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Original Research Paper

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# FNAC OF SOFT TISSUE TUMOR WITH HISTOPATHOLOGICAL CORRELATION IN WESTERN ODISHA- A 7YEARS PROSPECTIVE AND RETROSPECTIVE STUDY.

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## ABSTRACT

**Background:** Soft tissue tumors (STT) are defined as mesenchymal proliferations that occur in the extra skeletal, non-epithelial tissues, excluding the viscera, coverings of the brain and lymphoreticular system

**Materials and methods:** 570 cases of STT were included in present study. FNA smears were stained with Diff-Quik, PAP and H&E. Cytodiagnosis were characterized as benign, malignant and inconclusive lesions with subtyping of each lesions.

**Results:** 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 specificity of 97.97% and 80% respectively with 98.9% positive predictive value (PPV) in diagnosis of malignant and intermediate lesion.

**Conclusion:** FNAC is a useful technique for initial diagnosis of STT as well as for identification of recurrent and metastatic lesions.

**KEYWORDS** : Soft tissue tumor, FNAC, Histopathology

## INTRODUCTION:

Soft tissue tumors (STT) are defined as mesenchymal proliferations that occur in the extra-skeletal, nonepithelial tissues, excluding the viscera, coverings of the brain and lymphoreticular system. These include the adipose tissue, fibrous connective tissue, skeletal muscles, blood vessels and peripheral nervous system. Soft tissues are almost entirely derived from mesoderm except for peripheral nerves. [1] STT constitute a large and heterogenous group of neoplasms, classified as either benign or malignant neoplasm. Many belong to the category of intermediate group which implies locally aggressive recurrent lesions with low or moderate propensity for metastasis. [2] The incidence of benign STT is about ten times that of malignant ones. [3] FNAC can be done from multiple sites and has almost replaced large needle core biopsy in diagnosis of STT, thus providing more representative material. [4]

## MATERIALS AND METHODS:

Present study is both prospective and retrospective study conducted in the Department of Pathology, VIMSAR, Burla from a period between September 2011 to August 2018 for a period of seven years. FNAC was performed on patients referred to the Department of Pathology, clinically diagnosed as STT from out patient department and indoor patient. FNAC was done with 22-24 gauge needle and smears were stained with Diff-Quik, PAP and H&E stain. Prior to FNAC detailed clinical history was collected and clinical examination was done in each case. The data of all patients were recorded such as name, age, sex, site of mass, dimension and duration of mass and if any history of sudden increase in size or not. Histopathological confirmation was done after surgery. Cyto-histological correlation was done in patients who underwent operative procedure. Statistical analysis was performed using SPSS version 20.0. On cyto-histological correlation sensitivity, specificity and PPV were taken into account.

## RESULTS:

Total number of 1234 cases of palpable soft tissue lesions diagnosed clinically as STT underwent FNAC. Due to non-availability of biopsy specimens in all cases, only 570 cases were included in our study. Out of 570 palpable tumors, 558 cases were aspirated directly and in 12 retroperitoneal and intra-abdominal cases ultrasound guided aspiration was done. In the present study 342 cases were male and 228 cases were female patients with Male:Female ratio 1.5:1. Cytodiagnosis revealed 465 cases, 98 cases and 7 cases as benign, malignant and inconclusive lesions (benign or malignant nature could not be decided) respectively. On histopathology out of 98 malignant STT diagnosed in FNAC one case was finally diagnosed as ancient schwannoma (Fig 1&2) which was wrongly diagnosed as malignant spindle cell tumor. All benign lesions were confirmed histologically with 100% concordance. Out of 7 inconclusive diagnosis, 1 case was diagnosed as low grade fibrosarcoma, 2 cases as Dermatofibrosarcoma protuberans (DFSP) (Fig 3&4), one case as nodular fasciitis and another 3 cases were benign firohistiocytic tumor (BFH). The age group of the patients ranged between 2-72 years with maximum number of benign cases (25.53%) were seen in 31-40 yrs of age group and 29% of malignant lesions were are seen between 51-60 years. Benign tumors outnumbered malignant one with a ratio of 4.7:1. Malignant tumors found in the first decade were 2.04% cases [Table-1]. In case of benign tumors, head and neck was the most frequent site (37.44%) followed by upper extremities (25.10%), whereas in malignant lesions lower extremities were the most frequent sites (36%) [Table-2]. Majority cases presented as solitary lesion (91%) and only 9.0% presented as multiple swellings. All the 45 cases with multiple lesions were benign, majority being lipoma (18 cases), 5 cases of fibroma, 21 cases of neurofibroma and one case of multiple leiomyomatosis. The cytological findings of malignant STT were categorized into 7 distinct types [Table-3]. In our study adipose tissue tumor was the most common benign tumor (44.08%) followed by benign spindle cell tumors (34.83%). Spindle cell sarcoma were the commonest malignant STT (44.89%) followed by malignant round cell tumor (20.40%) and pleomorphic sarcoma (15.30%) [Table-3]. We observed separately benign and malignant lesion in histology. In histology maximum number of benign cases were lipoma followed by BFH [Table-4]. Amongst 98 cases of malignant lesions, fibrosarcoma was the most common malignant STT (28.57%) followed by extra-skeletal Ewing sarcoma (EWS Fig. 5&6) (15.30%). Rhabdomyosarcoma constituted 4.08% of cases and one case of Alveolar soft part sarcoma (ASPS, Fig. 7&8) was diagnosed. 2 cases diagnosed as inconclusive lesion on cytology were diagnosed as DFSP on histology [Table-5].

## DISCUSSION:

FNAC has several advantages over traditional open incisional biopsy, including no risk of tumor cell spread through biopsy track and significantly less risk of morbidity and mortality. [5] In the present study there was male predominance with M:F ratio was 1.5:1. Separate studies conducted by Roy s et al [6], Beg et al [7] and

Choukimath M et al [8] found male predominance but Oland J et al [9] and Nagira K et al [10] reported female predominance. In our study benign STT was found in maximum cases (25.53%) in 31-40 years age group followed by 21.70% in 41-50 years age group. In malignant STT cases, maximum number (29%) were found in 51-60 years followed by 11-20 years age group (20%). Roy S et al [6] found maximum number of cases in 21-40 years age group. In present study, Head and Neck was found to be commonest site for benign tumor (37.44%) and lower extremities (36.0% cases) were commonest site for malignant STT. In the study of Dhal et al [11], G Campora et al [12] and Roy S et al [6] they found head and neck found to be the commonest site of benign STT. Benign lesions outnumbered malignant lesions by a ratio of 4.7:1. Studies by Nagira k et al [10] and Hirachand S et al [13] benign lesions outnumbered the malignant lesions by 3.3:1 and 2.2:1 respectively. Studies by Rekhi B et al [13] and Palmer HE et al [14] showed malignant lesions outnumbered the benign lesions, as most of these studies were conducted in referral hospital or tertiary care centre where predominantly malignant lesions were encountered. Spindle cell sarcoma was the most common malignant tumor diagnosed cytologically in the present study, followed by round cell sarcoma, pleomorphic sarcoma, myxoid sarcoma and vascular sarcoma. Spindle cell sarcoma were the most common STT reported by Palmer HE et al [14] and Rekhi B et al [13]. Most common soft tissue sarcoma were extra-skeletal EWS and synovial sarcoma as reported by Wakely and Kneisl [15]. Liposarcoma was the most frequent STT as reported by Nagira K et al[10]. Histology in present study revealed highest incidence was that of lipoma (44.08%) followed by benign spindle cell tumor (34.83%). Present study was comparable with the studies of Roy S et al[6] and Wakely and Kneisl [15]. In terms of diagnostic efficacy of present study shows 97.97% sensitivity, 80% specificity and 98.9% PPV in malignant and intermediate tumors. Our study is comparable to results of Rekhi B et al (100% sensitivity and 87% specificity)[14], Nagira et al (92% sensitivity and 97% specificity)[10], Wakely and Kneisl (100% sensitivity and 97% specificity)[15] and Arul P et al (sensitivity 91.7% and specificity 97.7%) [16].

## CONCLUSION-

FNA cytology was found to be a reliable diagnostic procedure for early diagnosis of STT with no complication and fair sensitivity, specificity and accuracy. It is a useful technique for initial diagnosis of STT as well as for identification of recurrent and metastatic cases.

**TABLE-I AGE DISTRIBUTION IN BENIGN AND MALIGNANT STT**

| Age group (in years) | Benign STT | | Malignant and intermediate STT | | Total | |
|---|---|---|---|---|---|---|
| | No of cases | % | No. of cases | % | No of cases | % |
| 0-10 | 36 | 7.65 | 2 | 2 | 38 | 6.66 |
| 11-20 | 70 | 14.89 | 20 | 20 | 90 | 15.70 |
| 21-30 | 62 | 13.19 | 16 | 16 | 78 | 13.68 |
| 31-40 | 120 | 25.53 | 9 | 9 | 129 | 20.63 |
| 41-50 | 102 | 21.70 | 15 | 15 | 117 | 20.52 |
| 51-60 | 45 | 9.57 | 29 | 29 | 74 | 12.98 |
| 60> | 35 | 7.44 | 9 | 9 | 44 | 7.71 |
| Total | 470 | 100 | 100 | 100 | 570 | 100 |

**TABLE-2 Location of STT**

| Location | Benign cases | % | Malignant and intermediate cases | % |
|---|---|---|---|---|
| Head and neck | 176 | 37.44 | 16 | 16 |
| Upper extremity | 118 | 25.10 | 25 | 25 |
| Trunk | 75 | 15.95 | 6 | 6 |
| Lower extremity | 53 | 11.27 | 36 | 36 |
| Multiple site | 45 | 9.57 | 8 | 8 |
| Retroperitoneal and intra-abdominal | 3 | 0.63 | 9 | 9 |
| Total | 470 | 100 | 100 | 100 |

**Table – 3 CYTO- DIAGNOSIS OF STT ACCORDING TO MORPHOLOGY**

| Serial no | Group | Benign cases | % | Malignant cases | % | inconclusive | % |
|---|---|---|---|---|---|---|---|
| 1 | Adipose tumor | 205 | 44.08 | 4 | 4.08 | 0 | 0 |
| 2 | Spindle cell tumor | 162 | 34.83 | 44 | 44.89 | 7 | 100 |
| 3 | Round cell tumor | 5 | 1.07 | 20 | 20.40 | 0 | 0 |
| 4 | Vascular tumor | 57 | 12.25 | 3 | 3.06 | 0 | 0 |
| 5 | Myxoid tumor | 26 | 5.59 | 12 | 12.24 | 0 | 0 |
| 6 | Polygonal tumor | 10 | 2.15 | 0 | 0 | 0 | 0 |
| 7 | Pleomorphic tumor | 0 | 0 | 15 | 15.30 | 0 | 0 |
| 8 | Total no. of cases | 465 | 100 | 98 | 100 | 7 | 100 |

**TABLE- 4 CYTO-HISTO CORRELATION OF BENIGN STT**

| Sl No | Histological diagnosis | No. of cases | Concordant | Non-concordant | Cytodiagnosis |
|---|---|---|---|---|---|
| **1** | **Lipoma** | **167** | **167** | **0** | |
| **2** | **Spindle cell lipoma** | **35** | **35** | **0** | |
| **3** | **Angiomyolipoma** | **3** | **3** | **0** | |
| **4** | **Fibroma** | **25** | **25** | **0** | |
| **5** | **Leiomyoma** | **15** | **15** | **0** | |
| **7** | **Nodular Fasciitis** | **2** | **1** | **1** | **Inconclusive** |
| **8** | **BFH** | **60** | **57** | **3** | **Inconclusive** |
| **9** | **Neurofibroma** | **35** | **35** | **0** | |
| **10** | **Schwannoma** | **29** | **28** | **1** | **MPNST** |
| **11** | **Leiomyomatis Peritonitis Dissemineta** | **1** | **1** | **0** | |
| **12** | **Glomus tumor** | **4** | **4** | **0** | |
| **13** | **Granular cell tumour** | **1** | **1** | **0** | |
| **14** | **Hemangioma** | **57** | **57** | **0** | |
| **16** | **Cutaneous Myxoma** | **26** | **26** | **0** | |
| **17** | **GCT of tendon sheath** | **10** | **10** | **0** | |

**TABLE - 5 CYTO-HIST CORRELATION IN MALIGNANT AND INTERMEDIATE STT**

| Sl no. | Histological diagnosis | No of cases | Concordant | Non-concordant | Cytodiagnosis |
|---|---|---|---|---|---|
| 1 | Liposarcoma | 4 | 4 | 0 | |
| 2 | Myxofibrosarcoma | 12 | 12 | 0 | |
| 3 | Fibrosarcoma | 28 | 27 | 1 | Inconclusive |
| 4 | Leimyosarcoma | 3 | 3 | 2 | |

| | | | | | |
|---|---|---|---|---|---|
| 5 | Synovial sarcoma | 5 | 5 | 1 | |
| 6 | MPNST | 8 | 8 | 0 | |
| 7 | Extraskeletal EWS | 15 | 15 | 0 | |
| 8 | Rhabdomyosarcoma | 4 | 4 | 0 | |
| 9 | Alveolar soft part sarcoma (ASPS) | 1 | 1 | 0 | |
| 10 | Malignant Fibrous Histiocytoma (MFH) | 15 | 15 | 0 | |
| 11 | DFSP | 2 | 0 | 2 | Inconclusive |

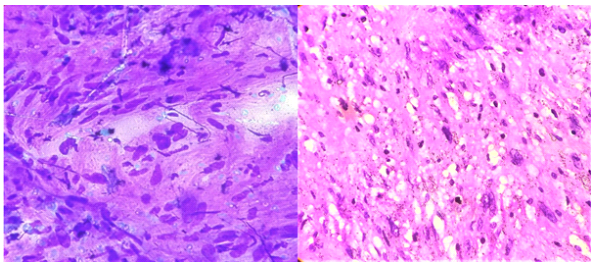

**Fig 1:** Highly cellular smear showing pleomorphic spindle shaped cells in clusters in Ancient schwannoma (Diff-Quik, x400).

**Fig 2:** Ancient schwannoma with degenerative atypia, witout mitotic activity (H&E, x400).

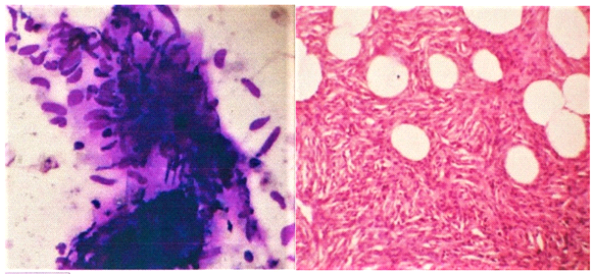

**Fig 3:** Cyto-smear shows plump spindle shaped cells present as cohhesive cluster in DFSP (Diff Quik, x100).

**Fig 4:** DFSP showing tumor interdigitates with normal fat (H&E, x400).

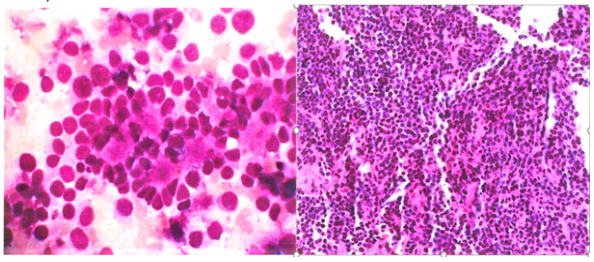

**Fig 5:** Cyto-smear, small round cells showing finely reticulated and evenly dispersed chromatin in EWS (Diff Quik x400).

**Fig 6:** Lobular pattern of monotonous population of round cells in EWS (H&E x400).

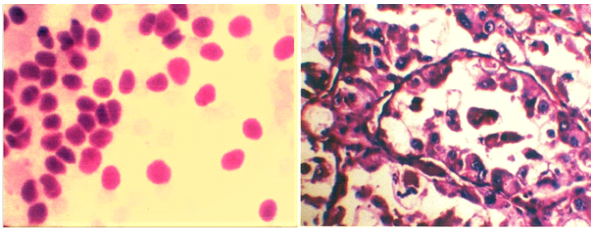

**Fig 7:** Cyto-smear show round cells with abundant granular cytoplasm and many stripped nuclei in ASPS (H&E, x400).

**Fig 8:** Cell nests separated by thin walled sinusoidal vascular space with prominent pseudoalveolar growth pattern in ASPS (H&E, x400).

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