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Original Research Paper

Histomorphological Spectrum of Soft Tissue Tumours at A Tertiary Care Hospital In Garhwal Region: A Retrospective Study

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ABSTRACT:
Background: Soft tissue tumours are defined as tumours of non-epithelial, extra skeletal tissues of the body excluding central nervous system, and haematolymphoid tissue. It includes muscular, fibrous, elastic, vascular and adipose tissue. Tumours arising from peripheral nerves as soft tissue masses are also included in soft tissue tumours. It is a heterogenous group of tumours that are classified on the histogenetic basis of the adult tissue they resemble. **Method:** All the histopathology sections diagnosed as soft tissue tumours from January 2019 to December 2023 in the Department of Pathology of our tertiary care hospital were analysed. A total of 325 cases were reported. The microscopic findings of the histological sections of these cases were studied in detail in Haematoxylin and Eosin stain. Histological subtyping of these tumours was done according to WHO classification of soft tissue tumours 2022. **Conclusion:** The peak age of incidence of soft tissue tumours was between 3rd to 4th decades of age with female to male ratio of 1.4:1. Benign tumours (89.5%) are more common than malignant tumours (5.5%). Most common soft tissue tumour is Lipomatous tumour.

Keywords: Haemangioma, Mesenchymal tumours, Leiomyoma, Lipoma, Sarcoma, Soft tissue tumour.

INTRODUCTION:

Soft tissue tumours are defined as tumours of non-epithelial, extra skeletal tissues of the body excluding central nervous system, and haematolymphoid tissue.[1,2] It includes muscular, fibrous, elastic, vascular and adipose tissue. Tumours arising from peripheral nerves as soft tissue masses are also included in soft tissue tumours. Embryologically, tumours of soft tissue have principally mesodermal origin along with some neuroectodermal contribution.[2] Soft tissue tumours are immensely diversified group of tumours and according to WHO classification of soft tissue tumours 2022, these tumours are histologically classified on the basis of their resemblance to adult tissue type. These tumours are divided into benign, intermediate and malignant, within various histological categories. Benign tumours have limited capacity of autonomous growth and these closely resemble the normal tissue from which they originate. They have low tendency to invade the surrounding tissue and have low rate of recurrence following therapy. Malignant tumours also known as sarcomas are highly aggressive tumours with capability to invade the surrounding tissues along with tendency to recur and metastasize. Radical surgery is needed for the removal of tumour, although it do not guarantee the non recurrence of the same. There are also tumours in intermediate category or borderline lesions for which determination of their malignant potential is difficult. The annual incidence of soft tissue tumours in the world was reported as 6 per 100,000 population.[2,3] Benign soft tissue tumours are more common than malignant ones by a ratio of 100:11.[4] The etiology of soft tissue tumours is still obscure but it is thought that risk factors such as viral infections, radiation and chemical exposure, inherited syndrome and genetic mutations, play a role in their pathogenesis.[5] The histological diagnosis conferred on light microscopy of histological sections stained with hematoxylin and eosin and special stains form the basis of the use of ancillary techniques such as electron microscopy, immunohistochemistry, cytogenetics and flowcytometry. These techniques although have assisted to gain better insight in tumour morphology and in delivering accurate diagnosis but use of light microscopy for evaluation of hematoxylin stained sections still is a standard technique for making the diagnosis of soft tissue tumours. In tertiary care

hospitals the reporting of soft tissue is less in respect to carcinomas of primary sites, there by making it difficult to accumulate sufficient number of cases for statistical analysis at a single institution Therefore retrospective studies dominate the soft tissue tumour literature. This study focuses on studying the histomorphological spectrum of soft tissue tumours reported in our tertiary care hospital, which caters to a large population of Garhwal region of Uttarakhand.

MATERIALS AND METHODS:

This is a retrospective study of 5 year conducted from 1st January 2019 to 31st December 2023 in the Department of Pathology of a tertiary care Hospital of Garhwal region of Uttarakhand. A total of 325 cases were diagnosed as soft tissue tumours. These reported cases were analysed in correlation with the information of age, sex, size and location retrieved from the requisition forms of the patients. The microscopic findings of the histological sections of these cases were studied in detail in Haematoxylin and Eosin stain. Histological subtyping of these tumours was done according to WHO classification of soft tissue tumours 2022. Special stains such as Reticulin stain, Periodic stain (PAS) and Alcian blue were also used for diagnosing and subtyping of tumours.

RESULTS:

This study in done by analysing the histopathological sections of cases, reported as soft tissue tumours, in the Department of Pathology of a tertiary care hospital. Total 325 cases were included in the study. The results of the study are as follows:

Table 1: Nature of Tumour

Category	Frequency	Percentage
Benign	291	89.5
Intermediate	16	5.0
Malignant	18	5.5
Total	325	100

Majority of the soft tissue tumours were benign (89.50%), followed by malignant (5.5%) and intermediate tumours (5%) (Table 1).

The age of subjects in this study range from 0 to 90 years. The peak incidence of soft tissue tumours were reported in the age group of 31-40 years with 28.3% cases which was closely followed by the age group of 41-50 with 18.5% cases. The tumour incidence was found to be reduced in extremes of age group like 0-10 years (10 cases, 3.1%) and 81-90 years (03 cases, 0.9%). The peak incidence of benign soft tissue tumours was reported in the age group of 31-40 years, with 28.3% of cases. The age group of 41-50 years had the second-highest incidence, with 18.5% of cases. The incidence of benign tumours was lower in the extremes of age groups, such as 0-10 years (3.1% of cases) and 81-90 years (0.9% of cases) (Table 2).

Table 2: Age group wise distribution of patients with nature of tumours

Age Group (in years)	Benign	Intermediate	Malignant	Total
0-10	10 100.0%	0 0.0%	0 0.0%	10 **3.1%**
11-20	43 87.8%	3 6.1%	3 6.1%	49 **15.1%**
21-30	46 82.1%	6 10.7%	4 7.2%	56 **17.2%**
31-40	87 94.6%	1 1.1%	4 4.3%	92 **28.3%**
41-50	55 91.7%	2 3.3%	3 5.0%	60 **18.5%**
51-60	30 90.9%	2 6.1%	1 3.0%	33 **10.1%**
61-70	10 76.9%	2 15.4%	1 7.7%	13 **4.0%**
71-80	09 100.0%	0 0.0%	0 0.0%	09 **2.8%**
81-90	01 33.3%	0 0.0%	2 66.7%	03 **0.9%**

Table 3: Gender wise distribution of type of tumours.

Type of Tumour	Female (190cases)	Male (135 cases)	Total (325 cases)
Adipocytic	47 42.3%	64 57.7%	111 **34.2%**
Fibroblastic & Myofibroblastic	14 51.9%	13 48.1%	27 **8.3%**
Fibrohistiocytic	10 38.5%	16 61.5%	26 **8.0%**
Vascular	32 55.2%	26 44.8%	58 **17.8%**
Perivascular	01 33.3%	02 66.7%	03 **0.9%**
Smooth muscle	73 100.0%	00 0.0%	73% **22.6%**
Skeletal muscle	00 0.0%	02 100.0%	02 **0.6%**
Peripheral nerve sheath	10 52.6%	09 47.4%	19 **5.8%**
Tumours of uncertain differentiation	02 33.3%	04 66.7%	06 **1.8%**

Out of the total 325 soft tissue tumour cases, 58.5% (190 cases) were reported in women and 41.5% (135 cases) in men, showing higher occurrence in female population (Table 3).

In female population the most common type of soft tissue tumour reported were smooth muscle tumours followed by adipocytic tumours, whereas in males adipocytic tumours constituted the majority among all the cases (Table 3). The occurrence of adipocytic tumours were found to be maximum (34.2%) in the study subjects, which were followed by smooth muscle tumours (22.6%). In adipocytic tumours 98.2% cases were of benign nature. Out of all the malignancy diagnosed (7.1%), cases were maximum (35.3%) from tumour of uncertain differentiation category of WHO Classification Of Soft Tissue Tumours 2022 (Table 4).

Table 4: Distribution of various types of soft tissue tumours

Type of Tumour	Benign	Intermediate	Malignant	Total
Adipocytic	109 **98.2%**	00 0.0%	02 **1.8%**	111 **34.2%**
Fibroblastic & Myofibroblastic	18 **66.7%**	05 **22.2%**	04 **11.1%**	27 **8.3%**
Fibrohistiocytic	11 **42.3%**	11 **42.3%**	04 **15.4%**	26 **8.0%**
Vascular	57 **98.3%**	00 0.0%	01 **1.7%**	58 **17.8%**
Perivascular	03 **100.0%**	00 0.0%	00 0.0%	03 **0.9%**
Smooth muscle	73 **100.0%**	00 0.0%	00 0.0%	73 **22.6%**
Skeletal muscle	01 **50.0%**	00 0.0%	01 **50.0%**	02 **0.6%**
Peripheral nerve sheath	19 **100.0%**	00 0.0%	00 0.0%	19 **5.8%**
Tumours of uncertain differentiation	00 0.0%	00 0.0%	06 **100.0%**	06 **1.8%**

DISCUSSION:

A total of 325 cases were analysed, out of which benign cases were maximum followed by equal occurrence of malignant and intermediate tumours. This is in concordance with the studies conducted by Heena Paul Singh et al, Agraval et al and Stout. [6,7,8] In this study, both benign and malignant soft tissue tumours were more common in younger age group with mean age of 35.5 years. These results are comparable to the study conducted by Mirza Asif Baig. [9] This study showed benign soft tissue tumours to be more common in second, third, fourth and fifth decade of life which is in correlation with Enzinger & Weiss.[2] The age of presentation of benign tumours ranged from

5 months old (capillary haemangioma) to 86 years (lipoma). The malignant soft tissue tumours, in this study were more common in third and fourth decades of life with the youngest case being reported of 11 years old (fibrosarcoma). In this study the benign soft tissue tumour cases greatly outnumber the malignant cases by the ratio of 16.2:1. This finding is similar to the results of the study conducted by Gayatri Gogoi et al in which the incidence of benign soft tissue tumours were 12 times more than that of malignant tumours.[10]

In our study 89.5% (291 cases) were benign and 5.5% (18 cases) were malignant. However, the results of relative frequency of benign and malignant soft tissue tumours found in the study cannot be reliably applied to general population because of asymptomatic nature of benign tumours and not all of them are surgically removed.

The incidence of soft tissue tumours, in this study, was more in females (58.5%) as compared to males (41.5%), with ratio of cases reported in female to male being 1.4:1. These results are similar to that of the study conducted by Heena Paul Singh.[6] The most common type of soft tissue tumour reported in this study was Adipocytic tumours with a frequency of 34.2%. These results are similar to the study conducted by Apoorv Saraswat et al.[5] Lipoma was the most frequent benign and overall the most common tumour reported in all age groups, constituting 98.2% of all the adipocytic tumours and predominantly affecting males. Liposarcoma and pleomorphic liposarcoma were the reported malignant soft tissue tumours both being common in the fourth decade of life.

Smooth muscle tumours were the second most frequent tumour reported in study. Leiomyoma was the most common benign smooth muscle tumour reported (73 cases). In females, the most common tumour reported was leiomyoma while in males lipoma was the most common tumour reported which was followed by haemangioma (Figure 1). The study conducted by Gayatri Gogoi et al. had similar results with leiomyoma being the most common tumour in female and haemangioma being the most frequent tumour in males.[10] However in our study haemangioma constituted the second most common tumour in males.

Tumours of uncertain differentiation were the commonest type of malignant tumours reported in this study (Figure 2). Undifferentiated sarcoma (Figure 2b) and alveolar soft part sarcoma were the commonest type of malignant tumours reported and were more common in the third and fourth decade of life. Intermediate soft tissue tumours constituted 5% of all the reported soft tissue tumours with highest incidence in the third decade of life. Fibrohystiocytic tumours constituted the largest tumours of this group. Giant cell tumours (10 cases) were the most common type of intermediate soft tissue tumours reported. There were also some rare soft tissue tumours reported such as Juvenile Xanthogranuloma, Verrucous Haemangioma and Glomangioma (Figure 3a, 3b and 3c).

CONCLUSION:

Soft tissue tumours constitute a large heterogenous group of tumours with the only common similarity of their mesenchymal origin. These can be diagnosed by their individual characteristics observed under routine light microscopy, which forms the fundamental aspect of their diagnosis. In this study a total of 325 cases, reported over 5 years period, were evaluated. The incidence of these tumours were more common in third and fourth decade of life and were more frequently reported in females than males. Benign soft tissue tumours vastly outnumbered malignant tumours with overall lipomatous soft tissue tumours being the most common type of soft tissue tumours. Tumours of uncertain differentiation were the commonest soft tissue tumours of malignant nature and with fibrohistiocytic tumours being the most frequent in the intermediate category. Lipoma and leiomyoma were the most common soft tissue tumours reported in males and females respectively. This study, therefore provided knowledge about the spectrum of soft tissue tumours, presenting in our tertiary care hospital, which caters to the population of Garhwal region of Uttarakhand.

Source of Funding: Self funded

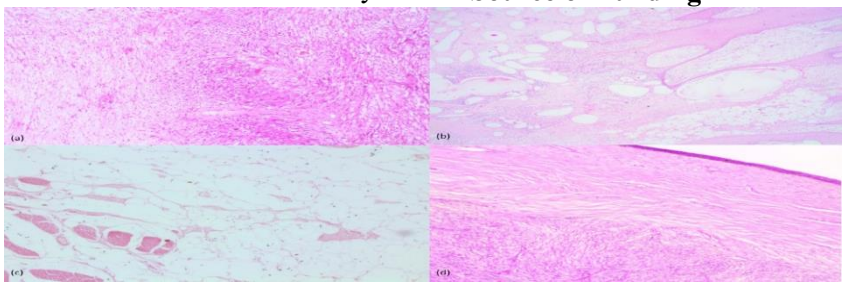

Figure 1 shows:- (a) Schwannoma- showing hypercellular and hypocellular areas. Hypercellular area show Verrocay body (H&E stain, 100X). (b) Lymphangioma- showing numerous variably sized dilated lymphatic channels, some of which are filled with eosinophilic fluid (H&E stain, 100X). (c)Intramuscular lipoma- showing skeletal muscle infiltrating between mature adipose tissue. (d) Dermatofibrosarcoma protuberans- showing prominent Granz zone below the epidermis with underlying spindle cells forming a storiform pattern (H&E stain, 100x).

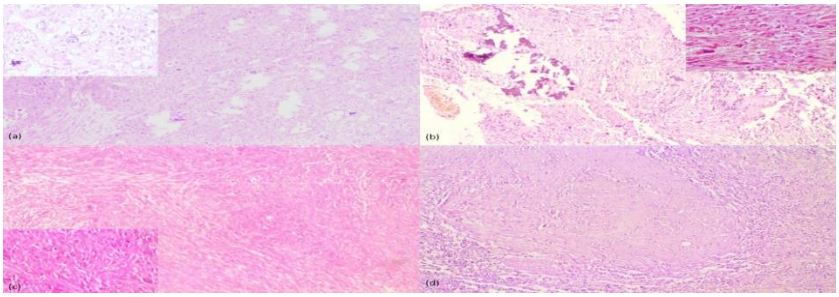

Figure 2 shows:- (a) Pleomorphic Liposarcoma- showing nests of numerous pleomorphic lipoblast in a background of high grade undifferentiated sarcoma (H&E stain, 100X). Inset shows atypical lipoblast (H&E 400X). (b) Undifferentiated pleomorphic sarcoma- showing numerous highly pleomorphic spindle cells with numerous mitotic figures along with area of bone formation (H&E stain, 100x). Inset shows pleomorphic spindle cells (H&E stain, 400X). (c) Fibrosarcoma- showing pleomorphic spindle cells forming a Herring bone pattern (H&E stain, 100X). Inset shows pleomorphic spindle cells (H&E stain, 400X). (d) Inflammatory Myofibroblastic Tumour- showing loosely arranged spindle cells with hyalinized stroma which is surrounded by dense collection of inflammatory cell infiltrate.

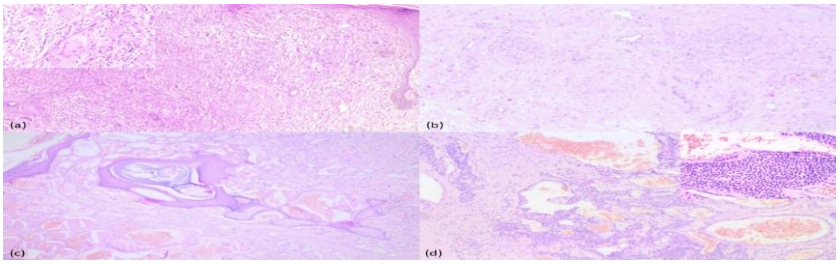

Figure 3 shows :- (a) Juvenile Xanthogranuloma – showing numerous scattered Toutan giant cells in dermis and mixed with spindle cells (H&E stain, 100X). Inset shows Toutan giant cell containing lipid in the cytoplasm (H&E stain, 400X). (b) Myopericytoma – shows variably sized blood vessels. Most of these blood vessels are surrounded by concentric growth of bland oval to spindle cells. (c) Verrucous Haemangioma- showing papillomatosis of epidermis. Epidermis shows numerous variably sized blood vessels lined by flattened endothelium (H&E stain, 100X). (d) Glomangioma- showing many dilated blood vessels surrounded by sheets of round polygonal cells (H&E stain, 100X). Inset shows sheets of glomus cells surrounding the blood vessel. (H&E stain, 400X).

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