytological material is important in rendering a definitive diagnosis. However, this may not always be possible since FNAC of bony lesions are generally bloody and tend to produce a low-cell-yield sample.¹⁶ The rate of unsatisfactory specimens in our series was 15.3%, which was slightly lower than the rates reported in other studies (16-19%).^{1,3} This also depends on the skill of the radiologist in deciding the optimal route of approach at various anatomical levels.⁴

Unusual complications such as transient radiculopathy and quadriparesis have been reported following FNAC of vertebral lesions.¹⁸ In our series, none of these or any other complications were encountered.

In conclusion, radiologically guided FNAC is a simple, cost effective procedure in vertebral and paravertebral lesions. It leads to accurate diagnosis and directs the treating physician/surgeon in management of patients in most of the cases, avoiding the open surgical biopsy.

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