Ultrasound in Emergency Medicine

AORTOENTERIC FISTULA IDENTIFIED BY CLINICAL ULTRASOUND

David C. Mackenzie, MD, CM
Department of Emergency Medicine, Maine Medical Center, Portland, Maine
Reprint Address: David C. Mackenzie, MD, CM, Department of Emergency Medicine, Maine Medical Center, 22 Bramhall St., Portland, ME 04102

Abstract—Background: Aortoenteric fistula is a rare but serious cause of gastrointestinal bleeding. Early diagnosis and definitive treatment with fistula repair may improve patient outcomes. We report the use of point-of-care ultrasound to identify an aortoenteric fistula in a patient presenting with abdominal pain and shock. Case Report: A 78-year-old man presented to the Emergency Department with abdominal pain and 5 days of minimal hematochezia. He was hypotensive and had diffuse abdominal tenderness. Point-of-care ultrasound was performed, demonstrating an abdominal aortic aneurysm with a hypoechoic projection into a segment of bowel abutting the aorta. Color flow was present through the structure, consistent with an aortoenteric fistula. After resuscitation with red blood cells, computed tomography was performed to confirm the diagnosis. Why Should an Emergency Physician Be Aware of This?: Clinical ultrasound has a well-established role in the detection of aortic aneurysm. This case illustrates that point-of-care ultrasound can also be used to rapidly identify an aortoenteric fistula and expedite timely care and surgical evaluation. © 2015 Elsevier Inc.

Keywords—aortoenteric fistula; aortic aneurysm; ultrasound; point-of-care; gastrointestinal bleeding

INTRODUCTION

Early recognition of the cause for hypotension and shock may improve care and outcomes of the critically ill. Point-of-care ultrasound can facilitate identification or exclusion of common etiologies for shock. We report a case of aortoenteric fistula diagnosed by point-of-care ultrasound in the Emergency Department (ED) in a man presenting with shock. Rapid identification of aortoenteric fistula during the patient’s initial evaluation prompted targeted resuscitation and immediate surgical consultation for consideration of operative repair.

CASE REPORT

A 78-year-old man presented to the ED with a 6-h history of progressive, generalized abdominal pain and altered mental status. He also reported 5 days of intermittent, scant hematochezia. His past medical history was significant for hypertension, hyperlipidemia, and tobacco use. He had no history of abdominal surgery. On arrival, he appeared acutely ill. His blood pressure was 82/58 mm Hg, heart rate 87 beats/min, respiratory rate 22 breaths/min, temperature 37.1°C, and pulse oximetry 95% on room air. Physical examination was notable for a soft but diffusely tender abdomen and cool extremities with delayed capillary refill. He had decreased responsiveness but no focal neurologic findings. A stool sample was positive for occult blood.

A structured point-of-care ultrasound protocol for hypotension was performed to evaluate the cause of shock. Echocardiography demonstrated preserved ejection fraction, and no pericardial effusion or right ventricular enlargement. Abdominal ultrasound revealed an abdominal aortic aneurysm (Figure 1). A hypoechoic projection from the aorta communicated with an adjacent segment...
of bowel, suggestive of an aortoenteric fistula (Figure 2). Color Doppler of the lesion showed pulsatile flow from the aorta into the bowel, providing further support for the presumptive diagnosis of aortoenteric fistula (Video 1, available online). Resuscitation with unpacked red blood cells and intravenous crystalloid was initiated. Empiric antibiotics were given and vascular surgery consultation was obtained. Laboratory values were significant for hemoglobin 4.9 g/L, lactate 8.9 mmol/L, creatinine 1.8 mg/dL, and international normalized ratio 1.3. Computed tomography (CT) of the chest and abdomen was performed. CT revealed a saccular aneurysm abutting small bowel, with inflammatory changes and gas noted in the mural thrombus, confirming the presence of an aortoenteric fistula (Figure 3).

The patient’s blood pressure improved with resuscitation, with mean arterial pressure of 65 mm Hg. He subsequently began to pass large volumes of stool mixed with gross blood. After further discussion of treatment options, prognosis, and his goals of care, the patient elected to pursue care with comfort measures only, and was admitted to the hospital with a plan to transition to hospice care.

DISCUSSION

Aortoenteric fistula is an uncommon cause of gastrointestinal bleeding. Primary fistulae can result from abdominal aortic aneurysm (AAA) or infectious aortitis due to tuberculosis or syphilis (1,2). Secondary aortoenteric fistulae can result from placement of a vascular graft, and less commonly from radiation, tumor invasion, trauma, gastrointestinal foreign body, or ulceration (3). CT, endoscopy, or laparotomy are the most common diagnostic tests. A history of aortic graft is the greatest risk factor for aortoenteric fistula, and should prompt consideration of the diagnosis in a patient with gastrointestinal bleeding (3). The classic triad of findings—a pulsatile mass, abdominal pain, and bleeding—is frequently absent. Regardless of the etiology, surgical repair of the fistula is the preferred treatment (1–3). The mortality of a symptomatic, unrepaired aortoenteric fistula in a patient with bleeding is near certain.

Recognition of an aortoenteric fistula is the central challenge for the emergency clinician. Patients may present initially with a small volume of gastrointestinal bleeding termed a sentinel or herald bleed (4). Such a presentation affords the clinician an opportunity to diagnose an aortoenteric fistula prior to overt hemorrhage. Although aortoenteric fistulae are sufficiently uncommon that not all patients with gastrointestinal bleeding can or should undergo testing for a fistula, the clinician should consider the possibility on the basis of history. Patients with risk factors for AAA, and in particular, those with a history of AAA repair, gastrointestinal tumor, or radiation to the abdomen, should be evaluated with heightened
scrutiny. Routine placement of a nasogastric tube is not recommended in the evaluation of gastrointestinal bleeding. Nasogastric tube placement and lavage cannot reliably exclude an upper gastrointestinal source of bleeding, and does not affect clinical outcomes; it is unlikely to add significantly to the investigation of a potential fistula (5,6).

The ED management of an aortoenteric fistula centers on correcting circulatory failure and expediting transition to definitive care. Patients with symptomatic hemorrhage may have massive transfusion requirements, necessitating replacement of packed red blood cells, plasma, and platelets. If present, warfarin-related coagulopathy should be corrected with vitamin K and prothrombin complex concentrate. As the communication between bowel and the vascular compartment may lead to bacteremia, broad-spectrum antibiotics directed against enteric pathogens should be administered (7,8). Emergent surgical consultation is indicated, and if unavailable, transfer to an appropriate facility must be arranged.

In patients presenting with decomposition or shock, point-of-care ultrasound has a well-established role in the evaluation of nontraumatic hypotension. It has been shown to improve decision-making and diagnostic accuracy in the care of undifferentiated shock (9,10). A strong body of evidence supports the use of point-of-care ultrasound for the identification of AAA, and use of ultrasound to detect AAA is a core element of residency training in emergency medicine (11). The test characteristics of clinical ultrasound for the detection of AAA in the ED are excellent; a recent meta-analysis reported a pooled sensitivity of 99% and specificity of 98% (12). Early detection of AAA in symptomatic patients has been shown to expedite disposition and definitive care (13).

Beyond identifying suspected AAA, point-of-care ultrasound can be used to identify other important aortic lesions that may lead to shock or critical illness; both dissection and vascular malformation have been described (14,15). This case extends these observations, illustrating the use of point-of-care ultrasound to identify an aortoenteric fistula. Although rare, the mortality associated with aortoenteric fistulae is high. Even with surgical repair, 30-day mortality in a contemporary case series was 21%, with shock or the need for preoperative transfusion as risk factors for death (3). Point-of-care ultrasound can facilitate timely diagnosis and treatment through rapid identification of a cause for hypotension, exclusion of alternative diagnoses, and, as illustrated in this case, detection of a potentially lethal aortic lesion.

**WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?**

This case illustrates the use of point-of-care ultrasound to identify an aortoenteric fistula. The mortality associated with symptomatic aortoenteric fistula is high. Rapid diagnosis of aortoenteric fistula may contribute to earlier surgical intervention and improved outcomes.

**SUPPLEMENTARY DATA**

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.jemermed.2015.01.003.

**REFERENCES**