Journal of Cardiovascular Disease Research

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 4, 2025

A STUDY ON LIMB SALVAGE IN EXTREMITY SOFT TISSUE SARCOMAS-A PROSPECTIVE STUDY

Dr . S.Sathyavani [1] , Dr. Sridar [2]

1 Junior Resident, Department of General Surgery Sree Mookambika Institute of Medical Sciences College Kanyakumari, Tamil Nadu, India.

2.Professor, Department of GeneralSurgery, Sree Mookambika Institute of Medical Sciences Kanyakumari, Tamil Nadu, India.

Corresponding Author S.Sathyavani ,Junior Resident, Department of General Surgery ,Sree Mookambika Institute of Medical Sciences College Kanyakumari, Tamil Nadu, India.

ABSTRACT :

Background : sarcomas are rare(less than 1% of all malignancies) and pose a challenging problem for patients and their surgeons / oncologist. In past, these cancers have treated by amputation with relatively poor functional outcome.Finally, there have been major development in limb reconstruction. Surgeons now have available implants that can be matched to the patients size, stronger metals, bone and soft tissues allografts micro vascular muscular transfer procedure. These techniques allow the limb to be resorted with good function.

Methods: the soft tissue sarcomas rare tumours, In our institution,we are treating a significant number of soft tissue sarcomas, Since our hospital has well established oncology department. The study design is a retrospective analysis about “Limb salvage in extremity soft tissue sarcomas”. This Study was conducted in sree mookambika institute of medical sciences at department of general surgery . Study period was one years duration between (Jan’ 2023 – Dec’ 2024). All the extremity soft tissue sarcomas patients who were attending our outpatient department and underwent treatment included in this study. All the age group of patients were taken for this study. Sex prevalence has been calculated.

Results: Upper extremity soft tissue sarcoma were about 39.3% and lower extremity as 60.7% Thigh is most common site for soft tissue sarcoma. This has been supported by this study which found about 39.3% of extremity soft tissue sarcoma seen in thigh region.

Conclusion: First surgery is the best surgery as far as limb salvage and local control of disease concerned.Ideally biopsy should be done by the same surgeon who is going to do definitive surgical procedure.Distant metastatic potential is not influenced by successful local controlLocal recurrence and distant metastasis are determined by tumour size, grade and plane of swelling as individual factor.Lung is the most commonest site of distal metastasis for extremities soft tissue sarcoma.

Keywords: Sarcoma, Limb salvage

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 4, 2025

INTRODUCTION:

Extremity sarcomas are rare(less than 1% of all malignancies) and pose a challenging problem for patients and their surgeons / oncologist. In past, these cancers have treated by amputation with relatively poor functional outcome. Over the last 30 yrs , limb salvage has evolved , this technique has been proven safe and effective . There have been developments in several areas to improve the outcomes with limb preservation. The neoadjuvant chemotherapy causes tumour necrosis, which allows for safer removal. In addition Chemotherapy causes the tumour to develop a rind or margin and in some cases Shrink , helping the surgeon to completely resect the tumour and minimize the removal of normal tissue. Imaging also play a major role in limb salvage with development of radiographic studies such as MRI .The surgeon can better see the extent of tumour and plan resection precisely.

Finally, there have been major development in limb reconstruction. Surgeons now have available implants that can be matched to the patients size, stronger metals, bone and soft tissues allografts micro vascular muscular transfer procedure. These techniques allow the limb to be resorted with good function.

Despite all of these improvement and enthusiasm for limb salvage , It is not For everyone . There are contraindications and complications that need to be considered. The decision needs to have a thorough understanding of the advantages and disadvantages of limb salvage before pursuing this technique.

AIM AND OBJECTIVES OF THE STUDY:

This study thoroughly analyze the epidemiology, anatomical distribution , common histological types of soft tissue sarcomas in extremities . But main focus of this study is , to analyze the proportion of patients underwent limb sparing surgeries, on what basis patients were offered either limb sparing procedure or amputations . Since our institute is tertiary centre many soft tissue sarcomas are referred with local recurrence due to unplanned first surgery, this study mainly analyze the feasibility of limb salvage treatment in these patients and the factors adversely affect treatment outcome.

MATERIALS AND METHODS:

The soft tissue sarcomas rare tumours, In our institution,we are treating a significant number of soft tissue sarcomas, Since our hospital has well established oncology department. The study design is a retrospective analysis about “Limb salvage in extremity soft tissue sarcomas”. This Study was conducted in sree mookambika institute of medical sciences at department of general surgery . Study period was one years duration between (Jan’ 2023 – Dec’ 2024). All the extremity soft tissue sarcomas patients who were attending our outpatient department and underwent treatment included in this study. All the age group of patients were taken for this study. Sex prevalence has been calculated.

Though Any soft tissue swelling which were > 5cms, or any suspicion of malignant features like sudden increase in size , adherent with a underlying fascia, recurrence after excision and any evidence of metastasis, these patients were subjected to Trucut Biopsy after thorough clinical examination.

For superficial swelling, that are smaller than 5cm, particularly those were suspected for malignancy,

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 4, 2025

Excisional biopsy was done. For more than 5cm sized and deep seated either Trucut biopsy or Incisional biopsy were done . Trucut biopsy was done in such way that the needle punctured site and track of the needle pathway were included in definitive surgery, If it could be proved to be as soft tissue sarcoma.

Incisional biopsy - the incision was made along the long axis of the affected limb, within the tumour limit and was planned to include the biopsy scar in following

definitive surgical procedure. After taking adequate tissue for HPE, perfect hemostasis was achieved and no drain was kept.

Role of FNAC in diagnosing sarcomas are limited. FNAC will be done for suspected recurrence after surgery and to diagnose sarcomas which are situated in deeper plane in trunk and abdomen. This is because the tissue material that we are getting through FNAC is inadequate to grade and subtype the tumour, which is essential in deciding its prognosis and choosing adjuvant therapy. After histological confirmation , staging work up will be done by using conventional radiographs, CT and MRI for local disease , And radiographs and CT for distant metastasis.

After complete evaluation, the extremities soft tissue sarcomas with distal metastasis, inoperable lesions, medically unfit or not willing for surgery were referred to palliative treatment. Other patients were taken for surgery after proper counselling.

RESULTS:

After metastatic work up, about 41 patients were found to be with distal metastasis and two patients were at inoperable stage due to extensive soft tissue involvement at critical anatomical site. These 43 patients were referred for palliative chemoradiotherapy. Others underwent multimodality treatment.

HISTOLOGICAL TYPES OF SOFT TISSUE SARCOMAS:

Malignant Fibrous Histiocytoma	N - 43 (40.2%)
Liposarcomas	N - 29 (27.1%)
MPNST	N - 17 (15.9%)

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 4, 2025

Synovial Sarcoma	N - 13 (12.1%)
Others	N - 5 (4.7%)

TREATMEMT STATISTICS

Total number of patients underwent surgery	Limb sparing surgery		Amputation
	Primary surgery	Reresection For local recurrence	
64	**25**	**31**	8

RECURRENCE RATE

After surgical treatment six patients developed local recurrence of which two(7.1%) from the group who underwent primary resection, four(11.1%) from the group who underwent re-resection for local recurrence.
All the local recurrence were in patient who underwent limb sparing surgery. No amputee developed local recurrence. Local recurrence rate is 9.4%.

METASTASIS
Ten patients developed distant metastasis. All were seen in lung (100%). Seven patients who underwent limb sparing surgery and three patient who underwent amputation developed pulmonary metastasis. Two patients developed both local recurrence and pulmonary metastasis simultaneously. All metastasis and local recurrence developed within 2 years of initial diagnosis. All were the high grade tumour.

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 4, 2025

DEATH

Eleven patients has been document as died in hospital due to soft tissue sarcoma in 5 years follow up with mean follow up of 29 months of which 9 patients were with distal metastasis (81.8%). Many patients lost for follow up.

DISCUSSION:

Soft tissue sarcomas are rare tumour. Since our institution is a tertiary centre and has well established oncology department, we are treating a significant number of soft tissue sarcomas. An analysis of population based data from Connectiout suggest increased incidence in both men and women, with a greater increase in women. This study shows increase number of soft tissue sarcomas in both male and female with minimal male preponderance. (M:F ration 1.3:1).

In MSKCC series shows mean age of soft tissue sarcoma occurrence as 51 years with range of 16-93 years and most of them are seen in sixth decade. In this review shows that age distribution range of 13-80 years with mean age of 39.1 years. Majority of cases were seen in fifth decade (40-49) years, especially malignant fibrous histiocytoma, the most common soft tissue sarcoma which is reported as more common in seventh decade. But in this review, MFH is common in fifth decade.

Lawrence et al, in his series found as soft tissue sarcomas in upper extremity as 30%, and lower extremity as 70%. In this study, we found upper extremity soft tissue sarcoma were about 39.3% and lower extremity as 60.7% Thigh is most common site for soft tissue sarcoma. This has been supported by this study which found about 39.3% of extremity soft tissue sarcoma seen in thigh region.

In a study conducted in MCH U.S(1994) showed malignant fibrous histiocytoma as most common soft tissue sarcoma (21.9%) followed by liposarcoma (16.0%) and MPNST(9.6%). In this review shows most common extremity soft tissue sarcoma is MFH (40.2%) followed by LPS (27.1%). Surprisingly MPNST accounted as (15.9%). By comparing both studies there is increased incidence of MFH and MPNST in our region. Synovial sarcoma is common among young adult. In this study shows most of the synovial sarcomas were seen in second and third decade (76.9%).

Before 1991, 90% of extremity soft tissue sarcoma were treated by amputation. After 1990, with better knowledge about biology of soft tissue sarcoma, availability of imaging modality, multimodality of treatment, improvement limb reconstruction technique and improved rehabilitation facilities, now about 90% of extremity soft tissue sarcoma are treated by limb salvage procedure. In this review study., out of 28 newly diagnosed soft tissue sarcoma, limb sparing surgery was done in 25 cases (89.2%). Where as amputation was done in 3 cases (10.7%). In recurrence

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 4, 2025

soft tissue sarcoma (36 cases) limb sparing surgery was achieved in 31 cases (86.1%). Amputation was done in 5 cases (13.8%). The minimal increase in amputation in the group with Re-resection were due to unplanned previous surgery like unknowingly tumour was removed as benign or improper biopsy procedure or intralesional / intracapuslar excision.

This led to difficulty in planning for second limb sparing procedure. In spite of this overall limb salvage rate of 87.5% was achieved. This study confirms the influence of surgical margin achieved in development of loc Wirbal et al, his series showed local recurrence rate of 9.3% after wide local excision with margin negative specimen and 28.5% after marginal margin resection. Simon and Enneking et al, in their series, found 5% local recurrence after negative margin and 89% of local recurrence after positive margin. In this study, After surgical treatment, six patients (9.4%) developed local recurrence of which two (9.1%) patients after primary resection. Four(11%) patients after re-resection developed local recurrence. This definitely shows the increase in local recurrence in re-resection group was due to unplanned first surgery which made difficulty in second limb sparing surgery. Moreover 5 out of 6 local recurrence were margin positive cases (83.3%).

Lung is the commonest site for distal metastasis extremity sarcomas. In this study ten patients developed distal metastasis All of them were pulmonary metastasis (100%). A study about extremity soft tissue sarcoma showed isolated lung metastasis as 70%, multiple metastasis as 5%. More than 60% of metastasis are found within 2 years. In this study, All lung metastasis were found with mean follow up of 29 months. Three metastasis were seen after amputation., which shows local control of soft tissue sarcoma does not alter the metastatic rate. By this, it is evident that local control of disease and metastasis are two separate entity which are individually determined by stage of the tumours. Achieving complete local control of disease will not alter the chance of distant metastasis.al recurrence and stress the importance of proper planning of primary surgery to minimize local recurrence .

Documented death of 11 cases were reported of which nine were with metastatic disease. It is evident as metastasis shorten the overall survival rate. Since many patients lost their follow up , this death rate is not reflecting the real picture of overall survival in soft tissue sarcomas of extremity after multimodality treatment.

CONCLUSION:

This retrospective review on “Limb salvage in extremity soft tissue sacomas” for five years period shows:Occurrence of limb soft tissue sarcomas has shifted one decade Iin our region earlier than literature evidence.

More number of soft tissue sarcoma seen in younger age with minimal male preponderanceHistologically, malignant fibrous histiocytoma is the most common extremity soft tissue sarcoma, followed by liposarcoma and occurrence of MPNST seems to be increased in our

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 4, 2025

regionAnatomically lower limb is common site, especially thigh is the most common site for limb sarcomas Due to better knowledge about soft tissue sarcoma, availability of imaging modality and multimodality treatment and improvement in limbreconstruction technique, Limb salvage procedure is achievable in about 90% of extremity soft tissue sarcomas.Local recurrence after limb sparing surgery is only 9.4% and shows success of limb sparing technique.Local recurrence are higher in re-resection group due to unplanned previous surgery which make the second surgery difficult to achieve limb salvage.

First surgery is the best surgery as far as limb salvage and local control of disease concerned.Ideally biopsy should be done by the same surgeon who is going to do definitive surgical procedure.Distant metastatic potential is not influenced by successful local controlLocal recurrence and distant metastasis are determined by tumour size, grade and plane of swelling as individual factor.Lung is the most commonest site of distal metastasis for extremities soft tissue sarcoma.

BIBLIOGRAPHY

1. Janice.N.Cornier and Raphael.E.Pollock;
2. Soft tissue sarcomas 35: 1328., Schwartz's Principles of Surgery 8th Edition.2005.
3. Murray F. Brennan and Samuel Singer; Sarcoma of the soft tissue and Bone, CANCER – Principle and practice of oncology by Vincent T.Devitta Jr. 35 : 1581 – 7th Edition.2005.
4. P.Cool, R. Grimer : Surveillance in patients with sarcomas of the extremities, EJSO (2005) 31:1020-1024.2003.
5. M.A. Clark and J.M.Thomas : Major amputation for soft tissue sarcoma.British Journal of Surgery, 90 : 102-107 (2003).
6. I.Benjamin, Iez M.D : major palliative amputation, Surgical Oncology.Clin. N . AM 13(2004) 543-547.
7. R. Jain, RJ Grimer, Sn Carter, R.M Tibman : Outcome after disarticulation of the hip for sarcomas EJS Jang JC, Chang AE, Baker AR Randomized prospective study of benefit of radiation radiation therapy in treatment of soft tissue sarcomas of extremities; Journal of Clinical Oncology 16; 197 – 203, 1998.
8. Zagers GK, Goowitz MS, Pollack H; Liposarcoma : Outcome and Prognostic factors following Conservative Surgery and Radiation Therapy International Journal of Radiation Oncology, Biology, Physics 36; 311- 319,1996.
9. Frustac S, GherlinzoniF, DepaolicA ; Adjuvant chemotherapy for adult soft tissue sarcomas of the extremities and Girdles. Journal of Clinical Oncology: 19 : 1278 – 1247, 2001.
10. Henshaw RM, PribatDA, PerryDJ ; Survival after induction chemotherapy and surgical resection for high grade soft tissue sarcoma. Is radiation necessary? Annals of Surgical Oncology 8; 484 - 495,2001.
11. Brooks AD, Bowne WB, Delgado R; Soft tissue sarcomas of the groin, management and prognosis, Journal of American College of Surgery 193 ; 130-136, 2001.
12. Abbatucci,Boulier, N,de Ranieri, j et al(1986) local control and survival in soft tissue sarcomas of the limbs, trunk and head and neck: int.j.radiat. Oncol.Boil.Phys. 12,579-86 .

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 4, 2025

13. Greenlee, RT,Hill-Harmon MB, murray T, Cancer stastics, 2001 CA Cancer J Clin . 2001;51:15-36.
14. Singer S , Corson K , Gonin JM , Labow B. Prognostic factor predictive
15. survival and local recurrence for extremity soft tissue sarcomas.Ann.surg1994 219; 165-173.
16. Edmonson KH,Riyan LM , Blum RH, et al. Randomized comparison of Doxorubicin alone versus ifosamide plus doxorubicin or mitomycin , doxorubicin and cisplatin against advanced soft tissue sacomas. J . Clin. Oncol.1993; 1276-1275.
17. Clark MA , Thomas JM, Major amputation for soft tissue sarcomas. Br J Surg. 2003;90(1); 102-107.
18. Thomas JM, Soft tissue sarcomas. Curr Pract Surg. 1996;8;59-63.
19. Rydholm A, Improving the management of soft tissue sarcomas.Diagnosis and treatment should be given in specialist centres. BMJ 1998 , 317; 93-94.
20. Temple LKF, Brennan MF, The role of pulmonary metastasectomy in soft tissue sarcomas . Semin thorac cardiovasc surg 2002; 14; 35-44.
21. Pitcher ME , Davidson TI, Fisher C, post irradiation sarcoma of soft tissues. Eur.J.Surg.oncol.1994; 20; 53-56.
22. Pisters PWT, Leung DHY, Woodru J, Analysis of prognostic factors in soft tissue sarcoma of extremity. J . Clin. Oncol.1996;14;1679-89.
23. Eilber FC, Rosen G,Nelson SD, . High grade extremity soft tissue sarcoma ; Factors predictive of local, recurrence and its effect on morbidity and mortality. Ann. Surg. 2003;237;218-26.
24. Sakata K, Johnson FE, Beitler AL, Extremity soft tissue sarcomas patients follow-up; It. J. Oncol.2003;22;(6);1335-43
25. Kane JM, Surveillance strategy for patients following surgical resection of soft tissue sarcomas. Curr. Opin . Oncol. 2004;16;328-32.
26. Sauter ER, Hoffman JP, Eiseberg BL, Diagnosis and surgical management of locally recurrent soft tissue sarcoma of the extremity. Semin. Oncol. 1993; 20;451-50.
27. KarakousisCP, ProimakisC, Rao U, Local recurrence and survival in soft tissue sarcomas Ann. Surg. Oncol. 1996;3;255-60..
28. Ramanathan RC, Mutschler W, Thomas JM .Prognostic index for extremity soft tissue sarcomas and isolated recurrence. Ann . Surg . 2001;8;278-89
29. Reuther G , Mutschler W, Fornago BD, Detection of local recurrence in musculoskeletal tumours; MRI vs CT. Skeletal radiology. 1990;13;49-54.
30. Jhonson FE, virgo Cancer patients follow up. St. Louis, MO, USA;Mosby , 1997
31. Zahm S Fraumeni J Jr, The epidemiology of soft tissue sarcomas . Semin. Oncol.1997;24;(5);504.
32. Khan J, Wei JS, Ringner M . Classification and diagnostic prediction of cancers using gene expression profiling and artificial neural networks.2001;7; 673.
33. Fabrizio Pl, Staford SL, Pritchard DJ. Extrimity soft tissue sarcomas selectively treated with surgery alone. Int. J. Radiat. Oncol.Biol.Phys. 2004;48;227.
34. Maghert M, Abudu J, N Driver . The indications for and prognostic significance of amputation as primary surgical procedure for extremity soft tissue sarcomas. Ann.Surg. Oncol.2005;Jan;12(1)-2.

ISSN: 0975-3583,0976-2833 VOL16, ISSUE 4, 2025

35. Sluga M, Windhagar K, Lang s,. Local and systemic control after ablative and limb sparing surgery in extremity soft tissue sarcomas. Jn. Clin. Oncol.(1999) 358;120.
1.