

# A Histopathological Study of Soft Tissue Lesions

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**Abstract:** *Background:* Soft tissue is defined as a complex of non - epithelial extra - skeletal structures of the body exclusive of the reticulo - endothelial system glia and supportive tissue of the various parenchymal organs. *Aims:* To study the following features of soft tissue tumors according to age, sex incidence, Site - specific distribution, most common type and various spectrum of soft tissue tumor in both malignant and benign of soft tissue tumor. *Material and Methods:* The present cross - sectional study was conducted in the Department of Pathology during the period of September 2016 to September 2020. A total of 100 samples from patient with soft tissue tumors, including both benign and malignant tumors, were analyzed. *Conclusion:* The large majority of soft tissue tumors are benign, with a very high cure rate rafter surgical excision. Malignant mesenchymal neoplasms amount to less than 1% of the overall burden of malignant tumors but they are life threatening and may pose significant diagnostic and therapeutic challenge

**Keywords:** STT: soft tissue tumor

## 1. Introduction

Soft tissue is defined as a complex of non - epithelial extra - skeletal structures of the body exclusive of the reticulo - endothelial system glia and supportive tissue of the various parenchymal organs. Soft tissue tumors are highly heterogenous group of tumors that are classified on a histogenetic basis they are broadly divided in to 2 types Benign and malignant types. Benign tumors more closely resembles normal tissue, have limited capacity for autonomous growth. Benign tumor far outnumber the malignant ones by 100: 1.1

Benign tumors are locally invasive while malignant high grade tumors are treated with radical surgery or chemotherapy and radiation, whereas low grade sarcomas are usually treated whit surgical excision alone.

Hence the present study was undertaken to assess the histopathological pattern of soft tissue tumors using routine, special and wherever warranted immunohistochemical stains and to classify soft tissue tumors according to new world health Organization classification 2013.

### Aims and objectives of the study

The aim of this study is to know the following features of soft tissue tumors.

- Age incidence
- Sex incidence
- Site - specific distribution
- Most common type of soft tissue tumor
- Various spectrum of soft tissue tumor both malignant and benign.

## 2. Material and Methods

The present cross - sectional study was conducted in the Department of Pathology during the period of September 2016 to September 2020.

A total of 100 samples from patient with soft tissue tumors, including both benign and malignant tumors, were analyzed.

### Inclusion criteria

All the tumors of soft tissue origin, benign and malignant, were included.

### Exclusion criteria

Inflammatory conditions were not included such as;

- Myositis
- Vasculitis
- Recurrent tumours

### Retrospective study group (n=30)

For the period of September 2016 to June 2017 embedded tissue blocks of patients diagnosed with soft tissue tumors, both benign and malignant, were retrieved from the surgical pathology department. The clinical details of the patients were obtained from the case filed retrieved from the Medical Records Department of the hospital.

### Prospective study group (n=70)

For the period of june 2017 to sep 2020, biopsies and surgical resected specimens of soft tissue tumors sent to the Department of Pathology were included. Thoroughly history was taken and findings were recorded on predesigned and presteed proforma. The biopsies and resected surgical specimens were sent to the Department of Pathology in 10% formalin fixative. The resected specimens were subjected to meticulous inspection of the external and cut surface. The gross findings were noted down in the proforma.

The specimens were grossed and multiple representative bits from the tumors, adjacent tissue, all surgical margins and any other relevant areas were submitted for processing. Regional lymph nodes, if received, were inspected grossly for nodal involvement and submitted either entirely if  $\leq 5$  mm or bisected and one half was submitted if  $> 5$  mm in dimension. Biopsies, whenever received for diagnosis, were submitted entirely for processing. Thin sections, 3 - 4 microns thick, were cut from the paraffin block. The slides prepared were routinely stained by Harris; Hematoxylin and Eosin stain and evaluated by light microscopy.

Special histochemical stains, like Periodic Acid Schiff stains, Gomoris reticulum were used wherever required.

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Immunohistochemical staining was employed in few cases where routine morphology and histochemistry was unsuccessful in providing a definitive diagnosis.

**Statistical analysis**

Data obtained was coded and entered into Microsoft Excel spreadsheet. The data was analyzed using rates, ratios and percentages.

**3. Results**

The Present study includes a total of 100 soft tissue tumors during sep 2016 to sep 2020 (30 cases in retrospective and 70 cases in prospective study) out of a total 1052 tumors of

all types received in the department of pathology at DECCAN COLLEGE OF MEDICAL SCIENCES during 4 years period. Out of which, there were 100 soft tissue tumours, which constitute about 9.5 % of all tumors.

**Table 1:** Percentage of Benign and Malignant Soft Tissue Tumors

Type	Total No %		Benign		Malignant	
	No	%	No	%	No	%
All tumors	1052	100	693	65.8	350	34.2
Soft tissue tumors	100	9.5	98	98	2	2

Benign tumors constituted 98% of all soft tissue tumors and the malignant counterpart formed only 2%.

**Table 2:** Incidence of Benign and Malignant OSFT Tissue Tumors according to Category

SL. No.	Tumors	Benign	%	Malignant	%	Total	%
1	Fibroblastic tumours	9	9	1	1	10	10
2	Fibrohistiocytictumours	2	2	-	-	2	2
3	Adipocytictumours	66	66	-	-	66	66
4	Peripheral nerve sheath tumours	9	9	0	0	9	9
5	Smooth Muscle tumours	1	1	0	0	1	1
6	Vascular tumours	11	11	0	0	11	11
7	Gastrointestinal stromal tumours	0	0	1	1	1	1

The adipocytic tumors accounts for the majority of benign soft tissue tumors (66%) followed by vascular tumors (11%) Fibroblastic Tumors (10%). Skeletal muscle tumors and tumours of uncertain differentiation are not encountered in the present study.

The gastrointestinal stromal tumours accounted for the (1%) of malignant soft tissue tumours

In case of all soft tissue tumors 55% of STT'S are encountered in females and 45% in males. Males to female ratio is 1: 1.2. Incidence of adipocytic tumors and vascular tumors are relatively more common in females while almost equal incidence in rest of the tumours.

The youngest patient in the present study was 4 yr old while the oldest was 76 years old. Majority of the benign tumor occurred in the second, third and fourth decade with a peak incidence in the fourth decade. Majority of the malignant tumors occurred in the fifth and sixth decade.

Soft tissue tumors occurred all over the body true to its vast distribution. In our study we divided while body in to 4 major anatomical category as -:

- Upper extremity – arm + Forearm + Hand + elbow + wrist
- Lower extremity – Thigh + Leg + knee + foot
- Head and Neck – Head + Neck + face

Trunk – Shoulder + Abdomen + Back + Retroperitoneum + Testis

The benign soft tissue tumors showed predilection for upper extremity followed by head and neck, trunk and lower extremity. Malignant soft tissue tumors showed a marked predilection for upper extremity and trunk.

Majority of soft tissue tumors presented with a painless mass, which had been present for 2 months to 3 years. Malignant tumors presented with duration from 8 months to 2 years.

On gross, majority of the benign tumors (93%) was well circumscribed measuring less than 5 cm.5 cases of lipoma were greater than 5cm. In contrast 50 of the malignant soft tissue tumors measured more than 5 cm.

Most benign soft tissue tumours are soft to firm in consistency while malignant are firm to hard.

Microscopically, all soft tissue tumors were histologically typed following recent WHO 2013 classification of soft tissue tumor.

The various histological subtypes of different tumor groups encountered are discussed under individual tumors.

**Table 3:** Tumors Incidence, Age, Sex and Site Distribution of Benign Tumors

Tumours type	SL. No	Histological type	No. of cases (%) of benign tumors	Age in Years (Range)	Sex M/F	Common site
Fibroblastic tumours	1	Fibroma	6	21 - 38	4/2	Upper extremity
	2	Desmoids type fibromatosis	1	76	0/1	Trunk
	3	Angiofibroma	1	27	1/0	Head & Neck
	5	Dermatofibrosarcomapertuberans	1 (1%)	32	0/1	Upper extremity
		Total	9 (9%)	21 - 78	5/4	Upper extremity
Fibrohistiocytictumours	1	Benign fibrous histiocytoma	2 (2%)	11 - 40	1/1	Upper Extremity
		TOTAL	2 (2%)	11 - 40	1/1	Upper extremity

Adipose tissue tumours	1	Lipoma	62 (63%)	3 - 68	35/27	Upper extremity
	2	Fibro lipoma	2 (1%)	43	2/0	Upper extremity Trunk
	3	AngioLipoma	1 (1%)	38	1/0	Lower extremity
	4	Lipomatosis	1 (1%)	62/M	1/0	Trunk
		Total	66 (66%)	3 - 68	39/27	Upper extremity
Vascular tumours	1	Hemangioma	8 (8%)	6 - 40	3/5	Head and neck
	2	Lymphangioma	3 (3%)	6 - 70	1/2	Upper extremity
		Total	18 (12.4%)	6 - 60	4/7	Head and Neck
Nerve sheath tumours	1	Neurofibroma	8 (8%)	18 - 75	3/5	Upper Extremity
	2	Neurofibromatosis	1 (1%)	14 - 75	3/6	Head and Neck
		Total	9 (9%)	14 - 75	3/6	Upper extremity
Malignant tumours	1	Adult Fibrosarcoma	1 (50%)	48	0/1	Lower Extremity
	2	GIST	1 (50%)	58	1/0	Trunk

Among fibroblastic tumours, the commonest benign tumor was fibroma (6 cases) which occurred more commonly in the young age group with predilection of upper extremity. There were only one case each of angioribroma, fibromatosis and Dermatofibrosarcomapertuberans.

Among fibrohistiocytictumours, there were 2 cases of benign Fibrous histiocytomas involving both upper and lower extremity with equal male and female ratio.

Among adipose tissue tumours, the commonest were lipomas followed by Fibrolipomas which showed slight female predilection and common site is upper extremity. Benign adipocytic tumors were most common tumors of all STT'S 66 Cases 66%

Benign vascular tumors are the second most common benign tumor group (11%). Hemangiomas occurred in first three decades, they showed a striking predilection for the head and neck region unlike other benign soft tissue tumor lymphangioma, were more common in first two decades. Benign vascular tumors were more common in females compare to males

Peripheral nerve sheath tumors constitutes 9% of all benign soft tissue tumors with a wide range of age distribution with M: F of 0.5. and the most common site was upper extremity. Neurofibroma was commonest benign tumor comprises of 8% of all benign soft tissue tumors followed by neurofibromatosis 1%.

Fibrosarcoma and GIST are two malignant cases encountered in the present study.

#### 4. Discussion

During the study period of 4 years, 100 soft tissue tumors were received in the department of pathology, Deccan College of Medical Science and Hospital formed 9.5% of all tumors of which 14.14% were benign soft tissue tumors among all benign tumors and 0.57% (<1%) were malignant soft tissue tumors among all malignant tumors.

A total of 100 soft tissue tumors were studied in the present study. Benign soft tissue tumors were 98 in number and malignant tumors were 2 constituting 98% and 2% respectively.

The percentage of malignant tumors was comparable with the study of Myhre Jensen et al (1981), which can be

explained by the inherent bias in a referral population. In Pramila jain et al study also benign tumour is more than 90%. The relative frequency of benign to malignant soft tissue tumors is difficult to estimate accurately since many of the benign tumors cause a few problems and thus the patients do not report to the clinician.

The general consensus is that the benign soft tissue tumors outnumber malignant counterparts by a considerable margin. The commonest benign tumor type was the adipocytic tumor forming 66% of benign soft tissue tumors, which is more as compared with the studies of Pramila jain et al<sup>3</sup> and Myhre Jensen et al<sup>2</sup> where they constituted 47.3% and 48.1% of benign tumors respectively.

The second most common benign tumor group was the vascular tumors, which constituted 11%, which is comparable to the studies of Pramila Jain et al<sup>3</sup> and Myhre Jensen et al<sup>2</sup> where they formed 18.9% and 11.7% respectively.

There were two malignant cases reported, Fibrosarcoma Constituted 50%, gastrointestinal stromal tumors constituted 50% percentage of GIST is slightly compatible with Amit bharu et al<sup>4</sup> study. GIST had been recently included in WHO 2013 classification so previous studies did not include this in their studies. In contrast all other tumor was comparable with the other studies.

There were 45 males and 55 females with male to female ratio of 1: 1.2 in contrast to the studies of Kransdorf et al<sup>5</sup>.

In the case of benign tumor group there were 45 males and 53 females with a male to female ratio of 0.8: 1, which is comparable to the study of Myhre Jensen et al<sup>2</sup> where the male to female ratio was 0.9: 1.

In case of malignant tumors there were no males and 2 females with a male to female ratio of 0: 2, which is more as comparable to the studies of M. Jensen et al<sup>2</sup> and P. Jain et al<sup>3</sup>.

In the present study the age ranged from 4 to 76 years. The average age in the case of benign tumors was 39.2 years and 57.3 years in the case of malignant tumors, which is comparable to the studies of M. Jensen et al<sup>2</sup>, AmitBharu et al<sup>4</sup>. However Bashar e al<sup>6</sup> studies show lower average age for both benign and malignant. The range in the benign tumor group was 4 to 76 years with a peak incidence in the

fourth decade. The age range in the case of malignant tumors varied from with a peak incidence in the fifth decade. In the present study the commonest site was upper extremity followed by head and neck region which is comparable to the Kransdorf et al<sup>5</sup>, Venkatraman et al<sup>7</sup> studies.

In the present study the malignant soft tissue tumors observed to have a strong predilection for lower extremities and trunk and abdomen constituting 50% each. However in kansdorf et al<sup>5</sup> and Shaham beg et al<sup>8</sup> study lower extremity was the commonest site for malignant tumor and GIST is not included in older classification as soft tissue tumor so this variation in trunk and abdomen in acceptable.

Majority of the soft tissue tumors presented with a painless mass of varying duration ranging from a few months to many years.

On gross, Majority (93%) of benign soft tissue tumors were well encapsulated and presented with a size less than 5 cm while 50% of malignant soft tissue tumors measured more than 5 cm, which had been noted by Myhre Jensen e al<sup>2</sup> where the comparative figures were 95% and 75%, respectively.

Microscopically, the different histological variants encountered are discussed under individual tumor groups.

The benign fibrous tumors constituted 9% of all benign tumors. The commonest site was the face (head and neck) followed by trunk comparable to the studies of other authors. There were 2 cases each of benign fibrous histiocytoomas, commonest site being upper extremity with equal sex predilection. The incidence of benign fibrohistiocytic tumors was less when compared to the studies of other authors however age range and commonest site was comparable to the above studies.

From the above table it is obvious that lipomas are the commonest of soft tissue tumors with a peak occurrence in the third and fourth decade, which is comparable to the studies of other authors. There was 62 cases of lipomas followed by cases of lipomatosis with a peak incidence in the third and fourth decade and shows slight male sex predilection which is quite comparable with the M. Jenson e al<sup>2</sup> studies. The most common site for lipoma in present study was upper extremity followed by head and neck, in contrast to other study where most common site was trunk. There were 18 cases of benign vascular tumors. There was a striking predilection for the Head and neck region, which favourably compares with the studies of other authors. Vascular tumor shows female preponderance. . In present study while in other study there was a slight male preponderance.

Benign peripheral nerve sheath tumors constitute 9% of all benign soft tissue tumors which is comparable to the above studies with female preponderance and common site was upper extremity which is more comparable to the M. Jenson et al<sup>2</sup> study while kansdrof et al<sup>5</sup> study shows male preponderance and commonest site was lower extremity however more female preponderance was seen in present study.

The malignant fibroblastic tumors included 1 case of adult fibrosarcoma occurring in female aged 48 years over the right thigh, sex predilection, age incidence cannot be commented on present study on account of very less data however in kransdorf et al<sup>5</sup> study there was slight male predilection and commonest site was lower extremity which is comparable to the present study while in Lazim e al<sup>9</sup> study upper extremity was the commonest site.

In the present study 1 case of gastrointestinal stromal tumors were encountered which constitutes 50% of all malignant soft tissue tumour.

Gastrointestinal stromal tumors was the new entity in new WHO 2013 Classification so no study was available for comparison.

## 5. Conclusion

The diagnosis and management of soft tissue tumors require a team perspective. Even though soft tissue sarcomas are rare and usually present just as painless mass, the clinician must be able to diagnose it early for better management.

Soft tissue lesions are a large and heterogeneous group of neoplasms. Traditionally, tumors have been classified according to histogenetic features. The large majority of soft tissue tumors are benign, with a very high cure rate rafter surgical excision. Malignant mesenchymal neoplasms amount to less than 1% of the overall burden of malignant tumors but they are life threatening and may pose significant diagnostic and therapeutic challenge.

Light microscopic morphology, supplemented whenever required by ancillary techniques especially immunohistochemistry, remains the comerstone for the diagnosis of soft tissue tumors.

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