



Ultrasound in Emergency Medicine

DIAGNOSIS OF RECTUS SHEATH HEMATOMA BY POINT-OF-CARE ULTRASOUND

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Abstract—Background: Rectus sheath hematoma is a rare but dangerous cause of undifferentiated hypotension and abdominal pain in the emergency department (ED). Point-of-care ultrasound is a useful tool in its identification. **Case Report:** A 75-year-old woman presented to the ED with hypotension of an unclear etiology. She was found, via point-of-care ultrasound, to have a large and expanding rectus sheath hematoma. She ultimately had embolization of a lacerated epigastric artery, likely caused by enoxaparin injection. **Why Should an Emergency Physician Be Aware of This?:** Rectus sheath hematomas are a dangerous and often unrecognized source of abdominal pain and shock in anticoagulated patients. Commonly applied point-of-care ultrasound algorithms to assess hypotension may miss this entity. © 2019 Elsevier Inc. All rights reserved.

Keywords—point-of-care ultrasound; bedside ultrasound; rectus sheath hematoma; undifferentiated hypotension

INTRODUCTION

Rectus sheath hematoma is a rare but dangerous cause of hypotension, with a mortality rate as high as 25% in anticoagulated patients (1). Multiple algorithms for evaluating patients with undifferentiated hypotension using point-of-care ultrasound (POCUS) exist and have been shown to influence clinical decision-making and improve surrogate outcomes (2–4). Targeted POCUS may be a useful tool to evaluate atypical sources of hypotension that fall outside the scope of established algorithms,

such as rectus sheath hematoma, in the patient with undifferentiated shock.

CASE REPORT

A 75-year-old woman with a past medical history of complete heart block, atrial fibrillation, and ischemic cardiomyopathy was brought to the ED via ambulance after her home health nurse found her to be confused and pale-appearing. Paramedics reported the patient had melanotic stool at home and that she had recently been transitioned to enoxaparin from warfarin for an upcoming procedure. On arrival to the ED, the patient was triaged as a “suspected gastrointestinal hemorrhage.” Due to altered mental status, the patient was unable to provide any significant additional history.

Her initial set of vital signs were as follows: heart rate 90 beats/min, respiratory rate 19 breaths/min, blood pressure 76/44 mm Hg, oxygen saturation 98% on room air, and a temperature of 36°C. Her abdomen was soft and moderately distended, with multiple areas of ecchymosis. Her digital rectal examination revealed no frank blood, but was guaiac positive. The remainder of her physical examination was unremarkable.

Initial laboratory tests were notable for significant anemia, with a hemoglobin of 5.6 g/dL. Resuscitation was immediately initiated with blood product administration via two large-bore intravenous catheters. Admission orders were placed to the medical intensive care unit for a presumptive gastrointestinal hemorrhage.



Figure 1. Axial B-mode point-of-care ultrasound image of the left lower abdominal wall demonstrating fluid collection.

Given the limited history and lack of overt evidence of gastrointestinal hemorrhage, the treating physician used POCUS to further differentiate her shock, and noted that there was a pocket of actively extravasating, arterial-sourced hematoma contained in one of the ecchymotic regions of her abdominal wall (Figures 1 and 2). The hematoma was measured to be approximately 10 cm in diameter, and color Doppler demonstrated active arterial bleeding. Surgery was consulted and the patient underwent computed tomographic imaging, which showed a lacerated inferior epigastric artery,

likely suffered during enoxaparin injection (Figures 3 and 4). She was immediately taken to Interventional Radiology for embolization and hemorrhage source control, and was admitted to the surgical intensive care unit. She was ultimately discharged to inpatient rehabilitation in good health.

DISCUSSION

Rectus sheath hematoma is a potential source of life-threatening bleeding in anticoagulated patients, and is

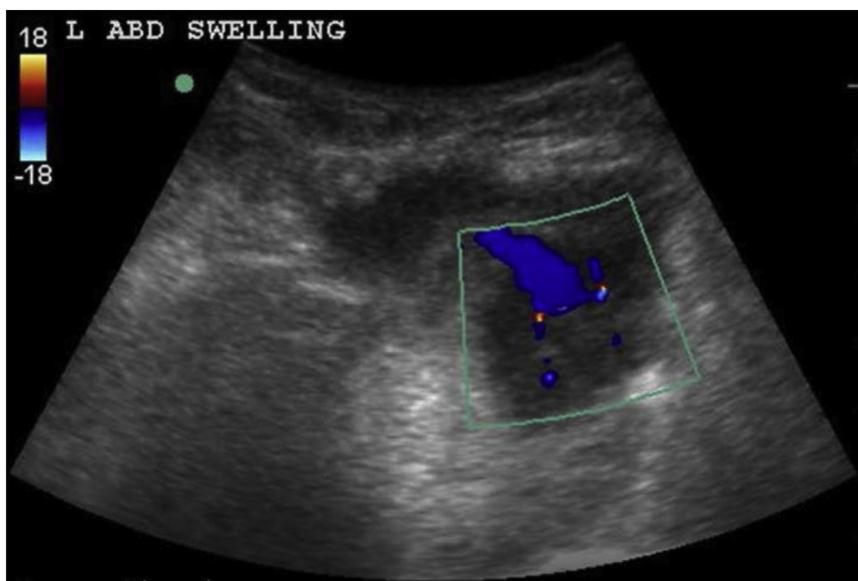


Figure 2. Axial color Doppler point-of-care ultrasound image of the left lower abdominal wall demonstrating active flow into the fluid collection.

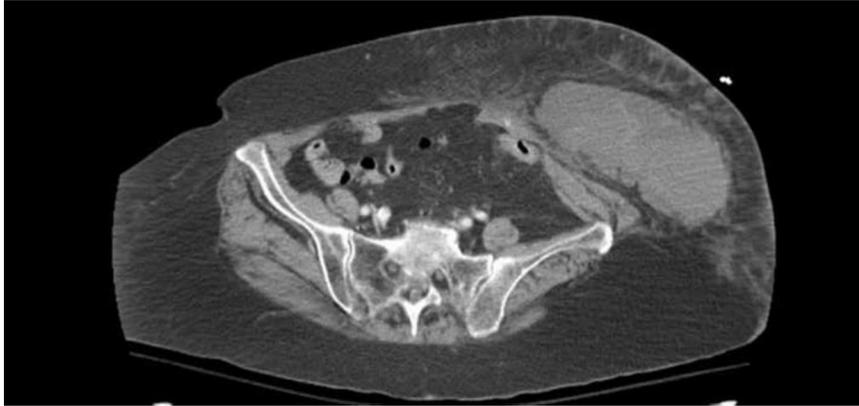


Figure 3. Axial computed tomography view of the abdomen demonstrating left-sided rectus sheath hematoma.

becoming more common as enoxaparin is increasingly prescribed in the outpatient setting (5). Rectus sheath hematomas account for 2% of cases of unexplained abdominal pain, and are most frequently caused by rupture or injury to the inferior epigastric artery (6). The rectus sheath is supplied by the epigastric arteries, and hemorrhage results from direct injury to those vessels or forceful contraction of the sheath itself, which results in tearing of the vascular wall (7). Patients with rectus sheath hematomas typically present with abdominal pain, palpable abdominal wall mass (most commonly in the right lower quadrant), and abdominal distension (7).



Figure 4. Coronal computed tomography view of the chest and abdomen demonstrating left-sided rectus sheath hematoma.

In the largest case series of rectus sheath hematomas, 126 patients were identified, with a mortality rate of 25% in anticoagulated patients (4). Risk factors include anticoagulation, trauma, pregnancy, repeated Valsalva maneuvers, recent laparoscopic surgeries, recent invasive procedures (such as paracentesis), hypertension, coughing, and advanced age (6). Rectus sheath hematoma occurs more often in the lower abdominal quadrants and may present with Cullen's sign, Grey-Turner's sign, or Carnett's sign (increased pain with rectus abdominis contraction) (6).

This case further demonstrates the value of focused bedside ultrasound in the patient with undifferentiated hypotension. The patient's clinical course and likely overall outcome was significantly changed by identifying the true cause of the patient's hypotension and overcoming the potential anchor bias associated with prehospital reports of gastrointestinal hemorrhage as the etiology of the patient's presentation. The patient's admitting service, subsequent diagnostic studies, and definitive management were rapidly tailored to POCUS findings. Prior reports demonstrate the utility of ultrasound in the diagnosis of rectus sheath hematoma because it is rapid, repeatable, and can be used to further characterize the hematoma (8). There have been no prospectively validated studies on the accuracy of POCUS for detecting rectus sheath hematoma, but there are case reports of emergency physicians using bedside ultrasound to diagnose rectus sheath hematoma (9). Multiple studies have shown a reduction in uncertainty, change in diagnostic maneuvers, and immediate resuscitation choice when POCUS is used to guide patient care (10,11). Multiple protocolized algorithms exist for the utilization of bedside ultrasound for the management of shock, though superiority of any has yet to be established (12–15). Most of these algorithms consist of echocardiography, and lung, abdominal, and aorta evaluations. Interestingly, the source of the patient's

hypotension fell outside the normal scope of evaluation covered in these established algorithms. This illustrates one of the most valuable aspects of bedside ultrasound—adaptability and flexibility at the bedside to a given clinical scenario.

WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?

Rectus sheath hematoma is a source of life-threatening hemorrhage in anticoagulated patients. Although not typically included in ultrasound examination in undifferentiated shock, this case illustrates the versatility of bedside ultrasound and that it can be used in a targeted fashion to rapidly and accurately diagnose atypical sources of hypotension.

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