



## SYNOVIAL SARCOMA DIAGNOSIS BY FINE NEEDLE ASPIRATION CYTOLOGY: A CASE REPORT

### Pathology

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### ABSTRACT

Synovial sarcoma is a rare soft tissue tumor accounting for 5-10% of soft tissue sarcomas. Most arise in the extremities and trunk, and a small proportion occur in the abdominal wall, head and neck region, and mediastinum. It manifests different phenotypic subtypes that render their cytologic evaluation challenging. We report a case of biphasic synovial sarcoma on the right lower extremity in a 42-year-old man diagnosed by fine needle aspiration cytology. The aspirate was moderately cellular and composed of a mixture of tissue fragments and dissociated cells with bland chromatin, inconspicuous nucleoli, and oval to spindle-shaped cytoplasm. Mitosis was rare. A monolayer sheet of epithelial component was seen. The cells in this monolayer sheet had more abundant distinct cytoplasm, round nuclei, and prominent micronucleoli. Synovial sarcoma is a rare soft tissue tumor accounting for 5-10% of soft tissue sarcomas. Most arise in the extremities and trunk, and a small proportion occur in the abdominal wall, head and neck region, and mediastinum. It manifests different phenotypic subtypes that render their cytologic evaluation challenging. We report a case of biphasic synovial sarcoma on the right lower extremity in a 42-year-old man diagnosed by fine needle aspiration cytology. The aspirate was moderately cellular and composed of a mixture of tissue fragments and dissociated cells with bland chromatin, inconspicuous nucleoli, and oval to spindle-shaped cytoplasm. Mitosis was rare. A monolayer sheet of epithelial component was seen. The cells in this monolayer sheet had more abundant distinct cytoplasm, round nuclei, and prominent micronucleoli.

### KEYWORDS

Sarcoma; Synovial; Fine Needle Aspiration Cytology; Epithelial Component

### CASE REPORT

A 42 year old male presented with a large painful swelling on the anterolateral aspect of proximal right leg approximately 10 cm in diameter. The swelling was progressively increasing in size and was associated with off and on fever. On examination it was a large non specific, somewhat lobulated swelling. It was tender, mobile, fluctuant with no restriction of knee movements. His base line investigations were within normal limits. Chest X-ray, CT chest and ECG were normal. MRI of the right leg suggested a sarcomatous lesion. Bone scan revealed increased uptake. Fine needle aspiration cytology and was performed.

**Cytologic Findings:** Atypical spindle shaped plump cells were present scattered as well as in cohesive clusters. These atypical cells had pleomorphic, hyperchromatic nuclei with irregular chromatin clearing and nuclear indentations. The cytoplasm was eosinophilic and relatively ample.

### DISCUSSION

FNAC plays a major role in diagnosing pre-operative mesenchymal lesions and distinguishes both benign and malignant soft tissue lesions. There are no major studies from India on synovial sarcoma alone emphasizing the role of FNAC in diagnosing the same except for a few case reports. Kumar et al.<sup>[1]</sup> and Dey et al.<sup>[2]</sup> published their studies in diagnosing soft tissue tumors from India. Different cytologic series report positive and negative predictive values of 85-100% and 94-100%, respectively.<sup>[1],[2],[5]</sup> Biphasic nature is the most distinctive histologic feature of synovial sarcoma.<sup>[4]</sup> A specific cytologic diagnosis is possible when there is distinct biphasic pattern. In many biphasic tumors cytology fails to sample the epithelial component preventing a specific diagnosis. Monophasic fibrous variant is more common among synovial sarcomas though the biphasic variant is the first described entity on cytology.<sup>[5],[6]</sup> Many biphasic tumors lose their epithelial component either at recurrence or metastases. Hence, it is necessary to emphasize the cytologic features of synovial sarcoma other than epithelial morphology. High cellularity, cellular anaplasia, foci of necrosis and a high mitotic index indicates aggressive behaviour of the lesion.<sup>[7]</sup> In addition to these features, obligatory clinico radiologic correlations are necessary for a reliable diagnosis of malignancy. Synovial sarcoma is a high grade neoplasm with remarkably uniform nuclei and evenly distributed chromatin. Necrosis is uncommon in synovial sarcoma but encountered in recurrent or metastatic diseases or cases with therapeutic irradiation.<sup>[8]</sup> Infrequent mitoses were noted in our study. Monophasic synovial sarcoma is a highly cellular tumor almost devoid of stroma. Only a single case showed such evidence in the present study. Calcification, which is usually described with synovial sarcoma was found infrequently.

Monophasic synovial sarcoma is prevalent in adolescents and young adults. Viguer et al.<sup>[7]</sup> in his study showed the prevalence in adolescents and young adults.

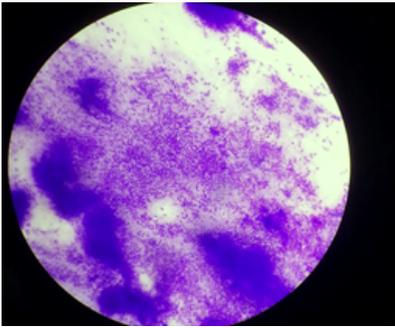
Synovial Sarcoma has to be differentiated from two broad based categories of lesions:

1. Mesenchymal lesions with uniform spindle to round cell morphology
2. Tumors with epithelioid cell morphology

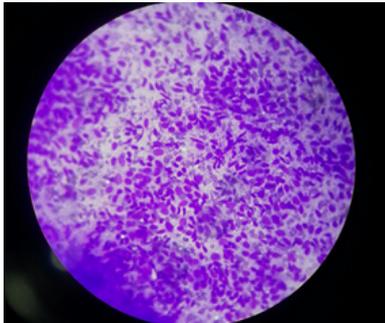
But the diagnostic difficulties are commonly encountered with hemangiopericytoma and fibrosarcoma.<sup>[9]</sup> Hemangiopericytic pattern is more commonly seen in hemangiopericytoma compared to synovial sarcoma. Such pattern was noticed in a single case in the present study. We could differentiate it from the presence of other cytologic features favouring synovial sarcoma. It has been proved that immunohistochemistry is crucial for the definite diagnosis of synovial sarcoma. Though keratin comes positive in all biphasic tumors and in many of the monophasic fibrous types according to Ackerman et al., it cannot be considered critical in the cytologic diagnosis of synovial sarcoma. Bcl-2 protein shows intense cytoplasmic positivity but has to be differentiated from bcl-2 positive lymphomas.<sup>[6]</sup> Thirty percent of synovial sarcomas show S100 protein positivity but one has to keep in mind malignant peripheral nerve sheath tumor in ruling out as a possibility.<sup>[8]</sup> Sarcomatoid mesothelioma can be excluded by doing calretinin and HBME1. In difficult cases, interphase fluorescent insitu hybridization aids in diagnosing synovial sarcomas.<sup>[10]</sup> Cytogenetic analysis can be performed on FNAC specimens from soft tissue sarcomas and may be a useful diagnostic aid in difficult cases. However, when cell block material is available for immunohistochemistry, the majority of sarcoma subtypes with specific cytogenetic profiles can be successfully classified with or without cytogenetic analysis.<sup>[11]</sup>

Mohite et al.<sup>[12]</sup> in their publication on a single case report of synovial sarcoma stated that fine needle aspiration is less accurate than other techniques for the diagnosis of soft tissue tumors and that cytogenetic analysis is an important diagnostic tool. However, there are studies from India and abroad emphasizing the utility of fine needle aspiration cytology in diagnosing soft tissue tumors. In the hands of experienced cytopathologists FNAC in conjunction with ancillary techniques has a diagnostic accuracy approaching 95% for the diagnosis of soft tissue sarcomas.<sup>[13]</sup>

Although cytomorphologic features of synovial sarcoma are characteristic enough to permit its recognition, clinical correlation is necessary for its correct identification.



**Fig. 1:** FNAC of the lesion showing cohesive clusters as well as scattered atypical spindle cells



**Fig. 2:** Morphological details: Atypical cells are plump and spindle having ovoid, pleomorphic, hyperchromatic nuclei with irregular chromatin clearing.

#### CONFLICTS OF INTEREST

There are no conflicts of interest

#### References

1. Kumar S, Chowdhury N. Accuracy, limitations and pitfalls in the diagnosis of soft tissue tumors by fine needle aspiration cytology. *Indian J Pathol Microbiol* 2007;50:42-5.
2. Dey P, Mallik MK, Gupta SK, Vasishta RK. Role of fine needle aspiration cytology in the diagnosis of soft tissue tumors and tumor-like lesions. *Cytopathology* 2004;15:32-7.
3. Ryan M. Cytology and mesenchymal pathology. How far will we go? *Am J Clin Pathol* 1996;106:561-4.
4. Koivuniemi A, Nickels J. Synovial Sarcoma diagnosed by fine needle aspiration biopsy. *Acta Cytol* 1978;22:515-8.
5. Sapi Z, Bodo M, Megyesi J, Rahoty P. Fine needle aspiration cytology of biphasic synovial sarcoma of soft tissue. Report of a case with ultrastructural, immunohistologic and cytophotometric studies. *Acta Cytol* 1990;34:69-73.
6. Willems JS. Aspiration biopsy cytology of soft tissue tumors. In: Linsk JA, Franzen S, editors. *Clinical aspiration cytology*. Philadelphia: J.B Lippincott; 1983. p. 319-47.
7. Viguer JM, Jimenez-Heffernan JA, Vicandi B, Lopez-Ferrer P, Gamallo C. Cytologic features of synovial sarcoma with emphasis on the monophasic fibrous variant: A morphologic and immunocytochemical analysis of bcl-2 protein expression. *Cancer* 1998;84:50-6.
8. Fisher C. Synovial sarcoma. *Curr Diagn Pathol* 1994;1:13-8.
9. Kilpatrick SE, Teot LA, Stanley MW, Ward WG, Savage PD, Geisinger KR. Fine needle aspiration biopsy of synovial sarcoma. A cytomorphologic analysis of Primary, recurrent and metastatic tumors. *Am J Clin Pathol* 1996;106:769-75.
10. Lee W, Han K, Harris CP, Shim S, Kim S, Meisner LF. Use of FISH to detect chromosomal translocations and deletions. Analysis of chromosome rearrangement in synovial sarcoma cells from paraffin embedded specimens. *Am J Pathol* 1993;143:15-9.
11. Kilpatrick SE, Bergman S, Pettenati MJ, Gulley ML. The usefulness of cytogenetic analysis in fine needle aspirates for the histologic subtyping of sarcomas. *Mod Pathol* 2006;19:815-9.
12. Mohite PN, Bhatnagar AM, Mehta S, Patel HD. Synovial sarcoma of the knee joint compressing the popliteal artery: A case report. *Internet J Surg* 2007;12:1.
13. Singh HK, Kilpatrick SE, Silverman JF. Fine needle aspiration biopsy of soft tissue sarcomas: Utility and diagnostic challenges. *Adv Anat Pathol* 2004;11:24-37.