



ORIGINAL RESEARCH PAPER

Radiodiagnosis

SPECTRUM OF SOFT TISSUE MASS LESIONS ON USG

KEY WORDS: USG, Lymphangio , Hemangioma , Lipoma , Ganglion.

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ABSTRACT

Ultrasonography plays an important role in diagnosis of soft tissue lesions. Soft tissue lesions are common pathology involving all age population. Ultrasonography is an important, easily available and cost effective method for diagnosis of soft tissue lesions. Ultrasonography has also a real time evaluation advantage. Guided procedure or interventions can also be done with help of ultrasonography. A prospective study of 50 patients was done at B.J, Medical college , Civil hospital. Ahmedabad over the period of 6 months. Our study aims to illustrate the sonographic findings of clinically palpable soft tissue mass lesions for differential diagnosis of various lesions, to study nature, extent of lesion and its relationship to surrounding structures and to differentiate between pseudotumor and true mass lesion. To conclude, USG is the initial modality of choice in evaluating soft tissue lesions as It provides information about the basic nature of mass, its extent , vascularity and relationship to adjacent structures and it can guide biopsies , abscess drainage and determining the need and role of other imaging modalities. Though easy availability, cost-effectiveness & freedom for dynamic examination makes USG the first line modality of choice, MRI remains the gold standard investigation in diagnosis of soft tissue lesions.

I. INTRODUCTION

USG is the initial modality of choice in evaluating soft tissue lesions. Knowledge of basic anatomy and pathology of soft tissue and joint is necessary for soft tissue lesions evaluation. Ultrasonography provides information about the basic nature of mass, its extent , vascularity and relationship to adjacent structures. In addition it can guide biopsies, abscess drainage and determine the need and role of other imaging modalities. There are a number of soft tissue lesions with varied presentations.

USG is the initial modality for imaging of soft tissue lesions as it is easily available, has real time evaluation capability, cost-effective and allow sonographically guided interventions.

II. MATERIAL AND METHODS

A perspective random study of 50 cases of clinically palpable soft tissue lesions referred to the radiology Department of BJMC, civil hospital, Ahmedabad , Gujarat from Month May 2012 to July 2012 were evaluated by ultrasound using high frequency linear array transducers.

Study design: Prospective observational study

Study Location: Radiology department, B.J. Medical college, civil hospital, Ahmedabad. It is a tertiary care teaching institute.

Study duration: Month May 2012 to July 2012

Sample size: 50 patients

Sample size calculation: The sample size was estimated on the basis of a single proportion design. Patients were selected as per month's USG reference for soft tissue lesions.

Subjects and selection method: The study population was drawn from daily referral patients from different departments like medicine, surgery, obstetrics and gynecology department and orthopedics.

Inclusion criteria: all aged patients with soft tissue lesion referred to radiology department for ultrasonography

Exclusion criteria: None, except patient who does not give

consent to be included in study

Procedure Methodology: After written informed consent was obtained, detailed history of each patient was taken and then patients were taken for ultrasonography. Ultrasonography was done always in presence of an attendant, female attendant in case of female patients. High frequency linear array transducer was used for evaluation of superficial structures. In cases where evaluation of deeper structures is required, lower frequency probe was used. Scanning approach carries with location of the lesions. However, in most of the cases images obtained in longitudinal & transverse plane suffice. Dynamic assessment during contraction & relaxation of area of interest was done which helped in evaluating the relationship of lesion with underlying structures. The split-screen feature allows better visualization of larger lesions by doubling the field of view. Doppler assessment was done to evaluate perfusion of the lesion. The pathological diagnosis was obtained after subsequent surgery.

III. Results and Discussion

Appearance of different soft tissue lesions were studied after taking history. The pathological diagnosis of cases studied was vascular malformations (n=10), lipoma (n=6), lymphangioma (n=4), cystic hygroma (n=2), baker's cyst (n=4) , subcutaneous hematoma (n=3), intramuscular abscess (n=5) , ganglion (n=5) , tendon sheath GCT (n=2), tendon sheath hemangioma (n=1) , fibromyoxoma of axilla (n=1), rhabdomyosarcoma of foot (n=1), osteosarcoma with soft tissue extension (n=1) , skull metastasis with soft tissue extension (n=1) , macrodystrophia lipomatosa (n=1) , neurofibromatosis (n=1) , lymphangio-hemangioma (n=1) , desmoid tumor (n=1).

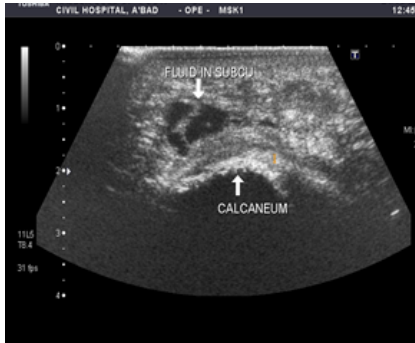
Non-Neoplastic lesions:

Haematoma: Haematomas have non-specific sonographic appearance. In early stages, they are hyperechoic, then hypoechoic and gradually become anechoic. They may contain internal echoes. And may be difficult to differentiate from abscess.^{1,2}

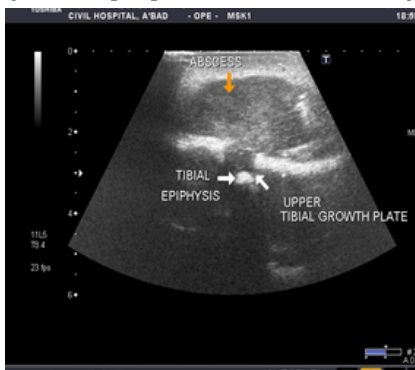
Subcutaneous hematoma near ankle joint appearing as well defined iso to hypoechoic lesion.



Subcutaneous fluid collection: Appears as hypoechoic collection within subcutaneous soft tissue.



Subcutaneous abscess: The sonographic findings may vary from diffuse thickening and echogenicity in early stage of cellulitis to hypoechoic collection when cellulitis develop in to abscess.³ On colour doppler study, there will be no internal vascularity, however peripheral increased vascularity is seen.³

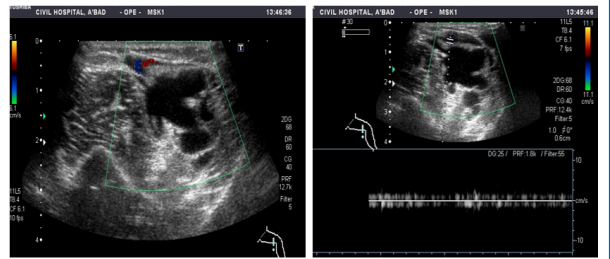


Baker's cyst: Fluid distension of a bursa between medial head of gastrocnemius & semimembranosus tendon via a communication with knee joint.⁴ On USG, appears as an anechoic mass with posterior acoustic enhancement that communicates with the knee joint cavity. May show calcified or loose bodies within. Absence of color flow on color doppler imaging.



Vascular Lesions :

Haemangioma: May be cavernous or capillary, cavernous hemangiomas being more common in adults. Intramuscular hemangiomas are mixed echogenicity ill defined lesions with few cystic foci whereas subcutaneous hemangiomas show more cystic & hypoechoic components. They show low velocity flow on color doppler study. Prominent vascular channels, phleboliths and fat can be seen within haemangioma.⁵



20 yrs female presented with painless swelling near elbow joint since birth with slight bluish discoloration over skin. The lesion was present in subcutaneous plane, septated, hypoechoic with cystic areas within and minimal flow on color doppler study.

Vascular malformations:⁶

Present since birth & enlarge in proportion to growth of child. Sub categorized as lymphatic, capillary, venous, arterial, arteriovenous or mixed.

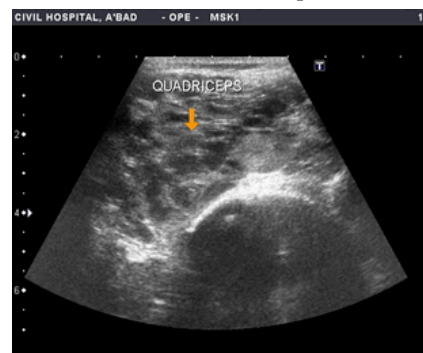
Differentiated from hemangiomas on the basis of clinical history, cellular turnover & histology.

Better classified as :

Slow flow malformations- Capillary, venous, lymphatic.

Fast flow malformations- Arterial & arteriovenous.

A 12 years old girl presented with swelling over anterior abdominal wall in right lumbar region. The lesion shows echogenic subcutaneous tissue with multiple anechoic vascular channels which show venous spectral waveforms.



A 14 years old boy with intramuscular vascular malformation near knee joint.

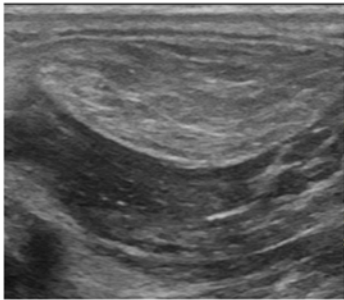
Lymphangioma: Sonography is used as a first investigation and modality of choice in case of soft tissue neck swelling.⁷

On Ultrasound, they characteristically appear as multicystic lesion with or without internal echoes. Septae can be thin or thick. Absence of internal or septal vascularity is suggestive of Lymphangioma.⁸



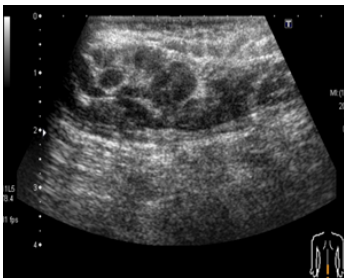
A 5 years old male child presented with a swelling over back of arm which on USG appeared as a multiseptated cystic lesion without any vascularity on color doppler study suggestive of Lymphangioma.

Lipoma : They are the commonest masses encountered. On ultrasonography , they are well defined hyperechoic lesions (may be iso or hypoechoic)⁹, non-compressible & do not show any internal vascularity. They can be located in any plane, subcutaneous, intramuscular or intermuscular. They are seen as encapsulated mass in subcutaneous fatty tissue.



Neurofibroma: Fusiform shaped benign peripheral nerve sheath tumors with nerve roots entering and exiting the extremities of lesion. Usually seen in children & young adults.

On USG, soft tissue neurofibromas appear as ill defined target like lesion with a subtle central hyperechoic region within the hypoechoic mass reflecting central fibrotic focus with surrounding myxomatous tissue with adjacent normal subcutaneous fat. Hypervascular on color doppler study.¹⁰



A 14 years old female presented with low backache and café au lait spots & axillary freckles and was clinically diagnosed as a case of neurofibromatosis . sonogram of lumbar region at back showed predominantly hypoechoic lesion with hyperechoic areas within.

Desmoid: A desmoid tumor arises from the fascia or the muscle aponeurosis . It often develops at the site of a previous surgical scar . Non inflammatory fibroblastic tumor with a tendency for local invasion & recurrence.

On USG, appear as homogeneously anechoic or hypoechoic masses with a smooth well defined margins.¹¹

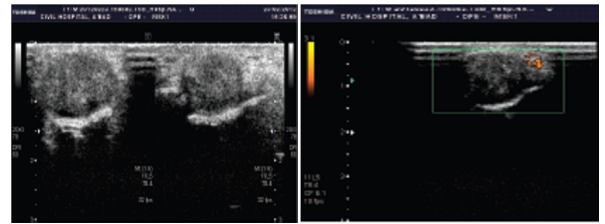


Tendon sheath giant cell tumour: Idiopathic proliferative lesions arising from tendon sheath.

Pathologically are identical to pigmented villonodular synovitis.

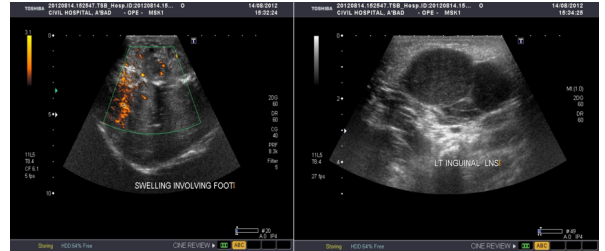
Typically present in hand with localised swelling with or without pain usually in females of 3rd to 5th decade. They involve volar surface more common than dorsal surface.¹²

On USG, appear as well defined hyperchoic or may be hypoechoic lesions¹² in relation to tendons with peripheral vascularity.



Rhabdomyosarcoma: Malignant tumors of muscle like appearance arising from primitive mesenchymal cells committed to skeletal muscle differentiation. Can be found anywhere, predominantly in head & neck and pelvis.

On USG, appear as heterogenous well defined irregular masses with low to medium echogenicity and show vascularity within on doppler study.¹³



Macrodystrophia Lipomatosa : A very rare congenital condition characterized by deposition of fat in the soft tissues of hand or foot along the nerve territory associated with hypertrophy of phalanges and affected limb. Commonly involves hands & feet and may extend to involve the proximal limb. Present with gigantism of hands or feet or an entire limb since birth.



IV. CONCLUSION

USG is the initial modality of choice in evaluating soft tissue lesions and provides information about the basic nature of mass, its extent , vascularity and relationship to adjacent structures. In addition it can guide biopsies , abscess drainage and determining the need and role of other imaging modalities. Though MRI remains the gold standard in evaluation of soft tissue lesions, easy availability, cost-effectiveness & freedom for dynamic examination makes it the first line modality of choice.

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