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Role of Fine Needle Aspiration Cytology in Diagnosis of Soft Tissue Tumors

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Abstract
Background:
The field of soft tissue tumors (STT) is enormously vast and yet as cytologically relatively undiscovered. They pose a significant diagnostic challenge due to their morphologic overlap and biological heterogeneity. These tumors are composed of neoplastic cells admixed with entrapped cells of local host tissue which can lead to errors of interpretation .FNAC has been identified as a useful diagnostic technique in the initial diagnosis of STT. Due to absence of tissue architecture in FNAC smears it may be very difficult to categorize these lesions exactly. The current study was undertaken to explore the utility of FNAC in STT.
Materials And Methods: *This is a retrospective study conducted in department of Pathology from January 2017 to June 2019*
Results:
Total number of FNAC done: 4450
Number of soft tissue tumors diagnosed : 561(12%) of total FNAC.
Number of benign tumors diagnosed : 531(94.6%) of soft tissue tumors.
Number of malignant tumors diagnosed : 30 (5.3%)of soft tissue tumors.
Keywords*: FNAC, Soft tissue tumors.*

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I. Introduction

The field of soft tissue tumors(STT) is enormously vast and yet as cytologically,relatively undiscovered.[(1)]They pose a significant diagnostic challenge due to their morphologic overlap and biological heterogeneity.[(2)]The neoplastic cells admixed with entrapped cells of local host tissue can lead to errors of interpretation.[(3)]

FNAC is almost painless, easy to perform, safe, and cost effective, without any anesthesia, and acts as a useful diagnostic technique in the initial diagnosis of tumors.[(4)]Though a high degree of accuracy in distinguishing malignant frombenign soft tissue tumors by FNAC has been reported [(5)] lack of tissue architecture in smears make it difficult to categorize these lesions exactly.[(3)]

The present study is aimed at evaluating the spectrum of soft tissue lesions in FNAC and assessing its utility in diagnosing the lesions and correlating histologically, where samples were available.

II. Materials And Methods

This is a cross sectional study conducted in department of Pathology from January 2017 to June 2019.FNAC was performed as per standard protocol.

Inclusion criteria

All patients who are clinically diagnosed with soft tissue tumors.

Exclusion criteria

Scanty aspirates.

III. Results

A total of 4450 FNA were done in the study period. Among them 561(12%) soft tissue tumors were diagnosed .While 543(97%) were benign, 18(3%) were malignant. The prevalence among males and females

was equal with male to female ratio being 1.1:1.The most common site was upper extremity(27%)followed by trunk (25%).

Table 1: Age Wise Distribution

Age	Total STT	Malignant cases
‹30	120 (21.4%)	2 (11%)
30-39	108 (19.3%)	3 (17%)
40-49	125 (22.3%)	1 (5%)
50-59	143 (25.5%)	5 (28%)
›60	65 (11.5%)	7 (39%)
Total	561(100%)	18(100%)

The most common age group presenting with soft tissue tumors was 50-59 followed by 40-49.Among the malignant tumors diagnosed, majority were diagnosed over 60 years.

Table 2: Spectrumoflesions according to cell of origin

Category	Cases/ Percent
Adipocytic	433(77.2%)
Fibrohistiocytic	28(5%)
Fibroblastic/Myofibroblastic	11(1.9%)
Vascular	5(0.9%)
Peripheral nerve sheath tumors	15(2.7%)
Smooth muscle tumors	1(0.2%)
Miscellaneous (spindle cell tumors,ganglion cysts,etc)	68(12.1%)
Total	561

The most common tumors were adipocytic followed by fibrohistiocytic and nerve sheath tumors. Miscellaneous tumors included spindle cell lesions and tumor like conditions, like ganglion cyts etc.

Table 3: Spectrum of benign and malignant tumors

Benign Tumors	No. of Cases	Malignant tumors	No. of case
Lipoma	433(79.7%)	Leiomyosarcoma	1(5.6%)
Benign spindle cell lesion	40(7.4%)	Round cell tumor	1(5.6%)
Ganglion cyst	18(3.3%)	Undifferentiated Pleomorphic sarcoma	9(50%)
Gaint cell lesions	14(2.6%)	Malignant Fibrohistiocytic sarcoma	4(22%)
Schwannomma	12(2.2%)	Myxofibrosarcoma	1(5.6%)
Benign fibrous histiocytoma	10(1.8%)	Low grade fibrosarcoma	1(5.6%)
Haemangioma	4(0.7%)	Malignant peripheral nerve sheath tumor	1(5.6%)
Fibroma	3(0.6%)		
Myofibroblastic tumor	2(0.4%)		
Neurofibroma	2(0.4%)		
Fibromyxoma	2(0.4%)		
Desmoid tumor	1(0.2%)		
Nodular fasciitis	1(0.2%)		
Lymphangioma	1(0.2%)		
Total	543(100%)		18(100%)

The most common benign tumors were lipomas followed by spindle cell lesions, fibrous histiocytomas, gaint cell lesions, ganglion cysts and schwannomas.

Among the malignant tumors diagnosed, most common were undifferentiated Pleomorphic sarcomas followed by malignant fibrohistiocytic sarcoma.

Table 4: Spectrum of lipomas

Types of Lipomas	Cases
Conventional	402(92.8%)
Fibrolipoma	17(4%)
Intramuscular	7(1.6%)
Spindle cell	4(1%)
Chondrolipoma	1(0.2%)
Neurolipoma	1(0.2%)
Myxolipoma	1(0.2%)
Total	433(100%)

Among the lipomas, majority were conventional type followed by fibrolipomas, intramuscular lipomas and spindle cell lipomas.

Histological diagnosis was available for 137 cases. Number of cases concordant with final histological diagnosis was 121(88.3%). Number of cases discordantwas 16(11.7%).Sensitivity in diagnosing benign tumors was 97%.Sensitivity in diagnosing malignant tumors was 50%.Diagnostic accuracy was 73%.

Table 5: Histocyto Discordant cases

Cytological diagnosis	Histopathological diagnosis
Nodular fasciitis	Low grade Fibromyxoid sarcoma
Spindle cell tumour	Undifferentiated Pleomorphic sarcoma
Fibroma	Fibromyxolipoma
Neurofibroma	Myxolipoma
Gaint cell tumor of soft tissue	Tuberous xanthoma
Benign fibroblastic tumor	Clear cell hidradenoma
Benign spindle cell tumor	Schwanomma
Benign spindle cell tumor	Schwanomma
Spindle cell tumor	Schwanomma

Most spindle cell lesions were not categorised in FNAC. They were diagnosed as schwannomas in histopathology. One of the fibroblastic tumor diagnosed as nodular fasciitis turned out be low grade fibromyxoid sarcoma.

IV. Discussion

Soft tissue tumors (STTs) have been diagnosed with the 'time-honored' histopathology that is recognized as the 'gold standard' for their evaluation.[2] FNAC is least invasive procedure which is simple, safe, cost effective and rapid.[6]The usefulness of FNAC in the diagnosis of soft tissue tumours has been a matter of controversy. Only a few large-scale studies are available in this regard.[3]

FNAC in the present study has shown 97% sensitivity in diagnosing benign tumors and 50% sensitivity in diagnosing malignant tumors. It was not soeffective in exact categorization of tumour type. The present study results are compared to results of other studies Veenu Jain et al and Priyanka Soni et al. [7,4]

Table 6: Comparision with different studies

	Veenu jain et al[7]	Priyanka Soni et al[4]	Present Study
No of cases (FNAC)	132	150	561
Duration	1 year	2 years	2.5years
Benign tumors	83.3%	95.3%	96.8%
Malignant tumors	16%	3.34%	3.2%
Male to female ratio	1.1:1	1.2:1	1.1:1
Histocyto correlation done in	86 cases	140 cases	137 cases
Accuracy	97.7%	98%	73%

In comparision with other studies the distribution of cases among males and females was similar and percent of benign cases was also similar. The percent of malignant cases diagnosed was concordant with the study of Priyanka Soni et al but discordant with the study VeenuJainet al.

V. Conclusion

FNAC is effective in distinguishing benign from malignant soft tissue tumours.[3]FNAC in routine evaluation of soft tissue lesions requires understanding of limitations, identification of potential pitfalls, and optimizing of ancillary methods necessary for accurate diagnosis.[5]

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