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Cytological and histopathological correlation of Soft tissue tumors

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ABSTRACT

Introduction: Fine ne edle aspiration cytology (FNAC) is useful in distinguishing accurately between benign and malignant soft tissue tumors and subclassify them into general and clinically relavant cases to initiate treatment.It's accuracy when applied by experienced and well trained practitioner matches that of histopatholgy in providing equivocal diagnosis.

Materials & Methods: This 2yrs retrospective and prospective study was done in Mahatma Gandhi Memorial Hospital Warangal by considering both exclusion and inclusion criteria in 240 cases. History & clinical evaluation were done.They were subjected to FNAC and later biopsy done and correlated.

Results:

FNAC revealed diagnostic material in 233 cases and7 cases were inconclusive for diagnosis.220 cases (92%) diagnosed as benign and 13cases(5.4%) were diagnosed as malignant on FNAC.Out of which 216(98%) benign cases were correlated on histopathology as benign,4 cases were diagnosed as malignant on HPE.All the13(100%) cases diagnosed as malignant on FNAC were correlated with histopathology as malignant.Out of the 7 inconclusive cases 4 cases diagnosed as benign and 3 cases diagnosed as malignant on histopathology. Diagnostic accuracy of benign cases is 97% & malignant cases is 100%.

Conclusion: FNAC is very useful procedure in preoperative diagnosis of benign&malignancy of soft tissue tumors with certain limitations.It is safe useful procedure of low financial cost, low morbidity with compliance& acceptable diagnostic accuracy.

Keywords: Fine needle aspiration cytology,soft tissue tumors,Histopathological examination.

INTRODUCTION

Soft tissue is non epithelial,extra skeletal tissue of the body exclusive of the reticulo endothelial system , glia and supporting tissue of the various parenchymal organs. It includes fat, fibrous tissue, voluntary & involuntary muscle,blood vessels and also peripheral nerves. The role of cytology in the diagnosis of soft tissue tumors is well debated.Tumors constitute a heterogenous group of lesions in terms of cinical presentation,morphological features,especially sarcomas have overlapping histopathological& cytomorphological features associated with morphological heterogeneity present in some of these mass lesions.

FNAC has also got some distinct advantages over a small biopsy sample for primary preoperative assessment of soft tissue lesions such as. Needle aspiration is associated with minimum chance of tumor Spread and Multipe aspirations from different parts of large heterogeneous tumor can be more informative.

FNAC being simple cheap&quick procedure is also considerably more cost effective,relatively painless procedure and is acceptable to the patient.It can be easily repeated if necessary. Limitations in diagnosis of soft tissue lesions includes[1]. Failure to get adequate specimen from deepseated,necrotic & cystic lesions[2]. Misdiagnosis in cases of samples drawn from reactive zones[3]. Faiure to specify&typify majority of soft tissue tumors[4]. Failure to interpret rare variants[5]. Lack of adequate cytological criteria of newly discovered and classified entities.

This study has been undertaken to increase our understanding about the soft tissue tumors,the sensitivity & Specificity of FNAC in diagnosing STT, it's architecteral features and to compare these findings with histopathological diagnoses.

MATERIALS AND METHODS

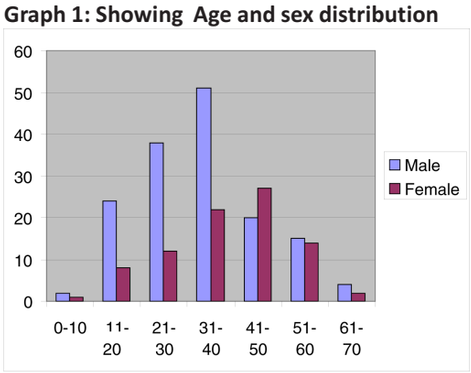
A total 240 cases selected and consent was taken to undergo FNAC and biopsy. A detailed history,clinical findings,routine laboratory investigations and radiological findings were carried out in each case. FNAC was done with 21G needle attached to 10ml disposable plastic syringe. Smears were fixed in 95% ethanol for 20 min and then stained with H&E and pap stain. Air dried smears were stained with May Grunwald's,Geimsa stain Pap stain.The smears were studied for cytological details& diagnosis.The surgical excised

specimens of above cases were processed routinely& stained with Haemotoxylin and eosin stain & examined. A final correlation was done between cytological and histological diagnosis.

RESULTS

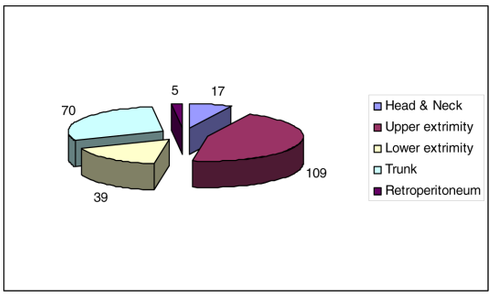
There were a total number of 240 cases from July 2010 to June 2014 of which 233 cases revealed diagnostic material and 7 cases were inconclusive . 220 cases (91%) diagnosed as benign lesions and 13cases(5.4%) were diagnosed as malignant lesions on FNAC. A total number of 240 cases suspected of STT were subjected to FNAC and compared with histopathology. Patient age ranged from 5-70 years most tumors observed between age group of 31-40 years accounting for about 73 cases(30%) and most cases were found in males with ratio of 1.8:1.[Graph 1]

Graph 1: Showing Age and sex distribution



Most of STT were presented in the upper extremity 109 cases(45%) followed by trunk 7 cases(29%) , lower extremity 39 cases(16%) , head & neck 17cases(7%), retroperitoneum 5cases(2%).[Graph 2]

Graph 2: Distribution of cases of STT according to site



On FNAC out of the 220 benign cases the commonest was lipoma 133cases(60.5%) followed by fibrolipomas 34 cases (15%), benign nerve sheath lesions 30cases(13.5%)(fig1a,5a), benign spindle cell lesions 16cases(7.2%)(fig3a) , Gaint cell tumor 3 cases(1.3%)(fig.4a) , intramuscular myxoma 2 cases(0.9%) benign vascular lesion 1 case (.4%) , spindle cell neoplasm 1 case(0.4%) (Table1).

Table 1:Distribution of benign lesion on cytology

Benign	No. of cases	Percentage%
Lipoma	133	60.5
Fibrolipoma	34	15
Benign Nerve sheath lesions	30	13.5
Benign spindle cell lesions	16	7.2
Gaint cell tumor	3	1.3
Intramuscular myxoma	2	0.9
Benign vascular lesion	1	0.4
Spindle cell neoplasm	1	0.4

Out of the malignant tumors most common was malignant spindle cell lesion 8 cases(61.5%) followed by malignant mesenchymal lesions 3 cases (23%) (Table4)

Table 2:Distribution of malignant tumours on cytology

Malignant tumours	No. of cases	Percentage%
Malignant spindle cell lesions	8	61.5
Malignant mesechymal lesions	3	23
Round cell tumors	2	15

On histopathological examination most common benign lesion was lipoma 126 cases(57.2%) followed by fibrolipoma 34 cases(15.4%) , schwannoma 19cases(8.6%)(fig.1b) , neurofibroma 16cases(7.2%)9(fig.5b) , benign fibrous histiocytoma 12 cases (5.4%) (fig.3b) (Table3).

Table 3: Distribution of benign lesions on HPE

Benign	No. of cases	Percentage%
Lipoma	126	57.2
Fibrolipoma	34	15.4
Schwannoma	19	8.6
Neurofibroma	16	7.2
Benign fibrous histiocytoma	12	5.4
Nodular fascitis	4	1.8
Gaint cell tumor	3	1.3
Neurolipoma	2	0.9
Angiolipoma	2	0.9
Haemangioma	1	0.4
Neurothekoma	1	0.4

Commonest malignant tumour diagnosed on histopathology was malignant fibrous histiocytoma 6 cases (30%) followed by rhabdomyosarcoma 3 cases(15%) , leiomyosarcoma(fig.7), Malignant peripheral nerve sheath tumor ,myxoid liposarcoma(fig.6), pleomorphic liposarcoma 2 cases each (10%) .(Table 4)

Table 4: Distribution of malignant lesion on HPE

Malignant	No. of cases	Percentage%
Malignant fibrous histiocytoma	6	30
Rhabdomyosarcoma	3	15
Pleomorphic liposarcoma	2	10
Myxoid liposarcoma	2	10
Malignant peripheral nerve sheath tumor	2	10
Leiomyosarcoma	2	10
Haemangioendothelioma	1	5
Dermatofibrosarcoma protruberns	1	5
Angiomatoid fibrous histiocytoma	1	5

Out of the 7 inconclusive cases 4 cases diagnosed as benign lesions nodular fascitis(1.8%) and 3cases diagnosed as malignant Dermatofibrosarcoma protruberance , Angiomatoidfibrous histiocytoma , haemangioendothelioma each 1 case(.4%).

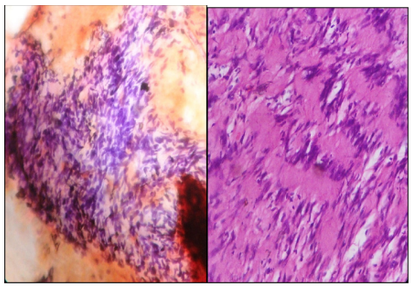


Fig1. Shwannoma;(a) loosely arranged spindled nucei with pointed ends,fibrillary stroma (FNAC,H&E X400).(b) Palisading spindled nuclei,verocay bodies (Histo,H&EX400)

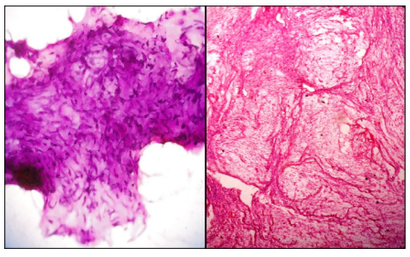


Fig2: Neurothekoma:Clusters of spindle cells on myxoid background (FNAC X400); Distinct lobules of connective tissue separated by fibrous septa,each lobule with myxiod matrix(H&E X400).

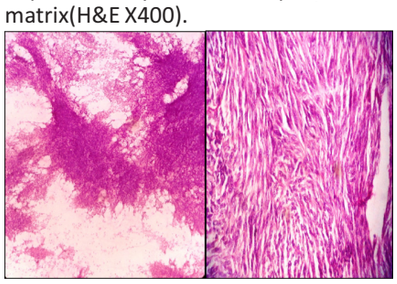


Fig 3:Benign firous histiocytoma;(a) solid clusters of cells with eosinophilic cytoplasm ovoid nuclei,multinucleate giant cells (FNAC X 400).(b)Fibroblast like cells arranged in bundles storiform pattern with histiocyte like cells.(H&E X 400)

Fig 4: Giant cell tumor;(a)Multinucleate giant cells with round to oval nuclei (FNAC X 400)(b)uniform mononuclear cells on a back ground of multinucleate osteoclast like giant cells (H&E X 400).

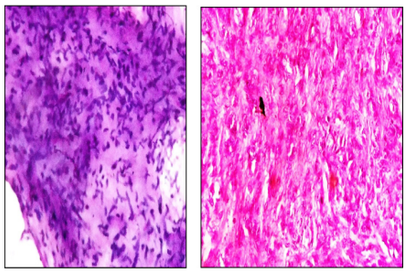


Fig 5: Neurofibroma;(a)Nuclei with slender nuceli comma shaped nuclei,myxoid back ground.(FNAC X 400). (b)low cellularity with elongated wavy nuclei,pointed ends,rich network of collagen fibres (H&E X 400).

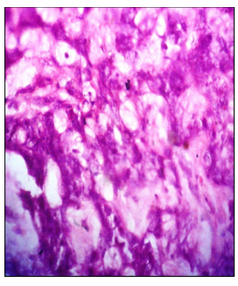


Fig 6: Myxoid liposarcoma;lipoblasts and capillary network,mucoid matrix(H&E X 400).

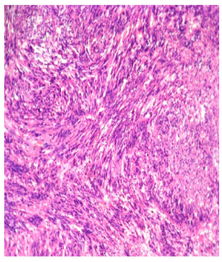


Fig 7: Leiomyosarcoma;Tumor bundles with elongated blunt ended nuclei arranged in fascicles intersecting each other with nuclear atypia(H&E X 400).

DISCUSSION

FNAC has an established role in the diagnoses of various neplastic& non neoplastic lesions. Reasonably accurate when applied by experienced & well trained practitioners. Complex heterogeneity is a challenging factor in diagnosis of STT.

This study was conducted on 240 patients with STT. 220 (91%) cases were benign& 20 (8.3%) cases were malignant.The results were comparable with other authors.

Shaham beg et al[1] found that 105 cases (105/126)were benign &21 cases (21/126) were malignant[2]. Benzabih et al[3] found that 82.8% (516/623) cases as benign&17.2% (107/623) as malignant.Dey et al[4] found that 83.7% (1135/1356) cases benign and 16.3% (221/1356) cases of malignant STT.

Majority of STT in our study were distributed between1st to 6th decade. 95.8% cases were benign. Between 3rd to 4th decade 33%cases most common.Malignant cases were most common between 5th to 6th decade 6 cases (2.5%) followed by6th to 7$_{th}$ decade.Shaham beg et al[1] found that most cases about 115 cases between 1st to5th decade in that 96 cases 91.4% found benign STT&19 cases of malignant STT were also in the same range.

Nagira et al[5] in their study on 279 cases of STT reported the mean age of 48yrs while Bezabih et al[3] found most common age group of benign tumors as 4th&5th decade and for malignant tumors 1st&2nd decades. We reported maximum no of cases 109 (45.5%) in upper extremity other authors like Shaham et al[1], nagira et al[5] found extremities followed by upper extremity.

As in our study Bennert et al in their study of 117 cases(69%) patients found lipoma as the most common benign STT and Malignant fibrous histiocytoma(30%) as the most common malignant STT.Nagira et al reported the most common benign STT a spindlecell(31.5%)followed by lipomatous tumor(4.6%)while the most common malignant STT in their study was pleomorphic cell(35%)followed by round cell tumor(19.3%).

Cytological details of aspiration smears along with clinico-radiological details help in making diagnosis.Both Cytological details including cell types, lipomatous, spindle, round or pleomorphic& the back ground materials like lipomatous,myxoid are indicators of type of STT on FNAC. We used similar approach in subtyping the STT on cytology.

Seven cases were reported as inconclusive on FNAC in our 4 of the 7 cases diagnosed as benign, 3 of the 7 cases diagnosed as malignant. Maximum correlation was seen in benign cases.1 case of neurofibroma,1 case of schwannoma,1case of neurolipoma,1 case of angiolipoma diagnosed as Lipoma on FNAC.1 case of Neurolipoma,1 case of Angiolipoma diagnosed as Fibrolipoma on FNAC&1 case of Fibrolipoma diagnosed as benign spindle cell lesion on FNAC.

4/220 cases benign lesions are not correlated on HPE, they were diagnosed as malignant on HPE.2 cases diagnosed as Pleomorphic liposarcoma on HPE,these were under diagnosed as lipoma on FNAC as there is lack of typical lipoblasts on FNAC. 2 cases of hyprecellular myxoid liposarcoma were diagnosed as Intramuscular myoma on FNAC as tumor cells some are spindle shaped some with round nuclei with pale vacuolated cytoplasm & less prominent capillary network on a myxoid background and absence of typical lipoblasts.

Present study shown that FNAC is very useful procedure in pre-op diagnosis of benign and malignancy of STTwith certain limitations. Different factors like localization of the lesions,tangential aspiration were needle misses the tumor & only inflammatory reaction are sampled,secondary changes like necrosis & haemmorhage,cystic change,desmoplastic reaction which makes the cells difficult to aspirate are the different factors leading to difficulty in adequate sampling of tumor cells.

FNAC gives instant diagnostic suggestions followed by therapeutic options.Adequacy & representiveness of smear material should be decided by the cytopathologist himself in order to give definite opinion supplemented with clinical & radiological data.[6-9]

In our study there were 4 FN,0 FN cases and 7 inconclusive cases on FNAC giving a positive predictive value of 100%, in terms of malignancy[10]. A sensitivity of 76.4% and a specificity of 100%. The diagnostic accuracy is 96%. A study on 517 STT aspirates by Akerman et al[11] revealed a 2.9% false positive rate, the subsequent studies by Wakely et al[10] and by Klipatrick et al[9] yielded single case of false negativity and nil false positivity[12]. This was in contrast to a study by Nagira et al[5] who identified higher figures for false positivity and false negativity with a specifity of 92% and sensitivity of 97%.Wakely et al[10] reported 100% and 97% specificity in STT diagnosis with FNAC.Layfield et al[7] achieved 95% sensitivity and specificity while dealing with these lesions. Amin et al[13] reported

sensitivity 85.7%, specificity 85.7% accuracy 81.6%.Similar study of FNAC of soft tissue tumors in correlation with histopathology was done by Kulkarni DR et al[12].

CONCLUSION

FNAC can be effective and reliable diagnostic tool in the evaluation of STT.Since the technique is relatively painless,easy to perform and cheap,there are clear advantages to the patients,doctors and to the hospital.Its accuracy in many situations when applied by experienced and well trained practitioners, matches tha tof histopatholgy in providing an equivocal diagnosis.

REFERENCES

1 Shaham Beg,ShaistaM Vasenwala,Nazima Haider. A comparison of cytological and histopathological findings and role of immunostains in the diagnosis of soft tissue tumors J Cyto 2012; 29(2):125-130.

2 Parajuli S,Lakhey M . efficacy of fine needle aspiration cytology in diagnosing soft tissue tumours. Journal of Pathology of Nepal (2012);99: 305-308.

3. Bezabih M. Cytological diagnosis of soft tissue tumors.Pathology 2007; 28: 368-76.

4. Dey P,MallikMK ,Gupta SK, Vashishta R K. Role of fine needle cytology in the diagnosis of soft tissue tumors and tumor like lesions. Diagn Cytopathol 1996;15:23-32.

5. Nagira K ,Yamamoto T, AkisueT, MarutiT ,Hitora T,et al. Reliability of fine needle aspiration biopsy in the inital diagnosis of tissue lesions.Diag Cytopathol 2002;27;354-61.

6. Bennert KW, Abdul Karim FW. Fine needle aspiration vs.core needle biopsy of soft tissue tumors.A comparison.Acta Cytol 1994;38:381-499.

7. Layfield LJ,Anders KH, Glasgow BJ,Mira JM. Fine needle aspiration of primary soft-tissue tumors.Arch Pathol Lab.Med 1986;110;420-4.

8. Rekhi B,Gorad BD,KakadeAC,Chinoy R. Scope of FNAC in the diagnsis of soft tissue tumors a study from tertiary cancer referral centre in India.CytoJornal 2007;4;20.

9. Kilpatrick SE,Gsinger KR. Soft tissue sarcoma; The utility and limitation of fine needle aspiration biopsy.Am J Clin Pathol 1998;110;50-68.

10. Wakely PE,Kniesel JS.Soft tissue aspiration cytopatholgy.Cancer 2000;90:292-8.

11. Akerman M,Rydholm A,Persson BM. Aspiration cytology of soft tissue tumors.The 10 yrs experience at an orthopedic oncologycentre.Cytopathology 2007;18:243-40.

12. Kulkarni DR,Hemant R,Kkandaker et al.Fine needle aspiration cytology of soft tissue tumors in correlation with histopathology.Indian J pathol,Microbiol 2002;3: 45-8.

13. Amin MS,Luqman M.Fine needle aspiration biopsy of soft tissue tumors.J coll Physicians Surg Pak 2003;13;625-8.

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