ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE AND SCHOOL OF MEDICINE DEPARTMENT OF PATHOLOGY

EVALUATION OF FINE NEEDLE ASPIRATION CYTOLOGY IN PRIMARY SOFT TISSUE TUMORS WITH ITS HISTOPATHOLOGICAL CORRELATION IN TIKUR ANBESSA SPECIALIZED HOSPITAL ADDIS ABABA, ETHIOPIA A 5 YEAR RETROSPECTIVE STUDY FROM JULY 2016 TO JULY 2021

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Table of Contents

List Of Tables

Abbreviations

STTs	Soft tissue tumors
STS	Soft tissue sarcoma
RMS	Rhabdomyosarcoma
MFH	Malignant fibrous histiocytoma
DFSP	Dermatofibrosarcoma protuberans
FNA	Fine needle aspiration cytology
TASH	TikurAnbessa Specialized Hospital
WHO	World Health Organization
SPSS	Statistical Package for social science

Abstract

Soft tissue tumors constitute a large and heterogeneous group of neoplasms. Benign tumors out number their malignant counterparts by a ratio of about 100:1 in hospital population. FNAC has emerged as a major outpatient procedure for the diagnosis of soft tissue tumors due to low cost of the procedure, less complications, feasibility, quick results and high therapeutic efficiency with specificity and sensitivity of approximately 95%. The diagnostic accuracy of FNAC of soft tissue tumors in distinguishing benign and malignant lesion is also very high. The objectives of this study will be to study the role of FNAC in the diagnosis of soft tissue tumors and its correlation with histopathology. Also, this study aimed at studying various cytomorphological patterns of soft tissue tumors and correlating cytological grading with histopathological grading. The aim of this study is to determine the role of fine needle aspiration cytology in soft tissue tumors and its histopathological correlation in TikurAnbessa Specialized Hospital.The study applies retrospective cross-sectional descriptive method to review the role of fine needle aspiration cytology in soft tissue tumors and its histopathological correlation in the five years period (July 2016 to July 2021).The data is collected from the pathology data archives and data analysis will be done by Using IBM SPSS 25.0.Both FNAC and biopsy done for soft tissue tumors are more common in males than females and for malignant tumors than benign tumors. The most common age at which both FNAC and biopsy done is from 2nd to 4th decade for benign soft tissue tumors and from 2nd to 6th decade for malignant soft tissue tumors. The commonest site for both benign and malignant soft tissue tumors were lower extremities followed by trunk and upper extremities. The commonest soft tissue tumors for which both FNAC and biopsy done were under spindle cell, adipocytic and small round blue cell tumor categories. Out of total of 34 sarcomas majority are grade 3 followed by 1 and most are under the group of small round blue cell sarcoma and spindle cell sarcomas. The diagnostic accuracy of FNAC of soft tissue tumors is about 81.08%. Majority of discordant rate was found to be under a group of spindle cell tumor. Excisional biopsy was recommended for majority of soft tissue tumors after FNAC especially for malignant soft tissue tumors.In this study soft tissue tumors are more common in males than females and the peak age at presentation was from 10 to 29 years. The top three commonest location of soft tissue tumors were lower extremities, trunk and head and neck regions. Malignant tumors outnumbered benign tumors and the commonest soft tissue tumors were grouped under spindle cell, adipocytic and small round blue cell tumors. The

majority of soft tissue tumor cytological diagnosis was a group diagnosis not specific diagnosis for which excisional biopsy was recommended. The majority of soft tissue sarcomas were high grade which has high concordance rate with histopathological grading. In general FNA cytology was found to be fairly reliable diagnostic procedure for early diagnosis of soft tissue tumors

***Key Words**: -Cytohistopathologiccorrelation, FNAC/FNAB, Histopathology*

1. Introduction

1.1. Background

Soft tissue is all the tissue in the body that is not hardened by the processes of ossification or calcification such as bones and teeth. Soft tissue connects, surrounds or supports internal organs and bones, and includes muscle, tendons, ligaments, fat, fibrous tissue, lymph and blood vessels, fasciae, and synovial membranes. It is sometimes defined by what it is not – such as "nonepithelial, extraskeletal mesenchyme exclusive of the reticuloendothelial system and glia".

Soft tissue tumors (STTs) are an extremely varied group of tumors and are classified on a histogenetic basis according to their similarity to adult tissue.They can be initially diagnosed by fine needle aspiration cytology (FNAC) for the identification of recurrent and metastatic cases.FNAC has replaced conventional large needle core biopsy in diagnosis of lesions. The 22-23-gauge fine needle has advantage of causing significantly less discomfort and very low risk of complication. Hospitalization of the patient is not necessary. FNAC can be done from multiple sites thus providing more representative material.

FNAC is a rapid diagnostic technique with limited patient morbidity. It may be preferred for the rapid and of superficial soft tissue lesions. This combined with its relatively low cost makes it an important alternative morethan traditional biopsy technique in the rapid work up of palpable tumors.

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.

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1.2. Statement of the problem

There are greater than 130 different soft tissue lesions, including more than 30 different entities of sarcomas in WHO Classification of Tumors of Soft Tissue. The annual incidence of soft tissue sarcoma is <1% of all malignant tumors. It is, therefore, extremely challenging for a general practitioner to properly work up on infrequently encountered soft tissue lesions with limited biopsy material. In addition, many mesenchymal tumors, like epithelioid hemangioendothelioma and PEComa, can occur in visceral organs, mimicking carcinoma clinically and radiologically, and therefore pose significant diagnostic challenges when sampled unexpectedly by FNA. Because of lack internationally accepted reporting system for cytopathology of tissue tumors, there is diagnostic dilemma and high rate of discordant rate with histopathological diagnosis. Awareness of diagnostic challenges and pitfalls is essential for successful fine needle biopsy diagnosis of soft tissue tumors.

1.3. Significance of the study

Fine needle aspiration (FNA) for the evaluation of soft tissue tumors was first introduced in the early 1930s. Although FNA has been widely accepted as a means to document recurrent and/or metastatic soft tissue tumors, its value as the initial diagnostic modality in patients with primary soft tissue tumors remains controversial. In recent years, minimally invasive biopsy techniques, namely, core needle biopsy (CNB) with or without accompanied FNA, have largely replaced incisional biopsy to establish histological diagnosis and grade for patients who are suspected to have a primary soft tissue and bone tumor. This advance is achieved in concert with the development in molecular genetic diagnostics, expansion of immunohistochemical biomarkers, and the maturation of various image guided needle biopsy techniques. Enhanced by rapid on-site evaluation (ROSE), and immediate tissue triage for flow cytometry and/or cytogenetic/molecular studies, FNA offers a valuable and fast diagnostic modality for lesions suspicious for high grade malignancy, especially for tumors with a broad differential diagnosis including carcinoma, lymphoma, and sarcoma.

2. Literature Review

A study conducted in India, 2017, a total of 479 soft tissue tumor cases were reviewed among this 423 cases (88.30%) were benign and 56 cases(11.69) were malignant. Well differentiated/lipomatous group was the commonest accounting about 339 cases, and spindle cell category was the 2nd commonest constituting 88 cases. Histopathological correlation carried out in 136 out of 479 cases (benign:111 and malignant:25) revealed that out of 111 cases diagnosed as benign by cytology, one case was malignant (liposarcoma) and among 25 malignant cases diagnosed by cytology one case was benign (myofibroblastoma). Overall sensitivity and specificity of FNAC was 96% and 99% respectively. Comparison of cytological and histopathological grading of 24 sarcomas showed overall concordance of 75%.

A study done in India in 2019, in Western Odessa, a seven years retrospective study showed a total of 570 cases reviewed in which cytodiagnosis reveals 465 benign lesions, 98 malignant lesions and 7 inconclusive lesions. Histopathology confirmed 470 cases, 2 cases and 98 cases of benign, intermediate and malignant lesions respectively with a sensitivity and specifcity of 97.97% and 80% respectively.

In 2017 a study conducted in India, Integral Institute of Medical Sciences, Department of Pathology, and diagnosis of STT by FNAC was done in 132 cases. In benign tumors, maximum number of cases (28) was in the age group of 20-29 years and in malignant tumours maximum number of cases (7) was in the age group of 40-49 years. 110 (83.3%) cases were benign and 22 (16.7%) cases were found to be malignant. Maximum number of STT was observed in trunk followed by limb extremities. Male preponderance was observed in the study. The overall accuracy of the present study was 97.7%. Accuracy for diagnosing benign soft tissue tumours was 100% and for malignant STT was 94.5%. The sensitivity, specificity and predictive value of the present study was 100%, 98.6% and 93.3%.

In 2000 a study conducted at the Ohio State University, 82 aspirates were performed from 77 patients ranging from 12–88 years of age (mean age of 50 yrs) with men outnumbering women 1.5:1. Soft tissue masses were most common in the extremities (41 cases), followed by the trunk (34 cases), retroperitoneum (5 cases), and head and neck (2 cases). Fine-needle aspirates were diagnosed as malignant in 42 (51%), benign in 32 (39%), non-diagnostic in 6 (7%), and atypical

in 2 (2%) cases. Malignant aspirates were comprised of 24 sarcomas (57%), 9 carcinomas (21%), 6 malignant lymphomas (14%), and 3 melanomas (7%). Twenty-two aspirates (52%) had an initial diagnosis of malignancy, whereas18 (43%) represented metastatic and 2 (5%) recurrent neoplasms. Confirmation of the cytopathologic diagnosis was by concurrent or subsequent tissue examination in 57%, flow cytometry in 5%, clinical outcome in 34%, and repeat aspiration in 4%. One false negative and no false positive diagnoses were issued for a sensitivity and specificity of 100% and 97% respectively in distinguishing benign and malignant lesions by FNA. Of the malignant aspirates, 83% could be sub typed whereas 72% of benign aspirates were correctly subtyped. For primary soft tissue sarcomas, 12 of 19 (63%) were accurately subtyped. In 48% of cases a concurrent cell block was obtained and found diagnostically useful in 54% of them.

In a study done at, Sweden, Skåne University Hospital, the retrospective study encompassed 828 primary soft tissue, analysed with FNA, and 95 CNB and/or surgical specimen, showed sensitivity of 87% and 94%, respectively, and specificity of 89% %, respectively. FNA and CNB analyses identified the correct histopathological entity of the examined lesionin 55% and 66%, respectively. The six diagnostic category of FNAC of STTs were proposed and the risk of malignancy within the tested categories was non-diagnostic 42%, non neoplastic 0%, atypia of unknown significance 46%, neoplasm benign3%, neoplasm of unknown malignant potential 27%, suspicious for malignancy72% and malignant 97%.

Similar study done in Nigeria, 2015, 107 aspirates were done and the age range was from 0-85 years (mean = 41.2 yrs.) with a roughly equal male: female ratio. The commonest locations were trunk -56 cases, lower extremity, 42 cases and upper extremity, -9 cases. The FNAB was diagnosed as benign in 56 (52.3%) cases, malignant in 48 (44.8 %) cases and suspicious of malignancy in 3(2.8%) cases. The cases were cytomorphologically classified into the following categories: Lipomatous (32 cases), epithelia (18), spindle cell (14), inflammatory (13) pleomorphic (11), small round (6), myxoid (5), epithelioid/ polygonal (1) and others (7). The sensitivity and specificity of diagnosed cases with FNAB as either benign or malignant when correlated with histology were 95% and 100% respectively

In a study conducted in Jimma University, 2018 a total of 268 patients were histopathologically diagnosed with STT over five years with malignant to benign ratio of 1:2.6 and sex ratio of male to female 1:1.01. The age group at which soft tissue tumors commonly occur was from 21-30(26.9%) years of age. The most favored site of occurrence is the lower limb (59.5% of cases). From the different histologic subtypes of sarcoma, the top three are Malignant Fibrous Histiocytoma (27.0%), which is common in adults followed by Fibrosarcoma (18.9%), and Rhabdomyosarcoma (17.6%) which is common in youngsters.

In a five year retrospective study done in AAU, 1996, a total of 623 STTs were retrieved in which only 53 cases (25 benign and 28 malignant) was having both FNAC and surgical biopsy results. 22 out of 25 benign and 23 out of 28 malignant STTs were correctly diagnosed. Thus, in this study a sensitivity and specificity FNAC diagnosis of STTs were 88.5% and 81.5% respectively.

3. Objective of the study

3.1. General objective

- To evaluate fine needle aspiration cytology in primary soft tissue tumors with its histopathological correlation

3.2. Specific objectives

- To determine clinicopathological and sociodemographic patterns of primary soft tissue tumors
- To determine the distribution of cytomorphological diagnosis of primary soft tissue tumors
- To examine the association between the cytological and histopathological diagnostic modalities of primary soft tissue tumors

4. Methodology

4.1. Study Area

This study was conducted at Black Lion (TikurAnbessa) specialized teaching Hospital.

TikurAnbessa (Black Lion) Specialized Hospital is located in Addis Ababa at Lideta sub-city opposite to Immigration office Ethiopia. It is the teaching hospital of the Addis Ababa University and the largest referral hospital in the country with over 700 beds, and serves as a training centre for undergraduate and postgraduate medical students, dentists, nurses, midwives, pharmacists,

medical laboratory technologists, radiology technologists, and others who shoulder the responsibilities to solve the health problem of the community and the country at large.

4.2. Study Design and Period

The study was a cross-sectional retrospective descriptive study where data was retrieved from the archive of the department of pathology that was registered from July 2016 up to July 2021.

4.3. Source Population

All patients whose both fine needle aspiration and biopsy specimens were done at department of pathology.

4.4. Study population

All patients whose both fine needle aspiration and biopsy specimens were done at department of pathology in the study period from July 2016 to July 2021.

4.5. Inclusion and exclusion criteria

4.5.1. Inclusion Criteria

Complete medical record of patients

All cases having both cytological and histopathological diagnoses

4.5.2. Exclusion criteria

Incomplete medical record of patients

Cases with descriptive and inconclusive histopathologic diagnoses

4.6. Sample size estimation

Non probable convenience sampling method used

All patients fulfilling the inclusion criteria during the study period were included

4.7. Sampling procedure

All the soft and hard copy of both soft tissue histopathology and cytopathology reports from July 2016 to July 2021 were reviewed from the archive of pathology department.

4.8. Data collection tools and procedures

Demographic data, anatomical site (location) of the lesions and morphological diagnoses are extracted from the hard copy using data extraction sheet.

4.9. Study variables

4.9.1. Dependent variables

Anatomical site (location) of the lesions

4.9.2. Independent variables

Age, gender, morphological pattern of the lesions, behavior of the tumor (benign & malignant)

4.10. Data analysis

The data sheets were coded and data entry, cleaning and analysed using the Statistical Package for the Social Sciences (SPSS)

4.11. Ethical consideration

Ethical permission was sought from the Department of Pathology, College of Health Sciences, Addis Ababa University, and ethics committee at TikurAnbessa hospital. Names of patients or their chart numbers is not mentioned in the study to keep the confidentiality of the patients.**5.**

Results

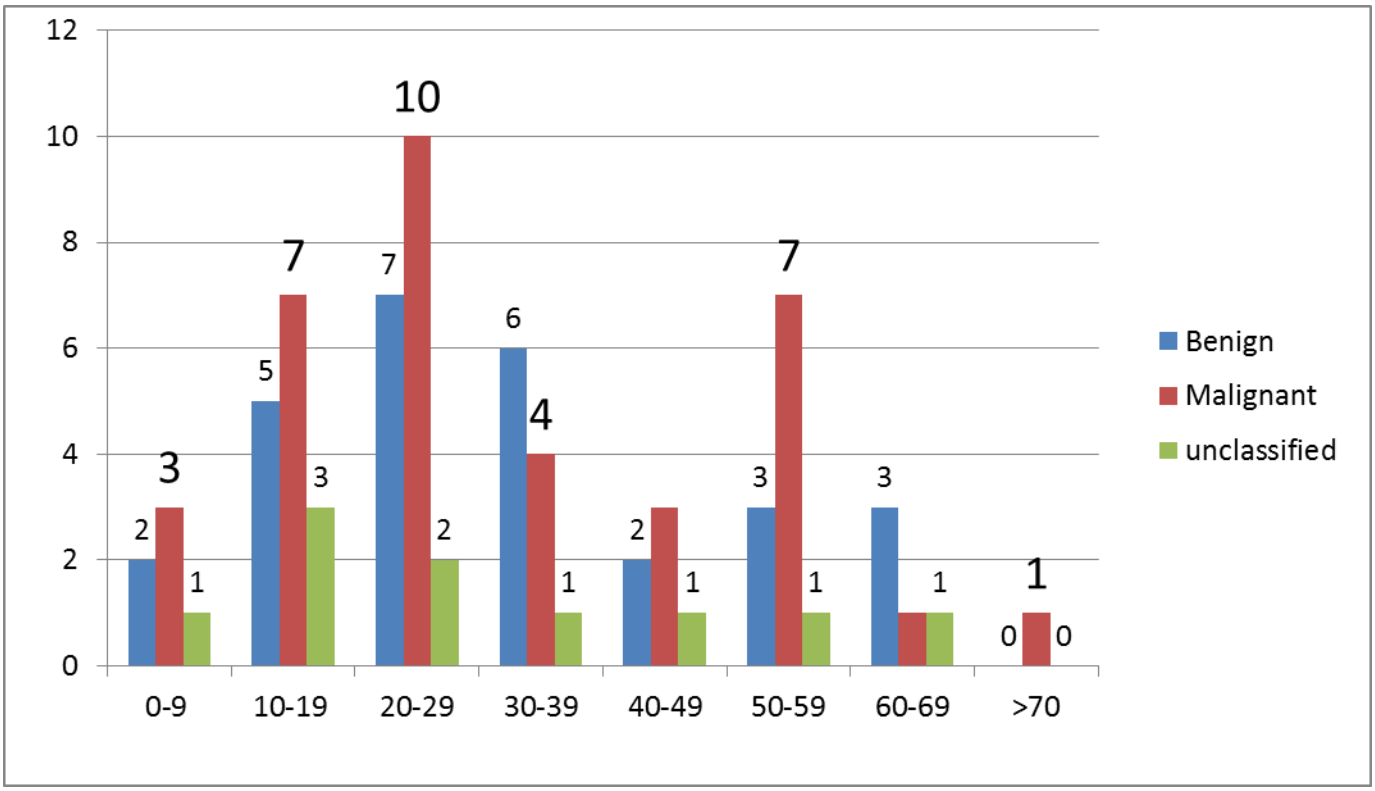
Table 1: Distribution of cases of STT according to sex (n=74)

Both FNAC and biopsy done for soft tissue tumors are more common in males than females and for malignant tumors than benign tumors.

Sex	Benign	Malignant	Not specified	Total (%)
Male	13	20	8	41(55.40%)
Female	15	16	2	33(44.59%)
Total (%)	28(37.83%)	36(48.64%)	10(13.51%)	74(100%)

Bar chart 1: Age specific distribution of STTs (n=74)

The most common age at which both FNAC and biopsy done is from 2nd to 4th decade for benign soft tissue tumors and from 2nd to 6th decade for malignant soft tissue tumors.



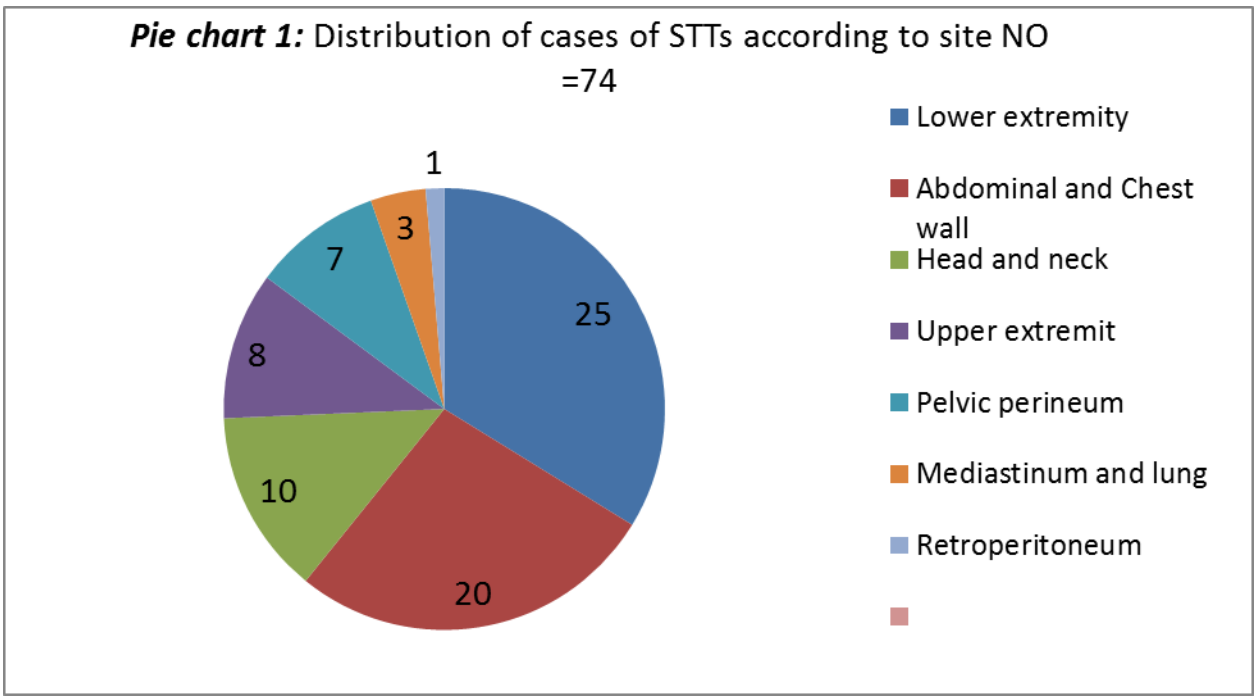


Table 2: Distribution of STT on FNAC according to tumor type (n=74)

The commonest soft tissue tumors for which both FNAC and biopsy done were under spindle cell, adipocytic and small round blue cell tumor categories.

Type of STT	Benign	Malignant	Unknown/Unclassified	Total (%)
Adipocytic neoplasm	13	0	0	13(17.56%)
Myxoid neoplasms	1	3	0	4(5.40%)
Spindle cell neoplasm	8	9	7	24(32.46 %)
Epithelioid cell neoplasm	0	1	0	1(1.35%)
SRBCT	0	10	0	10(13.51%)
Pleomorphic neoplasm	0	3	0	3(4.05%)
Vascular tumor	4	0	0	4(5.40%)
Unclassified	2	10	3	15(20.27%)
Total	28(37.83%)	36(48.64%)	10(13.51%)	74(100%)

Table 3: Grading of FNAB specimens of soft tissue sarcoma (n= 34)

Out of total of 34 sarcomas majority are grade 3 followed by 1 and most are under the group of small round blue cell sarcoma and spindle cell sarcomas.

Type of STT	Grade-I (%)	Grade-II (%)	Grade-III (%)	Total (%)
Myxoid sarcoma	1	1	1	3(8.82%)
Spindle cell sarcoma	2	2	3	7(20.58%)
Pleomorphic sarcoma	0	0	3	3(8.82%)
Small round blue cell sarcoma	0	0	10	10(29.41%)
Unclassified sarcoma	4	0	7	11(32.35%)
Total (%)	7(20.58%)	3(8.82%)	24(70.58%)	34(100%)

Bar chart 2: Correlation of grading with age (n=34)

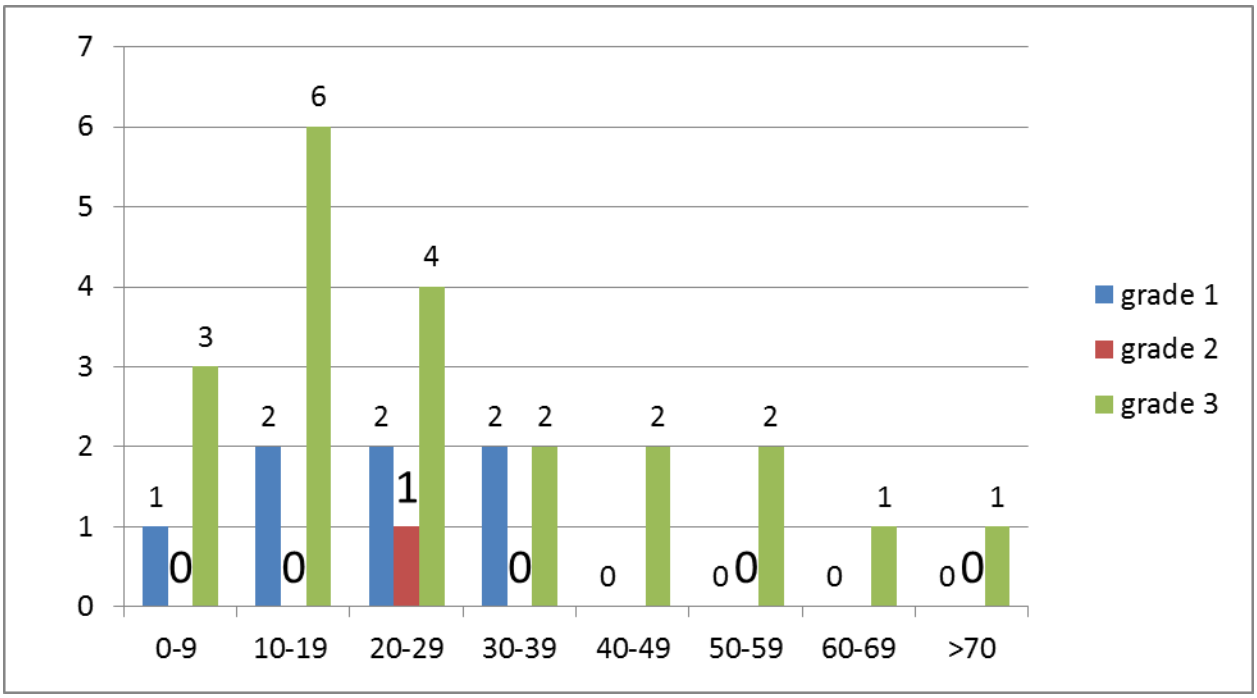


Table 4: Correlation of grading with site (n=34)

Site	Grade 1	Grade 2	Grade 3	Total
Head and neck	2	0	2	4(11.76%)
Abdominal and Chest wall	1	0	7	8(23.52%)
Retroperitoneum	0	0	1	1(2.94%)
Upper extremity	0	1	1	2(5.88%)
Lower extremity	2	2	10	14(41.17%)
Pelvic perineum	2	0	3	5(14.70%)
Total	7(20.58%)	3(8.82%)	24(70.58%)	34(100%)

Table 5: Correlation of cytodiagnosis and histologic diagnosis

Type of STT	Cytodiagnosis	Histologic diagnosis	
		Consistent	Inconsistent
Adipocytic	13	12	1
Myxoid	5	3	2
Spindle cell	24	18	6
Pleomorphic	3	3	0
Small round blue cell	10	7	3
Vascular tumor	4	4	0
Unclassified	15	13	2
Total (%)	74(100%)	60(81.08%)	14(18.91%)

Table 6: Specific cyto-histological discordant diagnosis

FNAC diagnosis	Histopathological Dx
High grade NHL	Alveolar RMS
Lipoma	Fat necrosis
Low grade sarcoma	Small cell undifferentiated carcinoma
Chordoma	Undifferentiated pleomorphic sarcoma
NHL	Alveolar RMS
Myxofibrosarcoma	Myxoid Liposarcoma
Fibrosarcoma	Leiomyosarcoma
Low grade Mucoepidermoid carcinoma	Myxoid Neurofibroma
High grade sarcoma, Alveolar soft part sarcoma	Epithelioid sarcoma, proximal type
Solitary fibrous tumor	Low grade fibromyxoid sarcoma
Plasmacytoma	High grade sarcoma
Fibromatosis	Neurofibroma
Ewing's sarcoma	Alveolar Rhabdomyosarcoma
Low grade fibromyxoid sarcoma	Myxofibrosarcoma

Table 7: Diagnostic accuracy in the present study

ThediagnosticaccuracyofFNACofsofttissuetumorsisabout81.08%.Majorityofdiscordantratewasfoundtobeunderagroupofspindlecelltumor.

Category	Cytological diagnosis (n=74)	
	Consistent	Inconsistent
For benign soft tissue tumours	26(35.13%)	2(2.70%)
For malignant soft tissue tumours	24(32.43%)	12(16.21%)
Not specified	10(13.51%	0(0%)
Overall/Total	60(81.08%)	14(18.91%)

Table 8: Excisional biopsy recommendation

Excisional biopsy was recommended for majority of soft tissue tumors after FNAC especially for malignant soft tissue tumors.

Tumor Type	Excisional biopsy recommendation		Total (%)
	Yes (%)	No (%)	Total(%)
Benign	3(4.05%)	25(33.78%)	28(37.83)
Malignant	30(40.54%)	6(8.10%)	36(48.64%)
Unclassified	6(8.10%)	4(5.40%)	10(13.51%)
Total	39(52.70%)	35(47.29%)	74(100%)

6. Discussion

Soft tissue neoplasms are a diagnostically difficult sector of tissue pathology. Their numbers are a small component of adult and pediatric tumors, and thus, they are encountered relatively infrequently by many pathologists. Coupled with their inherently challenging light microscopic nature, ranging from benign to borderline to malignant, and their generally heterogeneous composition, soft tissue tumors can be a source of diagnostic confusion and consternation. Pathologic assessment of a clinically suspicious soft tissue mass traditionally has been from specimens obtained by open surgical biopsy. Because of the larger amount of tissue it obtains, this technique is least susceptible to sampling error and to the problem of insufficient fresh material for ancillary studies, such as electron microscopy, molecular diagnostics, and cytogenetics. However, open surgical biopsy has several difficulties. Local complications, such as post-operative infection, hematoma, and an incorrect skin incision, can and do occur. More importantly, a poorly placed open biopsy in a sarcoma can increase the risk of tumor contamination into an uninvolved muscle compartment.

The present study has been undertaken to evaluate the acceptability, reliability and accuracy of cytodiangosis in comparison to open biopsy. In this study, total of 766 soft tissue were reviewed but only 74 cases were included in which males (41, 55.40%) outnumbered females (33, 44.59%) in male to female ratio of 1.24:1. A similar study done in India, Ohio state university and Jimma university shows male predominance.

In this study soft tissue tumors occur in a wide age range from 2 - 82 years with mean age of 30.9 years. The maximum number of benign soft tissue tumors occurred in the age group 10-39 years, while maximum number of malignant soft tissue tumour occurred in the age group 10-29 yeas. This is comparable with the same study done in India in which the maximum number of benign cases was in the age group of 20-29 years and the maximum number of malignant tumours was in the age group of 40-49 years. The same is true for the study done in Jimma University in 2018 G.C

In this study the majority of soft tissue tumors are grouped under a subgroup of spindle cell tumours (24, 32.43%) followed by Adipocytictumours (13, 17.56%) and SRBCT (10, 13.51%). And about 15 cases (20.27%) were not classified under any subgroup of soft tissue tumors. This

is comparable with similar study done in Nigeria in which the three most common cytomorphologic types of soft tissue tumors are lipomatous (32 cases), epithelial (18) and spindle cell (14) tumors.

Out of 74 cases, 28 were identified as benign in which majority of them was lipomas (13 cases, 46.42%) and 36 were as malignant and most of them were classified under small round blue cell tumors (10), spindle cell sarcoma (9) and unclassified sarcoma (10). Comparable result was seen in a study done in Ohio State University and AAU in which malignant soft tumours outnumbered benign soft tissue tumors but in a study done in Nigeria, benign soft tissue tumors outnumbered malignant ones.

In this study majority of STT are located in lower extremities (25, 33.78%) followed by abdominal and chest wall (20, 27.08 %) and head and neck regions (10, 13.51%) which is comparable with the findings in the study done in Ohio state university where extremity followed by trunk is the commonest sites for soft tissue tumors but trunk ranked the top commonest location in study done in Nigeria and India followed by extremities.

In most instances, therapy for sarcoma is driven by tumor location and stage, the latter of which incorporates tumor grade. Among the most important histologic parameters in grading soft tissue sarcomas are the number of mitotic figures and amount of necrosis in the lesion. FNAB was able to predict the grade in all of histologically confirmed sarcomas, when segregated into high or low grade lesions. In the present study, out of 34 sarcoma cases, grading was done in all cases. About 7 (20.58%) cases were grade 1, 3 (8.82%) cases were grade II and 24 (70.58%) cases come under grade III. Grading was not done in lymphoma, plasmacytoma and Ewing's sarcoma cases.This is in contrast to a study conducted in India where grade 1 sarcoma is the commonest soft tissue sarcoma followed by grade 3 sarcoma.

Out of all the FNAC diagnosis, 15 out of 24 spindle cell tumours, 12 out of 13 adipocytictumours, 3 out of 5 myxoid tumors, 3 out of 3 pleomorphic tumors, 7 out of 10 round cell tumours, and 4 out of 4 vascular tumors showed consistent results upon histological diagnosis. The discrepancy between the cytological and histopathological diagnosis was noted

in 18 cases out of total of 74 cases. The discordant rate in this study is higher compared to the study done in India (only 2 discordant cases) and AAU (8 discordant cases) reported.

In this study, the overall accuracy in diagnosing soft tissue tumours by FNAC was 81.08%. Accuracy for diagnosing benign soft tissue tumours was 92.58% and for malignant tumours accuracy was 66.66 %. In this study excisional biopsy was recommended in majority of cases accounting about 39 (52.70%) of cases but not in 35 cases (47.29%). This finding was comparable with the same study done in India (75% accuracy rate). In the study done in Nigeria and Sweden the diagnostic accuracy is 95% and 55% respectively. In the study done in AAU the diagnostic accuracy was about 88.5% higher than the present study.

7. Conclusion

In this study soft tissue tumors are more common males than females and the peak age at presentation was from 10 to 29 years.The top three commonest location of soft tissue tumors were lower extremities, trunk and head and neck regions. Malignant tumors outnumbered benign tumors and the commonest soft tissue tumors were grouped under spindle cell, adipocytic and small round blue cell tumors. The majority of soft tissue tumor cytological diagnosis was a group diagnosis not specific diagnosis for which excisional biopsy was recommended. The majority of soft tissue sarcomas were high grade which has high concordance rate with histopathological grading. In general FNA cytology was found to be fairly reliable diagnostic procedure for early diagnosis of soft tissue tumors

8. Limitations of the study

The majority of patient's medical records in our department were incomplete and handled inappropriately. In majority of soft tissue tumors cytological and histopathological examination was done at different health institution. Some soft tissue cytological diagnosis was nonspecific which makes histopathological correlation difficult. And histopathological examination is not diagnostic for some soft tissue sarcomas.

9. Recommendation

In about 15(20.27%) of soft tissue tumors, the type of soft tissue tumor is not mentioned and in about 10(13.51%) cases, the malignant potential(benign or malignant) of soft tissue tumors is not known which should be improved for further intervention of patient management.

The diagnosis of soft tissue tumors should consider the the triple test; Clinical data, the radiologic evaluation and FNAB or/and CNB findings. We need to stick on this triple diagnostics because one is not superior over the other instead complementary.

We need to know the limitations of FNAB of soft tissue tumors (limited exposure, greater morphologic overlapping, lack of uniform nomenclature and standardized reporting system, loss of architectural and vascular patterns and for fibrotic and cystic masses)

Multidisciplinary approach should be applied (Surgeons, pathologists/cytopathologist, Radiologist, Oncologist)

A new proposal for soft tissue cytopathology reporting system is developed in Sweden which will be accepted and published as international reporting system for cytopathology of soft tissue lesions with in upcoming years. And I strongly recommend to use it and avoid confusion and for standardized reporting and management of patients.

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