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HISTOLOGICAL STUDY OF SOFT TISSUE SARCOMA IN NAJAF FOR THE 3 YEARS (A RETROSPECTIVE CROSS SECTIONAL STUDY)

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ABSTRACT

Introduction: Soft tissue sarcomas (STS) are rare malignant tumors arising from mesenchymal tissues, characterized by histopathological and clinical heterogeneity. Despite accounting for less than 1% of adult malignancies, their varying subtypes and variable clinical presentations pose diagnostic and therapeutic challenges. This study aimed to evaluate the clinical and pathological features of STS cases diagnosed in Najaf, Iraq, over a three-year period. **Methods:** A retrospective cross-sectional study was conducted at the Kufa Training Center – Iraqi Council for Medical Specializations at Al-Sadr medical city teaching hospital - histopathology lab, Al-Najaf governorate in a period between 1ST October 2023- 1st October 2024. Data of 121 cases of soft tissue sarcoma cases diagnosed in the period of 2021 and 2023 were reviewed. Clinical parameters such as age, sex, tumor site, and type of biopsy were analyzed alongside histopathological findings, including tumor grade, subtype, and size. **Results:** Among the 121 cases reported, STS demonstrated near-equal gender distribution (50.4% males, 49.6% females), with the majority occurring in individuals aged 61–70 years (20.66%). Excisional biopsy was the primary diagnostic approach (80.1%). The most common histopathological subtypes were undifferentiated sarcoma (18.2%) and gastrointestinal stromal tumors (16.5%). Rare subtypes, including clear cell sarcoma and malignant angiosarcoma, were identified, each comprising less than 1% of cases. **Conclusion:** This study provides a comprehensive overview of the clinical and pathological spectrum of soft tissue sarcoma in a regional Iraqi population. The findings underscore the significance of histopathological. This insight enhances the understanding of soft tissue sarcoma pathology and contribute in extending the field knowledge with potential implications for regional healthcare strategies and future research.

KEYWORDS: Soft tissue, sarcoma, Iraqi patients. STS.

INTRODUCTION

Soft tissue sarcomas (STS) are a heterogeneous group of malignancies originating from mesenchymal tissues, including fat, muscle, and fibrous connective tissues. These tumors are relatively rare, accounting for less than 1% of all adult cancers, yet they are known for their diverse histological types and biological behaviors, which complicate diagnosis and treatment. Accurate classification and diagnosis of STS are crucial, as they determine the appropriate therapeutic strategies and influence patient prognosis.[1][2]

Histopathological examination stays a cornerstone in the diagnosis of STS, providing detailed information on the cellular architecture and differentiation of the tumors. This method is often complemented by immunohistochemical (IHC) techniques, which utilize specific antibodies to detect unique antigens in the tissue. IHC is particularly valuable in differentiating various STS subtypes and distinguishing them from other benign or malignant lesions.[3][4] For instance, specific markers such as Sox10,S100 and Mitf are used to identify subtypes like clear cell sarcoma, which may harbor distinct genetic anomalies like the EWS/ATF1 fusion gene.[5][6]

The present study aim to evaluated a review of STS including clinical & pathological feature as age, gender, site, size, histopathological picture & IHC investigates the in Najaf over the past three years. By analyzing a comprehensive dataset, this research aims to elucidate the prevalence and types of STS in this region, highlight

diagnostic challenges, and assess the efficacy of IHC markers in identifying various STS subtypes. This study not only contributes to the local understanding of STS but also provides insights relevant to global clinical practices and research.

Method

This is a retrospective cross sectional study carried out in Kufa Training Center – Iraqi Council for Medical Specializations at Al-Sadr medical city teaching hospital - histopathology lab, Al-Najaf governorate in a period between 1ST October 2023- 1st October 2024. Ethical approval was obtained from the institutional review committee of research projects (I.R.C.R.P) of Iraqi Board for Medical Specialization, issue N0. Path 24 in 31/3/2024.

All cases of soft tissue sarcoma were collected from the archive of histopathology and belonged to the period extending between 2021 and 2023. All clinical data were obtained from a histopathological report of these patients with malignant soft tissue tumors including, age, sex, site of tumor, type of biopsy, size, grade and stage. Annual population estimation during the study period were obtained from the Iraqi cancer registry 2020, Baghdad, ministry of health. These data were used as denominators in calculating incidence and prevalence.

Inclusion criteria

1- Cases of all age groups.
2- Both sexes (male and female).
3- All diagnosed and registered cases at Al-Sadr medical city teaching hospital - histopathology lab, Al-Najaf governorate between 1st January 2021 to 31th December 2023.
4- Cases from both Najaf governorate and some referred cases from other governorates.

Exclusion criteria

Cases without complete data

All cases were evaluated for their pathological parameters as follow; 1-Type of biopsy. 2- Histological type. 3-Grade of tumor. 4-Stage of tumor.

Statistical Analysis

Data were entered and transformed into a computerized data base with statistical utilities, the statistical package for social sciences (SPSS) version 22, was used for statistical procedures. Data were analyzed according to histological type, tumor grading, staging, site of distribution. Descriptive statistics were presented in the form of tables, charts, trends and numbers. P value was calculated using Chi square and regarded significant if ≤0.05.

RESULTS

Clinical presentation Among the 121 cases, there was a near-equal distribution between males (50.4%) and females (49.6%). The predominant clinical presentation was a soft tissue mass, observed in 92.6% of cases. Males about 57 cases (50.9%) presented with a soft tissue mass and females 55 cases (49.1%) presented with a soft tissue mass. (Table.1).

Table 1: Characteristic clinical features of all cases presented with soft tissue sarcoma distribution according to sex.

Clinical and radiological features	Sex		Total	Percent. (%)	P value
	Male	Female			
Soft tissue mass	57 (50.9%)	55 (49.1%)	112	92.6%	0.743
Cyst	0	2 (100.%)	2	1.7%	0.244
Scar tissue	1 (100%)	0	1	0.8%	
Referred cases	3 (50%)	3 (50%)	6	4.9%	1.0
Total	61 (50.4%)	60 49.6%	121	100.0%	1.0

Type of biopsy

Excisional biopsy has been performed on 97 cases (80.1%); 49 cases were male (50.5%) and 48 female cases (49.5%), showing a slight male predominance with significant difference (p value >0.05). (Table 2).

Table 2: Distribution gender of all cases according to type of biopsy.

Type of biopsy	Sex				Total	Percent. (%)	P - value
	Male		Female				
Excisional	49	40.5	48	39.7	97	80.16%	1.0
Incisional	0	0	2	1.7	2	1.65%	0.244
Tru cut	12	9.9	10	8.3	22	18.18%	0.814
Total	61	(50.4%)	60	49.6%	121	100.0%	

Age

The majority of cases were presented at age group above 40 years. The most frequent age group is 61-70 years 25 cases (20.66%), followed by the 51-60 age group 22 cases (18.18%). (Table.3).

Table 3: Distribution frequency of all soft tissue tumors according to age of patients.

Age (years)	Sex		Total	Percent. (%)	p-value
	Male	Female			
1-10	3 (60%)	2 (40%)	5	4%	1.0
11-20	8 (50%)	8 (50%)	16	13%	1.0
21-30	2 (18%)	9 (82%)	11	9%	0.029
31-40	7(63.64)%	4(36.36)%	11	9.09%	0.529
41-50	5(23.81)%	16(76.19)%	21	17.36%	0.008
51-60	13(50.09)%	9(40.91)%	22	18.18%	0.480
61-70	15(60.00)%	10(40.00)%	25	20.66%	0.369
71-80	5(71.43)%	2(28.57)%	7	5.79%	0.439
81-90	2(100.00)%	0(0.00)%	2	1.65%	0.495
91+	1(100.00)%	0(0.00)%	1	0.83%	1.0
Total	61 (50.4%)	60 49.6%	121	100.0%	1.0

Histopathological evaluation

The most common histological types were undifferentiated sarcoma 26 cases (21.5%) and gastrointestinal stromal tumors (GIST) formed 20 cases 16.5%. While, Liposarcoma, Ewing sarcoma, and Synovial sarcoma were less prevalent. (table.4).

Table 4: Distribution frequency of all soft tissue tumors according to histological type of tumor and sex of patients.

Histological type	Sex		Total	Percent.(%)	P value
	Male	Female			
Undifferentiated sarcoma	14(53.8)%	12 (46.2%)	26	21.5	0.825
GIST	12(60.0)%	8(40.0)%	20	16.5%	0.37
Liposarcoma	8(47.05)%	9(52.94)%	17	14.0%	0.80
EWING sarcoma	4(30.76)%	9(69.23)%	13	10.7%	0.16
Synovial sarcoma	9(75.0)%	3(25.0)%	12	9.9%	0.08
Fibrosarcoma	3(42.85)%	4(57.14)%	7	5.8%	0.70
Leiomyosarcoma	0(0.0)%	5(100.00)%	5	4.1%	0.02
EVAN	1(25.0)%	3(75.0)100%	4	3.3%	0.31
MPNST	3(75.0)%	1(25.0)%	4	3.3%	0.31
Dermatofibrosarcoma	2(50.0)%	2(50.0)%	4	3.3%	1.0
KAPOSI	3(100.0)%	0(0.0)%	3	2.5%	0.08
RMS	1(50.0)%	1(50.0)%	2	1.7%	1.0
Chondrosarcoma	0(0.0)%	2(100.0)	2	1.7%	0.15
Clear cell S	1(100.0)%	0(0.0)	1	0.8%	0.31
Malignant hemangiosarcoma	1(50.0)	4((0.0)	1	0.8%	0.31
Total	61(50.4)%	60(49.6)%	121	100	

Types of sarcoma in relation to site

The results revealed that soft tissue sarcoma of lower extremities was more predominant site among other sites; it formed 29.75% out of the total cases. While other sites were less frequent. (Table 5).

Table 5: Distribution frequency of soft tissue sarcomas according to site of tumor and sex.

Site of tumor	sex		Total	Percent. (%)	P value
	Male	Female			
Lower extremities	15(41.66)%	21(58.33)%	36	29.75%	0.36
Visceral organs	13(61,90)%	8(38.530%	21	17.35%	0.36
Abdomen and pelvis	7(41.17)%	10(58)%	17	14.04%	
Upper extremities	5(38.46)%	8(61.53)%	13	10.74%	0.56
Retroperitonium	6(75.5)%	2(25.5)%	8	6.61%	0.28
Head and neck	4(57.14)%	3(42.85)%	7	5.78%	1.0
Trunk and chest wall	4(57.14)%	3(42.85)%	7	5.78%	1.0
Unkown	7(58.33)%	5(41,66)%	12	9.91%	0.76
Total	61(50.41)%	60(49.58)%	121		1.0

Histological type and grade of tumor

The results revealed that grade 3 tumors were the most frequent among all cases. They formed 66.11%, while low-grade tumors (Grade1 and Grade2) were less frequent. They accounted 24.8% and 9.1% respectively. There was a significant difference among these grades (P value <0.05). (Table 6).

Table 6: Distribution frequency of all soft tissue sarcomas according to grade of tumor and histological type of tumor.

Histological type	Grade of tumor		G3	Total	Percent%	P value
	G1	G2				
Undifferentiated sarcoma	0	0	26	26	21%	2.260
GIST	12	0	8	20	17%	0.016
Liposarcoma	0	6	11	17	14%	0.025
EWING sarcoma	0	0	13	13	11%	0.002
Synovial sarcoma	0	0	12	12	10%	0.002
Fibrosarcoma	4	0	3	7	6%	0.240
Leiomyosarcoma	2	1	2	5	4%	0.893
EVAN	4	0	0	4	3%	0.135
MPNST	0	2	2	4	3%	0.449
Dermatofibrosarcoma	4	0	0	4	3%	0.135
KAPOSI	3	0	0	3	2%	0.223
RMS	0		2	2	2%	0.368
Chondrosarcoma	0	2	0	2	2%	0.368
Clear cell S	0	0	1	1	1%	0.607
Malignant hemangiosarcoma	1	0	0	1	1%	0.607
Total	30(24%)	11(9%)	80(66%)	121	100%	

Site and size of tumor

Lower extremities were the most frequent 36 cases (30%) site of tumor distribution, the size of these tumors showed a broad range of sizes, the majority being T1 (23 cases), followed by T2. There is a significant difference in tumor size among these categories (P value <0.05). (Table 7).

Table 7: Distribution frequency of all soft tissue sarcomas according to site of tumor and size of tumor.

Site of tumor	Size of tumor		T3	T4	Tx	Total	percentage	P value
	T1	T2						
Lower extremities	23	2	4	3	4	36	30%	<0.001
Visceral organs	11	2	3	2	3	21	17%	0.007
Abdomen and pelvis	5	1	1	5	5	17	14%	0.227
Upper extremities	6	2	3	0	2	13	11%	0.117
Retroperitonium	3	3	0	1	1	8	7%	0.343
Head and neck	5	1	0	0	1	7	6%	0.015
Trunk and chest wall	3	2	0	2	0	7	6%	0.516
Unkown	5	4	1	0	2	12	10%	0.05
Total	61 (50%)	17 (14%)	12 (9%)	13 (11%)	18 (15%)	121 (100%)	100%	

Histological types and size of tumor

Tumor size was predominantly distributed across various categories, with 28.9% (35 cases) measuring less than 2 cm, 14.04%(17 cases) in the 2-4 cm range, 17.35% (21 cases)in the 5-9 cm range, and 13.22%(13 cases) in the 10-14 cm range. Tumors exceeding 15 cm accounted for 11.6% (14 cases), while 14.9% (18 cases) of tumors did not have a recorded size. (Tabel 8).

Table 8: Distribution frequency of all soft tissue sarcomas according to size of tumor and histological types.

Histological type	Size (cm)						Total	%	P value
	2	2-4	5-9	10-14	+15	Un			
Undifferentiated sarcoma	9	6	7	1	1	2	26	21%	0.15
GIST	5	3	4	2	5	1	20	17%	0.15
Liposarcoma	4	1	1	7	3	1	17	14%	0.33
EWING sarcoma	5	0	1	2	1	4	13	11%	0.08
Synovial sarcoma	3	1	3	1	1	3	12	10%	0.35

Fibrosarcoma	3	0	0	2	1	1	7	6%	0.31
Leiomyosarcoma	1	0	0	1	0	3	5	4%	0.10
EVAN	0	2	0	0	0	2	4	3%	0.05
MPNST	1	1	0	0	2	0	4	3%	0.46
Dermatofibrosarcoma	0	1	3	0	0	0	4	3%	0.46
KAPOSI	2	1	0	0	0	0	3	2%	0.53
RMS	1	1	0	0	0	0	2	2%	0.66
Chondrosarcoma	1	0	0	0	0	1	2	2%	0.51
Clear cell S	0	0	1	0	0	0	1	1%	0.25
Malignant hemangiosarcoma	0	0	1	0	0	0	1	1%	0.32
Total	35 (28%)	17 (14%)	21 (17%)	16 (13%)	14 (11%)	18 (25%)	121		

Histological types and site of tumor

Tumor sites varied significantly across histological types, Specific tumor types showed distinct site preferences. As shown in (Table 9).

Table 9: Distribution frequency of all soft tissue sarcomas according to site of tumor and histological types.

Histological diagnosis	upper extremities	lower extremities	chest and trunk	retroperitoneum	abdominal and pelvic	visceral	head&neck	unknown	Total	percentage	P-value
undifferentiated sarcoma	2	9	0	1	3	3	2	6	26	21%	0.285
GIST	0	0	0	3	4	12	0	0	20	17%	0.009
liposarcoma	2	8	2	3	2	0	0	0	17	14%	0.192
Ewing sarcoma	2	7	2	0	2	0	0	0	13	11%	0.191
synovial sarcoma	1	4	2	1	0	2	2	0	12	10%	0.715
fibrosarcoma	2	3	1	0	0	0	1	0	7	6%	0.645
leiomyosarcoma	0	0	0	0	3	2	0	0	5	4%	0.537
Evan tumor	1	0	0	0	1	0	1	1	4	3%	0.914
MPNST	0	1	0	0	2	0	1	0	4	3%	0.810
dermatofibrosarcoma	1	1	0	0	0	0	0	2	4	3%	0.810
kaposi sarcoma	1	1	0	0	0	0	0	2	3	2%	0.810
rhabdomyosarcoma	0	1	0	0	0	1	0	0	2	2%	0.934
chondrosarcoma	0	1	0	0	0	0	0	1	2	2%	0.934
clear cell sarcoma	0	0	0	0	0	1	0	0	1	1%	0.980
malignant hemangiopericytoma	1	0	0	0	0	0	0	0	1	1%	0.980
total	13	36	7	8	17	21	7	12	121	100%	

DISCUSSION

The near-equal gender distribution between male and female (50.4% Vs 49.6%) achieved in this study reflects no significant difference (p value >0.05). This result aligns with findings by Fletcher et al., which indicated no significant gender bias in STS incidence.[2]

The most frequent clinical presentation of a soft tissue sarcoma was painless tumor mass seen in 92.6% of cases. This evidence has been also documented by Singer et al.[7] Also, less frequent clinical presentations (7.4%) encountered in this study were scar tissue and cysts. This may reflect some diagnostic challenges in the management of soft tissue sarcoma.

Excisional biopsy (80.16%) was the most commonly applied surgical procedure, reflecting a preference for complete removal when the clinical suspicion is highly offered. Tru-cut biopsy (18.18%) was used mainly for deep-seated or retroperitoneal tumors, this finding is consistent with Casali et al.[8], who recommended minimally invasive approaches for inaccessible lesions.

This study revealed that the highest prevalence of STS was reported in age group of 61–70 year, forming 20.66% of all cases. This finding has been reported also by Toro et al., they reported that a median age of STS diagnosis in Europe was of 62 years. Adults.[9] In contrast, studies from Asia, such as those by Wang et al. noted a higher prevalence of STS in older age groups (>70 years)[10], possibly due to differing genetic or environmental risk factors.

Undifferentiated sarcoma was the most common subtype 26 cases (21.5%) seen in this study, with a slight male predominance over female (63.6%12cases Vs 36.4%14 cases). These findings are consistent with Fletcher et al. which identified undifferentiated sarcoma as one of the

most frequent and aggressive STS subtypes. They have found that all (100%) these tumors are of Grade 3, reflecting a very poor prognosis, with median survival rate of less than two years without aggressive treatment. A higher percentage of these tumors were located in lower extremities.[2]

GIST represented 16.5% (20 cases) of cases, predominantly in males 12 cases (60%). This subtype is more common in older populations, as also seen in Joensuu et al., where GIST incidence peaked in individuals over 50.[11] Tumors were often large, with 25% exceeding 10 cm, a critical prognostic factor as noted by Rossi et al.[12]

Liposarcoma accounted for 17 cases 14%, with a near-equal gender distribution. These findings agree with Singer et al., where liposarcoma was common, especially in retroperitoneal locations.[7] This study did not classify liposarcomas further, but Creytens et al. highlighted the distinct behaviors of subtypes (e.g., well-differentiated vs. pleomorphic).[13] Typically affects patients aged 50–70 years, similar to reports from the Scandinavian Sarcoma Group.

Ewing sarcoma comprised 10.7%(13) of cases, predominantly affecting females (69.2%) 9 cases, differing from Marina et al., who reported a male predominance.[14]

Fibrosarcoma, representing 5.8% (7) of cases, is now rare due to reclassification using advanced diagnostic tools. Fletcher et al. noted its decreasing incidence. High-grade and locally invasive, needing wide surgical margins to minimize recurrence.[2]

Kaposi Sarcoma: Comprising 2.5% of cases, predominantly seen in immunocompromised patients, as noted by Ravi et al.[15]

The lower extremities were the most common site 36 cases (29.75%), consistent with Fletcher et al. where limb involvement accounted for over 50% of STS cases.[2] Retroperitoneal tumors 8 cases (6.6%) were more common in males, reflecting Singer et al., who associated these with delayed detection and larger tumor sizes.[7]

Tumors in lower Extremities (30%) region were predominantly smaller (T1: 23 cases), but larger tumors (T3 and T4) were also present. The highly significant p-value (<0.001) indicates a strong correlation between tumor size and site. This may reflect earlier detection in accessible areas like the limbs, as reported by Fletcher et al.[16]

Tumors in visceral sites (17%) had a notable proportion of larger sizes (T3 and T4), with a significant (p-value <0.05). This observed with findings by Casali et al., who noted the challenges of early detection in deep-seated locations, leading to advanced tumor stages at diagnosis.[8]

tumors in Abdomen and Pelvis (14%) region were evenly distributed across sizes, with a non-significant (p-value>0.05). This suggests variability in detection and growth rates, which is consistent with Singer et al.[7]

CONCLUSION

Soft tissue sarcoma (STS) shows no significant gender difference in incidence, though males are slightly more affected. The most common clinical presentation is a soft tissue mass, while rare presentations like scars and cysts pose diagnostic challenges. STS is most prevalent in individuals aged 61–70, whereas younger patients under 30 more frequently present with specific subtypes such as Ewing sarcoma and synovial sarcoma. Histologically, undifferentiated sarcoma is the most common subtype, followed by gastrointestinal stromal tumors (GIST) and liposarcomas, each with distinct clinical profiles. Tumors in accessible areas like limbs are generally smaller and detected earlier, while deep-seated tumors are often diagnosed at advanced stages. High-grade tumors are predominant, highlighting the aggressive nature of STS and the urgency of timely, effective treatment.

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