Ultrasound in Emergency Medicine

COMMON ILIAC ARTERY TORTUOSITY SIMULATING AORTIC DISSECTION ON FOCUSED ABDOMINAL ULTRASOUND IN THE EMERGENCY DEPARTMENT

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INTRODUCTION

Bedside ultrasonography performed by the Emergency Physician is a safe procedure for evaluating patients with trauma, hypotension, chest or abdominal pain, and dyspnea of unknown origin. Objectives: To present a case with apparent concordance between the patient’s history, symptoms, signs, and ultrasound imaging, that lead to diagnostic error. Case Report: A 74-year-old man was admitted to the hospital due to epigastric pain, radiating to the back. He reported previous detection of a small dilatation in the ascending aorta. On physical examination, the heart rate was 120 beats/min and the blood pressure was 90/60 mm Hg. These facts suggested the possibility of an aortic dissection; therefore, a bedside emergency ultrasound examination was performed. The first part of the examination focused on the ascending aorta, but the results were not significant. Then, an abdominal evaluation was performed that revealed an oval and pulsatile anechoic mass in the infrarenal tract, with an echoic wall and an endoluminal flap. A computed tomography scan of the aorta was ordered, and it showed a regular aorta in the entire tract, with an abnormal tortuosity of iliac arteries as the basis of the false-positive ultrasound. Conclusions: The use of ultrasound in emergency settings has improved the clinical evaluation of critical patients by Emergency Physicians, but the possibility of a false-positive diagnostic error always should be considered. © 2012 Elsevier Inc.

CASE REPORT

A 74-year-old man was admitted to the hospital due to sudden-onset epigastric pain, radiating to the back. His past medical history was significant for mild hypertension, treated with beta-blockers. He also reported the previous detection of a small dilatation in the ascending aorta, as seen on a recent echocardiogram. He described the pain as stabbing, located in the epigastric region, radiating to the back.

On physical examination, the heart rate was 120 beats/min, the blood pressure was 90/60 mm Hg, respiratory
rate was 24 breaths/min, oxygen saturation was 98% on room air, and body temperature was normal. The abdominal examination showed tenderness in the epigastric and mesogastric regions. The cardiac examination showed a slight murmur at the left upper sternal border. The head, neck, lung, and neurological examinations were normal, and distal pulses were normal and equal bilaterally. The patient’s history and physical examination findings suggested the possibility of an aortic dissection; therefore, a bedside emergency ultrasound examination was performed immediately by an Emergency Physician to rule out acute cardiac complications. The first part of the ultrasound examination focused on the aortic valve and ascending aorta, using a cardiac sector array transducer with a frequency range of 2.5 MHz, but the results were not significant for aortic dissection and the ascending aorta appeared normal. Then, an abdominal ultrasound evaluation was performed using a broadband curved array transducer with a frequency range of 3.5 MHz. The presence of excessive bowel gas prevented a full view of the abdominal aorta, especially in the proximal tract. In the infrarenal tract, the ultrasound study revealed a small ovular and pulsatile anechoic mass, anterior and slightly to the left of the lumbar spine, with an echoic wall and an endoluminal flap, synchronized with the heart beat (Figure 1). Because the patient’s history and physical examination, along with the bedside ultrasonography, strongly suggested a diagnosis of aortic dissection, a computed tomography (CT) scan of the aorta was immediately planned, to evaluate the location of dissection. The patient’s vital signs remained stable.

The CT scan showed a regular aorta in the entire tract, but revealed an abnormal tortuosity of both iliac arteries (Figures 2, 3). The left iliac artery passed below the right iliac artery for a short tract, before returning to the left position. The CT scan also showed an acute hemorrhagic pancreatitis, and this diagnosis was confirmed by increasing levels of amylases and lipase (up to 5420 U/L and 9587 U/L, respectively). The patient was admitted to the hospital.

**DISCUSSION**

ED ultrasound has proven to be a safe and useful diagnostic tool for evaluating patients with suspected ruptured abdominal aortic aneurysm, but the role of this procedure in case of suspected aortic dissection is less clear (4–7). Strong evidence suggests the diagnostic accuracy of transesophageal echocardiography in an emergency setting, when performed by a well-trained Emergency
dissection requires a thorough search, and is of the utmost importance because a delayed diagnosis can have
dramatic consequences. In our patient, the history of thoracic
aortic dilatation (not confirmed by our CT scan), the
presence of a murmur in the aortic valve, hypotension, tachy-
cardia, and stabbing epigastric pain radiating to the back
strongly suggested the diagnosis of aortic dissection or
abdominal aortic aneurysm, and the ultrasound imaging
obtained bedside appeared to confirm our suspicion. In
this case, the abnormal tortuosity of the iliac vessels
made possible the ultrasound images of an oval, pulsat-
tile mass with a synchronized endoluminal septimation,
mimicking an intimal flap. The left common iliac
artery was deviated and passed below the right common
iliac artery. In that position, the arteries were parallel,
and the ultrasound probe positioned in a transverse plane
demonstrated an illusory image of aortic dissection. A
subsequent color-Doppler and Power Doppler evaluation,
performed after the diagnosis of acute pancreatitis, dem-
onstrated the proper aspect of the two distinct arteries
(Figure 4).

The physical examination is neither sensitive nor
specific for detecting the presence of aortic dissection,
but in our case it was suggestive, and this led to the erro-
neous interpretation of emergency ultrasound imaging.
Multiple variables could have contributed to the misinter-
pretation of the emergency ultrasound examination:
the two-dimensional view with a low frequency array
couldn’t fully demonstrate the entire configuration of
the area of interest; and mainly, the separation of the two
arteries. Thus, it is important to scan all structures in at
least two planes to make a mental three-dimensional con-
struct of the organ of interest (9). The use of Color Doppler
and Power Doppler to evaluate vascular structures is al-
ways essential, and in our case, a subsequent study with
these modalities easily demonstrated the nature of the

Figure 3. Computed tomography reconstruction of the entire
aorta, with 100 degrees of rotation in the sagittal plane,
showing an abnormal tortuosity of the common iliac artery.

Figure 4. Subsequent color-Doppler and Power Doppler
evaluation demonstrating the proper aspect of the two dis-
tinct arteries.
two vascular structures as the basis of the patient’s misleading ultrasound image. Further, the presence of bowel loop distended by gas made it impossible to visualize the proximal tract of abdominal aorta, and transthoracic echocardiography would not provide the adequate accuracy for ruling out the diagnosis.

CONCLUSION

The bedside emergency ultrasound, when performed by a well-trained Emergency Physician, is safe and useful, but it must be interpreted in light of the clinical setting (1). In our case, the history, the physical examination, and the emergency imaging procedures all seemed to correlate with a diagnosis of aortic dissection, but the presence of one anatomic variation contributed to our diagnostic error. False-positive abdominal aortic dissections due to artifact associated with color Doppler ultrasound have been described (10,11). In recent literature, there is documentation of another case of false-positive abdominal aortic dissection due to an abnormal curvature of the aorta, and still another case of a false diagnosis of ruptured abdominal aortic aneurysm (9,11). However, overall, focused abdominal ultrasound to evaluate patients with suspected aortic disease is safe and highly recommended.

Ultrasound in emergency settings has improved the clinical evaluation of critical patients by Emergency Physicians, but the possibility of a diagnostic error always should be considered despite the use of advanced technology.

REFERENCES