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Research Article

Soft Tissue Sarcomas: Insights from a Single-Center Retrospective Study

Yakup Düzköprü,[1] Güner Akgüner[2]

[1]Department of Medical Oncology, Aksaray Training and Research Hospital, Aksaray, Türkiye
[2]Department of Medical Oncology, Ankara Etlik City Hospital, Ankara, Türkiye

Abstract

Objectives: Soft tissue sarcomas (STS) are a heterogeneous group of rare malignancies with diverse histopathological subtypes. This study aimed to evaluate the clinical, demographic, and pathological characteristics of STS patients and their treatment outcomes.

Methods: A retrospective analysis was conducted on 41 STS patients diagnosed between January 2016 and January 2021. Patient data, including tumor subtype, location, metastasis, and treatment, were analyzed using descriptive statistics and survival analysis.

Results: The median age was 64 years, with 63.4% male patients. Malignant mesenchymal tumors and Kaposi sarcomas were the most common subtypes (22% each), and extremities and trunk were the most frequent tumor sites (58.5%). Lung metastases were observed in 36.6% of patients. First-line treatment predominantly involved the IMA protocol, while pazopanib was the most used second-line therapy. Median overall survival was 16 months.

Conclusion: Leiomyosarcomas were the most prevalent subtype, with the extremities and trunk being the primary tumor sites and the lungs the predominant metastatic location. Anthracycline-based regimens and gemcitabine-docetaxel remain the cornerstone treatments for metastatic STS. Larger studies are needed to confirm these findings.

Keywords: Soft tissue sarcoma, leiomyosarcoma, chemotherapy, pazopanib, targeted therapies

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Soft tissue sarcomas (STS) constitute a heterogeneous group of tumors encompassing various histological subtypes. They originate from mesenchymal cells and connective tissue, accounting for approximately 1% of adult malignancies.[1, 2] STS can arise from various anatomical sites, including muscle tissue, the gastrointestinal and cardiovascular systems, the retroperitoneum, the head and neck region, and adipose tissue. Among these, extremity and trunk sarcomas and retroperitoneal sarcomas are more frequently observed. The most common histological subtypes include leiomyosarcoma, liposarcoma, synovial sarcoma, malignant peripheral nerve sheath tumors, and undifferentiated pleomorphic sarcomas.[3]

Prognostic factors for STS include tumor grade, size, and histological subtype.[4] Tumor grade is determined based on differentiation, the extent of necrosis, and mitotic activity.[5] Treatment strategies for patients vary depending on the stage of the tumor. While surgical resection is usually the first-line treatment for localized disease, advanced-stage STS often requires anthracycline-based chemotherapies (such as doxorubicin, ifosfamide, and mesna), as well as taxanes, gemcitabine, trabectedin, and tyrosine kinase inhibitors like pazopanib.[6]

Address for correspondence: Yakup Düzköprü, MD. Department of Medical Oncology, Aksaray Training and Research Hospital, Aksaray, Türkiye
Phone: +90 507 245 76 30 **E-mail:** yakupduzkopru@gmail.com

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This study aims to analyze the histopathological subtypes, anatomical locations, demographic characteristics, and treatment approaches of STS, which represent a highly heterogeneous group of tumors.

Methods

In this retrospective study, data from patients diagnosed with sarcoma and followed up at our hospital between January 2016 and January 2021 were analyzed. Patients aged 18 years and older with confirmed histopathological diagnoses of sarcoma were included. Patients who were not followed up at our clinic or had a second malignancy were excluded. A total of 41 patients meeting the inclusion criteria were enrolled in the study.

Data were collected from the hospital database and patient files. Variables recorded included patients' age, sex, histopathological diagnoses and subtypes, treatments received, chemotherapy regimens, and tumor locations.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistical Software (version 22.0, IBM SPSS, USA). Descriptive analyses were used to summarize the clinical and demographic characteristics of the patients. Categorical and numerical variables were presented as frequencies and percentages (n, %). Continuous variables were expressed as mean±standard deviation for normally distributed data, or as median and range for non-normally distributed data.

Overall survival (OS) was defined as the time from the date of diagnosis to either death or the date of the last follow-up. Survival outcomes were analyzed using the Kaplan-Meier method, and comparisons were performed with the log-rank test. A p-value of <0.05 was considered statistically significant for all analyses.

Results

A total of 41 patients diagnosed with soft tissue sarcoma (STS) were included in the study. The majority were male (n=26, 63.4%), with a median age at diagnosis of 64 years (range: 30–95 years). Among the pathological subtypes, malignant mesenchymal tumors and Kaposi sarcoma were the most common, each observed in 9 patients (22%). While Kaposi sarcomas were not graded due to their unique histological features, grade 3 tumors were identified in 27 patients with other tumor types. Detailed distributions of all pathological subtypes are provided in Table 1.

Tumor localization analysis revealed that trunk and extremity tumors were the most frequent, observed in 24 patients (58.5%). At diagnosis, 22 patients (53.7%) presented with de novo metastatic disease, with the lungs being the most common metastatic site (n=15, 36.6%). The clinicopathological characteristics of the patients are summarized in Table 2.

Table 1. Pathologic subgroups

	n	%
Malign mesenchymal tumor	9	22.0
Kaposi sarcoma	9	22.0
Liposarcoma	5	12.2
Leiomyosarcoma	4	9.8
Pleomorphic sarcoma	4	9.8
Fibrosarcoma	3	7.3
Synovial sarcoma	2	4.9
Condrosarcoma	2	4.9
Alveolar soft part sarcoma	1	2.4
Malignant peripheral nerve sheath tumor	1	2.4
Angiosarcoma	1	2.4
Total	41	100

No patients received neoadjuvant therapy. Among the cohort, 2 patients (4.9%) received adjuvant chemoradiotherapy, and 8 patients (19.5%) were treated with adjuvant chemotherapy. In the metastatic setting, first-line therapy was administered to 22 patients (53.7%), while 8 patients (19.5%) received second-line therapy. The most frequently administered first-line treatment was the IMA protocol (n=9, 22%), which combines anthracyclines and ifosfamide. In the second-line setting, pazopanib was the most commonly used therapy (n=5, 12.2%). Treatment regimens are summarized in Table 3.

Survival outcomes varied based on the treatment regimen. In patients treated with the IMA protocol as first-line therapy for metastatic disease, the median overall survival (OS) was 11 months, whereas it was 13 months for those receiving gemcitabine-docetaxel. The median OS for the entire cohort was 16 months (standard error: 3.9, 95% confidence interval: 8.3–23.7 months) (Fig 1). While there was a trend toward improved survival with gemcitabine-docetaxel compared to the IMA protocol, this difference was not statistically significant (p>0.05).

Discussion

Soft tissue sarcomas (STS) are relatively rare tumors that present with varying clinical features and affect individuals across a wide range of ages, depending on their histopathological subtypes. The incidence of STS generally increases with age, as reflected in our study, where the median age at diagnosis was 64 years. Previous studies from Turkey reported a median diagnosis age of 44.2 and a mean age of 49.3, respectively.[2, 7] In contrast, studies from Europe and East Asia reported median ages of 52.6 and over 65 for 42.7% of patients, respectively.[8, 9] These differences in me-

Tablo 2. Clinicopathological features of 41 soft tissue sarcoma patients

Feature	Frequencyn (%)
Age, median (years)	64 (30-95)
Gender	
Male	26 (63.4)
Female	15 (36.6)
Tumor grade	
Grade 1	2 (4.9)
Grade 2	3 (7.3)
Grade 3	27 (65.9)
Missing	9 (22)
Tumor location	
Trunk and extremities	24 (58.5)
Abdomen and Thoracic Visceral	8 (19.5)
Organs	
Retroperitoneum	4 (9.8)
Head and neck	5 (12.2)
Denovo metastasis	
Yes	22 (53.7)
No	19 (46.3)
Site of metastasis	
Lung	15 (36.6)
Liver	10 (24.4)
Intraabdominal Lymh node	5 (12.2)
Other	10 (24.4)
Adjuvant treatment	
Chemoradiotherapy	2 (4.9)
Chemotherapy	8 (19.5)
Metastatic firstline treatment	
Yes	22 (53.7)
No	19 (46.3)
Metastatic secondline treatment	
Yes	8 (19.5)
No	33 (80.5)

Tablo 3. Systemic therapy regimens

	n, %
Adjuvant treatment	
IMA	5 (12.2)
Dosetaksel+Gemsitabin	1 (2.4)
Paklitaksel	1 (2.4)
Interferon	3 (7.3)
Metastatic firstline treatment	
IMA	9 (22)
Dosetaksel+Gemsitabin	6 (14.6)
Pazopanib	2 (4.9)
Doxorubicin+Vincristin	1 (2.4)
Doxorubicin	1 (2.4)
Sunitinib	1 (2.4)
Paklitaksel	1 (2.4)
Interferon	1 (2.4)
Metastatic secondline treatment	
Pazopanib	5 (12.2)
Dosetaksel+Gemsitabin	2 (4.9)
Doxorubicin	1 (2.4)

IMA: Ifosfamide, mesna, adriamycin.

dian age may be attributed to variations in the pathological subtypes included in each study cohort.

In our study, the most common histopathological subtypes were malignant mesenchymal tumors and Kaposi sarcomas, each accounting for 22% of cases. Following these, leiomyosarcomas and pleomorphic sarcomas were observed in 9.8% of patients. In other studies conducted in Turkey, in the study by Pehlivan et al., the pathological subtype was unknown in 50% of the patients, with liposarcoma being the second most frequent subtype (17.5%).[7] In the study by Karhan et al., which included only patients who received pazopanib, the most frequent subtype was pleomorphic sarcoma (35.1%).[2] Internationally, leiomyosarcomas are often reported as the most common subtype.[10, 11] Such differences highlight the heterogeneity of STS and the potential influence of regional and demographic factors.

Accurate grading in STS is critical for determining disease stage and predicting prognosis. In our cohort, grade 3 tumors were the most frequent, comprising 65.9% of cases. However, grade information was unavailable for 22% of patients. This aligns with findings from a UK study, where grade 3 tumors were predominant(35/110), but a significant proportion of patients (30/110) also lacked grade data.[10]

STS predominantly arise in the extremities.[12] Similarly, in our study, 58.5% of tumors were located in the trunk and extremities. These findings are consistent with previous Turkish and UK studies, while an East Asian study identified abdominal, retroperitoneal, and pelvic tumors as the most common sites.[2, 7, 10, 11] Variations in patient characteristics and pathological subtypes may explain this discrepancy.

De novo metastatic disease was observed in 53.7% of patients in our cohort. This rate was higher than the 45.9% reported by Karhan et al. but lower than the 71.4% reported by Choi et al.[2, 11] A study focused on patients referred to plastic surgery services reported only two cases of de novo metastatic disease, likely due to earlier-stage referrals.[10] Literature suggests recurrence rates of 40–50% in follow-up, with 16% of patients presenting initially with metastatic disease and many others developing metastasis during follow-up.[13, 14] In our study, the lungs were the most common metastatic site (36.6%), followed by the liver (24.4%), consistent with previous findings.[14, 15]

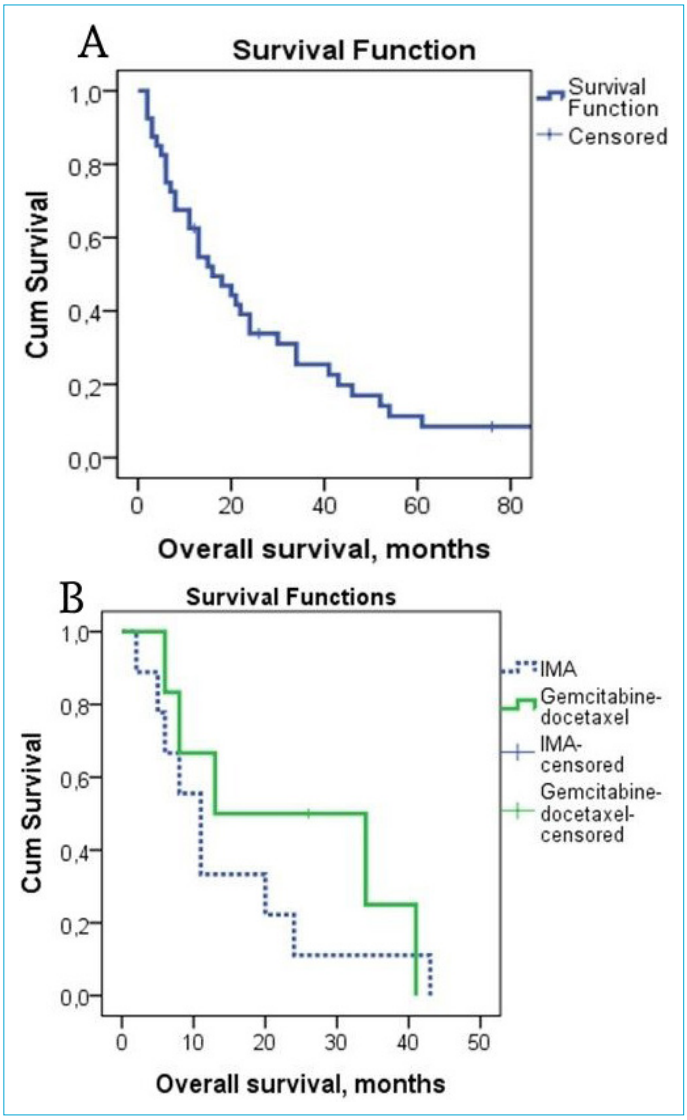

Figure 1. (a) Survival (univariate analaysis) of all patients, median OS 16 months (std error: 3.9, 95% CI: 8.3–23.7). **(b)** Survival (univariate analaysis) of patients according to chemotherapy regimen.

Chemotherapy remains the cornerstone of treatment for metastatic STS, with commonly used agents including anthracyclines, ifosfamide, gemcitabine, and taxanes.[6] In our study, the most frequently used first-line regimen was the IMA protocol (ifosfamide, mesna, doxorubicin), followed by gemcitabine-docetaxel. While the median overall survival (OS) appeared numerically higher in the gemcitabine-docetaxel group, the difference was not statistically significant, likely due to the small sample size. The GeDDis trial comparing anthracycline-based regimens with gemcitabine-docetaxel demonstrated similar efficacy between these treatments.[16] In the second-line setting, pazopanib was the most commonly used agent. The phase 3 PALETTE trial established the superiority of pazopanib over placebo in this setting.[17]

This study has several limitations. Its retrospective design introduces potential biases, and complete data, such as tumor grade, were not available for all patients. Additionally, the small sample size and the heterogeneous nature of the study cohort further limit the generalizability of the findings.

Conclusion

This study evaluated the clinical and demographic characteristics as well as treatment regimens of patients diagnosed with STS, and findings were largely consistent with the literature. Leiomyosarcomas were identified as the predominant histological subtype, with the extremities and trunk being the most frequent tumor sites and the lungs the most common site of metastasis. Despite limited advancements in STS treatments, anthracycline-based therapies and the gemcitabine-docetaxel regimen remain the cornerstone options in the management of metastatic STS. Future studies with larger, more homogeneous cohorts are essential to validate these findings and explore novel therapeutic approaches for STS.

Disclosures

Ethics Committee Approval: Ethical approval for the study was obtained from the Ankara Etlik City Hospital Ethics Committee (Approval Number: AEŞH-EK1-2023-409, Date: September 6, 2023). The study protocol was prepared in accordance with the principles outlined in the 1964 Declaration of Helsinki.

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