

CYTOLOGICAL STUDY OF SOFT TISSUE LESIONS WITH HISTOPATHOLOGICAL CORRELATION

Pathology

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ABSTRACT

Background: Soft tissue tumors are defined as nonepithelial extraskeletal tissue of the body exclusive of the reticuloendothelial system, glia, and supporting tissue of various parenchymal organs. The absence of recognizable tissue architectural patterns in cytological preparation makes diagnosis by FNAC more difficult. **Methods:** Out of 176 cases of soft tissue tumors were included in this study for cytologic and histologic correlation were done in 92 cases. FNAC Methanol fixed and air dried smears were stained with H&E, PAP stain and MGG respectively. **Observation:** The smears were studied for cytological diagnosis and were categorized as benign and malignant along with specific subtyping of the lesion and were compared for diagnostic concordance using histological diagnosis. The accuracy with histological correlation, of diagnosis of soft tissue tumors by FNAC was 96.7% in present study. Benign soft tissue tumors were common in 21-60 years of age. Malignant soft tissue tumors were common in the 51-60 years of age. Benign soft tissue tumors outnumbered the malignant tumors with a ratio of 10:1. 90.9% were benign tumors and 9.07% were diagnosed as malignant tumors. Soft tissue tumors were more common in male with M: F ratio of 1.31:1. Soft tissue tumors were most common in extremities (37.5%) followed by shoulder and back (24.43%). **Conclusion:** FNAC is a very important preliminary diagnostic tool in palpable soft tissue lumps with high degree of correlation with the final histopathology report.

KEYWORDS

Cyto-histo correlation, FNAC, Histopathology, Soft tissue tumours.

INTRODUCTION

Soft tissue tumors (STTs) are a highly heterogeneous group of tumors and are classified on a histogenetic basis according to their resemblance to adult tissue.^[1]

FNAC offers many advantages in different clinical scenarios. It can provide a predictive diagnosis of a benign or malignant neoplasm. If the diagnosis of benign neoplasm is made, surgery can be avoided in the elderly and in patients who are of poor surgical fitness. In high-grade malignancy or in recurrent cancers, it allows the administration of palliative treatment.^[1,2]

This study was undertaken to explore the utility and accuracy of FNAC in STT by correlating with subsequent histopathological results and also to compare the consistency of results with published literature.

This study was undertaken with the objectives to study the acceptability and diagnostic accuracy of cytodagnosis in soft tissue lesions, to evaluate the reliability of cytodagnosis as compared conventional histological paraffin section and to assess nuclear grade in various soft tissue lesions.

However, FNAC of soft tissue lesions has not been widely used because of concern about its diagnostic accuracy. The difficulties arise in exact typing and diagnosis of low grade sarcomas. But it gives fairly accurate result regarding the nature of lesion, especially when supported by appropriate clinical findings and other diagnostic data.^[3]

METHODS:

The observational study of all patients referred to FNAC of Soft Tissue Lesions in department of pathology, B.J. medical college, Ahmedabad was carried out during the period between August 2020 to August 2022.

Table I: Distribution Of Cases According To Cytologically Diagnosed Benign Soft Tissue Lesions

Sr.no	Category of soft tissue tumor	Tumor mass	No of case and percentage(n=160)	Percentage (N=176)
1	Adipocytic tumors	Lipomas	137(85.62%)	77.84%
		lipomatosis	1(0.63%)	0.56%
		Spindle cell lipomas	2(1.25%)	1.13%
2	Peripheral nerve sheath tumors	Schwannoma /Neurilemmoma	9(5.62%)	5.11%
		Neurofibroma	2(1.25%)	1.13%
		Nerve sheath tumor	1(0.63%)	0.56%

After taking informed consent, the aspiration was done following a thorough clinical examination. The swelling of interest was palpated to guide precise location for aspiration. With proper position under aseptic precaution 22 gauge needle was introduced into the lesion and to and fro movement performed quickly. Material aspiration and smear preparation were done. Methanol fixed and air dried smears were stained with H&E, PAP stain and MGG respectively.

RESULTS:

A total number of 203 cases clinically suspected as soft tissue tumours were subjected to FNAC and compared with histopathology.

Out of the 203 cases recorded in my study on cytological examination, 160 were diagnosed as benign soft tissue tumors, 16 were diagnosed as malignant soft tissue tumors, 10 were diagnosed as soft tissue tumor like mass and 17 cases were diagnosed as non neoplastic inflammatory lesions. As non neoplastic conditions can involve soft tissue, histopathological examination is not needed in those cases, so my study about soft tissue pathology is restricted to neoplasms.

The study shows that the age ranges for soft tissue tumors were from 11 to 80 years. Overall soft tissue tumors were more common in 21-30 years of age group (28.97%) followed by 31-40 years of age group (20.45%).

Out of 176 cases male to female ratio was 1.31:1 i.e. slightly higher in male.

The study shows that extremities (upper extremity) were the most common site to be affected (37.5%) followed by back and shoulder (24.43%) in benign soft tissue tumors.

Malignant soft tissue tumors were more common in lower extremities (43.75%) followed by trunk (31.25%) and other region.

		Spindle cell tumor	3(1.87%)	1.70%
3	So-called fibrohistiocytic tumors	Tenosynovial giant cell tumor	4(2.5%)	2.27%
		Low grade Fibrohistiocytic tumor	1(0.63%)	0.56%
		Total	160(100%)	90.90%

In benign soft tissue tumors, adipocytic tumors mainly lipomas (77.84%) were most common followed by, peripheral nerve sheath tumors, which includes schwannoma(5.11%), neurofibroma (1.13%), spindle cell tumor(1.70%), nerve sheath tumor(0.56%). So-called fibrohistiocytic tumors, which contain tenosynovial giant cell tumor(2.27%) and low grade fibrohistiocytic tumor(0.56%) respectively.

Table II: Distribution Of Cases According To Cytologically Diagnosed Malignant Soft Tissue Tumors

Sr no	Category of soft tissue tumor	Tumor mass	Number of case and percentage (n=16)	Percentage (N=176)
1	Adipocytic tumors	Liposarcoma	1(6.25%)	0.56%
		Atypical lipomatous tumor	1(6.25%)	0.56%
2	Fibroblastic and Myofibroblastic tumors	Dermatofibrosarcoma protuberans	1(6.25%)	0.56%
		Spindle cell tumor with undetermined malignant potential	1(6.25%)	0.56%
3	Undifferentiated small round cell sarcoma of bone and soft tissue	Primitive neuroectodermal tumor/extra skeletal ewing sarcoma	2(12.5%)	1.13%
4	Tumors of uncertain differentiations	Pleomorphic sarcoma undifferentiated	5(31.25%)	2.84%
		Low grade sarcoma	2(12.5%)	1.13%
		Low grade spindle cell sarcoma	1(6.25%)	0.56%
		Spindle cell sarcoma	1(6.25%)	0.56%
		Pleomorphic malignant soft tissue tumor	1(6.25%)	0.56%
		Total	16(100%)	9.02%

Tumors of uncertain differentiations was most common amongst malignant tumors. In tumors Pleomorphic sarcoma undifferentiated (2.84%) were most common followed by, low grade sarcoma(1.13%), spindle cell sarcoma(0.56%), and pleomorphic malignant soft tissue tumor(0.56%).Undifferentiated small round cell sarcoma of bone and soft tissue includes extraskeletal ewing's sarcoma(1.13%).Adipocytic tumors includes liposarcoma(0.56%) and atypical lipomatous tumor(0.56%).Fibroblastic and Myofibroblastic tumors includes spindle cell tumor with undetermined malignant potential(0.56%) and DFSP(0.56%) respectively.

Table III : Cyto-histological Correlation Of Soft Tissue Tumors

Soft Tissue Tumors	No of cases	Histopathology done	Concordant with histology	Discordant with histology
Benign tumors	160	87 (54.38%)	84 (96.55%)	3 (3.44%)
Malignant tumors	16	5 (31.25%)	5 (100%)	-
Total	176	92 (52.27%)	89 (96.73%)	3 (3.26%)

Histopathological follow up was available in 52.27% of cases with 96.73% concordance rate and 3.26% cases were discordant with diagnosis(table-6).In benign tumors histology were available for 54.38% cases with 96.55% concordance rate,whereas in malignant cases, histopathology were available for 31.25% cases with 100% concordance rate.

Table IV: Cyto-histological Correlation In Cytologically Diagnosed Benign Soft Tissue Tumors

Sr no	cytodiagnosis	Histology available in no. of Cases	Positive cytohistological correlation and percentage	Misdiagnosed cases	Malignant
1	Lipomas	80	77(96.25%)	2(2.5%)	1(1.25%)
2	Schwannoma	5	5(100%)	-	-
3	Spindle cell tumor	2	2(100%)	-	-
	Total	87	84(96.55%)	2(2.29%)	1(1.14%)

Out of 160 cytologically diagnosed benign soft tissue tumors, histological diagnosis were available in 87 cases.Two cases of lipomas were misdiagnosed (2.5%)as accessory axillary breast tissue and glomangioma.One was diagnosed as malignant(1.25%)as atypical lipomatous tumor.The positive cytohistological correlation in case of benign soft tissue tumors were found to be 96.55%.

Table V: Cyto-histological Correlation In Cases Cytologically Diagnosed As Malignant Soft Tissue Tumors

Sr. no	Cytodiagnosis	Histology available in no. of cases	Positive cytohistological correlation and percentage	Misdiagnosed cases
1	Atypical lipomatous tumor	1	1(100%)	0
2	Primitive neuroectodermal tumor	1	1(100%)	0
3	Dermatofibrosarcoma protuberans	1	1(100%)	0
4	Spindle cell sarcoma	1	1(100%)	0
5	Pleomorphic malignant soft tissue tumor	1	1(100%)	0
	Total	5	5(100%)	

In case of cytologically diagnosed malignant soft tissue tumors, histological diagnosis was available in 5 out of 16 cases.All 5 cases were confirmed histologically as shown in above table.

NEUROFIBROMA

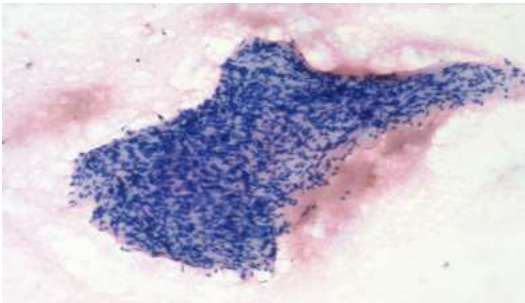


Figure I H&E stain(10X): Smears Show Dispersed As Well As Small Clusters Of Benign Spindle Cells Over Myxoid Background On.

NEUROFIBROMA

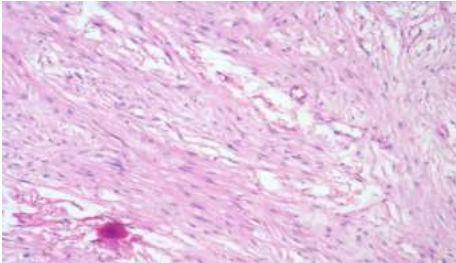


Figure II H & E Stain (10X): Proliferation Of All Elements Of Peripheral Nerves.

PLEOMORPHIC SARCOMA



Figure III PAP stain(40X): The Cells Are Spindle To Highly Pleomorphic With Large Bizarre Nuclei.

DISCUSSION

This was an observational study undertaken at the Department of Pathology, B J Medical College and Civil Hospital, Ahmedabad during the period from August 2020 to August 2022. Out of 203 cases 176 cases were of soft tissue tumors and 10 cases were tumor like lesions and remaining 17 cases were inflammatory lesions. Non neoplastic lesions were excluded from study. Out of 176 cases, 92 cases were confirmed histologically and results were compared with studies of other authors.

In the present study, from total cases benign were 91% and malignant were 9%, which correlates with Tailor HJ et al.^[4], Soni et al.^[5], Dr. Ravindra et al.^[6] and Alaka Sahu et al.^[7] in which benign cases were 93.58%, 95.3%, 56.65% and 87.06%. Malignant cases were 6.42%, 3.34%, 12.94% and 12.91% respectively.

The proportion of the benign and malignant cases in FNAC may vary widely between institutions depending on the evaluation protocol followed by them. Some of them may prefer FNAC in all cases while others may opt for excision/core needle biopsy in suspicious cases. This may explain the variation in the proportion of cases.

Table-VI: Study Comparison For Cytological Diagnosis Of Soft Tissue Tumors

Author	Year of study	Age group	
		Benign	Malignant
Tailor HJ et al. ^[4]	2013	21-40 years	0-70 years
Soni et al. ^[5]	2014	11-50 years	31-50 years
Alaka Sahu et al. ^[7]	2021	21-40 years	61-80 years
Present study	2020-2022	21-40 years	21-60 years

The present study, observed that benign and malignant tumors were more common between 21-40 years of age group and 21-60 years of age group respectively, similar to Soni et al. study.^[5] Alaka Sahu et al.^[7] noted that benign soft tissue tumor were common in the 21-40 years of age groups of life, and malignant soft tissue tumors observed in 61-80 years of life. Tailor HJ et al.^[4] noted benign tumors were more common in 21-40 years of age, which was also similar to present study.

Out of 176 cases male to female ratio was 1.31:1 i.e. slightly higher in male. For benign tumors it was 1.35:1 i.e. slightly higher in male, which was almost similar to the study of Alaka Sahu et al.^[7], Patel MM et al.^[9], and Beg et al.^[8], who reported a ratio of 1.32:1, 1.5:1 and 1.6:1 respectively.

While in case of malignant soft tissue tumors, male to female ratio was 1:1, which was almost similar to Alaka Sahu et al.^[7], who reported male to female ratio 1.15:1.

Hence supporting the fact that soft tissue tumors were are common in males as compared to females.

Beg et al.,^[8] Alaka Sahu et al.^[7] and Geethalakshmi U^[10] had shown in their series that lipomas were most common benign Soft tissue tumors. The present study also showed similar findings for benign soft tissue tumors.

In malignant soft tissue tumors pleomorphic sarcoma was most common diagnosis, which was similar to Nagira et al.,^[11] study.

variation in the distribution of various histological subtypes. For example, some institutions may not do FNAC of clinically obvious lipoma.

In my study, cytologically diagnosed benign soft tissue tumors were found to be more common in upper extremities (20.62%) amongst overall extremities (37.5%), as also reported by Tailor HJ et al.^[4] (32.06%) and Soni PB et al.^[5] (43.5%). Cytologically diagnosed malignant soft tissue tumors were found to be more common in lower limb (43.75%). Previous studies had also reported similar findings.^[4,5]

Table-VII : Comparison Of Accuracy For Cytohistological Correlation Of Soft Tissue Tumors

Study	Accuracy(%)
Soni et al. ^[5] (2014)	98
Dr. Ravindra et al. ^[6] (2018)	88.10
Alaka Sahu et al. ^[7] (2021)	97.3
Arul P et al. ^[12] (2016)	97
Present study (2020-2022)	96.7

Present study's accuracy result was comparable with soni et al.^[5] (98%), Arul P et al.^[12] (97%) and Alaka Sahu et al.^[7] (97.3%) studies, as accuracy of present study in diagnosis of soft tissue tumors was 96.7%.

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Institutional protocol regarding FNAC may be responsible for