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Original article

Fine needle aspiration (FNA) of soft tissue tumours (STT)

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Abstract
Objectives: The cytological findings of 50 ST Ts were evaluated aiming to determine the role of FNA in diagnosis of STTs
Methods: Fifty patients with soft tissue tumours underwent FNA in the preoperative investigation during a one year period. The smears were stained with Papanicolaou and May-Graunvald Giemsa stains.
Results: Forty-four cases were reported as benign, whereas 2 were malignant. Four cases revealed insufficient material. The malignant STTs were small round cell tumour and malignant spindle cell tumour. Cytological and histological correlation could be achieved in 40 cases. The overall sensitivity and specificity were 25% and 100% respectively with overall accuracy of 80%.
Conclusion: A reliable diagnosis of STTs can be made with FNA when supported by other clinical and other diagnostic data.

Key words: FNA, soft tissue tumours

Fine needle aspiration cytology is a relatively non-traumatic procedure for sampling both the superficial and deep-seated masses. Multiple samples can be obtained in the same sitting.[1] Since its introduction by Martin and Ellis in 1934, FNA has travelled its torturous course to present status. FNA is well established technique for evaluation of epithelial tumours for many years.[2] Now it has gained its reputation in the diagnostic work up of soft tissue tumours as well.[3,4] Although, the last few years have seen publication of several reviews and editorials on the cytodiagnosis of soft tissue tumors,[5,6,7,8] the diagnostic role of FNA in evaluating soft tissue tumours remains controversial.

FNA has increasingly been accepted in establishing the presence of malignancy and providing morphologic support for alternative therapy in inoperable cases and to monitor the effects of therapy. The diagnostic accuracy of FNA of soft tissue tumours in distinguishing benign and malignant lesions is very high. In this study, we aimed to investigate the value of FNA for cytodiagnosis of STTs in our series.

Materials and methods

Fifty patients of all age groups and clinically having soft-tissue swellings were evaluated by FNA. Lymph node, thyroid, breast and salivary gland swellings were excluded. Aspiration was done using a 10 ml sterile syringe coupled with 23G needle. Neither premedication nor local anaesthetics were used. Smears were prepared. Some were air dried and stained with May Grunwald- Giemsa, while others were wet fixed with 95% ethanol and saved for Papanicolaou stain.

Results

The series included 25 females and 25 male patients (1:1), ranging in age from 5 to 72 years. The case included 44 benign and 2 malignant lesions. Material aspirated was insufficient for diagnosis in 4 cases.

Benign soft tissue tumours

The most frequently diagnosed benign soft tissue tumour in this study was lipoma (19).Aspiration cytology smears in these cases revealed fatty tissue fragments intermingled with fibroblasts. FNA diagnosis was correct in 16 cases where as 3 cases were histologically diagnosed as hamartoma, collagenoma and schwannoma.

The second most common tumour was benign nerve sheath tumour (9), categorization of these tumours into neurofibroma and schwannoma was not possible. Of these 5 were categorized as schwannoma, 2 as neurofibroma and 2 as benign nerve sheath tumour histologically. Aspiration cytology revealed fragments of tissue of variable cellularity and sizes with fibrillary background matrix. Nuclear palisading and Verocay bodies were evident in one case.

Six cases were categorized as benign spindle cell lesions on FNA. Of these 2 each were histologically diagnosed as neurofibroma and schwannoma. The remaining 2 turned out to be malignant lesions (spindle cell sarcoma and leiomyosarcoma).

The smears of these cases showed scattered bland looking spindle cells, having elongated blunt nuclei and scant amount of cytoplasm. They did not reveal diagnostic clues such as wavy elongated nuclei and fibrillary background along with myxoid matrix to categorize them as peripheral nerve sheath tumour.

Benign mesenchymal tumours were diagnosed cytologically in 5 cases. Of these 4 were proven to be benign (benign fibrous histiocytoma1, schwannoma1, nodular fascitis1and lipoma1) and 1 as malignant(malignant mesenchymal tumour) histologically. The FNA of these cases showed fragments of mesenchymal tissue comprising of bland looking spindle cells, along with fibrofatty tissue.

Three cases were diagnosed as benign fibrohistiocytic lesions on cytology, which on histology showed pleomorphic MFH, neurofibrosarcoma and dermatofibrosarcoma.

Two cases were diagnosed as tumoural calcinosis. Aspiration yielded chalky white material, which on microscopy showed calcification, osteoclastic giant cells and macrophages.

Malignant soft tissue tumours

Two cases were diagnosed as malignant (small round cell tumour and malignant spindle cell tumour).

FNA of the small round cell tumour showed small round cells dispersed singly. Tumour cell had uniform small round hyperchromatic nucleus with scant amount of cytoplasm.

FNA of the malignant spindle cell tumour showed oval to spindle shaped nuclei with irregular chromatin clumping, prominent nucleoli and moderate amount of cytoplasm.

Histologically these cases were confirmed as small round cell tumour and pleomorphic malignant fibrous histiocytoma.

Table 1: Distribution of benign soft tissue tumours

Cytodiagnosis	**No. of cases**	**Percentage**
Lipoma	19	43.18
Benign nerve sheath tumour	9	20.45
Benign spindle cell lesion	6	13.64
Benign mesenchymal tumour	5	11.36
Benign fibrous histocytic tumour	3	6.82
Tumoral calcinosis	2	4.55
Total	44	100

Table 2: Distribution of Malignant lesions

Cytodiagnosis	**No. of cases**	**Percentage**
Small round cell tumour	**1**	**50**
Malignant spindle cell tumour	**1**	**50**
Total	**2**	**100**

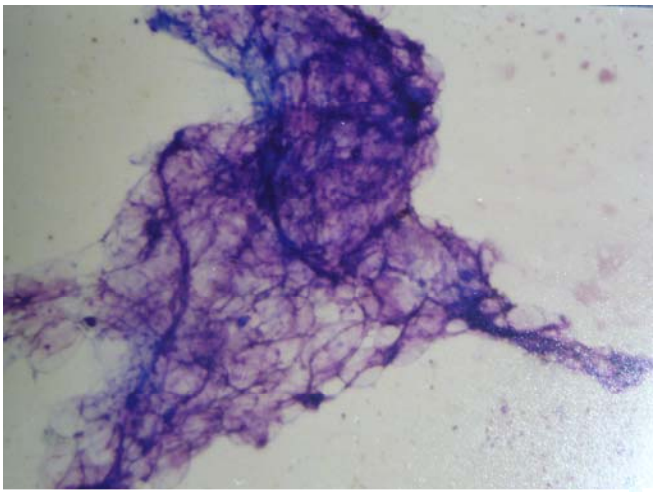

Fig 1: FNAC- Lipoma showing mature adipose tissue (MGGX20)

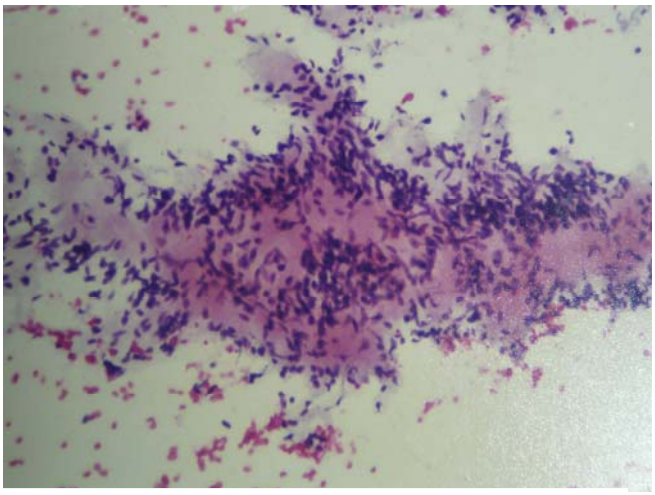

Fig 2: FNAC- Benign nerve sheath tumour showing spindle cells proliferation and verocay bodies (PAPX20)

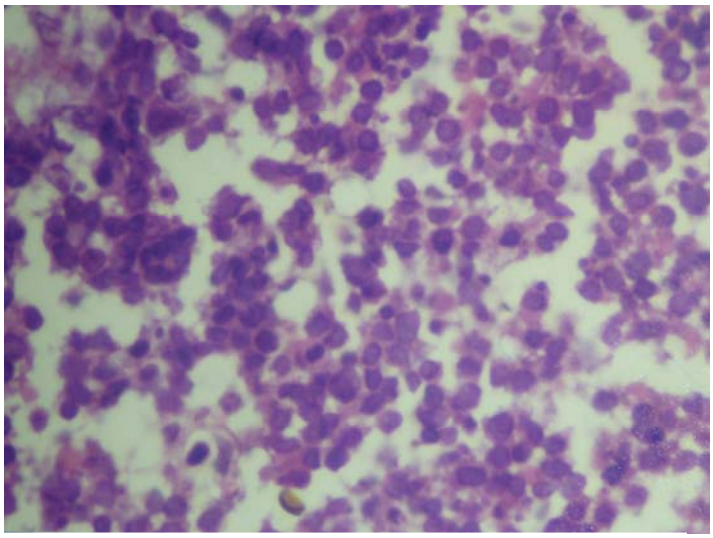

Fig 3: FNAC-Small round cell tumour (PAPX40)

Discussion

FNA has an established role in the diagnosis of various neoplastic and non-neoplastic lesions. It may also be used as a very useful alternative to excision biopsy in the diagnostic workup of soft tissue tumours. Although it is very difficult to categorize the soft tissue tumours exactly by FNA due to heterogeneous nature of the soft tissue tumours as well as absence of tissue architecture, [3,4,7] thorough familiarity with these histological diversities of soft tissue tumours and experience with interpretation of different cell types in cytology smears along with awareness of fallacies of FNA help in achieving high diagnostic accuracy in these tumors.[8,9]

In the present study FNA accuracy was 80% and the sensitivity and specificity of diagnosing benign soft tissue tumours was 100% and 25% respectively and for malignant soft tissue tumours it was 25% and 100% respectively. Amongst 44 benign lesions diagnosed on FNA, 38 were confirmed as benign on histopathology, whereas the remaining 6(false negative 13.5%) were diagnosed as malignant soft tissue tumour. Two tumours were diagnosed as malignant on FNA, both of which were confirmed on histopathology as malignant.

High false negative rates in our study can be explained due to absence of representative cells and arrangement to indicate malignancy. In our study, one case each of MFH, neurofibrosarcoma and dermatofibrosarcoma were diagnosed as benign fibrohistiocytic tumour on FNA. In all these cases mitotic activity was low and cellular pleomorphism was not appreciated in great deal to categorize them as malignant. One case each of spindle cell sarcoma and leiomyosarcoma, diagnosed as benign spindle cell lesion on FNA, shows very few mitotic activity as well as other features like necrosis and haemorrhage to categorize them as malignant. One case of malignant mesenchymal tumour was cytologically given as benign mesenchymal tumour due to paucity of cellularity and mitotic figure. The false negativity rate of 13.5% is high and comparable with high false negative rate shown by other authors P. Dey et al, 7.6%, Frable et al, 6.96% and Dinesh R. Kulkarni et al. 6.25%.[2,3,6]

The sensitivity and diagnostic accuracy of FNAC for benign soft tissue tumours in our study is high as compared to other studies, but sensitivity of FNA to diagnose malignant soft tissue tumours in our study is low. Thus it is emphasized that FNA should be carried out in diagnostic evaluation of soft tissue tumours with proper degree of attention to cytomorphological features, supplemented with clinical findings and other diagnostic data to arrive at a correct diagnosis.

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