International Journal of Clinical and Diagnostic Pathology

ISSN (P): 2617-7226
ISSN (E): 2617-7234
www.patholjournal.com
2021; 4(3): 10-15
Received: 05-05-2021
Accepted: 08-06-2021

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Clinicopathological study of 125 soft tissue tumours in a rural tertiary care centre

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DOI: https://doi.org/10.33545/pathol.2021.v4.i3a.382

Abstract
Introduction: Soft tissue is composed of fibrous (connective) tissue, adipose tissue, skeletal muscle, blood and lymph vessels and peripheral nervous system. Soft tissue tumours are diverse group of lesions that arises from the supporting soft tissue of the body.
Aims: To study histomorphology of soft tissue tumours and to evaluate pattern of distribution of the soft tissue tumours in relation to different age groups, sex and sites.
Setting and Design: Comprises of soft tissue tumours studied during period of 2 years. Prospective and observational study.
Result: Out of 125 cases of STTs recorded, 117 (93.6%) were benign and 08 (6.4%) were malignant. STTs in general had male preponderance. Of all benign STTs, the commonest was lipoma (39.2%).
Conclusion: Molecular diagnosis have started to gain momentum in the field of soft tissue tumours, however clinicopathological evaluation still remains the gold standard.

Keywords: Benign, malignant, soft tissue tumours, histopathology

Introduction

Soft tissue encompasses the supportive connective tissue of various organs and the other nonepithelial, extra skeletal structures excluding the viscera, lymphoreticular system and coverings of the brain (meninges). It is represented by adipose tissue, fibrous connective tissue, peripheral nervous system, skeletal muscle and blood/ lymph vessels [1]. The term was coined by Wardrab in 1782. They are derived principally from embryonic mesoderm with some contribution from neuroectoderm [2].

These are usually classified as benign, intermediate or malignant lesions which can occur in any age group, and which usually present as a painless mass [3]. The histological distributions of these tumours are specific for a particular age group at a particular anatomical site.[4] Benign tumours occur with an annual incidence of 300 per 1 lakh population and outnumber malignant tumours by a margin of approximately 100:1 [2] They are classified as per WHO classification based on the cell of origin. For primary level categorisation of tumours routine hematoxylin and eosin sections with light microscopy is adequate. For few cases IHC markers are used to find out chromosomal abnormalities and special stains are needed to confirm the diagnosis [5].

These tumours arise everywhere in the body, most commonly on the extremities, trunk, abdominal cavity and head neck region. The pathogenesis of most of the STTs is still unknown. Various physical, chemical, environmental, genetic factors, radiation, viral infections and immune deficiencies have been considered in the etiopathogenesis of these tumours [6].

With a few notable exceptions, histologic typing does not provide sufficient information for predicting the clinical course of a sarcoma and therefore, must be accompanied by grading and staging information. Grading assesses the degree of malignancy of a sarcoma and is based on an evaluation of several histologic parameters, whereas staging provides short hand information regarding the extent of the disease at a designated time, usually the time of initial diagnosis [7].

Soft tissue tumour and tumour like lesions have fascinated pathologists for many years because of their remarkably wide variety and the close histopathologic similarities between certain tumours with only subtle differences detectable on careful microscopic examination,

thus posing a diagnostic challenge to the histopathologist. The pathogenesis of most of the soft tissue tumours, like that of many other malignant tumours, is still unknown [8].

An accurate diagnosis can sometimes be made based on a detailed clinical history, a thorough physical examination of the patient and a proper naked eye examination of tumour. Features like the patient's age and the size and location of the tumour greatly help in shortlisting the differential diagnosis [9].

In the present study, we aimed at assessing the clinicopathological study of various soft tissue tumours with the histopathological findings with addition of special tests wherever necessary.

Aims and objectives

1. To study histomorphology of soft tissue tumours and to evaluate pattern of distribution of the soft tissue tumours in relation to different age groups, sex and sites.
2. To find out relative incidence of benign and malignant soft tissue tumours.
3. To analyse the available data and compare it with the observations of other studies.

Materials and methods

Study Design

The present study was carried out at histopathology section of pathology department of SRTR Government Medical College and Hospital, Ambajogai, a tertiary care centre in Beed district of Maharashtra state, India during the period of November 2018 to November 2020. The institute is one of the largest rural medical college and hospital.

Type of study: Prospective and observational.

Data collection procedure: In present study, we analysed all surgical specimens which received for histopathology examination under the diagnosis of soft tissue tumours. We also include small biopsies and tru-cut biopsies. Clinical history of all the cases was collected in pretested proforma meeting the objectives of the study.

Inclusion criteria: Cases of soft tissue tumours diagnosed on the basis of history, clinical examination and subjected to biopsy or surgery with subsequent histopathological examination were included in this study.

Exclusion criteria: Patients who were treated conservatively or patients referred to other hospitals were excluded from this study. Soft tissue tumours of systemic organs (like leiomyoma of uterus) were excluded from this study.

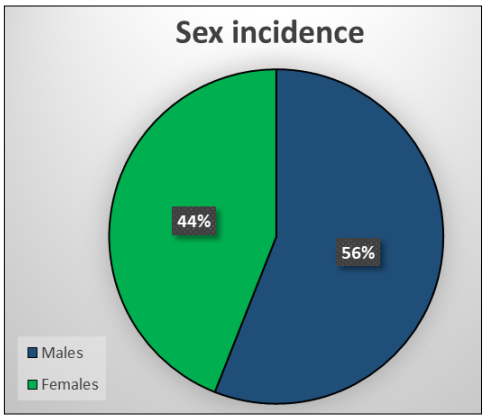
A detailed gross examination of the soft tissue specimen was performed to record the size, shape, colour, consistency and distance from the deep resected margins. The specimens were preserved in 10% formalin and allowed to fix for 24 hrs. The haematoxylin and eosin stained sections of all the specimens obtained by routine processing and paraffin embedding were studied to evaluate histopathological features. The sections were mounted using DPX and permanent slides were prepared. Tests like special stains & Immunohistochemistry were applied wherever necessary.

The data was analysed and compiled in the form of tables, pie chart and bar diagrams. Histological subtypes were classified according to the recent 2020 WHO classification of soft tissue tumours.

Results and discussion

The present study encountered 125 cases of soft tissue tumours out of 5042 all specimens received during the period November 2018 to November 2020. This represented 2.48% of all the specimens received during the same period. This closely approximates with 2.40 % and 1.30% incidence reported by Pramila J *et al.* [8] and Janaki M *et al.* [4] respectively.

Out of the total 125 specimens received of soft tissue tumours, 117 (93.6%) of soft tissue tumours were benign, whereas 08 (6.4%) were malignant with benign to malignant ratio 14.6:1. This ratio is similar to study by Agravat A H *et al.* [10] (2010) and Piyush S *et al.* [11] (2018) which having benign to malignant ratio as 14.3:1 and 15.8:1 respectively. According to WHO classification of soft tissue tumours there is another group known as intermediate tumours present but in our study, no case found of this group. Out of 125 soft tissue tumours cases 70 were male cases while 55 in female cases. (Graph: 1) We noted a male preponderance in our study, as sex incidence among benign tumours observed in present study is 1.3:1 similar to studies of Megha S *et al.* [12] (2015) and Swagata D *et al.* [13] (2016) which is 1.3:1. Janaki M *et al.* [4] (2015) observed male: female ratio of 1: 1 with equal distribution of benign tumours in male and females. Baste BD *et al.* [14] (2017) shows somewhat higher incidence among males with M:F ratio of 1.8:1.



Graph 1: Sex incidence of soft tissue tumours

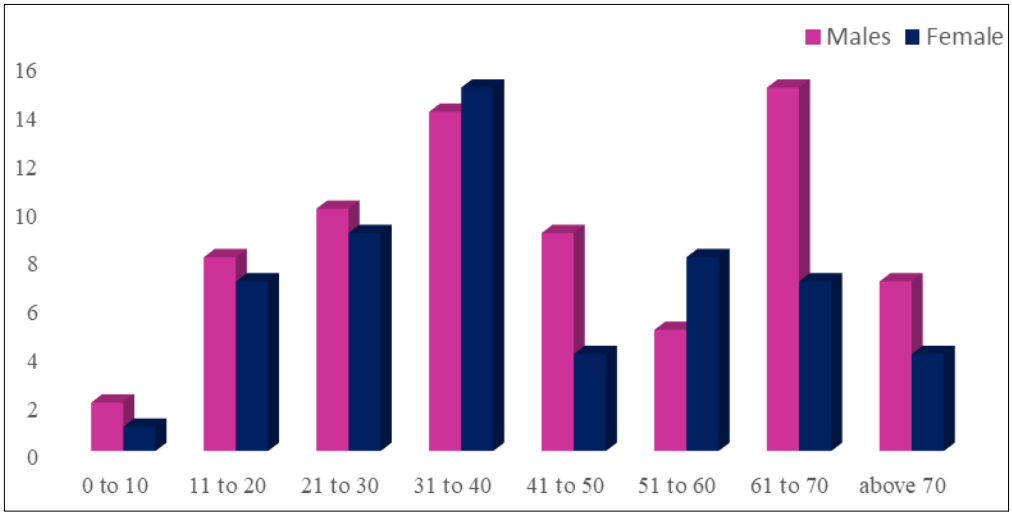
The age incidence ranged from a 5 year to 81 years. The different soft tissue tumours in different age groups showed the commonest age group was the fourth decade followed by seventh and third decade of life, comprising of 23.2%, 17.6% and 15.2% respectively. (Table no. 2) Comparative analysis of gender incidence and sex ratio was done with other studies. The study conducted by Swagata D *et al.* [13] (2016) found majority of the cases to be males (56%) and the male to female ratio was 1.3:1. These findings were similar to the findings of our study. Jain P *et al.* [8] (2014) reported the M: F as 1.2:1. A male predominance was noted in almost all the soft tissue tumours among the various studies available. Study conducted by Janaki M *et al.* [4] (2015) showed an equal incidence in males and females.

Benign tumours extended over the entire age range, with the peak occurring in the fourth decade of life. The sarcomas were distributed between the fourth and seventh decades with an average of 57 years. (Table no. 1)

Table 1: Age distribution of benign and malignant tumours

Sr. No.	Age in years ->	0 to 10	11 to 20	21 to 30	31 to 40	41 to 50	51 to 60	61 to 70	>70	Total
1	Benign	03	15	19	28	13	11	17	11	117
2	Malignant	00	00	00	01	00	02	05	00	08
	Total	03	15	19	29	13	13	22	11	125

Among males, the soft tissue tumours were seen commonly in the fourth (20 %) and the seventh (21.43 %) decade of life, while among females the fourth (27.27 %) and third (16.36%) decade of life were commonly affected. (Graph no. 2).



Graph 2: Age distribution within the male and female

Majority of the soft tissue tumours were seen in extremities comprising of 45 cases (36 %) of all soft tissue neoplasms, followed by head and neck, 42 cases (33.60%). Least commonly involved was the abdomen, with only 13 cases (10.40%). The benign tumours were predominantly seen involving head and neck region in 42 cases (33.6%), followed by extremities 38 cases (30.4%) in keeping with the overall picture. For the malignant tumours, extremities was the predominant site affected (07 out of 08 malignant). (Table no. 2). When the data was resolved based on sex, head and neck region is commonest site in male followed by extremities while in female extremities remains the most affected site followed by head and neck. Trunk was marginally affected in both males and females.

Table 2: Site distribution within the sex incidence

Sr. No.	Site	Male		Female		Total	%
		No.	%	No.	%		
1	Head & Neck	28	22.4 %	14	11.2 %	42	33.6 %
2	Upper limb	16	12.8 %	9	7.2 %	25	20.0 %
3	Lower limb	7	5.6 %	13	10.4 %	20	16.0 %
4	Abdomen	6	4.8 %	7	5.6 %	13	10.4 %
5	Back	13	10.4 %	12	9.6 %	25	20.0 %
		70	56%	55	44%	125	100 %

Distribution of histologic subtypes:

Out of 125 soft tissue tumours in the study, the most frequent were the adipocytic tumours. The adipocytic tumours constitute 56 cases accounting for 44.8% of all the tumours. This was followed by the vascular tumours, which constituted 21.6% (27 tumours), and the nerve sheath tumours which contributed 11.2% (14 tumours). These were succeeded, in decreasing order of frequency by fibroblastic/myofibroblastic (10 cases), So-called fibrohistiocytic (9 cases), tumours of uncertain differentiation (6 cases), perivascular (2 case) and chondro-osseous tumours (1 case). No lesions were found in the categories of smooth muscle or skeletal muscle tumours. (Table no. 3)

Table 3: Distribution of soft tissue tumours according to histopathological subtypes:

Sr. No.	Histologic subtypes	Total		Benign		Malignant	
		No.	%	No.	%	No.	%
1	Adipocytic tumours	56	44.8 %	54	43.2 %	2	1.6 %
2	Fibroblastic/ Myofibroblastic tumours	10	8 %	10	8 %	0	0 %
3	So–called fibriohistiocytic tumours	9	7.2 %	9	7.2 %	0	0 %
4	Vascular tumours	27	21.6 %	27	21.6 %	0	0 %
5	Pericytic/ perivascular tumours	2	1.6 %	2	1.6 %	0	0 %
6	Chondro-osseous tumours	1	0.8 %	1	0.8 %	0	0 %

7	Nerve sheath tumours	14	11.2 %	14	11.2 %	0	0 %
8	Tumours of uncertain differentiation	6	4.8 %	0	4.8 %	6	4.8 %
	Total	125	100 %	117	93.6 %	8	6.4 %

Distribution of individual tumours

Out of 125 soft tissue tumours, most common tumour is lipoma with 49 tumours (39.2%) followed by haemangiomas 24 cases (19.2%). Neurofibromas were the third most common tumour with 08 cases (6.4%). Among malignant tumours, pleomorphic sarcoma undifferentiated was most common constituting 04 cases (3.2 %) followed by 02 cases (1.6 %) of pleomorphic liposarcoma. One case each of clear cell sarcoma and chondroosseus sarcoma noted. (Table no. 4)

Table 4: Distribution of individual tumours

Tumour types	Subtypes	Cases	%
Adipocytic tumours	**Benign**		
	Lipoma	49	39.2%
	Cellular angiolipoma	1	0.8%
	Spindle cell lipoma	1	0.8%
	Chondroid lipoma	1	0.8%
	Lipoma with fibrous component (fibrolipoma)	2	1.6%
	Malignant		
	Pleomorphic liposarcoma	2	1.6%
Fibroblastic/Myofibroblastic tumours	**Benign**		
	Fibroma	1	0.8%
	Elastofibroma	1	0.8%
	Irrational fibroma	1	0.8%
	Angiofibroma	1	0.8%
	Angiofibroblastoma	1	0.8%
	Desmoplastic fibroblastoma	2	1.6%
	Fibrous hamartoma of infancy	1	0.8%
	Desmoid tumour	2	1.6%
So –called fibrohistiocytic tumours	**Benign**		
	Benign fibrous histiocytoma	4	3.2%
	Tenosynovial giant cell tumour	5	4.0%
Vascular tumours	**Benign**		
	Hemangioma	9	7.2%
	Capillary hemangioma	7	5.6%
	Cavernous hemangioma	1	0.8%
	Mixed hemangioma	1	0.8%
	Cellular hemangioma	1	0.8%
	Lobular capillary hemangioma	5	4.0%
	Lymphangioma	3	2.4%
Pericytic/perivascular tumours	**Benign**		
	Glomangioma	1	0.8%
	Glomus tumour	1	0.8%
Chondro-osseous tumours	**Benign**		
	Chondroma	1	0.8%
Nerve sheath tumours	**Benign**		
	Schwanoma	5	4.0%
	Cellular schwanoma	1	0.8%
	Neurofibroma	8	6.4%
Tumours of uncertain differentiatio	**Malignant**		
	Undifferentiated pleomorphic sarcoma	4	3.2%
	Clear cell sarcoma	1	0.8%
	Chondro-osseus sarcoma	1	0.8%

There was a single case of clear cell sarcoma in our study arising from the left foot of a 61-year-old female. We have done immunohistochemistry and S100 marker is strongly positive. A study conducted by Hocar O *et al* in France, in 2012 reported 52 cases. In all cases, the tumor cells were arranged in nests, clefts, and an alveolar pattern, separated by fibrous septa. S100 protein was largely positive in forty-four patients (84.61%) [15]. These findings were similar to the findings of our study.

There was a single case of extra-skeletal myxoid chondrosarcoma in our study arising from right thigh of 34-year-old female. A study conducted by Okamoto S in Tokyo, in 2001 reported 18 cases. Most common location found was thigh (08 cases). They showed typical histomorphological pattern as, a lobular proliferation of spindle and oval cells arranged in cords or strands or in a lacelike pattern and embedded in an abundant myxoid matrix, which was often basophilic [16]. These findings were similar to the findings of our study.

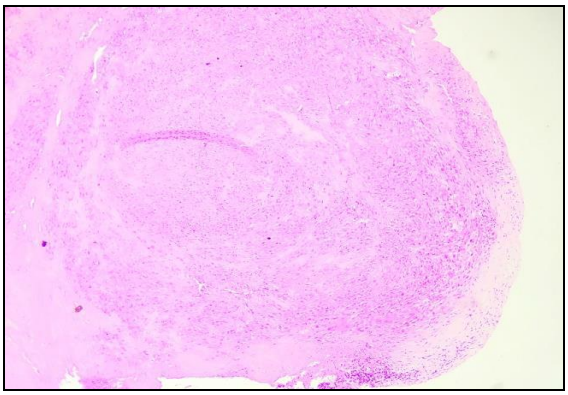


Fig. no. 1- Clear cell sarcoma - Photomicrograph shows distinctly nested growth pattern (H&E, 10X)

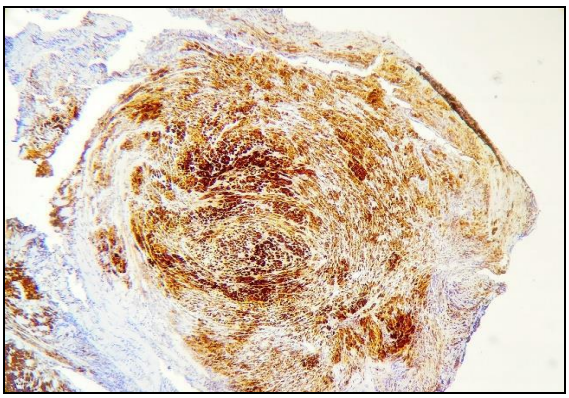


Fig. no. 2- Clear cell sarcoma – IHC: S100 Positive

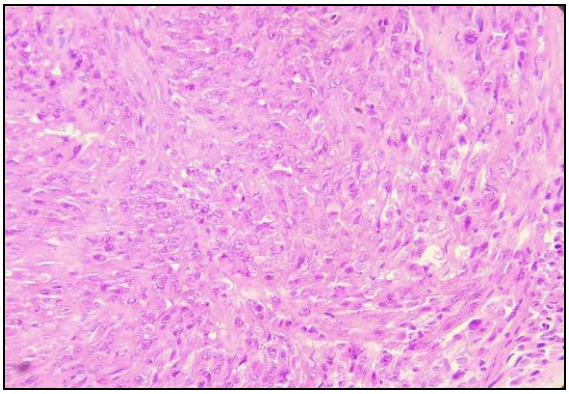


Fig. no. 3- Clear cell sarcoma - Photomicrograph shows polygonal and elongated shaped cells with acidophilic cytoplasm and prominent nucleoli, with fascicular growth pattern, delineated by fibrous septa. (H&E, 40X)

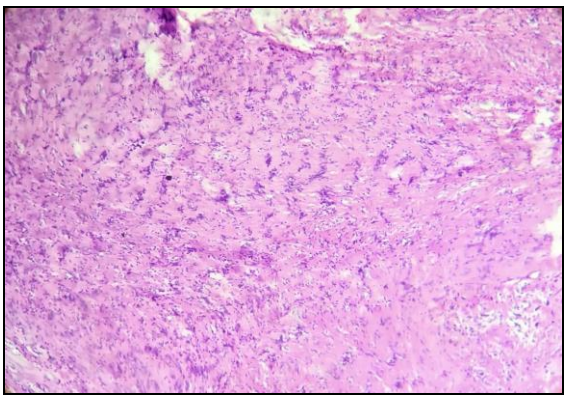


Fig. no. 4- Schwannoma - Photomicrographs showing compact hypercellular Antoni A areas and myxoid hypocellular Antoni B areas. (H&E, 10X)

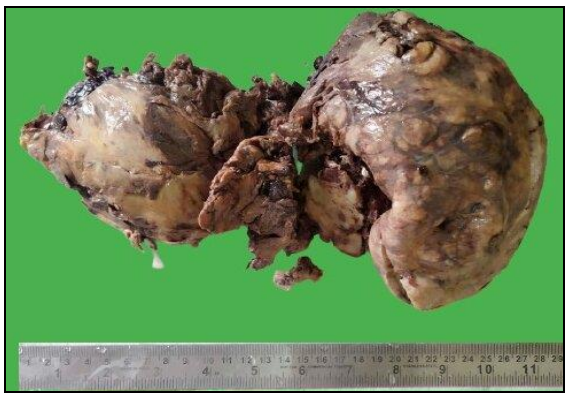


Fig. no. 5- Pleomorphic sarcoma – Gross external surface showing nodular and hemorrhagic

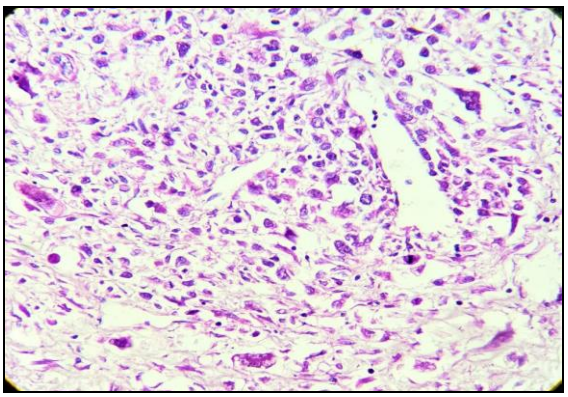


Fig. no. 6- Pleomorphic Sarcoma - Photomicrographs showing pleomorphic, bizarre tumour cells with marked hyperchromatic nuclei, prominent nucleoli and clear to eosinophilic cytoplasm. Tumour giant cell also noted. (H&E, 40X)

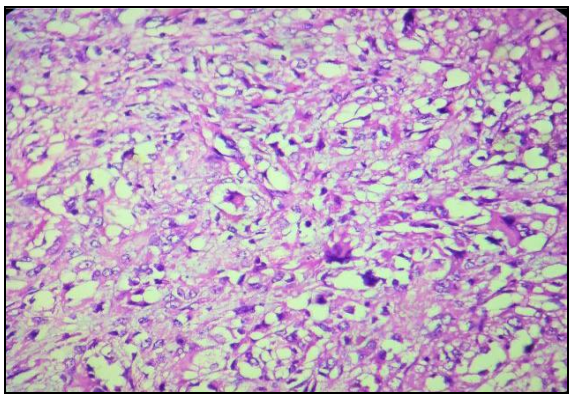


Fig. no. 7- Pleomorphic Liposarcoma- Photomicrograph showing extremely large lipoblasts with clear or vacuolated cytoplasm and central nucleus. (H&E, 40X)

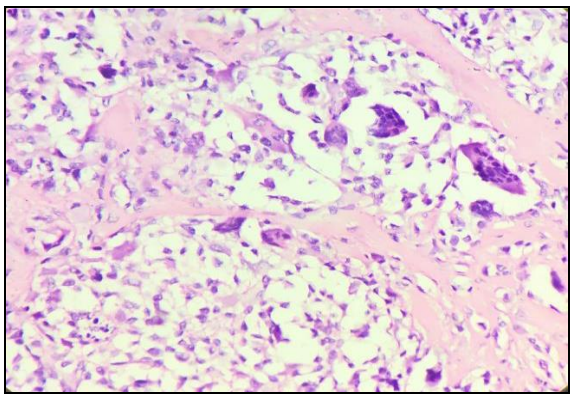


Fig. no. 8- Tenosynovial GCT - Photomicrographs showing Lobular architecture with fibrous bands separating lobules. Osteoclast like giant cells seen (H&E, 10X)

Conclusion

The soft tissue tumours are rare and usually presents as painless mass. We have incidence of soft tissue tumours as 2.48% in our study. Benign tumours were more common than malignant by a ratio of 14.6: 1. The most common benign tumours were lipoma followed by hemangioma. The most common malignant tumour was undifferentiated pleomorphic sarcoma. The most common site of benign lesion was head and neck region followed by extremities and for malignant tumours it was lower extremities. Hematoxyline and eosin stained sections remain the best method for establishing the primary diagnosis of soft tissue tumours. The clinicopathological correlation with latest (WHO) classification and standard nomenclature is essential for proper diagnosis of soft tissue tumours.

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