Original Article

Spectrum of Soft Tissue Tumors in Tertiary Cancer Centre

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Abstract

Introduction: Soft tissue can be defined as nonepithelialextraskeletal tissue of the body. Soft tissue tumors are a highly heterogeneous group of tumors that are classified on histogenetic basis according to the adult tissue they resemble. The large majority of soft tissue tumors are benign with a very high cure rate after surgical excision **Aims and Objectives:** To study Spectrum of Soft Tissue Tumors in Tertiary Cancer Centre. **Material and Method:** All soft tissue tumors diagnosed between January 2006 to June 2011 were retrieved from the surgical pathology files of the Department of pathology, Sri Ramachandra Medical College and Research Institute. A total of 513 cases were collected and reviewed .Out these cases benign, intermediate and malignant cases were identified. The malignant cases were selected for this study. Hematoxylin and eosin (H&E) stained sections were reviewed along with the grading of the tumours according to FNCLCC grading system. **Result:** Out of the 513 cases 297(58%) were males and 216(42%) were females. The age of patients in our study varied between 4 months to 82 years . Out of 513 cases of soft tissue tumours 74% were benign, 8% intermediate and 18% malignant. Histological grading was done on soft tissue sarcomas according to FNCLCC grading system. There were 23 cases in grade 1, 13 cases in grade 2 and 27 cases in grade 3. In Sarcomas the predominant site was the lower extremity with 33 cases followed by retro peritoneum 11cases and the upper extremity with 10 cases. There are 261 cases of adipocytic, 52 cases of vascular and 21 cases of fibrohistiocyticorigin . There are 261 cases of adipocytic, 52 cases of vascular and 21 cases of fibro histiocyticorigin . The predominant origin of intermediate tumours in our study were from fibroblastic (74%), Fibrohistiocytic (19%) and adipocytic (7%). Based on the origin of tumors, the predominant group belonged to the uncertain differentiation with 27%, fibroblastic origin 19% and 14% smooth muscle origin. **Conclusion:** Soft tissue tumours occur mostly within age group of 31 to 40 years with a slight male predominance Lower extremities are the most common site of the sarcomas Histological origin of various malignant the predominant group belonged to the uncertain differentiation with 27%, fibroblastic origin 19% and 14% smooth muscle origin

Key Words: Spectrum of Soft Tissue Tumors, FNCLCC (French Federation of Cancer Centers Sarcoma Group) System, Sarcoma.

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INTRODUCTION

Soft tissue can be defined as nonepithelial extra skeletal tissue of the body. Soft tissue tumors are a highly heterogeneous group of tumors that are classified on histogenetic basis according to the adult tissue they resemble. The large majority of soft tissue tumors are benign with a very high cure rate after surgical excision.

Soft tissue tumors are composed of numerous and complex diagnostic entities and the recognition of an intermediate malignancy category including some tumors with a deceptive bland histological appearance. Soft tissue tumors represent a major diagnostic challenge to the general practicing pathologist. Malignant soft tissue tumors (sarcomas) are relatively uncommon cancers. They account for approximately 1% of adult malignancies and 7% to 15% of pediatric malignancies. They can originate in the extremity but can occur anywhere in the body. Core-needle biopsy is the preferred biopsy technique for diagnosing sarcomas. Despite improvements in local control rates with wide local

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resections and radiation therapy, metastasis and death remain a significant problem in 50% of patients who present with high-risk. Sarcomas may occur anywhere in the body, but most arise from the large muscles of the extremities predominantly in the thigh. The other common sites are the chest wall, the mediastinum, and the retroperitoneum. Approximately 75% occur in lower extremities, especially the thigh and 10% each in trunk and retroperitoneum.[2] Sarcomas may occur at any age but more common in older patients. About fifteen percent arise in the children and they constitute the fourth most common malignancy in this age group and 40% affect persons 55 years or older. However, a definite relationship exists between type of soft tissue sarcoma and the age of presentation. The large majority of sarcomas seem to arise de novo without any apparent causative factor. Recognized causes include various physical and chemical factors, ionizing radiation and inherited or acquired immunological defects. Incidence of post radiation sarcomas range from 0.03% to 0.8%. More than half of radiation induced sarcomas is pleomorphic undifferentiated sarcomas (malignant fibrous histicytoma) which accounts for 70% of cases.[4]

MATERIAL AND METHOD

All soft tissue tumors diagnosed between January 2006 to June 2011 were retrieved from the surgical pathology files of the Department of pathology, Sri Ramachandra Medical College and Research Institute. A total of 513 cases were collected and reviewed .Out these cases benign, intermediate and malignant cases were identified. The malignant cases were selected for this study.Inclusion Criteria: All the specimens which were surgically resected soft tissue tumors and subsequently diagnosed as one of malignant soft tissue tumor by histopathological examination with Hematoxylin and Eosin stain were included in the study. The clinical features such as age, sex of the patient and location of the tumor were noted. The gross characteristics of the tumor which included the tumor location, size, necrosis, circumscription, cut section and secondary changes obtained from the pathology report registers were utilized for the study. Representative paraffin blocks of concerned cases were recovered and histological sections (5 to 6 um) were routinely stained with hematoxylin and eosin stains. Exclusion Criteria: Small biopsy specimens, cases that lacked clinical details and unavailability of blocks for study. Hematoxylin and eosin (H&E) stained sections were reviewed along with the grading of the tumours according to FNCLCC grading system.

RESULT

Table 1: Distribution of the Patients as per the Gender

S.No	Sex	Total Cases	%
1	Male	297	58%
2	Female	216	42%
3	Total Cases	513	100%

Out of the 513 cases 297(58%) were males and 216(42%) were females

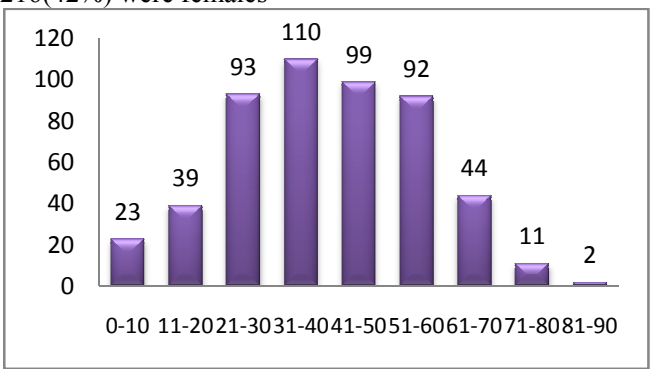

Figure 1: Age distribution

The age of patients in our study varied between 4 months to 82 years. The histogram shows the age wise distribution of cases.

Table 2: Distribution of the Patients as per the Histologic type

S.No	Histological type	Total cases
1.	Benign	380
2.	Intermediate	43
3.	Malignant	90
	Total cases	513

Out of 513 cases of soft tissue tumours 74% were benign, 8% intermediate and 18% malignant.

Table 3: Distribution of the Patients as per the Grade

Grade	Total number of cases
GRADE 1	23 (36%)
GRADE 2	13 (21%)
GRADE 3	27 (43%)
TOTAL CASES	63 (100%)

Histological grading was done on soft tissue sarcomas according to FNCLCC grading system. There were 23 cases in grade 1, 13 cases in grade 2 and 27 cases in grade 3.

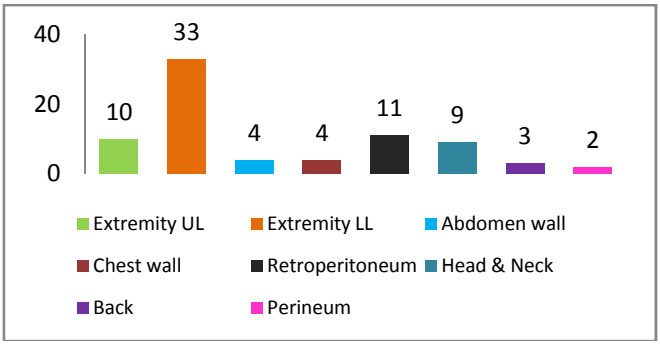

Figure 2

In our study of the sarcomas the predominant site was the lower extremity with 33 case s followed by retroperitoneum 11cases and the upper extremity with 10 cases.

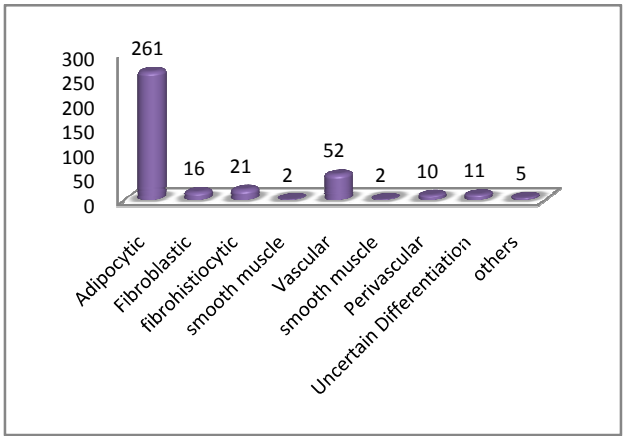

Figure 3: Histological Origin - Benign

The total number of benign cases with various histological origins is shown. There are 261 cases of adipocytic, 52 cases of vascular and 21 cases of fibro histiocyticorigin.

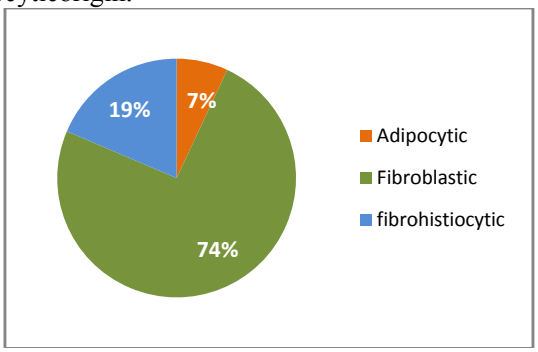

Figure 4: Histological Origin - Intermediate

The predominant origin of intermediate tumours in our study were from fibroblastic (74%), Fibrohistiocytic (19%) and adipocytic (7%).

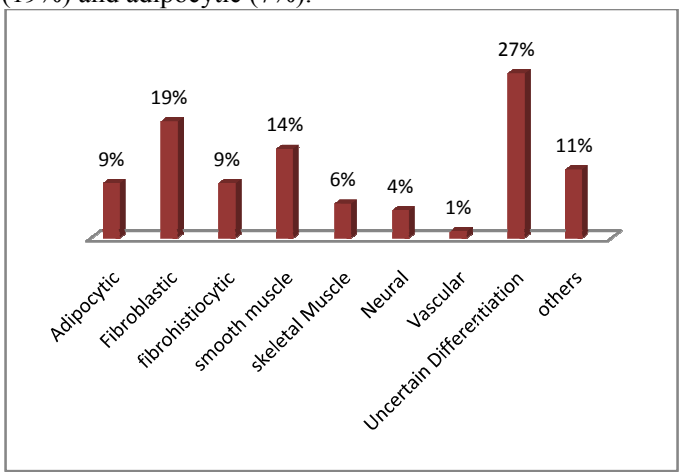

Figure 5: Histological Origin-Malignant

Histological origin of various malignant tumours is shown here. Based on the origin of tumors, the predominant group belonged to the uncertain differentiation with 27%, fibroblastic origin 19% and 14% smooth muscle origin. We encountered various subtypes of sarcomas as seen in the following table.

Table 4: Frequency of Histological Types

Histological Type	Frequency	Percentage
Synovial Sarcoma	16	16.5%
Liposarcoma	8	8.2%
Fibrosarcoma	14	14.4%
Leiomyosarcoma	13	13.4%
Rhabdomyosarcoma	5	5.2%
MPNST	4	4.2%
Ewing's/PNET	5	5.2%
Angiosarcoma	1	1%
Alveolar sarcoma	1	1%
DSRCT	1	1%
Pleomorphic sarcoma	8	8.3%
ExtraskeletalChondrosarcoma	1	1.0%
SclerosingEpitheloidFibrosarcoma	2	2.1%
Low Grade Fibromyxoid Sarcoma	1	1%
DFSP	7	7.2%
High Grade STS	10	10.3%
Total	**97**	**100%**

DISCUSSION

Soft tissue tumours (STT) are heterogenous group of mesenchymal neoplasm with variable histological behavior. Our study was conducted on soft tissue tumours which included 380 benign cases, 43 intermediate cases and 90 cases of malignant tumours at Sri Ramachandra medical college from the period of January 2006 to June 2011. STT can occur in any age group. Enzinger and Weiss *et al* have described that STT occur in various ages and predominately sarcomas in older age group[23]. In our study the neoplasm occurred at the age range of 4months to 82 yrs with peak incidence between 31 yrs to 40 yrs. They have also analyzed that males are more commonly affected than females. Similar results were obtained in the present study with occurring mostly in males (58%) as compared to 42% of females. Sarcomas can occur at various sites like extremities, retroperitonium, back, and chest wall. karakousis *et al* study had shown that sarcomas occur predominately in lower extremity than other sites.[24] Our analysis on sites of sarcomas in our study revealed similar data. STT have been classified according to the WHO as benign, intermediate and malignant. In our study benign tumours (74%) occurred commonly than other tumours. As evidence in literature the predominant origin of these benign tumours was adipocytic. Fletcher *et al* have shown that benign STT out number other sarcomas as evident in our study. The intermediate group tumour had 8 %, malignant tumour 18

% in our study. The predominant group based on our sarcomas belonged to tumours of uncertain differentiation, with a predominant histological type being synovial sarcomas (16.5 %). Histological grade of sarcomas is the most important prognostic factors. The concept of grading in sarcomas was first properly introduced by Russell *et al* in 1977 [5], and was the most important factor of their clinico-pathological classification. Several grading systems, based on various histological parameters, have been published and proved to correlate with prognosis.[6, 7, 8] The two most important parameters identified were mitotic index and the extent of tumour necrosis.[6, 9,10] A three-grade system was recommended, retaining an intermediate histological grade (grade 2) of malignancy. Grade particularly indicates the probability of distant metastasis and overall survival.[7, 11, 12 ,13] Moreover, the initial response to chemotherapy has been reported to be better in patients with a high grade tumour than in patients with a low grade one.[12,14]The two most widely used grading systems are the NCI (United States National Cancer Institute) system[6,15] and the FNCLCC (French Federation of Cancer Centers Sarcoma Group) System.[9,12,16,17,18] The FNCLCC system is based on a score obtained by evaluating three parameters Tumour differentiation, mitotic rate and amount of tumour necrosis.[9]A score is attributed independently to each parameter and the grade is obtained by adding the three attributed scores. Tumour differentiation is highly dependent on histological type and subtype.[18] Grading is not done on core needle biopsy because it is difficult to assess necrosis and mitotic index.[19, 20, 21] Moreover, core needle biopsies are prone to sampling error with the risk of underestimation of grade, so it is often inappropriate to use classical grading systems on core needle biopsies.[22] The FNCLCC grade is based on 3 parameters: differentiation, mitotic activity, and necrosis. Each of these parameters receives a score: differentiation (1 to 3), mitotic activity (1 to 3), and necrosis (0 to 2). The scores are summed to produce a grade.[1] FNCLCC grading depends on tumour differentiation, mitosis and necrosis. Various grade show different prognosis.[25, 26] According to various grades in our study GIII tumours have occurred more frequently than other grades with 43%. Coindre JM *et al* had shown increased number of GIII tumors and less GII tumors. Our study had 36% of GI and 21% of GII sarcomas.

FNCLCC grading system: definition of parameters:

Tumor differentiation
Score 1: Sarcomas closely resembling normal adult mesenchymal tissue e.g. low grade leiomyosarcoma)
Score 2 : Sarcomas for which histological typing is certain(e.g. myxoidliposarcoma)
Score 3 : Embryonal and undifferentiated sarcomas, sarcomas of doubtful type, synovial sarcoma
Mitotic count
Score 1: 0-9 mitosis per 10 HPF
Score 2: 10-19 mitosis per 10 HPF
Score 3: more than 20 mitosis per 10 HPF
Tumor necrosis
Score 0: No necrosis
Score 1: less than 50% necrosis
Score 2: more than 50% necrosis
Histological grade
Grade 1: total score 2,3
Grade 2: total score 4,5
Grade 3: total score 6,7,8

Tumor Differentiation Score According to Histological Type in the Updated Version of the French Federation of Cancer Centers Sarcoma Group System

(*Enzinger and Weiss's Soft Tissue Tumors,* 5th edition, 2008)

HISTOLOGIC TYPE	SCORE
Well-differentiated Liposarcoma	1
MyxoidLiposarcoma	2
Round cell Liposarcoma	3
Pleomorphic Liposarcoma	3
Dedifferentiated Liposarcoma	3
Well-differentiated fibrosarcoma	1
Conventional fibrosarcoma	2
Poorly differentiated fibrosarcoma	3
Well-differentiated Malignant Peripheral Nerve Sheath Tumor(MPNST)	1
Conventional MPNST	2
Poorly differentiated MPNST	3
Epithelioid MPNST	3
Myxoid MFH	2
Typical storiform/pleomorphic MFH	2
Giant-cell and inflammatory MFH	3
Well-differentiated leiomyosarcoma	1
Conventional leiomyosarcoma	2
Biphasic/monophasic synovial sarcoma	3
Embryonal/alveolar/pleomorphic rhabdomyosarcoma	3

CONCLUSION

Soft tissue tumours occur mostly within age group of 31 to 40 years with a slight male predominance Lower extremities are the most common site, Of the sarcomas Histological origin of various malignanttumours and the predominant group belonged to the uncertain differentiation with 27%, fibroblastic origin 19% and 14% smooth muscle origin.

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