Histopathological Pattern of Soft Tissue Tumours in 200 Cases.

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ABSTRACT

Background: Soft tissue tumors are a diverse and fascinating group of lesions that arise from the supporting soft tissue of the body. Although pathologically diverse, they frequently exhibit similar clinical presentations and radiological features. Correct histopathological diagnosis is therefore crucial. This study aims to analyze the histopathological findings of soft tissue tumors and their distribution according to age, sex and site of occurrence in patients. **Methods:** This study comprised of minimum of 200 cases. All soft tissue tumors received in the Department of Pathology, Govt. Medical College, Patiala were analysed. Their gross features, microscopic findings were analysed in detail. Soft tissue tumors were divided into benign and malignant categories and their further sub typing were done according to WHO Classification. The distribution of soft tissue tumors according to the age, sex and site of occurrence was studied. **Results:** Out of 200 cases of soft tissue tumors, 169 cases (84.5%) were benign, 20 cases (10.0%) were malignant and 11 (5.5%) were classified under intermediate category. Adipocytic tumors formed the largest group constituting 92 cases (46%).Vascular tumors were the second commonest (18%) followed by peripheral nerve sheath tumors (10.5%). The benign tumors were seen in younger age as compared to malignant tumors. **Conclusion:** Benign tumors were more common than malignant. The most common benign tumors were lipoma followed by hemangioma (14.0%) and schwannoma (5.5%).There is wide range of their distribution according to age, sex and site. The benign tumors were seen in younger age as compared to malignant tumors.

Keywords: Soft Tissue Tumours, Histopathology.

INTRODUCTION

Soft tissue tumors are a complex group of neoplasms with differentiation towards mesenchymal tissue occurring in all age groups. Although pathologically diverse, they frequently exhibit similar clinical presentations and radiological features. Correct histopathological diagnosis is therefore crucial.

Immunohistochemistry is used to detect tumor-specific alterations which add significantly to histological interpretation, but several groups of tumors still lack reliable immunohistochemical markers.[1]

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Soft tissue tumors are a diverse and fascinating group of lesions that arise from the supporting soft tissue of the body. [2] Within the various histogenetic categories, soft tissue tumors are usually divided into benign and malignant forms.[3]

Benign soft tissue tumors outnumber malignant tumors by a wide margin. Soft tissue sarcomas occur more commonly in males, but gender and age related incidences vary among the histologic types. They may occur anywhere but three fourth are located in the extremities (most common in the thigh) .One-third of the benign tumors are lipomas, one third are fibrohistiocytic and fibrous tumors, 10 % are vascular and 5% nerve sheath tumors.[4]

This study aims to give a broad overview of several of the main soft tissue tumors from the histopathological findings.

The recommended classification is WHO classification of soft tissue tumors and is used widely.

Grading Systems

The two most widely used systems are the NCI (United States National Cancer Institute) system and the FNCLCC (French Fédération Nationale des Centres de Lutte Contre le Cancer) System.

We accessed the cases received in our department according to FNCLCC grading system.[4]

MATERIALS AND METHODS

We analysed 200 cases received under the diagnosis of soft tissue tumors. All the non-mesenchymal tumors and the bone tumors were excluded. The dimensions of the excised tumor tissue and nature of specimen received were noted. The colour, consistency of the tumor and any calcified/ hardened areas/ areas of haemorrhage and necrosis/ cystic change were recorded. Presence or absence of any gross involvement of adjacent structure along with depth of the tumor. At least 2-3 representative sections from the excised tumor tissue were taken. At least one section from the tumor with adjacent area was taken. Representative section from the underlying bone or adjacent organ/ structure was taken to document invasion. Resected margins were taken to document if they were involved or not.

The tissue fixed in 10% neutral formalin was then processed through series of solutions in the automatic tissue processor and Hematoxylin and Eosin staining was done. The microscopic features were obtained by examination of stained slides. Histological sub typing was done according to W.H.O classification of soft tissue tumors 2002. The sarcomas were further graded according to FNCLCC grading system in to grades 1, 2, and 3 respectively. Other information included in this study (age, sex of the patient, and a history of recurrence) were retrieved from the medical reports.

RESULTS

Out of total 200 cases, 169 cases (84.5%) were benign, 20 cases (10.0%) were malignant and 11 (5.5%) were classified under intermediate category. Adipocytic tumors formed the largest group constituting 92 cases (46%). Vascular tumors were the second commonest comprising 36 cases (18%) followed by peripheral nerve sheath tumors constituting 21 cases (10.5%) [Table 1].

Table 1: Distribution of Soft Tissue Tumors According to Tumor Differentiation and Prognosis

Tumor Differentiation	Benign (%age)	Intermediate (%)	Malignant	P value
Adipocytic	89 (44.5)	0 (0.0)	3 (1.5)	
Vascular	33 (16.5)	3 (1.5)	0 (0.0)	
Peripheral Nerve Sheath Tumours	21 (10.5)	0 (0.0)	0 (0.0)	
Fibroblastic	11 (5.5)	5 (2.5)	2 (1.0)	
Fibrohistiocytic	11 (5.5)	3 (1.5)	0 (0.0)	<0.001
Smooth Muscle	0 (0.0)	0 (0.0)	4 (2.0)	
Pericytic	1(0.5)	0 (0.0)	0 (0.0)	
Skeletal Muscle	0 (0.0)	0 (0.0)	1 (0.5)	
Could not be classified	3 (1.5)	0 (0.0)	10 (5.0)	
Total	169	11	20	

The benign tumors were seen in younger age as compared to malignant tumors. The p value was 0.004, which was highly statistically significant. [Table 2].

Table 2: Age Distribution of the Cases

Age (years)	Benign n=169(%)	Intermediate n=11(%)	Malignant n=20(%)	P value 0.004
Up to 10	15 (7.5)	0 (0.0)	0 (0.0)	
11-20	17 (8.5)	4 (2.0)	1 (0.5)	
21-30	38 (19.0)	2 (1.0)	4 (2.0)	
31-40	22 (11.0)	3 (1.5)	2 (1.0)	
41-50	35 (17.5)	2 (1.0)	2 (1.0)	
51-60	21 (10.5)	0 (0.0)	8 (4.0)	
61-70	16 (8.0)	0 (0.0)	2 (1.0)	
71-80	04 (2.0)	0 (0.0)	1 (0.5)	
80-90	00 (0.0)	0 (0.0)	0 (0.0)	
90-100	01 (0.5)	0 (0.0)	0 (0.0)	

Soft tissue tumors as a whole were found to be more common in males (106 cases) as compared to females (94 cases). Benign tumors were seen more in males and intermediate & malignant in females.

The most common site of soft tissue tumors as a whole is head and neck (n = 58; 29%) followed by upper limb, (n=51; 25.5%). Although benign tumors were seen to be maximum in head & neck, (n = 55; 27.5%) where as intermediate in upper limb (n=5; 2.5%) and malignant tumors showed a predilection for lower limb (n=10 cases; 5.0%).

Majority of the benign and intermediate tumors were superficial in location, which included dermis and subcutis. However, malignant soft tissue tumors were deeper in location, which included tumors arising from muscle, deep to muscle and in the retroperitoneum or mediastinum.

Adipocytic tumors constituted 92 cases (46.0%) of all soft tissue tumors, out of which 89 cases were benign and 3 were malignant. Among adipocytic tumors, males outnumbered the females. The most common site of benign adipocytic tumors was upper

limb and of malignant adipocytic tumors was lower limb.

The vascular tumors were the 2nd most common soft tissue tumors and also the 2nd most common benign tumors, the bulk of which was hemangiomas. There was a wide range of age distribution in benign vascular tumors, most commonly diagnosed in first two decades. Of the 36 vascular tumors, 19 were males and 17 were females with a M: F being 1.1:1. Of the 33 benign vascular tumors, 21 cases were seen in head & neck region followed by 3 cases in the upper limb.

Of all soft tissue tumors, 21 cases were diagnosed as peripheral nerve sheath tumors (10.5%). All of them were benign (21 cases), out of which 11 cases were of schwannoma and 10 of neurofibroma. These tumors showed a wide range of age distribution, majority were seen in 11-30 years of age i.e. in younger age. Of the 21 peripheral nerve sheath tumors reported, 10 were males and 11 were females.

Out of 18 fibroblastic tumors, 11 cases were of benign and 5 belonged to intermediate category followed by 2 malignant cases Among the11 benign cases, 8 cases were of fibroma. The benign fibroblastic tumors showed a wide range of age distribution from 2nd to 7th decade. Most of the benign and intermediate fibroblastic tumors were superficial in location and malignant were deep.

Among tumors of fibrohistiocytic differentiation (14 cases), 11 cases were diagnosed as benign and 3 belonged to intermediate category.
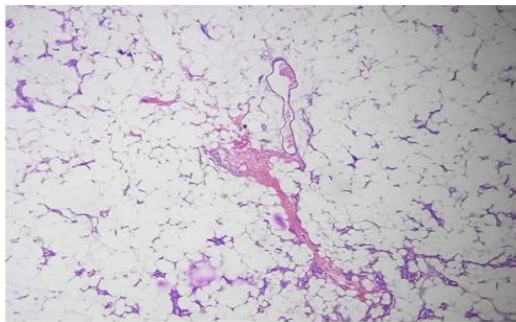

Figure 1: Photomicrograph showing lipoma consisting of lobules of mature adipose tissue (H&E stain 40X)
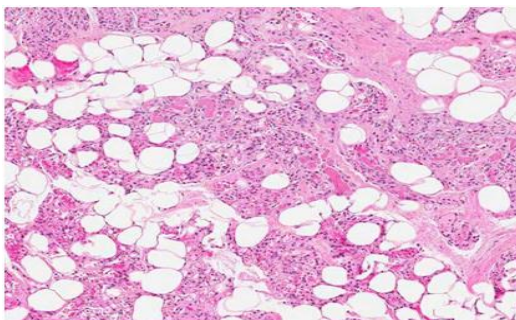

Figure 2: Photomicrograph of angiolipoma showing admixture of fat cells and thin walled blood vessels. (H&E stain 10X)
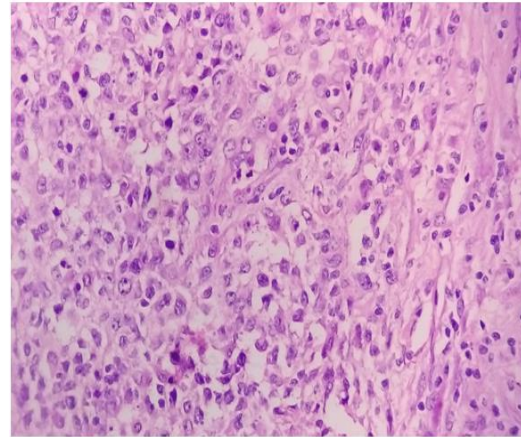

Figure 3: Photomicrograph of liposarcoma showing malignant cells with atypical nuclear features, acidophilic cytoplasm and scattered lipoblasts(H&E stain 40X)

Fibrohistiocytic tumors showed a wide range of age distribution from 2nd decade to 8th decade of life. Out of 11 benign cases, 4 were seen in lower limb followed by 2 cases in upper limb. All the 3 intermediate category cases were seen in head and neck.

All the tumors of smooth muscle differentiation diagnosed were of malignant category. Four cases of malignant smooth muscle tumors (2.0%) were diagnosed and were the second most common malignant soft tissue tumors. Malignant smooth muscle tumors showed a wide range of age distribution. Majority were diagnosed in 6th and 7th decade.

Only one case was diagnosed of skeletal muscle differentiation that was of malignant category. It was reported in 14 years old male in lower limb. Only 1 case, glomus tumor, was diagnosed with pericytic differentiation, of benign category. It was reported in male patient of 3rd decade in upper limb.
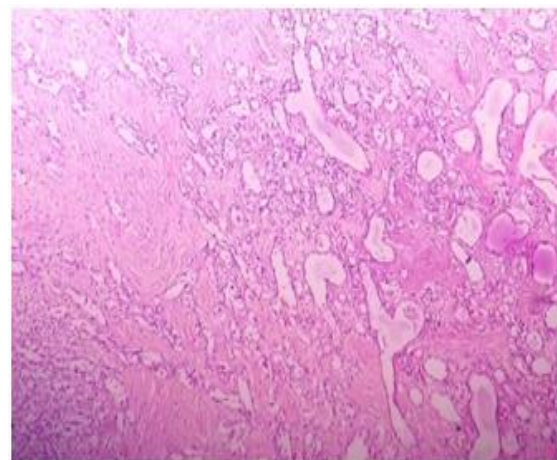

Figure 4: Photomicrograph showing lymphangioma with lymphatic channels lined by flattened endothelial lining and lymphocytes in the stroma. (H &E stain 40x)
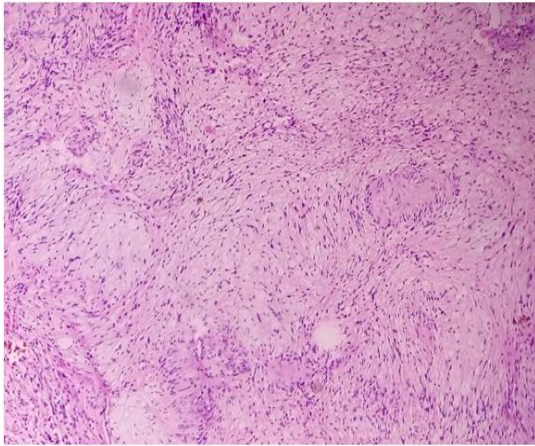
Figure 5: Photomicrograph of schawnomma showing hypercellular Antoni-A with Verocay body and Antoni-B hypocellular areas. (H&E stain 40X)

Figure 6: Photomicrograph of fibroma showing dense fibrous tissue with spindle shaped cells (H&E stain 10X)

Figure 7: Photomicrograph of nodular fasciitis with proliferation of spindle shaped cells lined by collagen (H & Estain 40X)
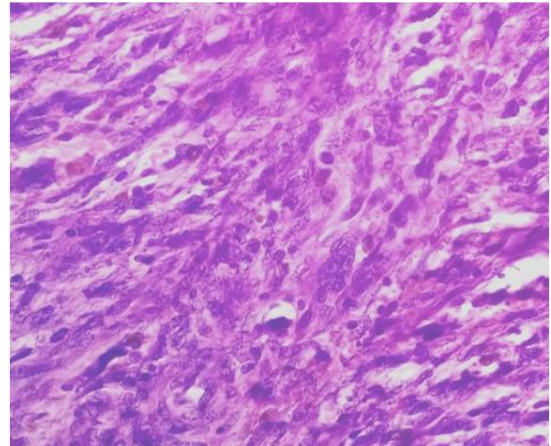

Figure 8: Photomicrograph of leiomyosarcoma showing malignant smooth muscle cells with elongated blunt ended nucleus with atypical features and acidophilic fibrillary cytoplasm (H & E stain 40X)
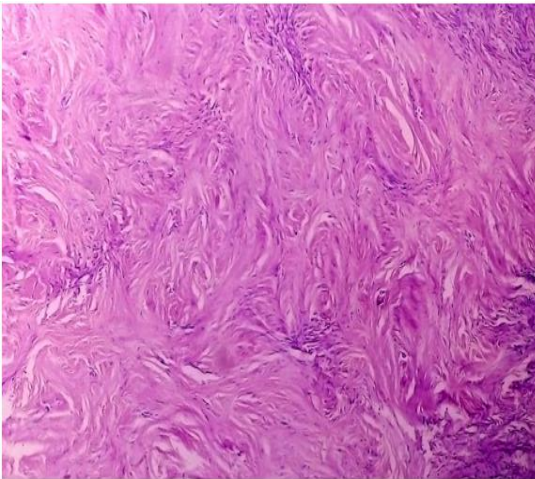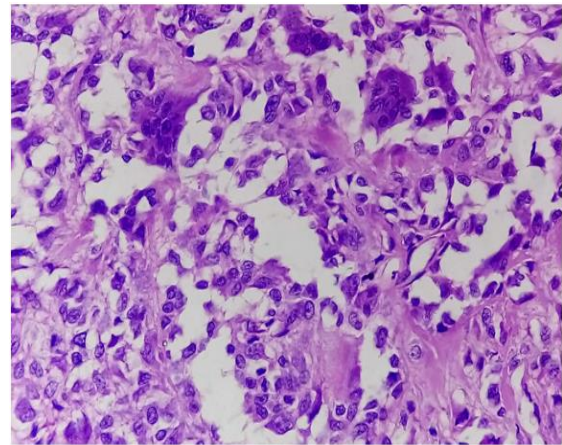

Figure 9: Photomicrograph of giant cell tumor of soft tissue showing multinucleated giant cells and neoplastic stromal tissue (H& E stain 100X)
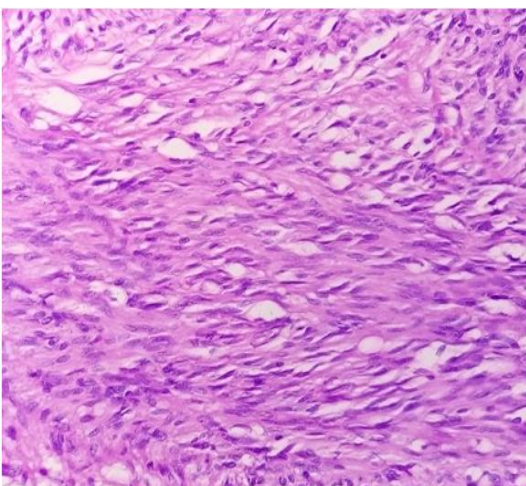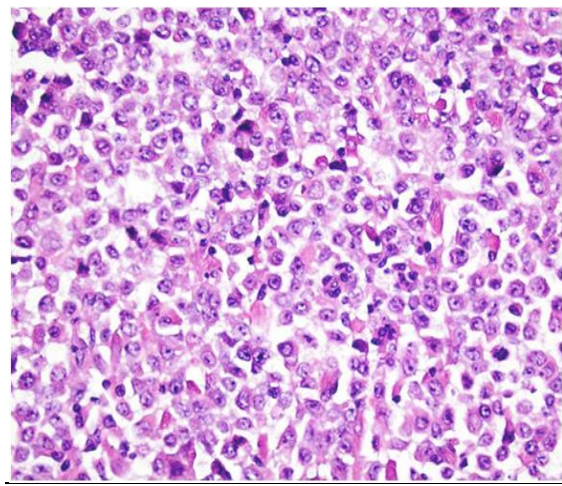

Figure 10: Photomicrograph of rhabdomyosarcoma showing malignant round cells with eoisinophilic cytoplasm. Typical cross straiation not seen. (H& E stain 40X)

DISCUSSION

In the present study, 200 soft tissue tumors were analyzed, out of which 169 (84.5%) cases were benign, 11 (5.5%) were intermediate and 20 (10.0%) malignant tumors.

This is in concordance with the study conducted by Agravat et al[2] who analyzed 100 cases of soft tissue tumors (n=94) and tumor like lesions(n=6), of which benign tumors formed the bulk, the results of which are shown in the table below. In another large scale study of 8686 cases done by Stout,[5] 84.5% tumors belonged to benign category and 15.5% to malignant category [Table 3].

Table 3: Comparison with various studies.

S. No.	Study	Total cases	Benign (%)	Intermediate (%)	Malignant (%)
1.	Stout (1953)	8686	7337 (84.46%)	-	1349 (15.53%)
2.	Agravat et al (2010)	100	86%	2%	6%
3.	Present study	200	169 (84.5%)	11 (5.5%)	20 (10.0%)

The age of the patients in our study ranged from 6 months to 98 years. Benign tumors were found to be more common in younger population whereas malignant tumors were commoner in 5th to 6th decade of life. This result was in concordance with studies conducted by Agravat et al[2] and Wimber et al[6] according to them benign tumors were commoner in younger age group as compare to malignant tumors which were recorded maximum in 60-70 years age group.

In our study, 106 males and 94 females were included. The male to female ratio was 1.1:1. Over all incidences of soft tissue tumors was higher in males. This observation is in concordance with the studies conducted by Trojani et al,[7] Jemal et al,[8]Gustafson,[9] Ducimetiere et al[10] as shown in table below. The slight discrepancy was due to the fact that the later studies were done on sarcomas only and benign tumors were not included.

Table 4: Comparison with various studies.

S. No.	Study	Total Cases	Males	Females	M:F
1	Trojani et al (1984)	155	90	65	1.38L1
2.	Gustafson P (1994)	508	288	220	1.3:1
3.	Jemal et al (2007)	9220	5050	4170	1.2:1
4.	Ducimetiere et al (2011)	433	245	188	1.3:1
5.	Present study	200	106	94	1.1:1

However, Agravat et al[2] did not find any sex predilection in his study, according to their study males and females were equally affected.

Head and neck was found to be the most common site involved by benign tumors and benign vascular tumors were seen to be the most common tumors at this site constituting 23 out of 36 cases occurring in this region. These findings are in agreement with the study conducted by Makino[11] who analysed 651 soft tissue tumors arising in the head & neck region

and found that 96% tumors (n=628) were benign while only 4% were malignant. The bulk of benign tumors in his study was formed by haemangiomas (47%) followed by adipocytic tumors (19%)

In the present study, lower limb was the most common site affected by sarcomas. This observation is in agreement with the study of 1660 sarcoma cases done by Mastrangelo et al[12] who observed lower limb (n=329) to be the most common site of sarcoma followed by stomach. In our study, visceral mesenchymal tumors were excluded. This finding is also comparable to studies conducted by Coindre et al[13] and Talati et al[14] who also found lower limb (extremities) to be the most common site involved by sarcomas.

In our study of 200 cases, the most frequent tumors were of adipocytic differentiation constituting 46.0% (n=92) followed by 18.0% (n=36) cases of vascular tumors. Third in frequency were peripheral nerve sheath tumors (n=21; 10.5%). These observations were somewhat similar to the study conducted by Agravat et al.[2]

Table 5: Comparison with various studies.

Tumor Differentiation	Present Study	Agravat et al (2010)
Total number of cases	200	100
Adipocytic	92	33
Vascular	36	22
Peripheral Nerve Sheath Tumors	21	19
Fibroblastic	18	9
So called Fibrohistiocytic	14	5 of BFH+7 cases of GCT of tendon sheath = 12
Smooth Muscle	4	1
Pericytic	1	0
Skeletal Muscle	1	1
Uncertain	0	1
Could not be categoriezed	13	2

CONCLUSION

Benign tumors were more common than malignant. The most common benign tumors were lipoma (44.5%) followed by hemangioma (14.0%) and schwannoma (5.5%).The bulk of intermediate tumors was formed by fibromatosis, hemangioendothelioma and giant cell tumor of soft tissue. The commonest malignant tumors were sarcomas NOS (n=10; 5.0%) followed by leiomyosarcoma. (n=4; 2.0%).

The benign tumors were found to be commoner in younger population whereas malignant tumors were seen in 5th to 6th decade. Statistically highly significant correlation was found between age and the category of tumor (p value = 0.004). Although rhabdomyosarcomas are malignant tumors but they were seen in 2nd decade of life.

The most common site of soft tissue tumors as a whole was head & neck (29.0%) followed by upper limb (25.5%).Among benign tumors, hemangiomas had a predilection for head & neck (10.5%) while lipomas were seen commonly in upper limb (14.5%).Most favoured site for sarcomas was lower limb (n=10; 5.0%), out of which 5 cases were of sarcomas NOS. The second most common site involved by sarcomas was abdomen (n=5; 2.5%). The benign soft tissue tumors were found to be superficial in location, while malignant tumors were deep.

All the soft tissue sarcomas were graded according to FNCLCC grading system and grade 2 tumors were maximum (n=10) followed by grade 2 tumors (n=8).

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