Visual Diagnosis in Emergency Medicine

IDENTIFICATION OF PORTAL VENOUS AIR WITH BEDSIDE ULTRASOUND IN THE EMERGENCY DEPARTMENT

Seth R. Strote, MD, Liberty V. Caroon, RDMS, and Robert F. Reardon, MD

Department of Emergency Medicine, Hennepin County Medical Center, Minneapolis, Minnesota
Reprint Address: Seth R. Strote, MD, Department of Emergency Medicine, Hennepin County Medical Center, 701 Park Ave. South, Minneapolis, MN 55415

CASE REPORT

A 57-year-old man with a history of atrial fibrillation presented to the Emergency Department with a 1-day history of diffuse abdominal pain associated with several liquid non-bloody stools. Initial vital signs were temperature 38.1°C, heart rate 131 beats/min, blood pressure 111/77 mm Hg, respiratory rate 27 breaths/min, and SpO₂ 97%. Physical examination revealed tachycardia with an irregularly irregular rhythm and diffuse abdominal tenderness with guarding. Electrocardiography demonstrated atrial fibrillation with rapid ventricular response.

Bedside abdominal ultrasound was performed by the emergency physician and demonstrated air in the portal venous system visualized by scattered hyperechoic areas (Figure 1) and ring-down artifact (Figure 2) throughout the liver. The patient had a marked leukocytosis of 28,400 cmm with left shift; liver function tests were within normal limits, lactate was 1.8 mmol/L, blood urea nitrogen was 52 mg/dL, and creatinine was 1.5 mg/dL.

Figure 1. Right upper quadrant ultrasound demonstrating scattered hyperechoic areas (arrows) consistent with the presence of air in the portal venous system.

Figure 2. Right upper quadrant ultrasound showing ring-down artifact (arrows) created by air within the portal venous system.

Received: 14 April 2010; final submission received: 25 June 2010; accepted: 3 November 2010
Diagnosis: Portal Venous Air, Pneumatosis Intestinalis, Mesenteric Ischemia

The surgical team was consulted and computed tomography (CT) of the abdomen and pelvis was obtained showing portal venous air, pneumatisos, and mesenteric ischemia (Figure 3) (1). The patient underwent an exploratory laparotomy, with small bowel resection, superior mesenteric artery thrombectomy, and right hemicolecotomy.

DISCUSSION

Bedside sonography is frequently employed by emergency physicians in the assessment of abdominal pain. When assessing for portal venous air (PVA) with ultrasound, one should assess the liver for echogenic particles and patches (air) associated with ring-down artifact (Figures 1, 2). PVA is readily seen on ultrasound but can be mimicked by other conditions such as extensive hepatic calcifications and pneumobilia (2). Both sonography and CT are excellent tests to detect PVA. CT scan can allow the physician to determine the underlying cause. PVA is a condition commonly associated with mesenteric ischemia and carries a poor prognosis (3,4). In our case, the patient had known atrial fibrillation and was not anticoagulated. He was found to have embolic occlusion of the superior mesenteric artery. Bedside sonography, in this case, helped to facilitate diagnosis and surgical consult.

REFERENCES