

A 93-Year-Old Man With Submassive Pulmonary Embolism and Fall



Kevin C. Proud, MD, FCCP; Moezullah Beg, MD; and Nilam J. Soni, MD



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Physical Examination Findings

A 93-year-old man with a history of hypertension and stage 3 chronic kidney disease presented to the ED complaining of sudden onset shortness of breath and lightheadedness. He denied chest pain, fever, chills, or syncope. His BP was 107/53 mm Hg, and his heart rate was 87 beats per minute, and he was showing signs of respiratory distress with a respiratory rate of 32 breathes per minute and oxygen saturation of 83% on room air.

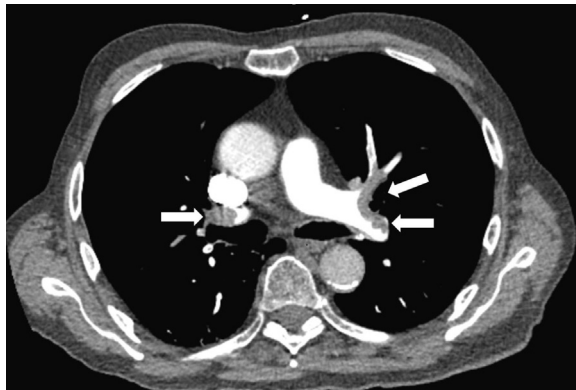


Figure 1 – Pulmonary emboli (white arrows) on CT. (Original: 251 × 169 mm [120 × 120 DPI].)

Diagnostic Studies

Laboratory studies were significant for a lactic acid of 3.8 mM (normal, 0.5 to 2.2 mM), a troponin I of 0.08 ng/mL (normal, <0.03 ng/mL), and a B-type natriuretic peptide level of 171 pg/mL (normal, 0-100 pg/mL). Given his respiratory distress and elevated lactate, a CT angiogram (CTA) of the chest was performed that revealed filling defects in both left and right pulmonary arteries that extended into the segmental branches (Fig 1). The CTA also showed evidence of right-side heart strain with severe right ventricular dilation (Fig 2). The diagnosis was a

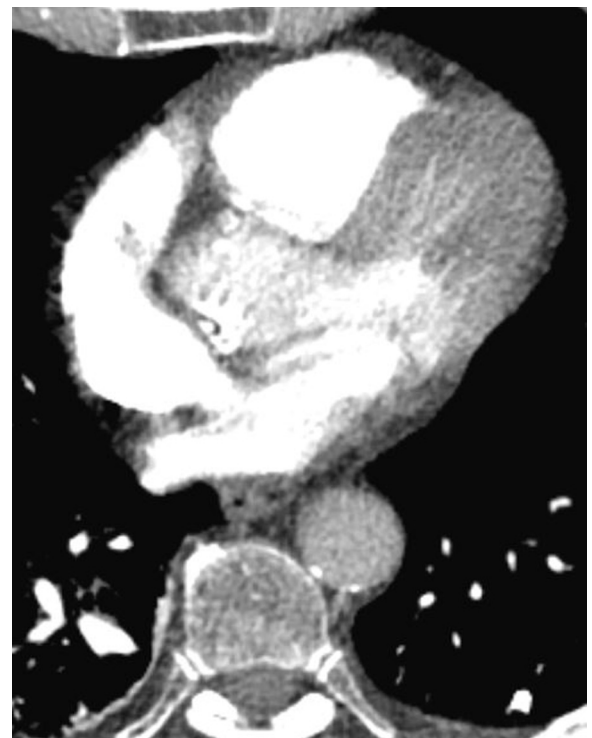


Figure 2 – Right ventricular dilation on CT. (Original: 103 × 161329 mm [120 × 120 DPI].)

AFFILIATIONS: From the Long School of Medicine at University of Texas Health San Antonio and South Texas Veterans Health Care System, San Antonio, TX.

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CORRESPONDENCE TO: Kevin C. Proud, MD, FCCP, 7703 Floyd Curl Dr, MC 7885, San Antonio, TX 78229; e-mail: proud@UTHSCSA.edu

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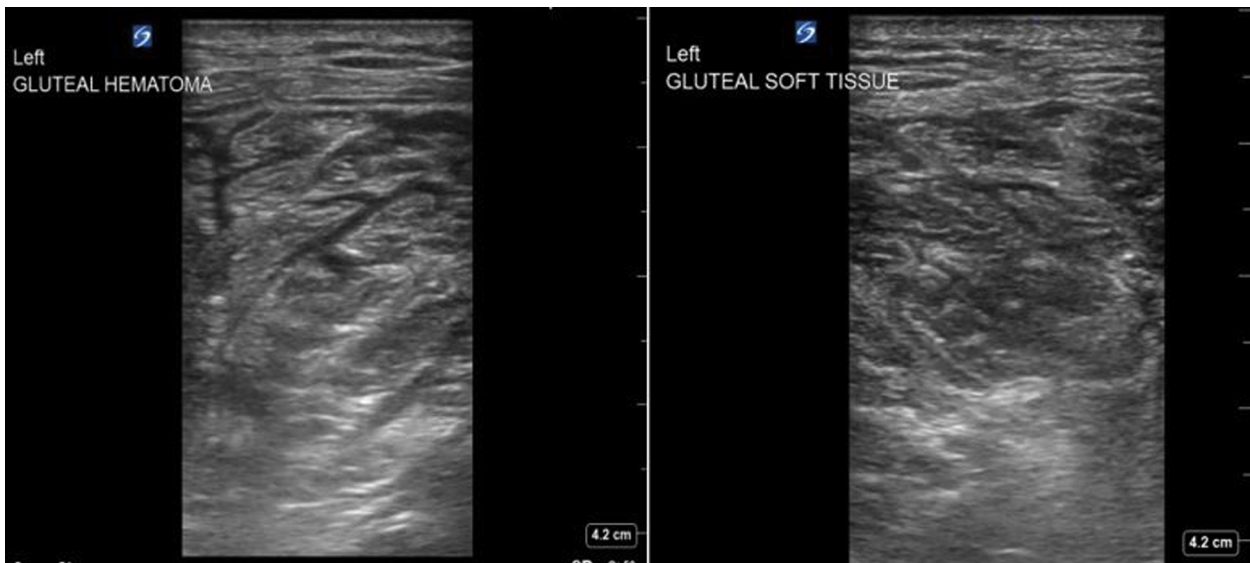


Figure 3 – Still images of gluteal hematoma. (Original: 162 × 73 mm [120 × 120 DPI].)

submassive pulmonary embolism; he was administered IV heparin and admitted to the medical ICU. Interventional radiology evaluated the patient and decided to proceed with catheter-directed thrombolysis. Before being transported to the interventional radiology suite, he complained of left gluteal pain. Further examination revealed a small area of swelling and tenderness over his left gluteus maximus muscle. He

recalled falling to the floor and hitting his buttocks prior to the admission.

A point of care ultrasound (POCUS) examination was performed. His cardiac POCUS examination at admission, although off axis and of limited quality (Videos 1 and 2), was consistent with a dilated and hypokinetic right ventricle. Taken in context with his

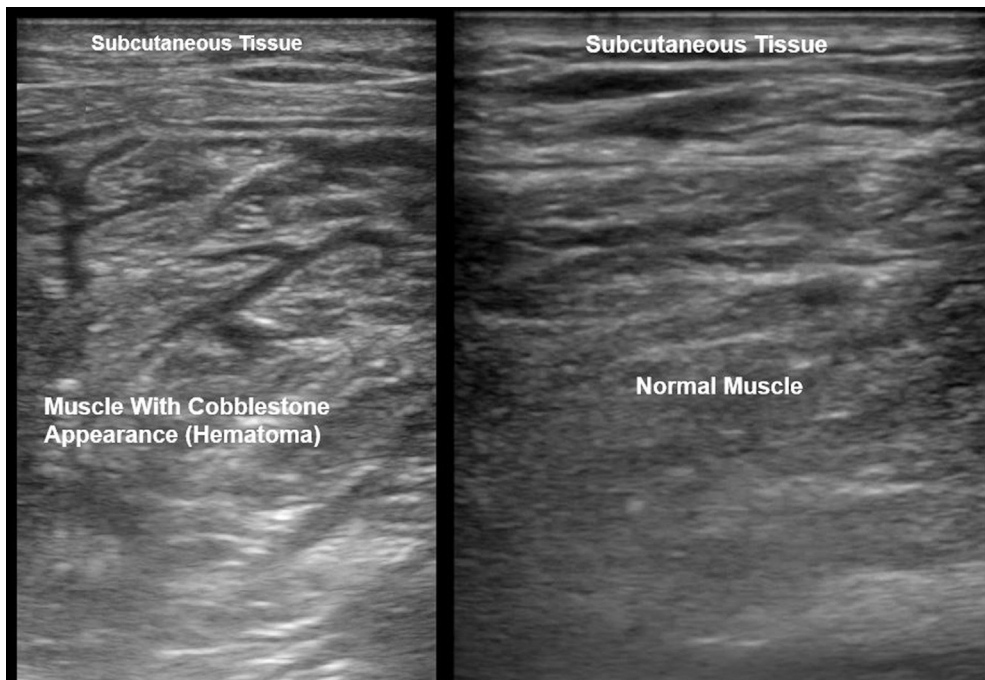


Figure 4 – Still image of soft tissue hematoma with cobblestone appearance, next to the patient's contralateral gluteal region, which appears normal. (Original: 193 × 133 mm [120 × 120 DPI].)



Figure 5 – CT scan of gluteal hematoma. The arrow designates the location of the hematoma. (Original: 208 × 122 mm [120 × 120 DPI].)

CTA findings, elevated troponin level, and elevated B-type natriuretic peptide level, it was believed to fit clinically with right-sided heart strain due to submassive pulmonary embolism. The POCUS examination of his gluteal region showed cobblestoning of the soft tissue and a small fluid collection that was concerning for an intramuscular (IM) hematoma (Video 3; Fig 3). The ultrasound examination of the patient's contralateral gluteal region was normal (Video 4). A side-by-side still image of the IM hematoma and normal soft tissue is shown in Figure 4. A CT scan of the lower extremity was later obtained to confirm the findings (Fig 5).

Question: How do the POCUS findings alter the management of this patient?

Answer: The soft tissue cobblestoning is concerning for an IM fluid collection, which is likely a hematoma after a fall in this case. Therefore, the planned thrombolytic therapy should be cancelled, and a stat hemoglobin should be checked. Although controversial, given his right ventricular strain, placement of inferior vena cava filter could be considered, and the risks and benefits of stopping the heparin drip should be considered.

Discussion

Ultrasonography has been shown to be a useful diagnostic modality for various skin, soft tissue, and musculoskeletal pathologies that include cellulitis, soft tissue abscesses, and IM tumors. Despite its clinical usefulness, the use of POCUS to evaluate IM hematomas has not been well described in the literature.

On our review, only three published reports describe the use of POCUS for identification of IM hematomas, but none of these cases involved the critical care setting. POCUS use in critically ill patients for identification of soft tissue conditions, such as IM hematomas, has not been reported previously. We identified one case report of necrotizing fasciitis that was detected by POCUS in a critically ill patient.

In this patient, the POCUS evaluation of the skin and soft tissues revealed an occult contraindication to thrombolytic therapy ([Narration Video](#)). This finding changed the immediate management and prevented sending the patient for a procedure that could have resulted in a life-threatening complication.

Although this patient tolerated systemic heparin, thrombolytic therapy with tissue plasminogen activator likely would have resulted in significant expansion of the hematoma. The patient subsequently underwent a CT scan of the lower extremities that confirmed a large left gluteal hematoma ([Fig 5](#)). However, it was the bedside POCUS examination that prompted obtaining a CT scan, which took approximately six hours to complete. Without the use of POCUS, the diagnosis of hematoma would have been delayed or missed until after the patient had received thrombolytics.

Clinical Course

This case illustrates the usefulness of POCUS for the evaluation of skin and soft tissue conditions in the ICU. POCUS can be used to diagnose and monitor soft tissue conditions and to prevent missing important findings that are clinically significant.

Clinical Pearls

1. Skin and soft tissues conditions can be rapidly evaluated at the bedside with ultrasound imaging, and detection of an abscess or hematoma can have important implications on the management of patients.
2. Prior to administration of thrombolytics, a focused bedside ultrasound examination can supplement the physical examination to rule out potential sources of bleeding, especially in patients with a history of trauma.
3. Training intensivists in the fundamentals of skin and soft tissue ultrasound imaging can expedite making diagnoses and may alter decision-making in the treatment of critically ill patients.

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Additional information: To analyze this case with the videos, see the online version of this article.

Suggested Readings

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