IDENTIFICATION OF SPLENIC INFARCTION BY EMERGENCY DEPARTMENT ULTRASOUND

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Abstract—Background: Splenic rupture or infarction can occur secondary to acute infectious mononucleosis. Patients with abdominal pain and known or suspected infectious mononucleosis mandate evaluation for these complications, which can have significant morbidity or mortality. Case Report: An 18-year old man presented to the emergency department (ED) with a 2-day history of left upper quadrant abdominal pain. He had been diagnosed with mononucleosis 4 days before his ED presentation. Physical examination was notable for focal left upper quadrant tenderness. The treating physician's principal diagnostic considerations were splenic rupture or infarction secondary to mononucleosis. Point-of-care ultrasound was performed by the emergency physician, demonstrating multiple hypoechoic areas in the splenic parenchyma with absent Doppler flow, consistent with multiple splenic infarcts. The patient was admitted for observation, managed conservatively, and had an uneventful course. Conclusion: Emergency ultrasound of the spleen can allow rapid diagnosis of splenic infarction and exclusion of splenic rupture in a patient at risk for splenic pathology. © 2013 Elsevier Inc.

Keywords—ultrasonography; spleen; splenic infarction; mononucleosis; point-of-care

INTRODUCTION

Abdominal pain is a common reason for patients to seek evaluation in the Emergency Department (ED). Few chief complaints are as dependent on the use of patient demographics, history, and physical examination to narrow an otherwise broad differential diagnosis.

Infectious mononucleosis is caused by the ubiquitous Epstein-Barr virus. The classic presentation of the disease is characterized by fever, pharyngitis, lymphadenopathy, fatigue, and an atypical lymphocytosis. Patients may also present with abdominal pain, which is most commonly due to splenomegaly, although abdominal pain in mononucleosis may be due to splenic rupture or, rarely, splenic infarction.

We report a case of a patient presenting with abdominal pain and a recent diagnosis of mononucleosis, in which the use of emergency physician-performed bedside ultrasound allowed rapid evaluation of the spleen. Point-of-care ultrasound identified multiple splenic infarctions, a rare complication of infectious mononucleosis, and excluded splenic rupture. This represents a novel use of emergency ultrasound in the evaluation of abdominal pain.

CASE REPORT

An 18-year-old man presented to the ED with 2 days of abdominal pain. He described constant, non-radiating pain in the left upper quadrant. He denied trauma, vomiting, or changes in his bowel habits. He had no prior surgical history. He had seen his primary care physician 4 days previously, with complaints of sore throat, fever, fatigue, and myalgias. His physician had ordered a mono-spot test at that time, which was positive, and the patient was diagnosed with mononucleosis. His medical history was otherwise unremarkable.
On arrival to the ED, the patient’s temperature was 36.7°C, blood pressure 128/81 mm Hg, pulse 76 beats/min, respirations 16 breaths/min, and pulse oximetry 98% on room air. Physical examination was notable for a soft abdomen with normoactive bowel sounds and mild tenderness to palpation in the left upper quadrant; there was no guarding or rebound. Cervical lymphadenopathy was present. Laboratory studies were obtained, including hemoglobin 13.1 g/dL; platelets $309 \times 10^9$/L; white blood cells $10.5 \times 10^9$/L, with 24% of atypical morphology; lactate dehydrogenase 352 IU/L; alanine aminotransferase 54 IU/L; aspartate aminotransferase 27 IU/L; alkaline phosphatase 96 IU/L; and international normalized ratio 1.1.

Given his recent diagnosis of mononucleosis, the differential diagnosis of left upper quadrant pain included splenomegaly, spontaneous splenic rupture, and splenic infarction. The treating emergency physician performed a point-of-care ultrasound to assess characteristics of the spleen. Transverse and longitudinal images (Figure 1) of the spleen were obtained using a 5-1 MHz curvilinear probe (SonoSite Inc., Bothell, WA). The spleen measured 17 x 8 cm, consistent with moderate splenomegaly (1). Multiple wedge-shaped hypoechoic areas at the periphery of the splenic parenchyma were identified (Figure 1). There was no internal flow to these areas on examination with color Doppler. No free fluid was identified. A diagnosis of multiple splenic infarcts was made. The patient was admitted to the hospital for control of pain and nausea.

The patient’s hospital course was unremarkable. The hospitalist team obtained a confirmatory ultrasound in the Radiology Department, which demonstrated persistent hypoechoic areas in the splenic parenchyma, with no Doppler flow (Figure 2). An echocardiogram was obtained to exclude a patent foramen ovale; it was notable only for the presence of a bicuspid aortic valve. During the patient’s hospitalization, he was evaluated by a hematology consultant, who agreed with the diagnosis of splenic infarction secondary to infectious mononucleosis, and suggested an assessment for an underlying hypercoaguable state. On the second hospital day, the patient’s symptoms were well controlled, and he was discharged home. Serologic studies for Epstein-Barr virus obtained during his admission were consistent with acute infectious mononucleosis. A subsequent outpatient evaluation for an underlying hypercoaguable state was unrevealing.

**DISCUSSION**

Splenic infarction is an unusual complication of mononucleosis; only a handful of cases have been reported in the literature (2-4). Splenic rupture is less rare, occurring in one to two per 1000 cases (5). Rupture is typically spontaneous, can occur up to 3 weeks after the onset of symptoms, and predominantly affects males. The symptoms of spontaneous splenic rupture may be the presenting complaint in a new diagnosis of acute infectious mononucleosis (6).

Evaluating for splenic complications in a patient presenting with abdominal pain and risk factors for infarction or rupture is critical, given the potential for significant morbidity or mortality (7). Both splenic infarction and rupture are typically managed conservatively, but rupture mandates surgical evaluation for possible splenectomy, and thus, timely identification of and distinction between these pathologies is essential (5,8). Ultrasound is an excellent imaging modality for the evaluation of the spleen (9,10). As this case illustrates, bedside ultrasound may have a role in the rapid detection of splenic pathology in a patient with known risks for infarction or rupture.

A point-of-care ultrasound for splenic rupture would be expected to show subcapsular or subdiaphragmatic fluid indicative of blood. In contrast, as in this case, the sonographic appearance of a splenic infarct shows hypoechoic areas in the splenic parenchyma with an absence...
of internal flow on color Doppler, and no intra-abdominal free fluid.

Although rare in mononucleosis, splenic infarction is a well-recognized complication of other disease states (11,12). These include hypercoaguable disorders; embolic diseases, such as endocarditis and atrial fibrillation; hemoglobinopathies, notably sickle cell disease; malaria; and myeloproliferative disorders (2,13,14). More generally, any process causing splenomegaly may lead to splenic infarction. Clinicians should specifically consider splenic disorders in patients presenting with abdominal pain and one of these underlying predispositions.

CONCLUSION

This case demonstrates a novel application of point-of-care ultrasound in the evaluation of abdominal pain, in a patient with a well-known risk factor for splenic pathology. In the appropriate clinical context, ultrasound of the spleen can be used to support and differentiate between two of the principal splenic complications of infectious mononucleosis, splenic rupture and infarction.

REFERENCES


