Original article

Spectrum of soft tissue sarcomas: Experience of surgery at a tertiary care referral hospital in Central Lahore

Absar Nazir[1], Muhammad Rashid Naveed[2], Ghazala Bano[3], Azka Sohail[4]

[1]Assistant Professor, [2]Senior Registrar, [3]Resident General Surgery, [4] Resident General Surgery, Department of General Surgery Unit 1, Fatima Jinnah Medical University/Sir Ganga Ram Hospital, Lahore-Pakistan

Correspondence to: Absar Nazir, Email: abbsar71@hotmail.com,

ABSTRACT

Background: Soft tissue sarcomas (STS) are malignant tumours arising from mesenchymal tissue, comprising <1% of all the tumours of the human body and represent the second most common type of solid tumours in children and adolescents. Surgical resection is considered the mainstay of treatment, supported by multimodal therapies including chemotherapy and radiotherapy. Resource-limited countries, like Pakistan, face additional challenges due to inadequate resources. This study presents the experience of management of soft tissue sarcomas presenting to a tertiary care hospital in Central Lahore.

Patients and methods: This was an observational study conducted in Surgical Unit I of Sir Ganga Ram Hospital Lahore from January 2017 till June 2022. American Joint Committee on Cancer (AJCC) staging system and Fédération Nationale des Centres de Lutte Contre le Cancer (FNCLCC) resection classification was applied. Surgical treatment including R0, R1 and R2 resections were carried out. SPSS 23 version was used for statistical analysis of collected data.

Results: A total of 36 patients; 24 male (66.7%) and 12 females (33.3%) were included. Anatomical site involvement was observed as 23 (63.8%) limb sarcomas and 13 (36.1%) trunk sarcomas. Out of 36 patients, 20 (55.6%) patients were staged as stage II, 11 (30.5%) patients as stage III and 5 (13.9%) as stage I. Total 17 (47.2%) patients underwent wide excision, 13 (36.1%) patients underwent limited excision, 4 (11.1%) patients underwent compartmental excision and 2 (5.6%) patients underwent palliative excision. Recurrence was observed in 8 patients for which palliative 2 (5.6%), limited 3 (8.3%) or potentially curative resection 3 (8.3%) was performed.

Conclusion: Thigh was the commonest site of involvement in extremity sarcomas. Retroperitoneal sarcomas were most frequent among trunk tumours. Leiomyosarcoma was the most common histopathological diagnosis followed by malignant peripheral nerve sheath tumours. Most of the patients presented with stage II disease. Resectional surgery, whether curative or palliative, was found to be the management modality of choice. Rhabdomyosarcoma most frequently recurred within 6 months of potentially curative surgery (R1), most likely due to compromised initial resection.

Keywords: Soft Tissue Sarcoma, Presentation, Resection, Histology, Outcome

INTRODUCTION

Soft tissue sarcomas (STS) are malignant tumours arising from mesenchymal tissue, comprising <1% of all the tumours of the human body and represent the second most common type of solid tumours in children and adolescents.[1] In adults, the most common histotypes include liposarcoma, leiomyosarcoma, and undifferentiated pleomorphic sarcoma (UPS).[2] Approximately 40-50% of STS occur in the extremities, thigh being the most common site and approximately 15-20% occurs in the trunk.[3] Surgical resection is considered the mainstay of treatment, supported by multimodal therapies including chemotherapy and radiotherapy, hence requiring a multidisciplinary management preferably under one roof.[4] However, surgery remains a challenging task with about one-quarter of cases presenting with recurrence following resection.[5]

Moreover, late presentation and involvement of vital neurovascular bundles poses greater difficulty especially in radical excision of limb sarcomas and there is a debate regarding prognostic outcome of various resection margins and overall survival of patients.[6,7] Resource-limited countries, like Pakistan, face additional challenges due to inadequate resources, expansive and not freely available imaging technology, and non-availability of specialised referral centres. General surgeons are usually the first ones who deal with these patients. This study presents the experience of management of soft tissue sarcomas presenting to a tertiary care hospital in Central Lahore.

PATIENTS AND METHODS

This is an observational study conducted in Surgical Unit I of Sir Ganga Ram Hospital Lahore from January

Conflict of interest: The authors declared no conflict of interest exists.

Citation: Nazir A, Naveed AR, Bano G, Sohail A, Khalid K. Spectrum of soft tissue sarcomas: Experience of surgery at a tertiary care referral hospital in Central Lahore. J Fatima Jinnah Med Univ. 2022; 16(2):74-78.

DOI: https://doi.org/10.37018/ANMR.0901

2017 till June 2022. All consecutive patients presenting to the surgical outpatients department or referred from peripheral hospitals with soft tissue swellings involving various parts of the body and having clinical features of malignancy were included in the study. Demographic details, presentation, comorbidities, investigations, stage at presentation, type of surgery, histopathology and postoperative outcome were recorded. After initial imaging investigations, including ultrasonography, CT scan or MRI, confirmation of diagnosis was achieved by histopathological diagnosis using FNAC followed by Trucut biopsy. Subsequent imaging investigations for staging were obtained, as advised by the tumour board. American Joint Committee on Cancer (AJCC) staging system for Trunk and Extremities sarcomas was used.[8]

Patients with extensive debilitating disease with or without metastases were excluded. All patients were offered initial excisional surgery after advice from the tumour board. Various Resectional procedures comprising wide local excision (R0), compartmental excision (R0), limited excision (R1), palliative excision (R2) was opted depending upon initial presentation, location, stage of tumour and consent of patient. Fédération Nationale des Centres de Lutte Contre le Cancer (FNCLCC) Guidelines were followed for type of resection and histopathology.[9] All patients were referred for consideration of adjuvant treatment according to the advice of the tumour board. Follow up was done on a 3-month basis for 1 year, then 6 monthly for 2 years and later annually. Detailed history and examination were performed on each visit. Appropriate laboratory and imaging investigations were used whenever a recurrence or metastatic disease was suspected. Recurrent tumours were subjected to Re-resectional surgery wherever possible.

RESULTS

A total of 36 patients were included. Mean age was 31.9 (range 18-56 years) years. There were 24 males (66.7%) and 12 females (33.3%), with male to female ratio of 2:1. Mean duration of presentation was 11 months (range 4 months to 35 months). Commonest mode of presentation was progressively enlarging swelling involving the anatomical region of the body. Associated pain or limitation of movement was common in patients with late presentation. Abdominal swelling and pressure symptoms were more frequent in retroperitoneal sarcomas. Some degree of weight loss was observed in all patients. Anatomical site of involvement was 23 (63.8%) limb sarcomas and 13 (36.2%) trunk sarcomas, including 9 (25%) abdominal tumours. The detail of the anatomical spectrum of involvement in 36 patients is summarised in Figure 1.

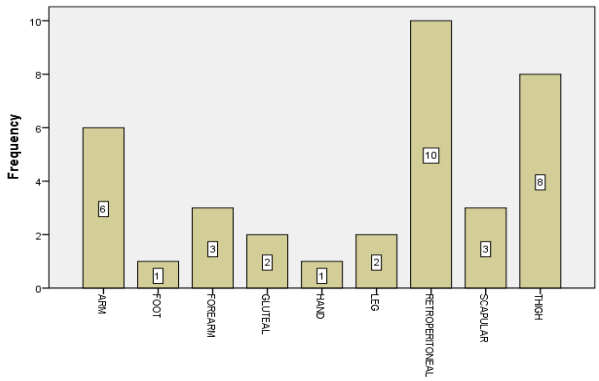

Figure 1: Frequency distribution of soft tissue sarcomas according to anatomical location (n=36)

FNAC suspected the soft tissue tumour in 13 (36%) patients with extremity sarcomas. Tru-cut was diagnostic in all patients (100%) with extremity and trunk sarcomas. Abdominal tumours were suspected on imaging (CT/MRI) findings and patients were explored after clinical correlation. All patients were evaluated with CT and MRI. Both imaging modalities were helpful in initial diagnosis and staging of the disease. Out of 36 patients, 20 (55.6%) patients were preoperatively staged as stage II, 11(30.9%) as stage III and 5 (13.5%) as stage I. Total 17 (47.2%) patients underwent wide excision, 13 (36.1%) patients underwent limited excision (<1 cm resection margin) (Figure 2), 4 (11.1 %) had compartmental excision and 2 (5.6%) patients had palliative excision. Five out of 9 abdominal sarcomas near the paravertebral region underwent limited resections, whereas 3 in the psoas muscle region had wide excision. Only one patient presented in emergency with clinical features of peritonitis for 3 days duration and was found to have a bleeding tumour in the right perinephric region. Complete excision including partial nephrectomy was performed in this patient.

Histopathology on all tumours is available and is summarised in Figure 3. Most common histopathological diagnosis was malignant peripheral nerve sheath sarcoma and leiomyosarcoma reported in 7 (9.4%) patients each. Five of the 7 malignant peripheral nerve sheath tumours involved retroperitoneum and 2 were reported in the extremities. Grading of the tumours according to the FNLCC classification system is summarised in Table 1. Grade 2 tumours on histopathology were seen to be the most common, up to 53 % (19 patients).

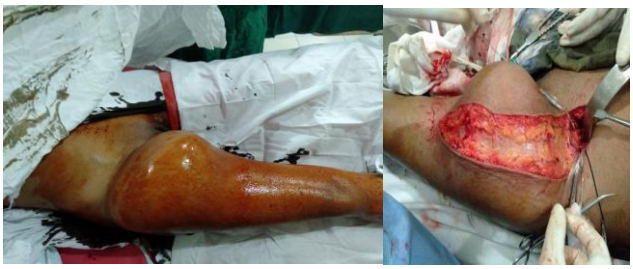

Fig 2.1 Fig 2.2

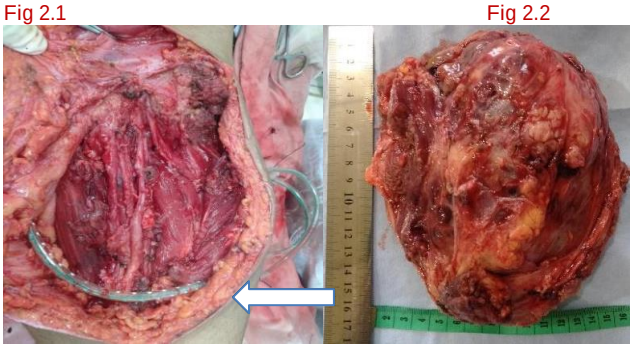

Fig 2.3 Fig 2.4

Figure 2. Rhabdomyosarcoma of left thigh presenting in a 35-year-old female with progressive weakness of left lower leg. 2.1: Clinical presentation, 2.2: Incision for limited excision, 2.3: R1 excision with shaving off from neurovascular bundle (black arrow), Redivac® suction drain is visible (white arrow), 2.4: Excised tumour (16x16 cm) with <1cm gross margins

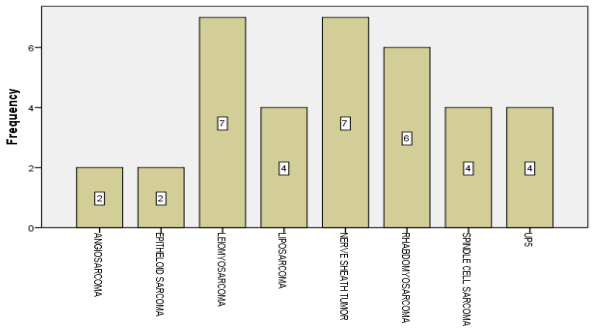

Figure 3: Histopathology of soft tissue sarcomas (n=36)

Follow-up was available on all patients. Mean follow up time was 3.8 years (range 7 months to 5 years). Overall postoperative morbidity was recorded in 36% (n=13) patients. Commonest complication was chest infection observed in 11 (30.5%) patients. Table 2 summarises various postoperative complications.

Recurrent disease (local, regional, or metastatic) was observed in 8 (22%) patients, within a mean period of 10 months. Five (14%) patients had local recurrence (3 in extremities and 2 in retroperitoneum), whereas 2 (5.6%) patients of lower extremity rhabdomyosarcoma presented with regional nodal metastases. Two (5.6%) patients (including 1 with local recurrence) presented with pulmonary metastases. All patients with local

Table 1: Grade of tumour on histopathology according to FNLCC classification

Histologic type	No.	Grade 1 No. %*	Grade 2 No. %*	Grade 3 No. %*
Leiomyosarcoma	7	2 (28.5)	3 (42.8)	2 (28.5)
MPNST**	7	3 (42.8)	3 (42.8)	1 (14.2)
Rhabdomyosarcoma	6	1 (16.6)	4 (66.6)	1 (16.6)
UPS***	4		2 (50)	2 (50)
Spindle Cell Sarcoma	4		4 (100)	
Liposarcoma	4	3 (75)	1 (25)	
Angiosarcoma	2		1 (50)	1 (50)
Epithelioid Sarcoma	2		1 (50)	1 (50)
Total	36	9 (25)	19 (52.7)	8 (22.2)

*Percentages calculated for number of tumours in that category **Malignant peripheral nerve sheath tumour *** UPS – Undifferentiated Pleomorphic Sarcoma

Table 2: Postoperative complications observed in 36 Patients

	Postoperative complication	Patients No. %
1	Chest Infection	11 (30.5)
2	Wound Infection	4 (11.1)
3	Limb Weakness	1 (2.8)

*Some patients had more than one complication

recurrence or with metastatic disease underwent limited resection and presented within 6 months (range 3-6 months) of initial surgery. Five (extremity sarcoma) of the 8 patients with recurrent disease underwent wide re-excision, one with retroperitoneal sarcoma underwent re-excision whereas 2 (one extremity and one retroperitoneal) were sent for adjuvant treatment because of extensive pulmonary metastases.

Hospital mortality was seen in 2.8% cases; one patient with extensive right lower extremity rhabdomyosarcoma involving thigh and pelvic girdle who died after hindquarter amputation.

DISCUSSION

Soft tissue sarcomas (STS) are malignant tumours arising from mesenchymal tissue. In this study the disease was seen predominantly in male population which is consistent with both local and international literature.[1,4,9] Most of the patients were from relatively younger age group , the mean age of the patients presenting was 31.9 years, which is comparable to the Local and regional studies.[10,11] While older age group ranging from 40-60yrs is observed in other international studies.[4,6,9] Soft tissue sarcoma is a rare type of cancer that comprises a variety of histological subtypes, There are more than 100 histological varieties of soft tissue tumors.[12] They differ not only in histological features but also in clinical presentation and prognostic response to treatment. The most common being undifferentiated pleomorphic sarcoma, liposarcoma and leiomyosarcoma but various studies show different histological presentation. [6,10,13,14] In this

study comprising a five-year period, it was observed that most tumours that presented in the department were leiomyosarcoma, malignant peripheral nerve sheath tumour and rhabdomyosarcoma. In this study malignant peripheral nerve sheath tumours were seen relatively in higher proportion and 4 (11.1%) tumours were observed in young females in the retroperitoneal region, which is a noticeable finding. Grade 2 tumours were observed in high ratio in the local literature, which is in correspondence to this study where 52.7% grade 2 tumours were seen, while more grade 3 tumours were seen in the international literature.[1,6,9] Pertaining to anatomical site involvement, extremities predominantly the lower extremity are the most commonly involved anatomical site ranging from 40-60% which is analogous to this study with an involvement of 36%.[6,13,15] All three type of resections R0,R1,R2 have been opted as surgical treatment in both the local and international studies with on average R0 being done in 70%, R1 in 15% and R2 in 8 %of the patients.[1,6,9,10] While in this study resections were R0-46%, R1-49.5% and R2-5.5%. In this study R1 resection is relatively more, as 27.7% of the tumours were located in the retroperitoneal region and those in the extremity regions were involving the neurovascular bundles where R1 was the acceptable mode of resection.[16] One of the 2 patients undergoing R2 resection was a young patient with a high grade tumour of thigh involving gluteal region did not give consent for amputation thus R2 resection was performed but prognosis was poor and the patient died within the same hospital admission. The other R2 resection was performed in a patient who presented in emergency with retroperitoneal bleed.

Most recurrences occurred within 6 months after the surgery in 22% cases which is consistent with both the national and international literature.[6,9,10,15] For soft tissue sarcoma, the recommended surgical treatment is wide local excision with negative margins.[1,2,16]. However, in compromised situation like involvement of neurovascular bundle or when limb-salvage surgery is required, limited resection of tumour with microscopic positive margins is an acceptable option.[4,16] Multiple articles debate on the efficacy of such resection as to whether it gives similar prognosis to margin-negative resection or not.[15,17]

CONCLUSION

Thigh was the commonest site of involvement in extremity sarcomas. Retroperitoneal sarcomas were most frequent among trunk tumours. Leiomyosarcoma was the most common histopathological diagnosis followed by malignant peripheral nerve sheath tumours. Most of the patients presented with stage II disease. Resectional surgery, whether curative or palliative, was found to be the management modality of choice. Rhabdomyosarcoma most frequently recurred within 6 months of potentially curative surgery (R1), most likely due to compromised initial resection.

REFERENCES

1. Shafiq M, Rafi I, Shoaib A, et al. (June 19, 2022) The Outcome of Extremity Soft Tissue Sarcomas in Terms of Resection Margins: A Study from a Cancer Dedicated Center.Cureus 14(6): e26086. doi:10.7759/cureus.26086
2. Gamboa AC, Gronchi A, Cardona K. Soft-tissue sarcoma in adults: An update on the current state of histiotype-specific management in an era of personalized medicine. *CA Cancer J Clin*. 2020;70(3):200-229. doi:10.3322/caac.21605
3. Hui JY. Epidemiology and etiology of sarcomas. Surg Clin North Am 2016; 96:901-14.
4. Vodanovich DA, M Choong PF. Soft-tissue Sarcomas. *Indian J Orthop*. 2018;52(1):35-44. doi: 10.4103/ortho.IJOrtho_220_17
5. Guerrero WM, Deneve JL. Local Recurrence of Extremity Soft Tissue Sarcoma. *Surg Clin North Am*. 2016;96(5):1157-1174. doi: 10.1016/j.suc.2016.05.002.
6. Zagars GK, Ballo MT, Pisters PW, et al. Prognostic factors for patients with localized soft-tissue sarcoma treated with conservation surgery and radiation therapy: an analysis of 1225 patients. *Cancer*. 2003;97(10):2530-2543. doi:10.1002/cncr.11365
7. Stojadinovic A, Leung DH, Hoos A, Jaques DP, Lewis JJ, Brennan MF. Analysis of the prognostic significance of microscopic margins in 2,084 localized primary adult soft tissue sarcomas. *Ann Surg*. 2002;235(3):424-434. doi:10.1097/00000658-200203000-00015
8. Amin MB, Edge S, Greene F, Byrd DR, Brookland RK, Washington MK, Gershenwald JE, Compton CC, Hess KR, et al. (Eds.). AJCC Cancer Staging Manual (8th edition). Springer International Publishing: American Joint Commission on Cancer; 2017 [cited 2016 Dec 28].
9. Bilgeri A, Klein A, Lindner LH, et al. The Effect of Resection Margin on Local Recurrence and Survival in High Grade Soft Tissue Sarcoma of the Extremities: How Far Is Far Enough? *Cancers (Basel)*. 2020;12(9):2560. Published 2020 Sep 8. doi:10.3390/cancers12092560.
10. Umer M, Saeed J, Shamsi Z, Tariq MU. Treatment and outcomes of soft tissue sarcoma of groin, hip and thigh: a retrospective review from a tertiary care hospital. *J Pak Med Assoc*. 2021;71(Suppl 5) (8): S75-S78.
11. Ansari TZ, Masood N, Parekh A, et al. Four-year experience of sarcoma of soft tissues and bones in a tertiary care hospital and review of literature. *World J Surg Oncol*. 2011; 9:51. Published 2011 May 17. doi:10.1186/1477-7819-9-51
12. Sbaraglia M, Bellan E, Dei Tos AP. The 2020 WHO Classification of Soft Tissue Tumours: news and perspectives. *Pathologica*. 2021;113(2):70-84. doi:10.32074/1591-951X-213
13. Bhurgri Y, Bhurgri H, Pervez S, et al. Epidemiology of soft tissue sarcomas in Karachi South, Pakistan (1995-7). *Asian Pac J Cancer Prev*. 2008;9(4):709-714.
14. Traub F, Griffin AM, Wunder JS, Ferguson PC. Influence of unplanned excisions on the outcomes of patients with stage III extremity soft-tissue sarcoma. *Cancer*. 2018;124(19):3868-3875. doi:10.1002/cncr.31648

15. Cammelli S, Cortesi A, Buwenge M, et al.: The role of radiotherapy in adult soft tissues sarcoma of the extremities. Eur J Orthop Surg Traumatol. 2021, 31(8):1583-96. 10.1007/s00590-021-02990-6
16. Ikoma N, Roland CL, Feig BW. Soft-tissue and bone sarcoma. In The MD Anderson Surgical Oncology Handbook, Sixth Edition. Wolters Kluwer Health Adis (ESP). 2018. p. 245.
17. Liu CY, Yen CC, Chen WM, et al. soft tissue sarcoma of extremities: the prognostic significance of adequate surgical margins in primary operation and reoperation after recurrence. *Ann Surg Oncol*. 2010;17(8):2102-2111. doi:10.1245/s10434-010-0997-0