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Hope Werenski, Kristy Ford, Dillon Casey, Casey Glass & Jacob Schoeneck

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CASE REPORT Open Access

Abscess pulsatility: a sonographic sign of osteomyelitis

Hope Werenski[1], Kristy Ford[1], Dillon Casey[1], Casey Glass[1] and Jacob Schoeneck[1*]

Abstract

Introduction Early diagnosis and aggressive treatment of acute osteomyelitis may improve prognosis and prevent further complications. Sonography is useful in the evaluation of osteomyelitis. It can demonstrate early signs of inflammation, such as soft tissue changes near the affected bone, periosteal thickening, periosteal elevation, and subperiosteal abscess.

Case presentation A 68-year-old female presented to the emergency department with 3 weeks of worsening left lower extremity pain. She was initially seen by urgent care for left shin erythema and swelling and treated for cellulitis with intramuscular ceftriaxone without improvement. On presentation, she was afebrile and hemodynamically stable with erythema, swelling, and tenderness of the left pretibial soft tissues. Her labs revealed leukocytosis and elevated inflammatory markers. Point-of-care ultrasound demonstrated a bidirectional flow of fluid through a disruption in the bone cortex visualized on greyscale imaging and confirmed with color and spectral Doppler. The patient was diagnosed with osteomyelitis and treated with antibiotics and incision and drainage by orthopedic surgery.

Discussion The unique sonographic finding of pulsatile flow of fluid within an abscess near bone has not been previously described in the literature. The presence of Doppler signal in any fluid other than blood is known as pseudoflow. The presence of pulsatility in this case, which could represent either blood or pseudoflow, drew the ultrasound operator's eye to the cortical defect and lead to the diagnosis of osteomyelitis.

Conclusions The sonographic finding of pulsatility in an abscess near bone should raise the concern for communication with the medullary cavity.

Keywords Case report, Ultrasound, Soft tissue infections, Osteomyelitis

Fig. 1 External appearance of the patient's lower extremity demonstrating swelling and erythema

Fig. 2 Plain radiograph of the patient's left lower extremity demonstrating focal soft tissue swelling overlying the anterior aspect of the tibia

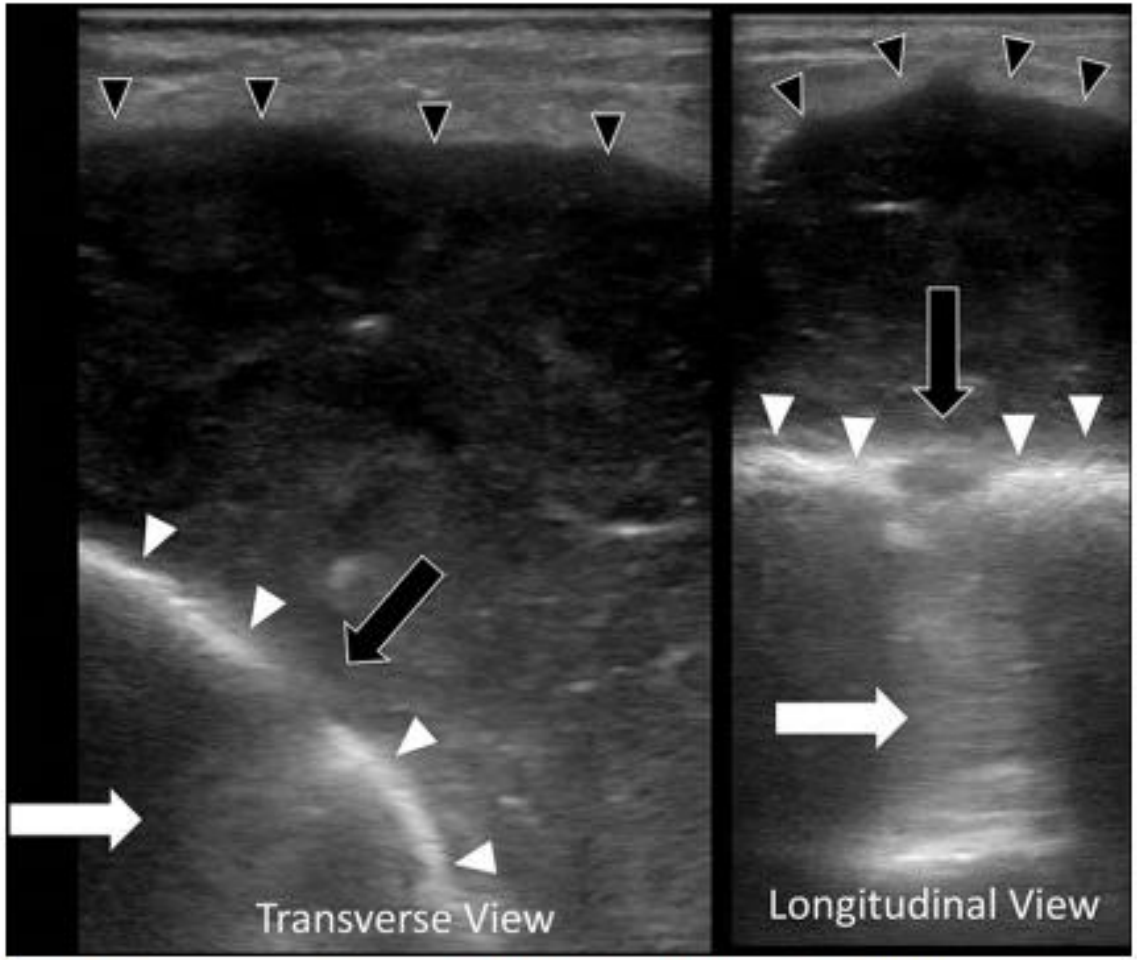

Fig. 3 Point-of-care ultrasound demonstrating a heterogeneous hypoechoic fluid collection (black arrowheads) adjacent to the tibial cortex (white arrowheads). There is a defect in the cortex (black arrow) with fluid communicating into the medullary cavity (white arrow)

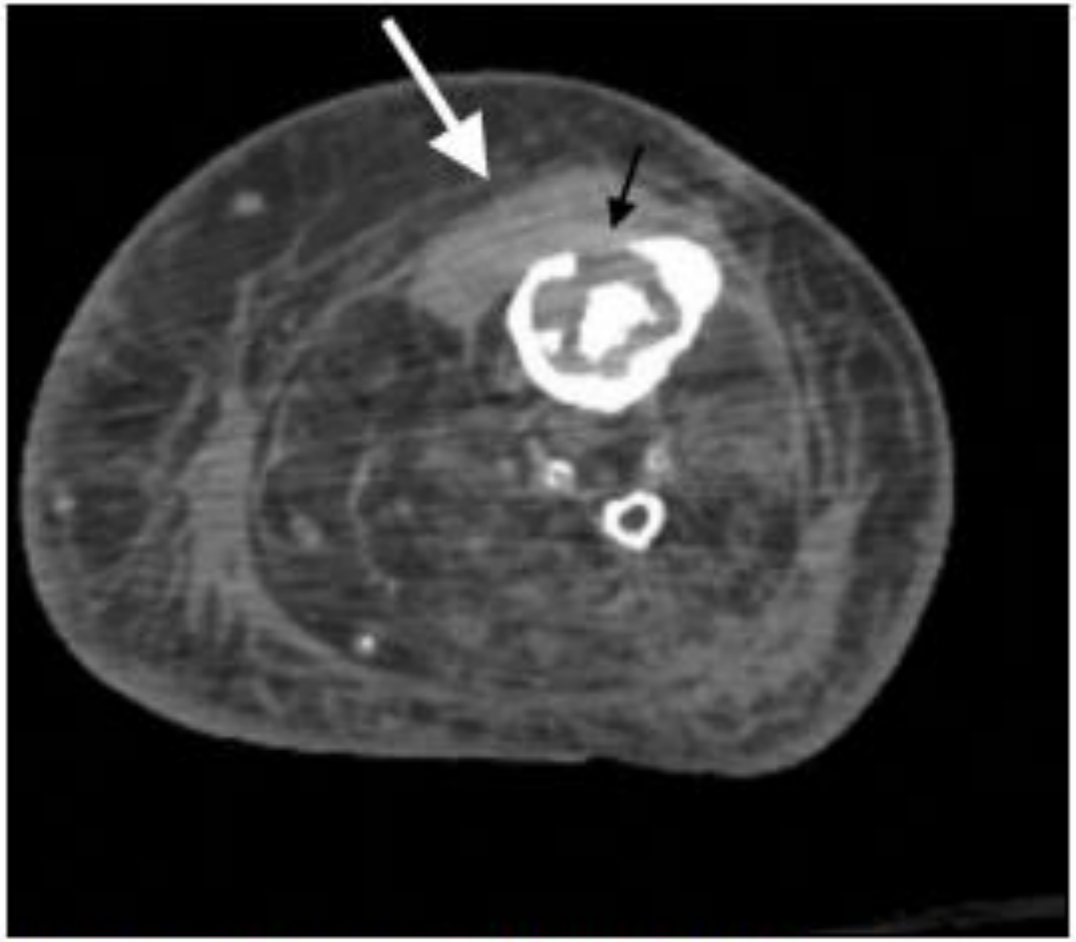

Fig. 5 Computed Tomography of the patient's left lower leg demonstrating a fluid collection adjacent to the tibia (white arrow) with erosion through the cortex (black arrow)

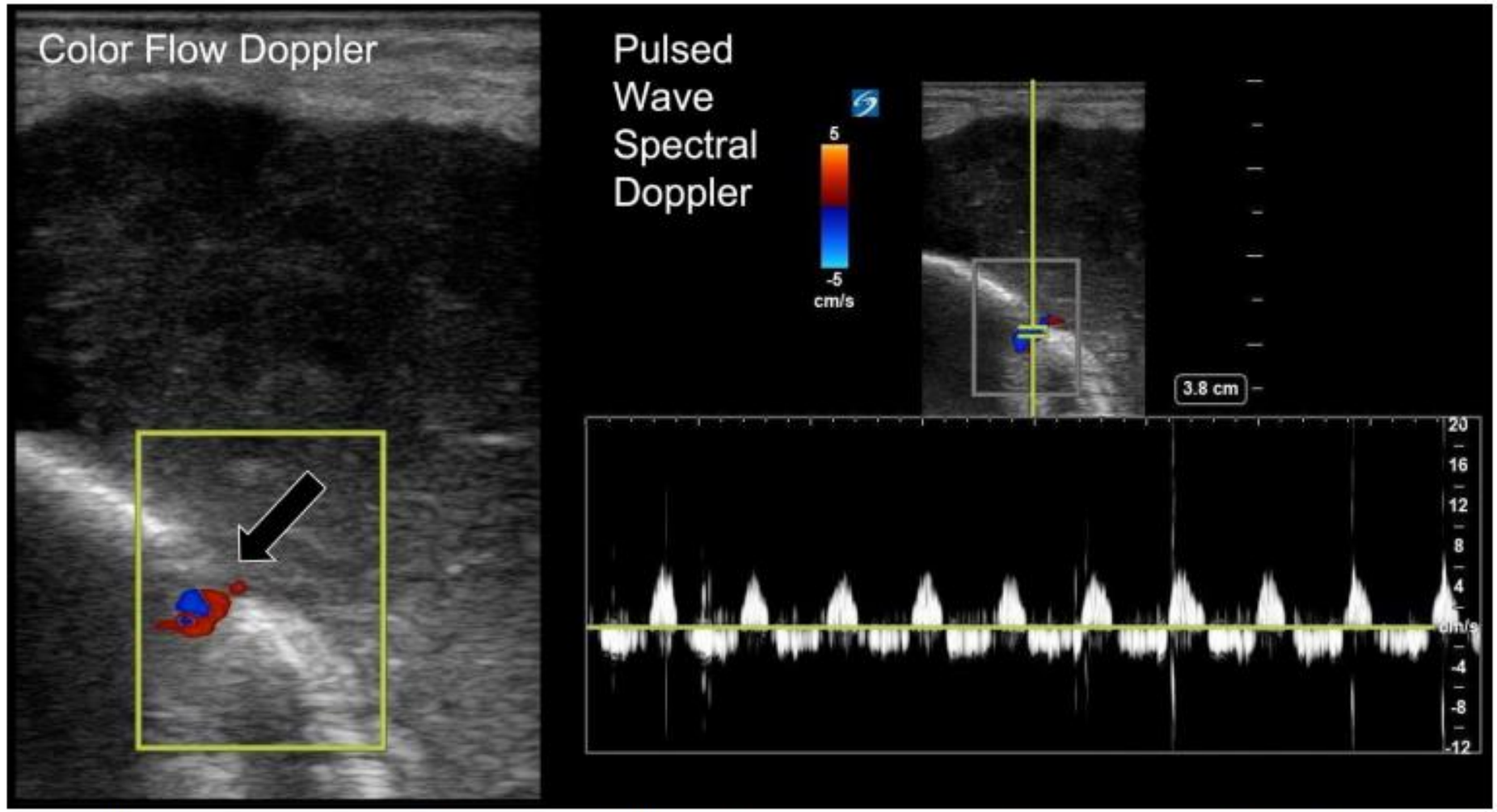

Fig. 4 Point-of-care ultrasound demonstrating alternating color flow and pulsed wave spectral Doppler through the cortical defect (black arrow)

Pulsatile flow or
pseudoflow in an abscess near bone should raise the concern
for communication with the medullary cavity, prompting a search for
cortical defects and obtaining more advanced imaging.

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Case Report

Sonographic Features of a Tuberculous Cold Abscess: A Case Report and Literature Review

Amir Alzarrad*; Salman Naeem, MBBS PG cert; Serena Rovida, MD

Barts Health NHS Trust, Emergency Department, London, United Kingdom

Abstract

The use of point of care ultrasound (POCUS) to aid diagnosis of tuberculosis has been investigated in countries where concomitant endemic prevalence of HIV increases the incidence of extrapulmonary tuberculosis (EPTB). In such cases, using a focused assessment with sonography for HIV-associated tuberculosis (FASH) scan has found to be immensely advantageous as a rapid diagnostic tool in low resource settings where other imaging modalities are scarce. The prevalence of EPTB in immunocompetent patients in industrialised countries is growing. Since EPTB can manifest itself in almost any part of the human body, symptomatic patients present with constitutional and non-specific symptoms. In our case, a 44-year-old male presented to the emergency department (ED) with a 3-month history of left-sided chest pain and swelling of the chest wall. Clinical examination revealed a swollen and tender lump above the left first rib. Palpation of the thoracic (T7) vertebral body demonstrated localised pain. POCUS showed a collection of heterogenous material with fluid content and specks of hyperechoic 'ring-like' structures. Further investigations led to the diagnosis of EPTB. The patient was admitted and treated for EPTB where he went on to make a full recovery. This case report highlights the role of integrating POCUS in clinical examination of patients with suspected EPTB, which can expedite its diagnosis and management.

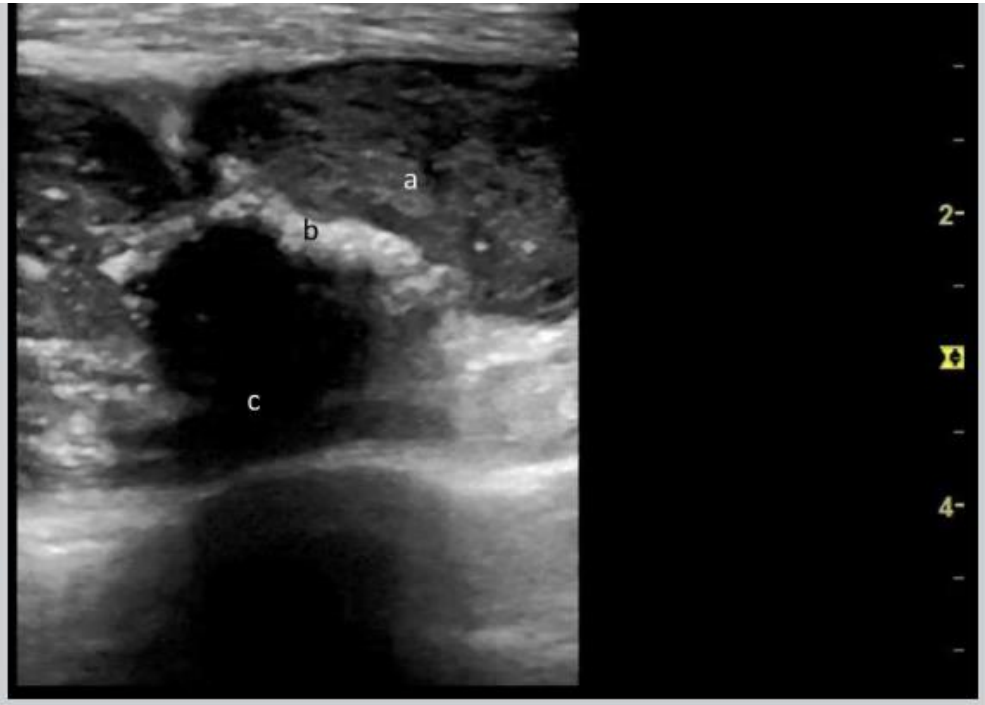

Figure 1. A sonographic image of the cold abscess using a 12 MHz linear probe showing heterogenous fluid collection (a) in the pectoralis major on the left hemithorax. Thickened periosteum of the first rib (b) with break in the cortex representing osteomyelitis. There is posterior acoustic shadowing below the first rib (c).

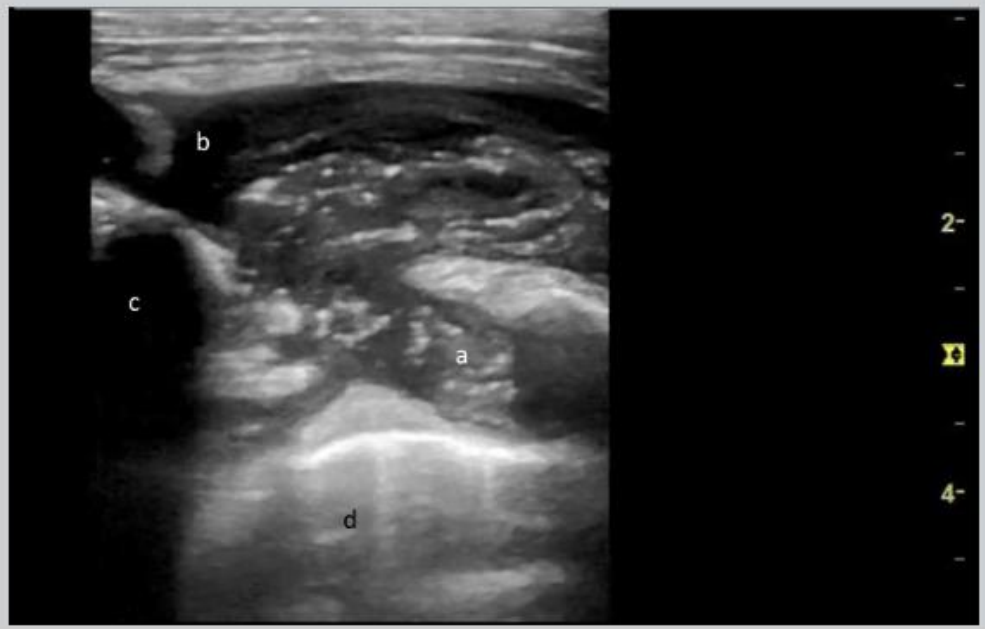

Figure 2. A sonographic image of the cold abscess using a 12 MHz linear probe showing fluid collection of mixed echogenicity. There are 'ring lesions' (a) with hyperechoic irregular margins and relatively hypoechoic centre which might represent caseous lymph nodes. There is anechoic fluid (b) and posterior acoustic shadow of the first rib (c) with under lying lung (d).

Figure 3: Axial view of the plain CT thorax showing low density collection in the pectoralis major muscle of the left hemithorax (a) with underlying costochondral junction showing break in cortex (b).

In this case, the sonographic and clinical findings of cold abscess along with constitutional symptoms were consistent with TB. POCUS of the cold abscess showed a fluid collection of mixed echogenicity along with ring-like structures with hyperechoic irregular borders and hypoechoic centres, representing caseating lymph nodes. These echogenic foci possibly represent caseating necrosis of lymph node and TB is one of the Figure 3: Axial view of the plain CT thorax showing low density collection in the pectoralis major muscle of the left hemithorax (a) with underlying costochondral junction showing break in cortex (b).

This case report highlights how integrating POCUS within clinical practicecan allow a physician to provide a more detailed evaluation of patients and test a suspected hypothesis, which as a result allowed the patient to have an expedited diagnosis and management of his disease.

JUM Journal of Ultrasound in Medicine

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Original Article

Volume Effect of Nerve Hydrodissection for Carpal Tunnel Syndrome: A Prospective, Randomized, and Single-Blind Study

Chien-Yao Huang MD, Chia-Ying Lai MD, Kenneth Dean Reeves MD, King Hei Stanley Lam MBBS, MSc, Tsung-Ying Li MD, Chin-I Cheng PhD, Yung-Tsan Wu MD

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The study was supported by the Ministry of Science and Technology, Taiwan, Republic of China (grant no. MOST 107-2314-B-016-044). The authors are grateful to Ying-Vonne Shen who help tract the study patients and enabled the completion of this study.

Abstract

Objectives

This study compared ultrasound-guided nerve hydrodissection (HD) outcomes using two commonly used injectate volumes (10 and 5 mL) of normal saline to explore if there is a volume effect of HD for patients with moderate carpal tunnel syndrome (CTS).

Methods

Twenty-four participants were randomly assigned to treatment with HD using ultrasound-guidance and either 10 mL or 5 mL of normal saline (HD-10 and HD-5 groups respectively). Our primary outcome measures were the change scores of the two subscales of the Boston Carpal Tunnel Syndrome Questionnaire: The Symptom Severity Scale (SSS) and Functional Status Scale (FSS). We conducted a one-way repeated analysis of variance for 3 time points (4, 12, and 24 weeks) for both SSS and FSS, respectively, for change scores from time 0, and percentage change from time 0.

Results

All participants (n = 12 per group) completed the study. From 0 to 24 weeks the HD-10 group outperformed the HD-5 group for improvement in SSS (median ± IQR; −0.8 ± 0.4 versus −0.5 ± 0.5; $P = .024$) and FSS scores (mean ± SD; −0.8 ± 0.2 versus −0.5 ± 0.5; $P = .011$). The HD-10 group improvement in FSS subtest significantly exceeded the MCID percentage-change-based threshold of 27% (34%; $P = .039$).

Conclusions

Despite the limitations of small study size, a largely inert injectate, and a single injection approach, these findings in favor of the 10 mL group suggest that the volume used for ultrasound-guided HD in moderate CTS matters, and a higher volume is more effective.

Outline

Images

Ultrasound Imaging in a Woman with Lateral Heel Pain

Lee, Wei-Chun[1,2]; Chen, Pei-I[1,2]; Lin, Hong-Yi[1,2,*]

Author Information

Journal of Medical Ultrasound 31(3):p 258, Jul–Sep 2023. | **DOI:** 10.4103/jmu.jmu_213_21

Case

A 47-year-old woman dancer presented with right lateral heel edema and pain with a numbness sensation. The range of motion of her right ankle was normal. She had not previously undergone any surgery on the affected ankle. The physical examination revealed a right lateral heel mass at the posterior talus–calcaneus junction. The mass was characterized by a mild numbness sensation upon palpitation, which radiated to the lateral heel and foot. She underwent an ultrasound examination [Figure 1]. Figure 1a was obtained by placing the transducer between the peroneus muscle and Achilles, where the small saphenous vein and sural nerve are present. The subsequent ultrasound image revealed the long and short axis of a portion of the sural nerve [Figure 1b and 1c]. Magnetic resonance imaging was performed for further evaluation and localization [Figure 2].

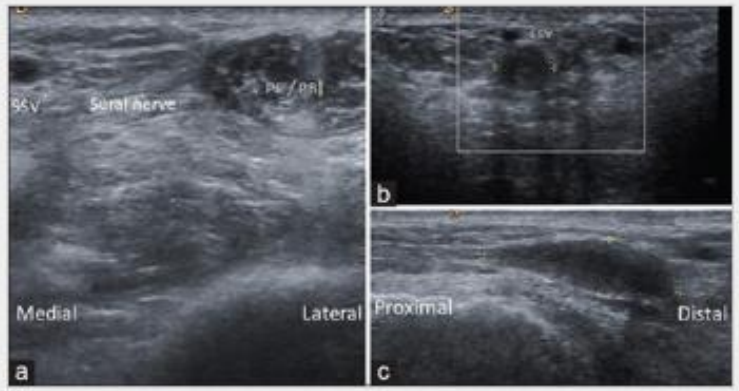

Figure 1: (a) Was obtained by placing the transducer between the peroneus muscle and Achilles tendon where small saphenous vein and sural nerve just there. (b and c) are ultrasound images of the long axis and short axis of part of the sural nerve. SSV: Small saphenous vein, PL: Peroneus longus muscle, PB: Peroneus brevis muscle

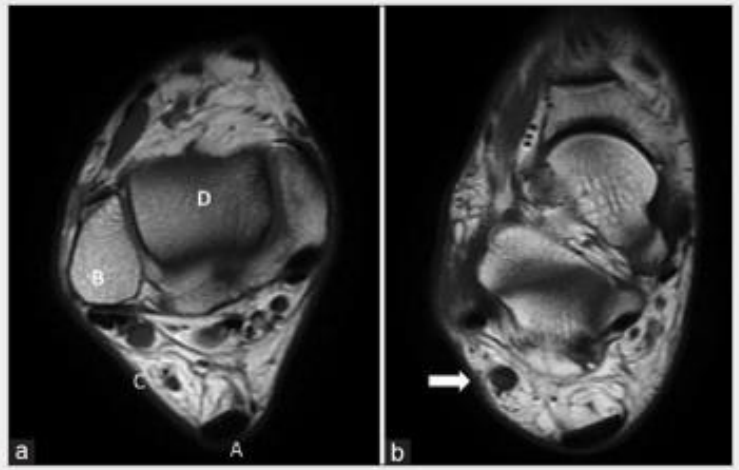

Figure 2: (a) A: Achilles tendon, B: Lateral malleolus of the fibula bone, C: Sural nerve and small saphenous nerve, D: Tibial bone. (b) Magnetic resonance imaging long axis T1 FSE signal revealed an enlarged part of sural nerve compared to Figure 2

Case File

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Acute Upper Extremity Arterial Occlusion Diagnosed on POCUS in the Emergency Department

Derrick Huang, MD[1]*; Jacob Ruzicka, MD[1]; Leoh León, MD[1,2]; Latha Ganti, MD, MS, MBA, FACEP[1,3]

(1) University of Central Florida College of Medicine/HCA Emergency Medicine Residency Program of Ocala at HCA Florida Ocala Hospital, Ocala, FL, USA
(2) Emergency Ultrasound Director at Emergency Medicine Residency Program of Ocala at HCA Florida Ocala Hospital, Ocala, FL, USA
(3) Research Director at Emergency Medicine Residency Program of Ocala at HCA Florida Ocala Hospital, Ocala, FL, USA

Abstract

Upper extremity acute limb ischemia (ALI) is a limb-threatening and potentially lethal pathology that is most commonly caused by vascular embolization. Outcomes of limb ischemia are time-sensitive due to the correlation between a longer time from symptom onset to intervention with a vastly higher risk of amputation. In this report, point of care ultrasound (POCUS) was utilized to rapidly diagnose a patient with a proximal right brachial artery embolic occlusion, prompting expedited surgical consultation and successful embolectomy. POCUS can provide a focused vascular examination of the limbs to expedite diagnosis of time-sensitive ALI and facilitate timely medical intervention and surgical consultation.

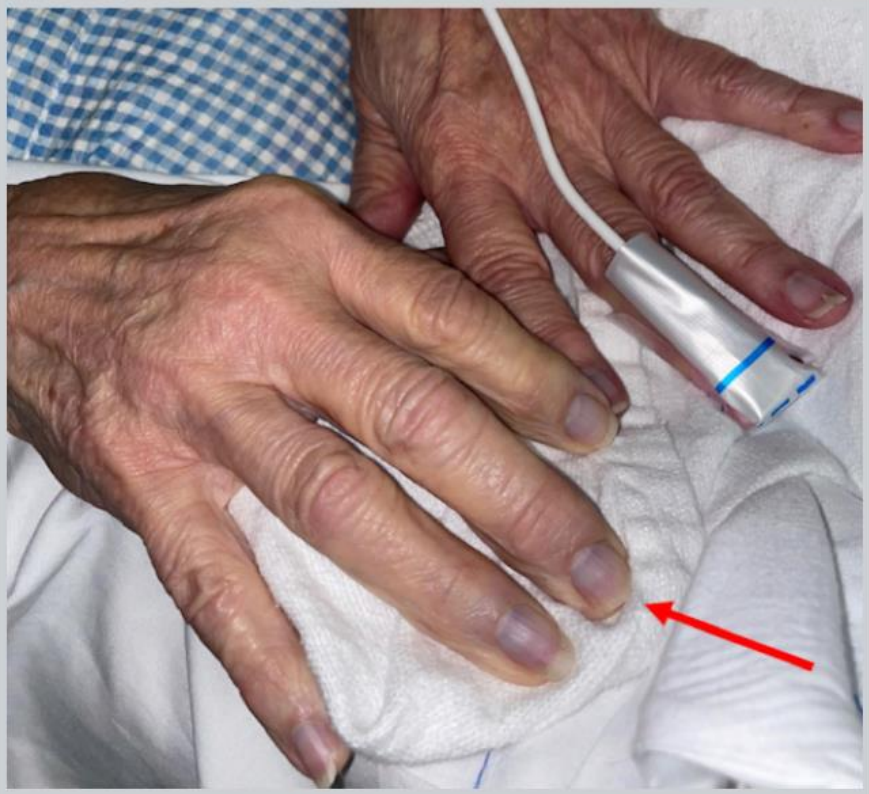

Figure 1. Finger tips of right hand with faint blue discoloration (red arrow).

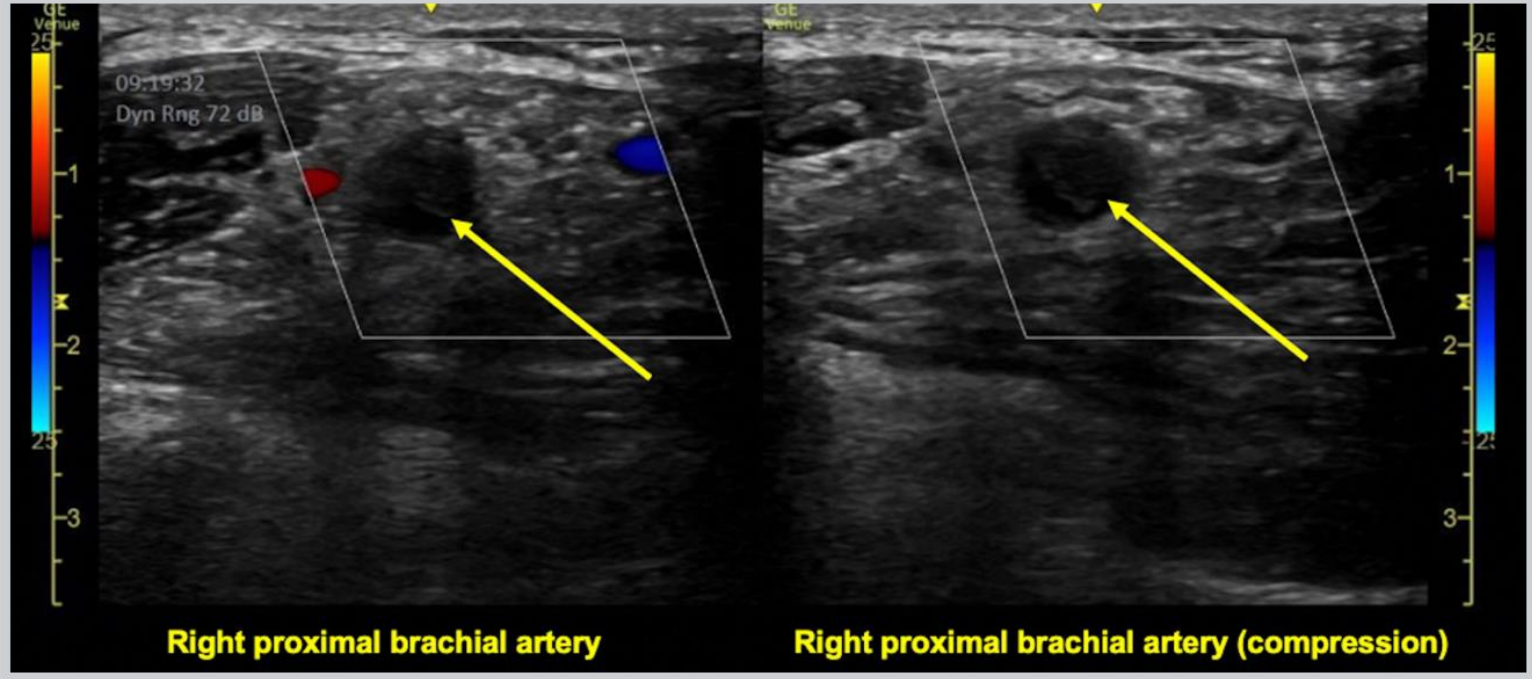

Figure 2. Point of care ultrasound with color Doppler mode in a transverse view utilizing a linear probe to visualize echogenic embolic material (yellow arrow) in the right proximal brachial artery, which was noncompressible and without any Doppler flow signal.

Figure 3. Point of care ultrasound in a longitudinal view utilizing a linear probe to visualize embolic material occluding the lumen of the proximal right brachial artery (yellow arrow).

Figure 4. CT angiography of the right upper extremity in the coronal plane. There is a filling defect seen in the proximal right brachial artery at the level of the right humeral neck characteristic of 3 cm embolus (yellow arrow). There is a small amount of flow around this embolus into the mid right brachial artery.

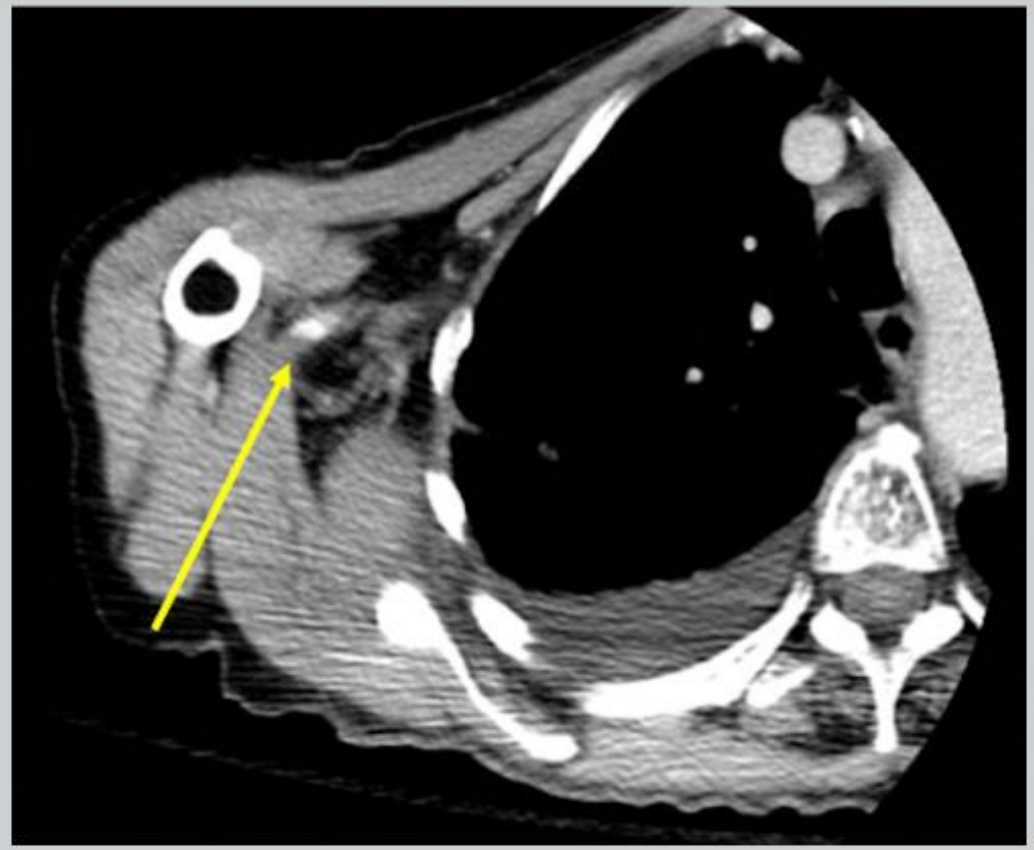

Figure 5. CT angiography of the right upper extremity in the axial plane. There is a filling defect seen in the proximal right brachial artery at the level of the right humeral neck characteristic of embolic debris (yellow arrow).

Delayed Iatrogenic Bladder Rupture Diagnosed by POCUS in the Emergency Department

Helen J. Lu, MD[1]; Edward H. Lee, MD[2]; Stephen Alerhand, MD[1]*

(1) Department of Emergency Medicine, Rutgers New Jersey Medical School; Newark, NJ, USA
(2) Department of Emergency Medicine, Hackensack University Medical Center; Hackensack, NJ, USA

Abstract

Bladder rupture is an uncommon injury that leads to significant morbidity and mortality. Though occurring mostly due to trauma, this life-threatening pathology may also occur spontaneously or after a procedure such as transurethral resection of bladder tumor (TURBT). Computed tomography (CT) cystography is the standard imaging modality for diagnosis. However, this test is unlikely to be ordered in a patient with undifferentiated abdominal pain unless there is specific suspicion for this diagnosis. In our emergency department, a 48 year-old male with history of bladder cancer and TURBT two weeks prior to arrival presented with severe abdominal pain and difficulty urinating for 3 days. Point of care ultrasound (POCUS) revealed an irregularly shaped bladder, likely site of bladder rupture, and large amount of abdominal free fluid with sediment. These findings prompted an expedited diagnostic CT scan with cystography. Emergent exploratory laparotomy ultimately confirmed a small bladder defect with 2.5 L of urinary ascites. The diagnosis of non-traumatic bladder rupture can be overlooked in patients presenting with a peritonitic abdominen. The typically ordered test for such patients is standard CT, which carries a high false-negative rate for bladder rupture. This case highlights the utility of POCUS in facilitating a rapid diagnosis.

Figure 1. Point of care ultrasound in transverse plane demonstrating an irregularly-shaped bladder filled with anechoic contents and floating sediment.

Figure 2. Point of care ultrasound in sagittal plane demonstrating the purported disruption in the hyperechoic bladder dome (red arrow).

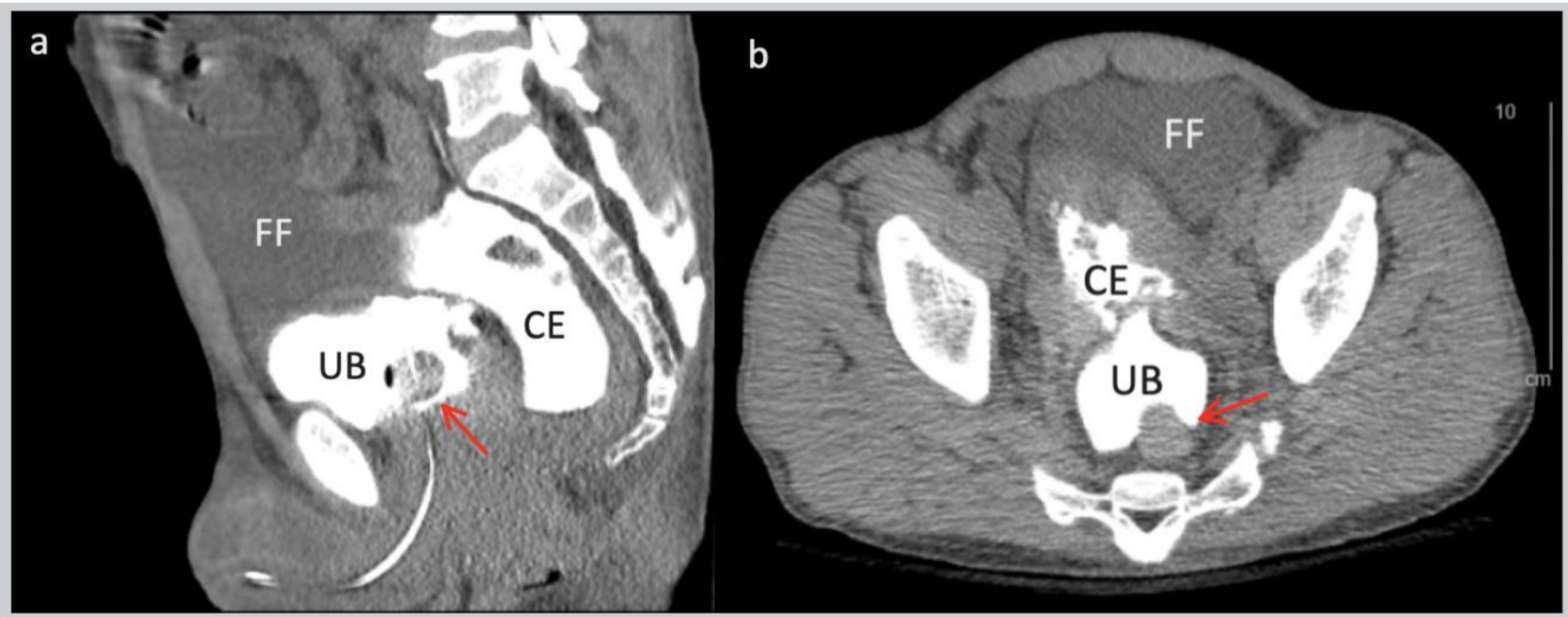

Figure 4. Computed tomography cystography demonstrating urinary contrast extravasation. In sagittal view (a), the Foley catheter appears filled with contrast. In both sagittal and axial (b) views, the catheter balloon (indicated by the red arrow) can be visualized within the urinary bladder (UB). Contrast extravasation (CE) can be seen emerging through the defect at the bladder dome and residing posteriorly in the supine patient. Eventually, the large amount of extravasated urinary contents has pushed the initial contents and free fluid (FF) into the anterior space as well.