

# Ultrasound in Emergency Medicine



## POINT-OF-CARE ULTRASOUND IN DIAGNOSING PYOMYOSITIS: A REPORT OF THREE CASES

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**Abstract—Background:** Pyomyositis is a bacterial infection of skeletal muscle that often results in deep intramuscular abscesses. The absence of external dermatologic manifestations in the early stages of pyomyositis makes this a challenging diagnosis. In addition, physical examination findings can be difficult to distinguish from more common processes, such as soft-tissue cellulitis. Clinicians can fail to diagnose this serious disease in a timely manner, resulting in delayed treatment and potential clinical deterioration from sepsis. Although advanced imaging modalities, such as computed tomography (CT) and magnetic resonance imaging (MRI) provide excellent detail, ultrasound (US) can also be used to detect this disease. US can be performed expeditiously at the bedside and is less expensive than CT or MRI. It allows the clinician to examine the deeper tissue planes of muscle, in which purulent fluid collections will develop as pyomyositis advances. **Case Report:** Three patients presenting with leg pain were evaluated with point-of-care (POC) US and diagnosed with pyomyositis. The early diagnosis of this condition prompted rapid treatment with administration of appropriate antibiotics and involvement of orthopedic surgery. Aspiration of fluid allowed for detailed fluid analysis and bacterial cultures. Additional diagnostic imaging was performed, confirming the initial

US diagnosis. **Why Should an Emergency Physician Be Aware of This?:** POC US can be helpful in identifying and further delineating intramuscular abscesses and can subsequently lead to expedited and appropriate care in patients who present with extremity pain, but lack significant dermatologic changes. © 2014 Elsevier Inc.

**Keywords—**pyomyositis; intramuscular abscess; muscle infections; point-of-care ultrasound

### INTRODUCTION

Pyomyositis is a rarely encountered deep infection of skeletal muscle. It is believed to be more commonly a result of a transient bacteremia, although contiguous bacterial invasion from a traumatic injury has been reported (1). The overall mortality reported in the literature ranges from 1.5% to 27%, and patients with comorbidities have higher mortality rates (2). Although most common in the tropics and in patients with human immunodeficiency virus (HIV), there are at least 250 documented cases since 1980 in the United States that are not HIV related. Reported underlying medical conditions include diabetes mellitus, malignancy, cirrhosis, rheumatologic conditions, and sickle cell disease (2). Of these conditions, diabetes was the most common predisposing factor (1). The relative immunocompromised state of these patients predisposes them to serious sequelae from pyomyositis,

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including joint invasion, sepsis, and even death. The treatment of pyomyositis includes the prompt administration of intravenous antibiotics and definitive surgical drainage.

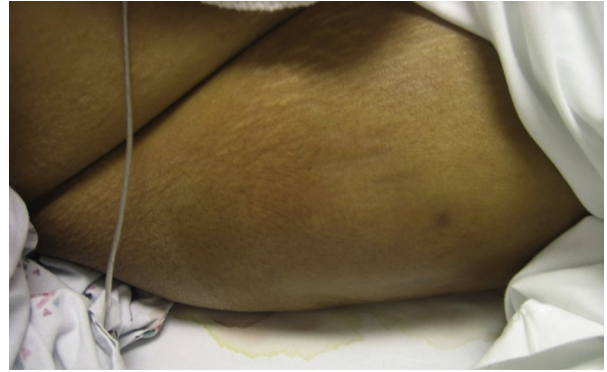
Although magnetic resonance imaging (MRI) and computed tomography (CT) scans are considered to be the diagnostic gold standards, point-of-care ultrasound (POCUS) can also be a useful diagnostic imaging modality. We report three cases of pyomyositis located in the quadriceps, including one case with an additional site in the leg. In all three cases, the use of US prompted rapid diagnosis, expediting appropriate treatment that included i.v. antibiotics and early surgical consultation.

## CASE REPORTS

### Case 1

A 61-year-old woman with poorly controlled non-insulin-dependent diabetes mellitus (NIDDM), cirrhosis, and obesity presented to the emergency department (ED) with right thigh pain, redness, and swelling. Of note, there was no history of trauma, i.v. drug abuse, or skin popping. She presented to her primary care physician, who referred her to the ED for evaluation of a presumptive right thigh abscess. She was afebrile and had no clinical evidence of sepsis. Examination revealed faint erythema and induration of the skin on the right proximal lateral thigh, with associated tenderness and edema (Figure 1). She had bilateral lower-extremity edema, which was worse in the right leg. Plain radiographs of the right femur were unremarkable. Laboratory results were significant for a nonreactive HIV test and a complete blood count with white blood cell (WBC) count of  $9200/\text{mm}^3$ , hemoglobin of 9.6 g/dL, and platelets of  $116,000/\text{mm}^3$ . C-reactive protein (CRP) was 20.4 mg/L and erythrocyte sedimentation rate (ESR) was 101 mm/h. Her blood glucose was 335 mg/dL. POCUS with a Micromaxx (SonoSite Inc, Bothell, WA) 10-MHz linear array probe of the right thigh showed a  $2 \times 4$  cm irregularly bordered, hypoechoic fluid collection with internal echogenicity and posterior acoustic enhancement located 1.5 cm deep to the skin and clearly within the muscle (Figure 2). The overlying soft tissue showed “cobblestoning,” indicating advanced tissue edema (Figure 3). The contralateral thigh had the US appearance of normal muscle (Figure 4).

Under US-guided needle aspiration, 13 mL cloudy yellow fluid was drained from the visualized intramuscular abscess. Orthopedic surgery was consulted for definitive care. An MRI of the leg showed myositis of the vastus lateralis muscle with a 1.3-cm fluid collection in the proximal and lateral aspect of the muscle, concerning for focal intramuscular abscess (Figure 5). Interest-

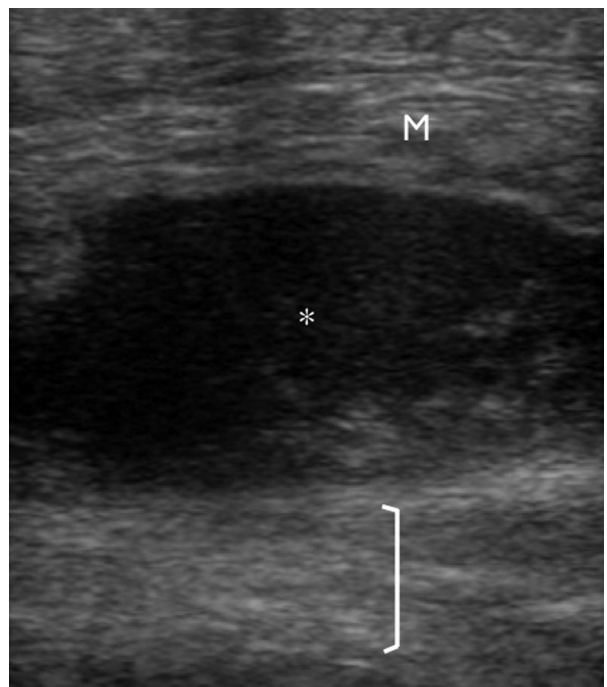


**Figure 1.** Picture of right thigh of patient without significant cutaneous evidence of infection. (Abdominal pannus is shown at the upper left of the picture, and thigh is in the center.)

ingly, cultures did not isolate a pathogen. However, the Gram stain demonstrated 3+ polymorphonuclear leukocytes. The patient was then managed by orthopedic surgery for definitive therapy of the abscess.

### Case 2

A 55-year-old man with poorly controlled NIDDM presented to the ED with right thigh and left lower-extremity pain. There was no history of trauma, i.v.



**Figure 2.** Ultrasound image of right thigh. Large hypoechoic area (\*) within muscle (M) with internal echogenic foci suggestive of debris demonstrates posterior acoustic enhancement (bracket), confirming the presence of fluid (or pus in this case).

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