ORIGINAL RESEARCH PAPER

Radiology

KEY WORDS: Soft tissue tumors, Lipoma, Hemangioma, Sarcoma.

RADIOLOGICAL EVALUATION OF SOFT TISSUE MASSES WITH CLINICO-PATHOLOGICAL CORRELATION

Dr.J.Abdul Gafoor M.D.R.D., Professor and HOD, Kurnool Medical College, Kurnool.

Dr. B. Suresh M.D.R.D., Associate Professor, Kurnool Medical College, Kurnool.

Dr. M.Padmalatha M.D.R.D., Associate Professor , Kurnool Medical College, Kurnool.

Dr.P.Kavitha M.D.R.D., Assistant Professor, Kurnool Medical College, Kurnool.

Dr. Bandaru Mahesh Yadav* M.D.R.D. Kurnool Medical College, Kurnool. *Corresponding Author

ABSTRACT

Evaluation of soft tissue tumours has undergone a dramatic change with the advent of ultrasonography(USG),magnetic resonance(MR)imaging and computed tomography (CT). Patients are referred for imaging to evaluate a soft tissue lesions in the trunk or extremities.These lesions range from non-neoplastic conditions to benign and malignant tumours. The primary goal for the imaging referral is to confirm the presence of a mass and to assess its extent. And also the study is an attempt to define the role of different imaging modalities in the evaluation of patients with soft tissue tumours in correlation with histopathology.

INTRODUCTION

Soft tissue is derived from mesenchyme primarily and by convention, consists of skeletal muscle, fat, fibrous tissue, and the vascular structures as well as the associated peripheral nervous system.

The classification of Soft tissue tumours was done based on the adult tissue they resemble. Patients are referred for imaging to evaluate a soft tissue mass in the trunk or extremities. These lesions range from non-neoplastic conditions to benign and malignant tumours.

Evaluation of soft tissue tumours has undergone a dramatic change with the advent of ultrasonography(USG), magnetic resonance (MR) imaging and computed tomography (CT).A correct histologic diagnosis based on *imaging studies alone* has reached in only approximately one-quarter to one-third of cases. Therefore, the primary goal for imaging referral is to confirm the presence of a mass and assess its extent in preparation for possible treatment.

In a majority subset of cases, specific clinical and imaging information can help to narrow the differential diagnosis. These characteristics include clinical history, lesion location, mineralisation on radiographs, echogenic patterns on USG, attenuation differences `on CT and signal intensity (SI) characteristics on magnetic resonance (MR) images.

AIMS & OBJECTIVES

1. The study is an attempt to define the role of different imaging modalities in the evaluation of patients with soft tissue tumours in correlation with histopathology.
2. To study the incidence of various subtypes of soft tissue tumours with the total number of Soft tissue tumours.

METHODOLOGY: Sixty-nine patients with soft tissue tumours belonging to all ages are subjected to study presented to the department of radiodiagnosis and imaging within a span of 2 years(November 2017 to October 2019)which included outpatients, inpatients, referral patients of Government general hospital, Kurnool medical college, Kurnool.

IMAGING TECHNIQUES

ULTRASOUND

The study was performed on Esaote My lab 40 USG machine or e-Saote My lab class C USG machine for initial imaging.

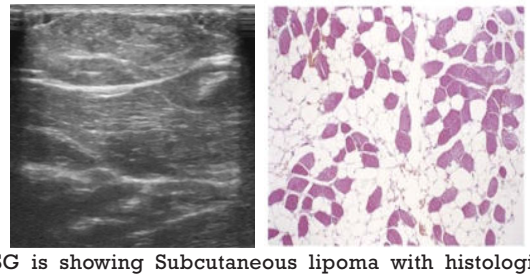
COMPUTED TOMOGRAPHY

The study was performed on Multidetector High-Resolution Computed Tomography (General Electrical - GE BRIGHT SPEED 16 SLICE CT).

MAGNETIC RESONANCE IMAGING

The study performed was on Philips INGENIA1.5 Tesla MRI scanner.

FIGURE-1 **FIGURE-2**



USG is showing Subcutaneous lipoma with histological depiction.

FIGURE-3 **FIGURE-4**

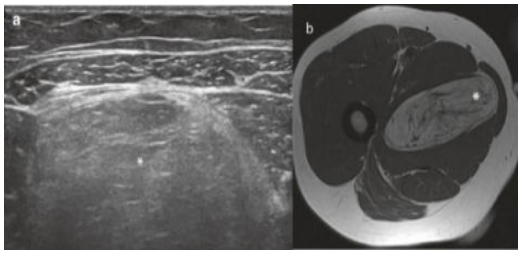
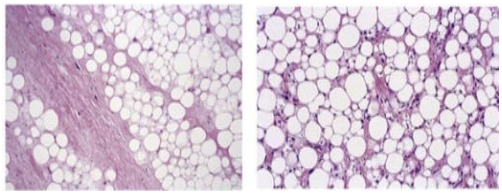
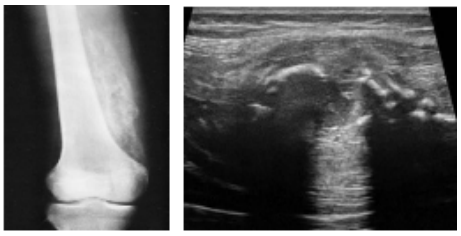


FIGURE-5 **FIGURE- 6**



Figures 3,4,5,6 USG, MR AND HISTOLOGICAL DEPICTIONS OF WELL DIFFERENTIATED ADIPOCYTIC INTRA-MUSCULAR LIPOSARCOMA .

FIGURE 7 **FIGURE 8**



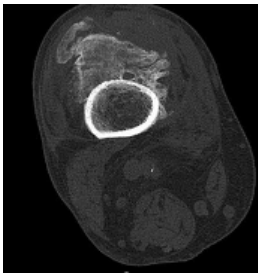


FIGURE 9

Myositis ossificans showing an intramuscular calcified mass on X-ray, USG and CT

FIGURE 10A **FIGURE 10B**

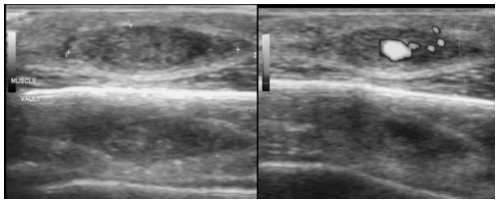
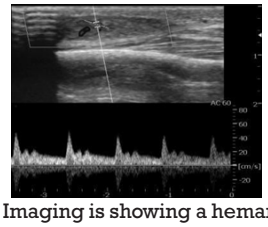
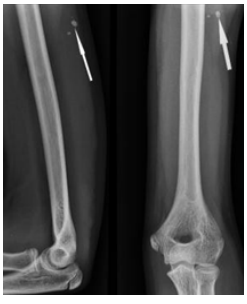


FIGURE 10C



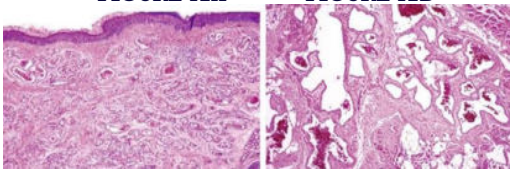
USG Greyscale Imaging is showing a hemangioma on the left forearm and subsequent colour Doppler and spectral map of the same.

FIGURE 11



X-ray Hemangioma showing phleboliths.

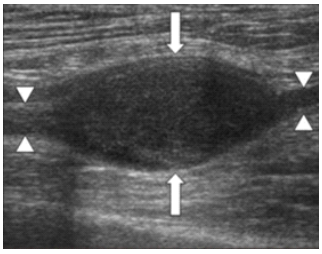
FIGURE 12A **FIGURE 12B**



Capillary Haemangioma **Cavernous haemangioma**

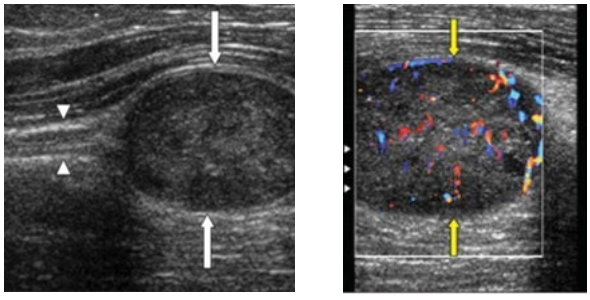
FIGURE 12A AND 12B ARE Histological depictions Capillary Haemangioma and Cavernous haemangioma respectively.

FIGURE 13



Grayscale USG showing neurofibroma.

FIGURE 14

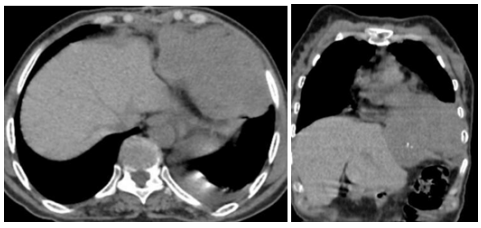


A. **B.**

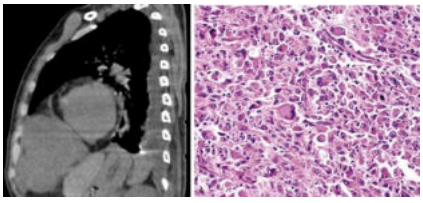
A- Schwannoma of the median nerve in a 45-year-old man. Ultrasonography of the left arm over the medial aspect shows oval mass with heterogeneous hypoechogenicity. Direct and centric contiguity with the median nerve and posterior acoustic enhancement are shown.

B- Color Doppler USG shows a oval mass (arrows) with peripheral and central colour flow signals, suggesting a hypervascular tumour.

FIGURE 15



A. **B**



C. **D.**

A, B, C are CT images in axial, coronal and sagittal planes showing undifferentiated spindle cell sarcoma arising from the diaphragm in a 59-year-old woman given radiologically as soft tissue sarcoma. A subsequent biopsy revealed a histologically challenged undifferentiated tumour of spindle cell origin.

RESULTS

The present study includes the study of a total of 69 soft tissue tumours. Benign soft tissue tumours were 59 in number, and malignant tumours were 10 constituting 85.5% and 14.5% respectively.

The relative frequency of benign to malignant soft tissue tumours is difficult to estimate accurately since many of the benign tumours cause a few problems and thus, the patients do not report to the clinician.

The consensus is that the benign soft tissue tumours outnumber malignant counterparts by a considerable margin.

USG has 82.6% accuracy in detecting soft tissue tumours.

USG has more accuracy in detecting lipomas followed by haemangiomas and nerve sheath tumours when compared with other soft tissue tumours.

TABLE 1 - INCIDENCE OF BENIGN AND MALIGNANT SOFT TISSUE TUMORS

S.No	Tumors	Benign	%	Malignant	%	Total	%
1	Adipose	31	44.9	4	5.8	35	50.7
2	Fibrous	2	2.9	1	1.45	3	4.35
3	Fibrohistiocytic	3	4.35	0	0	3	4.35
4	Skeletal Muscle	0	0	1	1.45	1	1.45
5	Smooth Muscle	0	0	1	1.45	1	1.45
6	Blood Vessel	16	24	1	1.45	17	25.4
7	Nerve sheath tumours	07	10.15	0	0	07	10.15
8	Uncertain differentiation	0	0	2	2.9	2	2.9

TABLE 2
Radiologically evaluated soft tissue tumours in correlation with Histopathological diagnosis.

Soft TissueTumour	Radiological Diagnosis	Final diagnosis
Lipoma	31	31
Liposarcoma	3	4
Myositis ossificans	1	1
Elastofibroma	0	1
Fibrosarcoma	0	1
Benign fibrous histiocytoma	1	3
Spindle cell sarcoma	0	1
Leiomyosarcoma	1	1
Hemangioma	14	16
Angiosarcoma	0	1
schwannoma	2	3
Neurofibroma	5	4
Uncertain differentiation	0	2

- Out of 69 soft tissue tumours diagnosed histopathologically, 57 of them are diagnosed based on imaging exclusively.

CONCLUSION:

The present study includes 69 cases of soft tissue tumours evaluated radiologically at the department of Radiodiagnosis and Imageology, Kurnool Medical College, Kurnool for two years (November 2017 – October 2019).

- Malignant soft tissue tumours showed a
- Soft tissue tumours, in general, showed a slightly female preponderance with a male to female ratio of 1:1.09.
- The male to female ratio among benign soft tissue tumours was 1:1.18 and 1.5:1 among malignant soft tissue tumours.
- The benign soft tissue tumour showed a predilection for upper extremities and Head Neck regions with a peak age incidence in the fourth decade.
- The malignant soft tissue tumours showed a marked site predilection for the lower extremities peak age incidence in the fourth decade.
- On detailed Radiological examination, the single most common group was the adipose tumour, which accounted for 50.7% of all soft tissue tumours.
- The most common benign tumour was a lipoma (52.5%) followed by vascular tumours (27.1%), nerve sheath tumours(12%), fibrohistiocytic tumours (5%) and fibrous tumours (3.4%) in the decreasing order to frequency.
- The most frequent malignant soft tissue tumour was liposarcoma (40 %) followed by the tumour of uncertain differentiation (20%), spindle cell sarcoma(10%), Myxofibrosarcoma(10%), angiosarcoma (10%) and Leiomyosarcoma (10%) in the descending order of frequency.
- USG has 82.6% accuracy in detecting soft tissue tumours.

SUMMARY:

Soft tissue tumours are encountered frequently in everyday practice. Characterisation of these lesions remains problematic despite advances in imaging.

No single imaging feature can allow specific tissue diagnosis. So by systematically using clinical details like age, sex, lesion location, combining with USG characters and CT / MRI imaging can narrow the differential diagnosis.

Together with proliferation markers, histological and immunohistochemical examination, USG and MRI form cornerstones in diagnosing and thus avoiding non-suited invasive therapy for many patients with benign STT and optimising the treatment, prognosis and outcome.

Thus, histological and surgical/ medical follow-ups play a role in arriving a complete diagnosis.

REFERENCES:

1. Kransdorf MJ, Murphey, MD. Radiologic evaluation of soft-tissue masses: a current perspective. American Journal of Roentgenology. 2000 Sep;175(3):575-87.
2. Inampudi P, Jacobson JA, Fessell DP, Carlos RC, Patel SV, Delaney-Sathy LO, van Holsbeeck MT. Soft-tissue lipomas: accuracy of sonography in diagnosis with pathologic correlation.Radiology. 2004 Dec;233(3):763-7.
3. Carra BJ, Bui-Mansfield LT, O'Brien SD, Chen DC. Sonography of musculoskeletal soft-tissue masses: techniques, pearls, and pitfalls. American Journal of Roentgenology. 2014 Jun;202(6):1281-90.
4. Chiou HJ, Chou YH, Chiu SY, Wang HK, Chen WM, Chen TH, Chang CY. Differentiation of benign and malignant superficial soft-tissue masses using USG. Journal of the Chinese Medical Association. 2009 Jun 1;72(6):307-15.