

## Ultrasound Evaluation & Characterization of Lumps & Bumps in Region of Foot & Ankle

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### Abstract

**Introduction:** Musculoskeletal ultrasound is a very dynamic, cost effective & powerful tool for the evaluation of lumps & bumps in the region of foot & ankle. We present a case series of 56 patients with ultrasound findings in various 'lumps & bumps' in the region of foot & ankle.

**Aims & objective:** In this study we planned to evaluate and characterize 'lumps & bumps' in the region of foot & ankle with USG examination.

**Material & method:** The present study was conducted in the Department of Radio-diagnosis, TMMC & RC, Teerthanker Mahaveer University, Moradabad. Patients under study were referred from the department of Surgery and Orthopaedics. Patients included for study were evaluated by Clinical and Ultrasound examination.

**Result:** On examination distribution of lesions was found to be ganglion(36%), bursa related(24%), tendon and ligament related(14%), synovium related(4%), Inflammatory/Infective(4%), bony lesions(6%), vascular(4%), fatty lesions(4%) & foreign body related(4%).

**Conclusion:** Musculoskeletal ultrasound is a very dynamic and powerful tool for the evaluation of lumps & bumps in the region of foot & ankle. It is easily available & provides the option of real time & dynamic imaging of the joints & tendons as well as it helps in the assessment of vascularity of the lesion. MRI cannot be replaced by Ultrasound. However, USG should be the primary investigation for the evaluation and characterization for the 'lumps & bumps' in the foot & ankle region.

**Key Words:** Musculoskeletal, Ultrasonography, lumps & bumps, foot and ankle.

### Introduction:

Musculoskeletal Ultrasound is used very frequently in evaluation of lumps present in the region of foot & ankle. Foot contains relatively small amount of soft tissue and rich in ligaments, tendons, fasciae, synovial & subcutaneous tissues. Because of the compact anatomy of foot, lumps in the foot & ankle region usually present at earlier stage.<sup>1</sup> Ultrasound is easily available & cheap modality. On the other hand, it provides the real time and dynamic imaging of the ligaments & joints.<sup>2-6</sup> Color & power Doppler are the other tools available to assess vascularity of the lesions simultaneously.<sup>7</sup> Comparison with the other

ankle & foot is also helps in evaluation & characterization of the swelling.<sup>8</sup>

MRI evaluation & Histopathological confirmation might be needed for further evaluation & can not be replaced by Ultrasound. However, USG should be the primary investigation for the evaluation of lumps in the region of foot & ankle.

### Material & Method:

The present study was conducted in the Department of Radio-diagnosis, TMMC & RC, Teerthanker Mahaveer University, Moradabad. Patients under study were referred from the

department of Surgery & Orthopaedics. Patients included for study were evaluated by Clinical and Ultrasound examination.

**Patient Evaluation:** Patients were evaluated along the following lines.

**A. Clinical Examination:** A detailed clinical case history was taken from all cases and through general physical and local examination were carried out.

**B. Radiological Evaluation:**

**Ultrasonography:** High-resolution real time sonography of the lumps & bumps of foot & ankle

was done in all patients. Scanning done with 7-10 MHz transducers on MEDISON Diagnostic ultrasound system installed in Department of Radio-diagnosis, TMMC & RC, TMU, Moradabad. The sonographic examination of the foot was performed via medial, lateral & dorsal approach with patient in supine position & for posterior ankle & tendo-achilles complex in prone position(2-4,9). Color Doppler(CD) & Power Doppler (PD) also used for assessment of vascularity of the lesion. Joints, ligaments & tendons were evaluated dynamically as well, to assess subluxation, dislocation & tear.

## Results:

**Table-1: Lesion Detection in 56 Patients on USG Examination in Foot and Ankle Region**  
(Number of Patients) N = 56

Nature of lesion	No. of Cases
Lesions	50
Indeterminate	02
Normal	04

**Table-2: Ultrasonic Characterization of 50 Lesions in Foot and Ankle Region**

(Number of Lesions)

N = 50

Nature of lesion	No. of Cases	Percentage
Ganglion	18	36
Bursitis	12	24
Tendon & ligament related		
Tenosynovitis	04	08
Tendon subluxation /Rupture	02	04
Tendinopathy	01	02
Bony lesion	03	06
Synovial	02	04
Abscess/Cellulitis	02	04
Foreign body related	02	04
Fatty lesion	02	04
Vascular malformation	02	04
<b>Total</b>	<b>50</b>	

**Discussion:**

In our series, 56 patients with complaints of lumps & bumps in foot & ankle region were assessed. Mostly patients presented with clinical features of lumps/swelling, pain, paresthesia, restricted mobility and combination of these complaints.

Out of 56 patients, lesions were detected in 50 patients on ultrasound examination, while 4 patients were normal on clinical & ultrasound examination and two patients were with indetermined lesions on USG. Ganglions were the largest group, representing 36% (18 out of 50) of lesions. On ultrasound it

showed a typical well-defined uni/multilocular anechoic cystic lesion with posterior acoustic enhancement debris within, & closely approximated with tendon sheath and joint. Septations and internal echoes were noted in complex ganglion lesions. On CD & PD, mostly lesions present with increased peripheral vascularity.

Bursitis comprised 24% (12 out of 50) of lesions. On ultrasound it showed anechoic/hypoechoic lesions within normal bursa at typical locations i.e. Inter metatarsal, retrocalcaneal or at friction sites. Related bursal wall thickness were increased or normal in

cases with acute presentations. However, it is increased in chronic Bursitis. Few lesions showed internal septations, echoes & wall calcifications. On CD & PD mostly lesions present with increased peripheral vascularity. Air shadowing was also noted along with inflammatory changes within bursa suggestive of superadded infections.

Tendon & ligament related lesions comprised 14% (7 out of 50) of all lesions. Out of which 4 lesions turned out to be Tenosynovitis, 2 lesions with tendon subluxation/Rupture related with history of trauma and 1 lesion out of 7 showed changes of Tendinopathy. On ultrasound it showed low echogenicity, swelling, fibers disruption and calcifications along with increased or normal vascularity.<sup>10-12</sup>

Three out of fifty lesions(6%) were turned out to be related with bony pathology, comprised of osteophytes, callus due to stress fracture and exostosis ,and were confirmed with X-Ray foot & ankle examination.

Two out of fifty (4%) lesions showed synovial pathology and were present with past history of rheumatoid arthritis. On ultrasound there were presence of joint effusion and heterogeneous synovial proliferation at metatarso-phalangeal and proximal inter-phalangeal joints. These patients were also examined by X-Ray of foot & ankle & confirmed on serological marker examination.

Two out of fifty (4%) lesions turned out to be abscess/cellulitis of inflammatory/infective nature. On ultrasound it showed soft tissue swelling, edema & air shadowing along with increased vascularity on CD & PD.

Two out of fifty lesions (4%) were with suspected foreign body with history of thorn prick in sole of foot, showed echogenic lesion with posterior acoustic shadowing & hypochoic rim along with associated inflammatory soft tissues changes. Foreign bodies

were detected, marked and were evaluated for the depth from surface.

Two out of fifty (4%) lesions showed fatty nature. On ultrasound showed well-defined echogenic masses and were confirmed on histopathology.

Two out of fifty (4%) lesions turned out to be of vascular nature, showed multiple vascular channels with arterial and venous flow on CD & PD along with associated soft tissue swelling in the region.

### Conclusion:

Musculoskeletal Ultrasound is a very dynamic and powerful tool for the evaluation of lumps & bumps in the region foot & ankle. Most of the soft tissues in foot and ankle region can be easily evaluated by ultrasonography. The advantages of USG include good availability, cheaper, fast, with no ionizing radiation, and it provides real-time and dynamic imaging of the ligaments and tendons of the joints. As well as it helps in the assessment of vascularity of the lesion. MRI cannot be replaced by Ultrasound. However, USG should be the primary investigation for the evaluation and characterization for the 'lumps & bumps' in the foot & ankle region.

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