



ULTRASONOGRAPHY IN THE EVALUATION OF SOFT TISSUE LUMPS AND BUMPS

Radiology

Dr. Ketki Naik

Junior Resident at Dept. of Radiology MGM Medical College, Chh. Sambhajinagar

Dr. Prasanna Mishrikotkar

Professor at Dept. of Radiology MGM Medical College, Chh. Sambhajinagar

Dr. Asmita Suryavanshi

Associate Professor at Dept. of Radiology MGM Medical College, Chh. Sambhajinagar

Dr. Saurabh Joshi

Assistant Professor at Dept. of Radiology MGM Medical College, Chh. Sambhajinagar

ABSTRACT

Soft tissue lumps and bumps includes the masses of soft tissues situated superficially and deep such as lipoma, epidermal inclusion cyst, peripheral nerve sheath tumors, fat necrosis, ganglion and pseudomasses. Ultrasonography is an excellent imaging method in the evaluation of palpable superficial soft-tissue masses; advantages of which includes high spatial resolution, portability, easy access, comparison to other side. The ability to combine physical examination and patient's history with sonographic findings gives an upper edge. The US findings of superficial soft tissue masses uncommonly changes with subsequent MR making it ideal investigation. Our study considers common soft tissue masses stated as above along with their location in body and tissue itself as well, composition, involved structures, echogenicity, margins, calcifications and vascularity with pattern recognition. It will help to narrow down to the ultimate diagnosis solely on the basis of ultrasonography and potentially reduces the need of subsequent MR imaging and invasive investigations such as biopsy in every case. Thus our study highlights that ultrasonography desired to be an ideal and first line investigation in diagnosis soft tissue lumps and bumps making need of MR imaging and biopsy in every case obsolete.

KEYWORDS

INTRODUCTION

Soft tissue lumps and bumps includes the masses situated superficially and deep. It includes lipoma, epidermal inclusion cyst, peripheral nerve sheath tumors, fat necrosis, vascular malformations, lymphadenopathy, ganglion and pseudomasses². Ultrasonography is an excellent imaging method in the evaluation of palpable superficial soft-tissue masses. Advantages of which includes high spatial resolution, portability, easy access, comparison to other side and pattern recognition of lesion. It will help to reduce the need of further invasive or non-invasive investigations for the confirmation of diagnosis. Which eventually will lead to early and prompt diagnosis in turn facilitates management of the same.

Aims and Objectives

- To evaluate soft tissue swelling by ultrasonography under echogenicity, vascularity, location, calcification, margins and characteristic findings.
- To assess the possibility of ultimate diagnosis solely on the basis of ultrasonography.
- To identify the need of either invasive or advanced non-invasive imaging to confirm diagnosis.

MATERIALS AND METHODS

- It is time bound observational study
- Study was conducted in tertiary care centre from Nov-2024 to jan-2025 using high frequency linear transducer of Samsung V8 / Voluson S10 expert.
- Total 72 patients were included in study

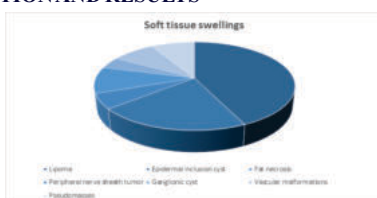
Inclusion Criteria

- Patients presented with soft tissue swelling with age more than 18 yrs.

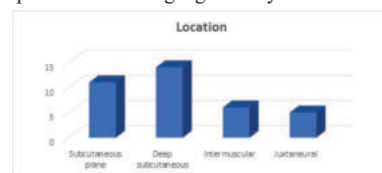
Exclusion Criteria

- Patients already diagnosed by other imaging or invasive modalities.
- Deeply situated soft tissue swelling.

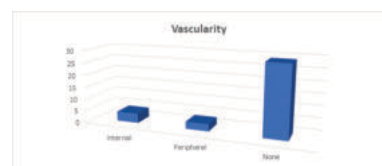
OBSERVATION AND RESULTS-



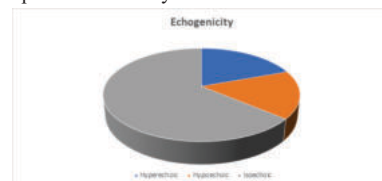
Of total 72 patients studied; 43.05% were lipoma followed by epidermal inclusion cyst which were 20.83%; peripheral nerve sheath tumours comprised 9.72% of total patients while vascular malformations and pseudomasses were noted in 8.33% of patients. Fat necrosis comprised 5.55% and ganglionic cyst stands at 4.16%.



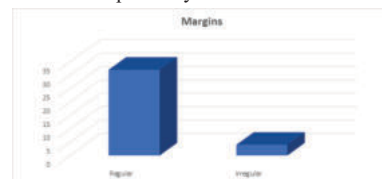
Out of total 72 patients studied 28 had deep subcutaneous soft tissue swelling while 22 were superficial 12 intermuscular and 10 juxtaneural⁴



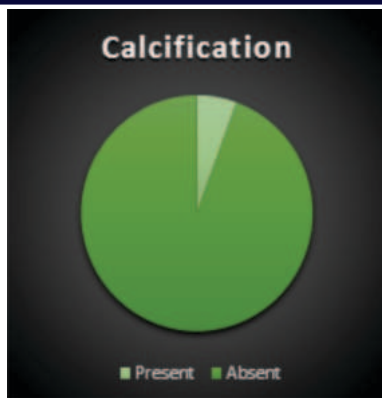
80.55% of patients (58) had no vascularity while 8 patients had internal and 6 had peripheral vascularity.



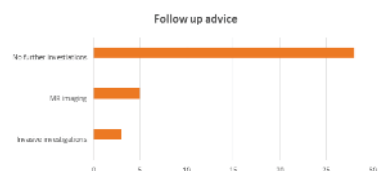
46 lesions (64%) were isoechoic followed by hyperechoic and hypoechoic 14 and 12 respectively.



64 of 72 patients had regular margins while only 8 presented with irregular.

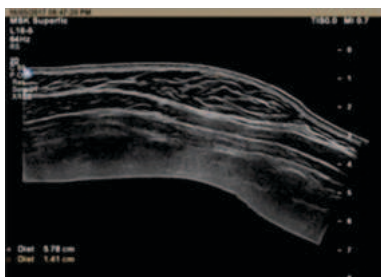


Only 4 patients had calcification within lesion.

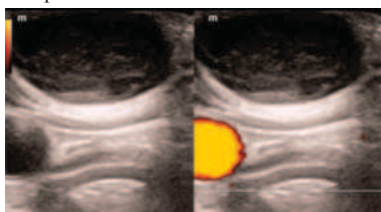


- Total 72 patients were studied in our study of which 56 patients were provided with ultimate diagnosis comprising to 77.77% needing no further invasive or non-invasive advanced imaging study.
- While 10 were advised MR imaging to conclude final diagnosis and 6 were advised invasive investigations such as biopsy.

DISCUSSION



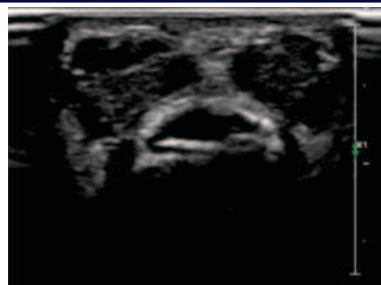
Lipoma- Hyperechoic to isoechoic, Oval, No or minimal septal vascularity, Compressible



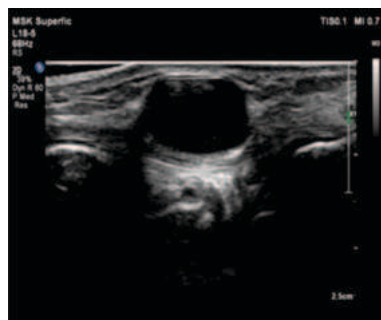
Epidermal Inclusion Cyst- Minimally hyperechoic, Echogenic debris, Contact with dermis, Avascular



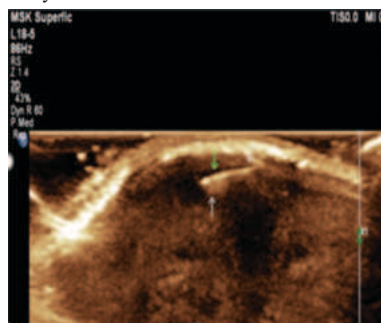
Fat Necrosis- Hyperechoic, Poor vascularity, Irregular margins, Prior history of trauma/injections



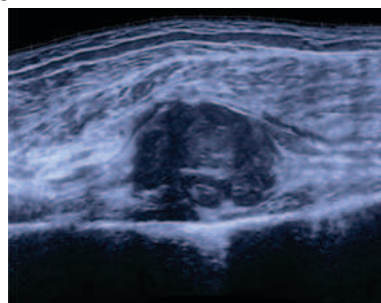
Schwannoma- Hypoechoic, Round or oval, Along the nerve, Internal vascularity



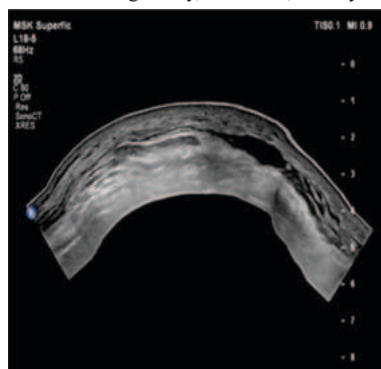
Ganglionic Cyst- Hypoechoic/Anechoic, Unilocular/multilocular, Septal vascularity



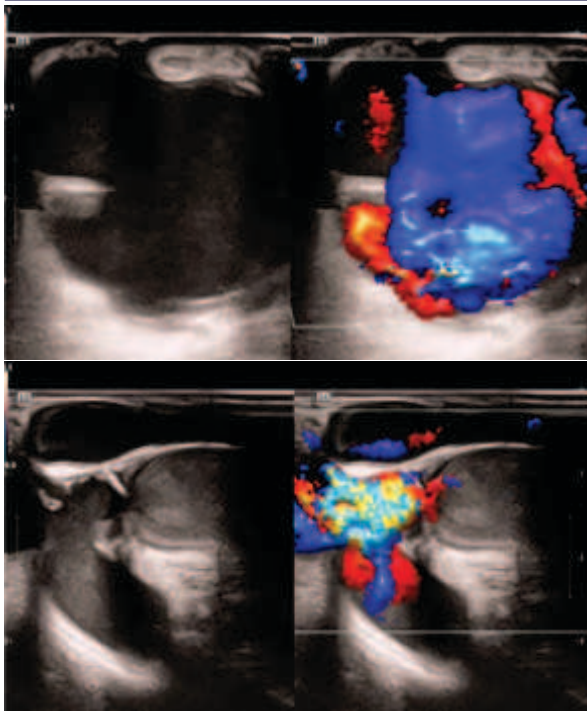
Foreign Body- Echogenic, Posterior acoustic shadowing, Surrounding inflammation



Hematoma- Variable echogenicity, Avascular, History of trauma.



Bursitis- Hypoechoic, Location-anatomic bursa, Well circumscribed, Variable vascularity.



Vascular Malformation- Heterogenous hyperechoic and hypoechoic areas, Variable vascularity

- Vascularity and calcification within the lesion noted on ultrasonography plays the crucial role in follow up advice to patients.
- Vascularity (internal or peripheral) along with feeding vessel states the need of further investigation while calcification can point towards developing necrosis and malignant potential³
- As described above with the characteristic features of common soft tissue lumps and bumps; 56 of 72 patients studied comprising to 77.77 % could be narrowed down to ultimate diagnosis solely on the basis of ultrasonography¹.
- Remaining 16 patients were advised follow up investigations of which 10 were advised MR imaging and 6 were suggested for invasive investigations⁵.
- This shows that only 22.23% patients needed further investigation for final diagnosis.
- Ultrasonography makes the ideal and first investigation for soft tissue lumps and bumps for ultimate diagnosis reducing need of further investigations.

CONCLUSION

Ultrasonography provides the characteristic and typical findings of soft tissue swellings with pattern recognition. Follow-up need of invasive as well as non-invasive advanced imaging will be required only for atypical, nonspecific and suspicious US findings or a conflicting clinical history. Ultrasonography could be used as the sole investigation in most of the soft tissue lumps and bumps which are situated superficially for the ultimate diagnosis dragging down the need of invasive as well as non-invasive advanced imaging. Thus ultrasonography the ideal and first investigation in evaluation of soft tissue swelling.

REFERENCES

1. Ultrasonography of Superficial Soft-Tissue Masses: Society of Radiologists in Ultrasound Consensus Conference Statement J. A. Jacobson¹, William D. Middleton, Sandra J. Allison, Nirvikar Dahiya, Kenneth S. Lee, Benjamin D. Levine, David R. Lucas, Mark D. Murphey, Levon N. Nazarian, Geoffrey W. Siegel, Jason M. Wagner
2. Wagner JM, Rebik K, Spicer PJ. Ultrasound of soft tissue masses and fluid collections. *Radiol Clin North Am.* 2019;57:657–669. doi: 10.1016/j.rcl.2019.01.013.
3. Gruber L, Gruber H, Luger AK, Glodny B, Henninger B, Loizides A. Diagnostic hierarchy of radiological features in soft tissue tumours and proposition of simple diagnostic algorithm to estimate malignant potential of an unknown mass. *Eur J Radiol.* 2017;95:102–110. doi: 10.1016/j.ejrad.2017.07.020.
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 grayscale and color doppler ultrasonography. *J Chin Med Assoc.* 2009;72:307–315. doi: 10.1016/S1726-4901(09)70377-6.
5. Church D, Krumme J, Kotwal S. Evaluating Soft-Tissue Lumps and Bumps. *Mo Med.* 2017;114(4):289-94. PMC6140092 - Pubmed
6. Shah A, Parameswaran K, Robinson P, Rennie W. Non-Neoplastic Soft Tissue Tumors and Tumor-Like Lesions. *Semin Musculoskelet Radiol.* 2020;24(6):645-66. doi:10.1055/s-0040-1713606 - Pubmed