|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
NLM (National Library of Medicine ID: 101738825)
Index Copernicus Value 2019: 79.34
Original Research Article
Volume 4, Issue 12; December: 2020; Page No. 227-230

ROLE OF FNAC IN DIAGNOSIS OF SOFT TISSUE TUMORS AND ITS CORRELATION WITH HISTOPATHOLOGICAL STUDY

Dr. Sanjay Pralhad Ingle

Assistant Professor, Department of Pathology, SSPM Medical College & Lifetime Hospital, Padve, Kudal (Sindhudurga), Maharashtra

Article Info: Received 03 November 2020; Accepted 20 December 2020
DOI: https://doi.org/10.32553/ijmbs.v5i2.1531
Corresponding author: Dr. Sanjay Pralhad Ingle
Conflict of interest: No conflict of interest.

Abstract

Aim: The basic aim of the present work is to study role of FNAC in diagnosis of soft tissue tumors and its correlation with Histopathological study.

Methods: The present study was conducted on 145 patients of soft tissue tumors, duration of 35 months in the department of pathology and microbiology, Medical College. FNAC was done in 145 cases and eight aspirations from patients with suspected hemangiomas and lymphangiomas were unsatisfactory for evaluation and these were excluded from the study.

Results: Among 145 cases, 13 cases were excluded from the study. Diagnosis by FNAC was done in 132 cases. In benign tumours maximum number of cases (28) was in the age group of 20-29 years, followed by 26 cases in 10-19 years. Among them largest number of samples 41 (31.1%) samples were categorized to be lipomas followed by spindle cell carcinomas in 39 (29.5%) cases, myxoid in 28 (21.2%) cases, pleomorphic in 5 (3.8%), round cell in 5 (3.8%) and polygonal in 1 (0.7) case. Maximum number of benign cases of tumour were seen in trunk and peritoneum 40 (36.4%) followed by upper 38 (34.5%) and lower 22 (20%) extremities and head and neck 10 (9.5%). Most common malignant tumours were noticed in lower extremities 10 (45.1%) followed by trunk 9 (40.9%). **Conclusion**: FNAC is an excellent diagnostic modality in the early diagnosis of soft tissue tumors. It is highly sensitive in detecting benign soft tissue tumors and highly specific for malignant soft issue tumors. Cytological categorization of sarcomas especially high-grade tumors like round cell and pleomorphic sarcomas will definitely help in early formulation of effective management protocol. Exact subtyping and grading of sarcomas by FNAC is possible in most of the cases. However, scope of soft tissue evaluation on cytology can be increased with more studies dealing with application of various ancillary techniques like IHC and cytogenetics.

Keywords: FNAC, Soft tissue tumors, STTs, Histopathology study, Musculoskeletal system, Lymphangiomas

Introduction

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.[1] They can be initially diagnosed by fine needle aspiration cytology (FNAC) for the identification of recurrent and metastatic cases.[2] 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.[3]

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 more traditional biopsy technique in the rapid work up of palpable tumour invading the musculoskeletal system.[4]

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.[5]

This basic aim of the present investigation is to study role of FNAC in diagnostic accuracy of soft tissue lesions and its correlation with Histopathology.

Methods

The present study was conducted on 145 patients of soft tissue tumors duration of 35 months in the department of pathology and microbiology, Medical College. FNAC was done in 145 cases and eight aspirations from patients with suspected hemangiomas and lymphangiomas were unsatisfactory for evaluation and these were excluded from the study. All the smears were stained with Leishman's stain. In 86 cases, biopsy was resorted and the histological examination of tissue was carried out. The paraffin sections of surgically resected specimens were with stained haematoxylin and eosin, reticulin, Van Gieson, Masson trichome stain, Phosphotungstic acid hematoxylin, periodic acid Schiff (PAS). The routine investigations and other necessary investigations were

also carried out to conform the diagnosis. A comparison was made between the cytological and histological findings wherever material for histopathological examination was available. On the correlation of FNAC diagnoses with histopathological diagnoses the sensitivity, specificity, accuracy and positive predictive values were calculated. Various diagnostic methods were calculated by statistical analysis (Chi square test).

Results

Of 145 cases, 13 cases were excluded from the study. Diagnosis by FNAC was done in 132 cases. In benign tumours maximum number of cases (28) was in the age group of 20-29 years, followed by 26 cases in 10-19 years. In malignant tumours maximum number of cases (7) was in the age group of 40-49 years as shown in below mentioned table (Table 1).

Table 1: Age specific distribution of STT

Age Group	Benign	Malignant	Total
0-9	8	1	9
10-19	26	1	27
20-29	28	2	30
30-39	18	4	22
40-49	14	7	21
50-59	10	5	15
60-69	5	2	7
>70	1	-	1

On FNAC smears, 110 (83.3%) cases were benign and 22 (16.7%) cases were malignant. As shown in Table 2, soft tissue tumors were classified into six types. Among them largest number of samples 41 (31.1%) samples were categorized to be lipomas followed by spindle cell carcinomas in 39 (29.5%) cases, myxoid in 28 (21.2%) cases, pleomorphic in 5 (3.8%), round cell in 5 (3.8%) and polygonal in 1 (0.7) case.

Table 2: Distribution of STT on FNAC (n=132)

Types of STT	Benign (%)	Malignant (%)	Total
Myxoid	24.5	4.5	21.2
Spindle cell	28.2	36.4	29.5
Pleomorphic	1.8	13.6	3.8
Polygonal	-	4.5	0.7
Round cell	-	22.7	3.8
Miscellaneous	36.4	4.5	31.1
Tumour like lesions	9.1	13.6	9.9

As in Table 3, maximum number of benign cases of tumour were seen in trunk and peritoneum 40 (36.4%) followed by upper 38 (34.5%) and lower 22 (20%) extremities and head and neck 10 (9.5%). Most common malignant tumours were noticed in lower extremities 10 (45.1%) followed by trunk 9 (40.9%).

Table 3: Distribution of cases of STT according to site (n=132)

Site	Benign (%)	Malignant (%)	Total
Head and neck	9.5	4.5	8.3
Trunk/retroperitoneum	36.4	40.9	37.1
Upper extremity	34.5	9.0	30.3
Lower extremity	20.0	45.1	24.2

Table 4: Cytohistological correlation of malignant soft tissue tumors

FNAC Diagnosis	Histopathological Diagnosis	IHC
Pleomorphic sarcoma (1)	Alveolar rhabdomyosarcoma (1)	Desin+, myogenin+
Alveolar rhabdomyosarcoma (RMS) (1)	Alveolar rhabdomyosarcoma (1)	Desmin+, myogenin+, myo D1 -
Pleomorphic sarcoma (1)	Angiosarcoma (1)	CD34+, desmin+
Dermatofibro sarcoma protubrens (3)	Dermatofibro sarcoma protubrens (3)	CD34+, vimentin+
Embryonal rhabdomyosarcoma (1)	Embryonal rhabdomyosarcoma (1)	Desmin+, myogenin+
Malignant round cell tumor (3)	Ewing/PNET (3)	CD99+, vimentin+
Myxofibrosarcoma (2)	Myxofibrosarcoma (2)	EMA-, S100-
Spindle cell sarcoma (2)	Malignant peripheral nerve sheath tumor (MPNST) (1)	S100+, vimentin+
Pleomorphic sarcoma (1)	Myxoinflammatory fibro sarcoma (1)	vimentin+, EMA-, S100-, desmin-,
Pleomorphic Rhabdomyosarcoma (1)	Pleomorphic Rhabdomyosarcoma (1)	vimentin+, desmin+, CK-, mic2-, myoD1-, calretinin-
Pleomorphic sarcoma (1)	Pleomorphic Rhabdomyosarcoma (1)	Desmin+, myogenin+
Pleomorphic sarcoma (3)	Pleomorphic sarcoma (3)	n/a
Spindle cell sarcoma (3)	Synovial sarcoma (3)	vimentin+, SMA-, CD34-, CD99+, S100-
Malignant peripheral nerve sheath tumor (1)	Synovial sarcoma (1)	CD99+, CD34-, CK-, EMA+, bcl2+
Spindle cell sarcoma (1)	Inflammatory myofibroblastoma (1)	SMA+, CD31-, CD34-, S100-

Discussion

There is some reluctance among clinicians and cytologists to use FNAC for the diagnosis of soft tissue tumours. Previous studies however demonstrated that FNAC leads to an accurate diagnosis of many types of tumour in various parts of the body.[6] FNAC has several advantages over traditional open incisional biopsy, including little or no risk of tumor cell contamination of the biopsy track, significantly less risk of morbidity and mortality and ease of learning and performance by most physicians.[7] An added advantage is the ability, especially in pediatric sarcoma to determine an immediate interpretation, allowing for obtainment of ancillary studies and planning of surgical intervention and/or neoadjuvant therapy at the initial presenting clinic visit.[8]

The present study has been undertaken to evaluate the acceptability, reliability and accuracy of cytodiangosis in comparison to open biopsy. In this study, one hundred and forty aspirations from patients with soft tissue masses were performed of which 8 were excluded from the study,

because they were unsatisfactory for evaluation.

The maximum number of benign soft tissue tumors occurred in the age group 20-29 years, while maximum number of malignant soft tissue tumour occurred in the age group 40-49 years. Bezabih found that the most common age group for benign tumors observed as 4th and 5th decades and for malignant tumors, 1st and 2nd decades.[9] In the present study, males outnumbered the females in the incidence of STT. This was similar with the observations of Beg et al.[10]

The present study in accordance with similar studies carried out within India and outside India clearly indicated that FNAC is an excellent diagnostic modality in the early diagnosis of soft tissue tumors. All patients in present study presented with swellings ranging from well-defined solitary to diffuse swellings. Swellings varied in size from smallest measuring 1x1cm (lipomas) to largest measuring 15x15cm (MPNST). Large size of tumors was especially seen in high grade sarcomas with a history of rapid increase in size. Cytomorphological subtyping of tumors on FNAC was done into 6 categories of myxoid, pleomorphic, spindle cell, epitheloid cell, round cell or lipomatous/well differentiated.[10]

Myxoid tumors

Tumors rich in myxoid matrix have soft consistency and aspiration generally yields varying amount of viscous material. Special attention should be paid to lipoblasts, ganglion cells, stellate cells and metachromatic fibrillary material. Myxoid tumors noted in present study were 3 cases of myxofibrosarcoma and one case of myxoid chondrosarcoma. Both cases were males in their sixth decade.

Round cell tumors (RCT)

This group of generally high-grade tumor affect mainly children and young adults. Cytological findings of special interest include rhabdomyoblasts, atypical lipoblasts, neuroblast rosettes and intracytoplasmic glycogen.[11,12] Categorisation is difficult because of absence of specific morphological features. In these cases, IHC, cytogenetic, molecular genetics and electron microscopy is helpful in addressing diagnostic dilemma.[13,14] 11 cases of RCT (Figure 1) were seen in present study mostly in children and adolescents. They were further subcategorised into embryonal RMS, alveolar RMS and glomus tumor which were concordant with their histopathology and IHC. Out of 5 cases, 3 proved to be cases of Ewing's/PNET on histology and IHC (CD99 positive).

Spindle cell tumors

This is the most heterogenous and numerous of soft tissue tumor groups. The most important diagnostic finding includes biphasic cellularity, elongated, buckled nor wavy, tapering nuclei, nuclear palisades, melanin pigment, storiform pattern etc.[15]

88 cases were found in this category which included 29 cases of neurofibromas, 22 cases of schwannomas, 7 cases of fibromatosis, 3 cases of fibro histiocytic tumor and one case of myofibroblastoma. 11 cases reported as benign mesenchymal tumors (unspecified) on FNAC proved to be schwannomas (5), neurofibromas (2) and one case each of fibromatosis, elastofibroma, and angiolipoma. Among malignant tumors, special diagnosis was assigned in 9 cases including synovial sarcoma (2 cases), MPNST (1 case), DFSP (5), and leiomyosarcoma (1 case). 6 cases were reported as spindle cell sarcomas (unspecified) in out of which 3 turned out to be synovial sarcoma, 2 were MPNST and 1 was inflammatory myofibroblastoma on tissue sections.

Pleomorphic tumors

Mostly present in middle age or elderly and generally are aggressive. 36 cases fell into this category in present study out of which 22 were diagnosed as malignant. HPE was available in 8 cases and included pleomorphic sarcoma NOS (3 cases) (Figure 2), alveolar RMS (1 case), pleomorphic RMS (2 cases), myxo-inflammatory fibro sarcoma (1 case) and angio-sarcoma (1 case).

Epitheloid/polygonal tumors

In present study, single case of epitheloid sarcoma was seen cytological criteria of this category include high cellularity with cells arranged in clusters, tight groups and dispersed individually with cells having epitheloid features.[16]

Well differentiated/lipomatous category

Includes lesions composed of well differentiated cells, the architecture pattern of which resembles that of mature tissue e.g. lipoma. In present study, largest numbers of cases were in this category (339 cases) out of which 280 were lipoma.

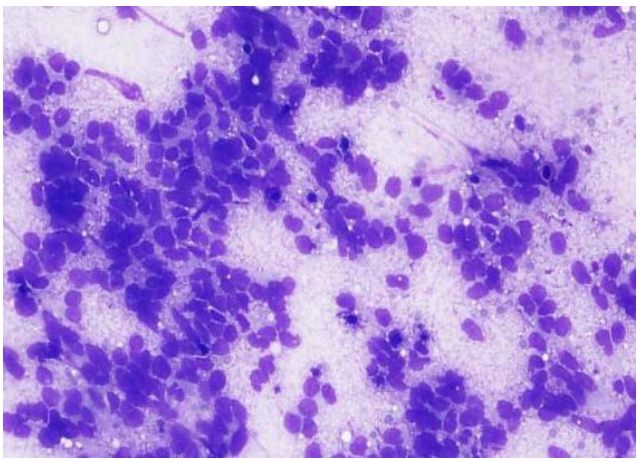

Figure 1: Small round cell tumor showing small cells with fine granular chromatin, inconspicuous nucleoli and scant amount of cytoplasm

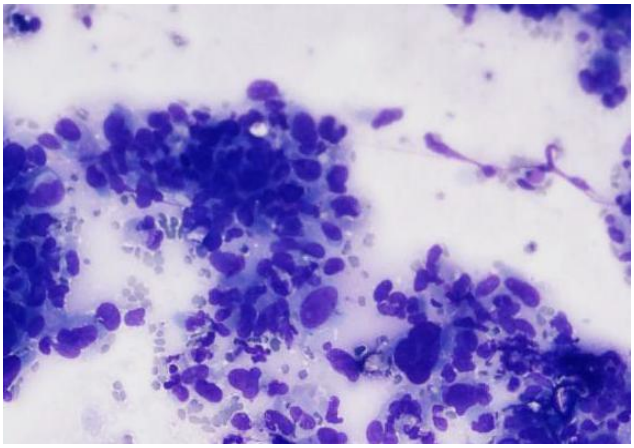

Figure 2: Pleomorphic sarcomas smear showing highly pleomorphic malignant cells

Conclusion

FNAC is an excellent diagnostic modality in the early diagnosis of soft tissue tumors. It is highly sensitive in detecting benign soft tissue tumors and highly specific for malignant soft issue tumors. Cytological categorization of sarcomas especially high-grade tumors like round cell and pleomorphic sarcomas will definitely help in early formulation of effective management protocol. Exact subtyping and grading of sarcomas by FNAC is possible in most of the cases. However, scope of soft tissue evaluation on cytology can be increased with more studies dealing with application of various ancillary techniques like IHC and cytogenetics.

The study concluded that aspiration cytology was found to be an outstanding procedure for early diagnosis of soft tissue lesions with no complications. When utilized in context with the clinical history and radiographic findings, it was found to be powerful tool in the multidisciplinary approach to the diagnosis and management of soft tissue lesions. It was more accurate in diagnosing benign lesions as compared to malignant lesions. High accuracy as in the present study (97.7%), was achieved with the close cooperation of the clinician, radiologist and pathologist. The results indicate that the grading scheme can accurately grade most of soft tissue sarcomas on FNAC specimens.

References

1. Roy S, Manna AK, Pathak S, Guha D. Evaluation of fine needle aspiration cytology and its correlation with histopathological findings in soft tissue tumours. J Cytol. 2007;24:37-40.
2. Rekhi B, Gorad BD, Kakade AC, Chinoy R. Scope of FNAC in the diagnosis of soft tissue tumors-a study from a tertiary cancer referral center in India. Cyto J. 2007;4:20.
3. Tailor HJ, Bhagat VM, Kaptan KBR, Italiya SL, Balar HR, Agarwal MP. Diagnostic accuracy of fine needle aspiration cytology in soft tissue tumors: our institutional experience. Int J Res Med Sci. 2013;1:443-7.
4. Chatura KR, Katyal A, Hiremath SS. Fine-needle aspiration cytology in soft tissue tumors: How far did we go? J Adv Clin Res Insights. 2015;2:1-5.
5. Moschetta M, Telegrafo M, Carluccio DA, Jablonska JP, Rella L, Serio G, et al. Comparison between fine needle aspiration cytology (FNAC) and core needle biopsy (CNB) in the diagnosis of breast lesions. G Chir. 2014;35(7-8):171-6.
6. Maitra A, Ashfaq R, Saboorian MH, Lindberg G, Gokaslan ST. The role of fine-needle aspiration biopsy in the primary diagnosis of mesenchymal lesions: a community hospital-based experience. Cancer. 2000;90:178-85.
7. Bennert KW, Abdul Karim FW. Fine needle aspiration cytology versus core needle biopsy of soft tissue lesions: a comparison. Acta Cytol. 1994;38:381-4.
8. Kilpatrick SE, Geisinger KR. Soft tissue sarcomas; The utility and limitations of fine needle aspirations biopsy. Am J Clin Pathol. 1998;110(1):50-68.
9. Bezabih M. Cytological diagnosis of soft tissue tumors.Pathologe. 2007;368(76):28.
10. Beg S, Vasenwala SM, Haider N, Ahmad SS, Maheshwari V, Khan M. A comparison of cytological and histopathological findings and role of immunostains in the diagnosis of soft tissue tumors. J Cytol. 2012;29:125-30.
11. Bennert KW, Abdul Karim FW. Fine needle aspiration versus core needle biopsy of soft tissue tumors-a comparision. Acta Cytol. 1994;38:381-4.
12. Gonzalez-compara R. Cytoarchitectural findings in the diagnosis of primary soft tissue tumors. Acta Cytol. 2001;45:115-46.
13. Coindre JM. Grading of soft tissue sarcomas. Arch Pathol Lab Med. 2006;48(1):3-12.
14. Akhter M, Ali MA, Hug M. Fine needle aspiration biopsy diagnosis of rhabdomyosarcoma; cytologic, histologic and ultrastructural correlation. Diagn Cytopath. 1982;34:1737-43.
15. Rajvanshi A, Srinivas R, Upsana G. Malignant small round cell tumors. J Cytol. 2009;26(1):1-10.
16. Liu K, Dodge RK, Dodd LG, Layfield LJ. Logistic regression analysis of low grade spindle cell lesions: a cytologic study. Acta Cytol. 1999; 43:143-52.