



Case of the Month

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"Abdominal U/S in the ED- A case of AAA"

ABSTRACT

Abdominal Aortic Aneurysms (AAA) are famously insidious in nature, often progressing without any obvious signs and frequently presenting as a nonspecific set of symptoms. Therefore, identification of this particular pathology can be quite challenging when a standard ED physical examination reveals no significant findings. Fortunately, Point of Care Ultrasonography (POCUS) enables ED Physicians to augment their patient examination and evaluation by providing immediate, real-time, clinically relevant information that can prove integral to the patient's subsequent management. The following case highlights a scenario where Bedside Abdominal Ultrasound proved an invaluable tool in quickly and effectively visualizing an expanded, potentially fatal Abdominal Aortic Aneurysm in a patient with nonspecific abdominal and back pain.

CASE PRESENTATION

A gentleman in his late sixties presented to the emergency department with complaints of mild epigastric pain and left shoulder pain that had started 4 hours ago. Pain was rather dull in nature and was continuous. He had no sweating, nausea, shortness of breath or palpitations. He never had similar pain before. His past medical history included Diabetes Mellitus, Hypertension, and a single functioning kidney with Chronic Kidney Disease. Upon questioning if he had any Ischemic Heart Disease, he answered that he had a stent placed 6 years ago in a different country. No reports were available and patient could not provide any further details due to language barrier.

FINDINGS

Vital signs on presentation were within normal limits apart from an elevated blood pressure of 156/92 mmHg. Patient had a large BMI and looked older than his stated age. He was sitting comfortably in bed and did not look in pain. His chest and heart exams were unremarkable. The abdominal exam revealed mild epigastric tenderness. A quick ECG showed some nonspecific T wave changes, so cardiac workup was sent for him and he received 300mg of Aspirin.

In an about an hour's time the patient's epigastric pain had increased and was now in the back. His blood pressure had also increased to 168/100 mmHg. Bedside ultrasound was performed to explore possible causes for his symptoms. The epigastric area revealed a very large round structure anterior to the vertebral body (Figure 1). The lumen of the mass was hypoechoic and had no pulsation or color flow on doppler. However, within the lumen was another pulsatile lumen with clear hyperechoic walls which was identified as abdominal aorta. The diameter of the mass was 13.5cm. On vertical probe positioning the mass continued till middle aorta. The patient had an Aortic Aneurysm.

After performing an extended search through the patient's records, an old abdominal CT dating 4 years back was discovered. It appeared that the patient had an aortic aneurysm repair 6 years ago. The CT scan showed an aortic stent in place with a saccular aneurysm measuring 7cm in diameter. However, on this visit the aneurysm was twice that size and it was very likely the aortic stent was leaking.

The radiologist was called for an urgent CT aortogram. He was very resistant at first as the patient had a single kidney with a high creatinine level. However, after he had seen the images on the ultrasound machine, he was more convinced. In the meantime, the patient received 5mg of Morphine and 20mg of Labetalol to control the rising blood pressure. The CT aortogram was eventually done and confirmed the presence of a massive aortic sac with an active leak from the aortic stent (arrow on Figure 2). The patient was transferred to the Operating Theater and underwent a successful stent repair.

DISCUSSION

An Introduction to POCUS

Ever since its initial integration into Emergency Medicine training in 1994¹, Point of Care Ultrasonography (POCUS) has rapidly grown as an essential adjunct in initial diagnosis and management of the acutely ill patient. Considered by most EM Physicians as a 'second stethoscope', POCUS offers immediate, goal-directed information that often times proves vital to the user's decision-making process.

Standard departmental ultrasonography requires that a physician order the examination- a relatively time-consuming process that is also governed by the patient's eligibility for transfer out of the ED- and relies on a radiologist's ability to rapidly and accurately interpret the image without having actually witnessed the patient's presentation first-hand.

EM Physicians, however, operate at the front-lines of patient care, where the acquisition and interpretation of information by POCUS is immediate, addressing specific hypotheses with real-time implications on patient intervention.

In the case described above, the bedside ultrasound played a pivotal role in providing pertinent information to support the suspicion of an aortic pathology. The identified abnormality led to more specific investigations that ultimately revealed a diagnosis which, if missed, could have had disastrous consequences.

Abdominal Ultrasonography in the ED- Indications and Utility

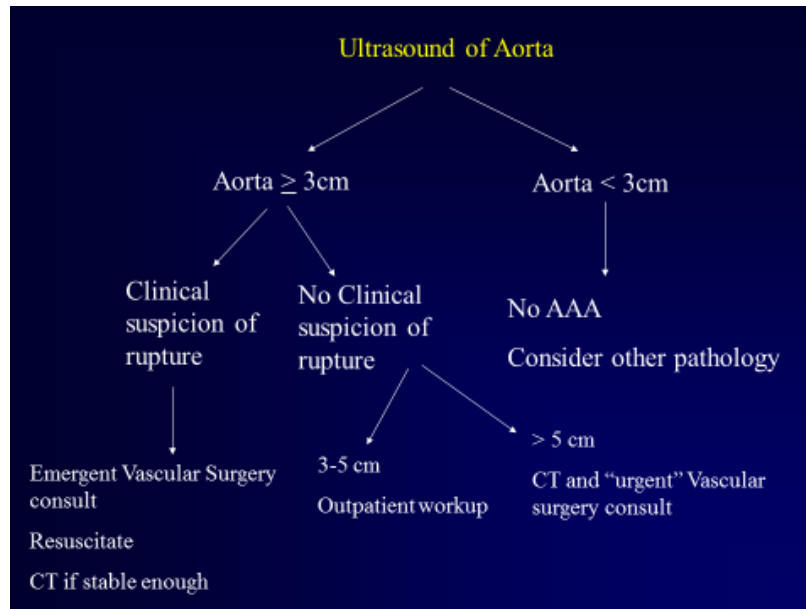
Abdominal Ultrasonography for Abdominal Aortic Aneurysm (AAA) remains an integral part of several algorithms (particularly in the evaluation of patients in shock) due to the fact that visualization of a normal caliber aorta reliably precludes ruptured AAA as a diagnosis. Emergency physicians are able to identify AAA with sensitivity of 99% and specificity of 98%,² enabling early diagnosis of ruptured AAA.

A general outline for when Bedside Ultrasound is utilized to visualize a suspected Abdominal Aortic Aneurysm is given below:

<i>Indications for Abdominal Aorta Ultrasound^{3,4}</i>	
Suspicion of AAA	<ul style="list-style-type: none"> - Palpable or pulsatile abdominal mass or abdominal bruit - Unexplained lower back pain, flank pain, or abdominal pain (especially age ≥ 60)
Age	<ul style="list-style-type: none"> - All men age >65 - Men >55 with family history of AAA - Women >65 with family history of AAA or who have smoked <p><i>(Society for Vascular Surgery recommendations)</i></p>
Evaluation of the Unstable ED patient	Direct visualization of the Aorta when evaluating and screening for possible causes for shock during resuscitation ⁵

Keep in mind that only less than 25% of patients will present with the classic triad of abdominal pain, hypotension, and a pulsatile mass.

Once the aorta is identified and visualized, the Ultrasound findings are correlated with the patient's clinical status and the ED Physician proceeds to the next appropriate course of action. An example algorithm³ that outlines the Physician's clinical decision-making process is shown below:



The overall mortality rate for a ruptured AAA is very high- 85 – 90%.^{6,7} Bedside ultrasound is a valuable and accessible tool that can timely change or expedite management. The main question to answer during aortic scan is: is the diameter of aorta greater than 3cm? The entire abdominal aorta should be visualized from the entry into diaphragm all the way to its bifurcation at the level of umbilicus. Aortic diameter more than 3cm is abnormal, and more than 5cm has a high risk of rupture.⁸

CONCLUSION

In our patient, the aortic aneurysm that was confirmed on CT scan eventually underwent endovascular repair with a successful post-surgical outcome. The patient was subsequently discharged after an uncomplicated inpatient stay at the hospital in a clinically stable condition.

This case highlights the importance of utilizing POCUS as an initial diagnostic tool to effectively guide the Emergency Physician's plan of care. Routine use of POCUS, either as part of an established algorithm or with a focus on a specific area of examination, is fast becoming an integral component of every ED Physician's workflow, allowing for an improved diagnostic accuracy and decision-making efficiency.

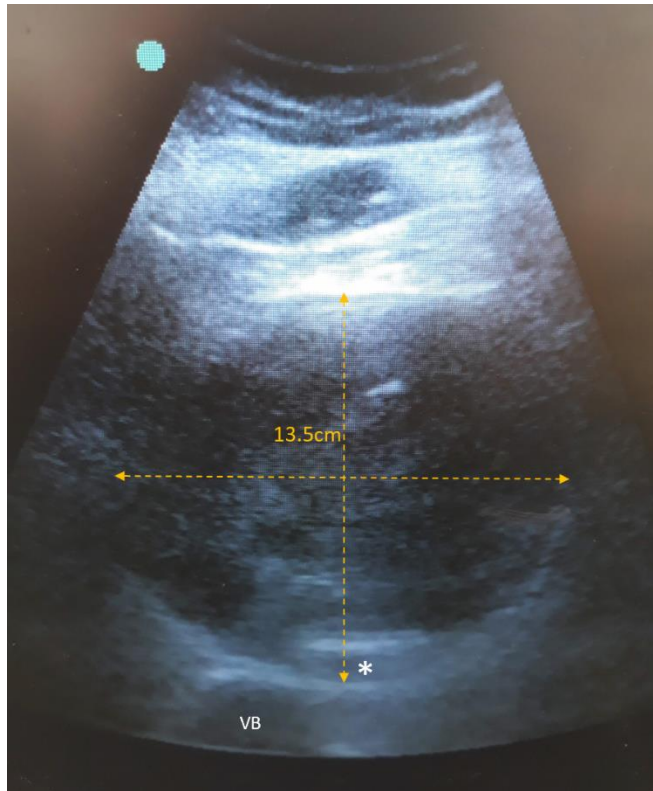


Figure 1- . Ultrasound scan showing an epigastric transvers view of abdominal aorta (*) and a large aortic aneurysm (yellow arrows) measuring 13.5cm in diameter. VB= vertebral body.



Figure 2 - CT aortogram showing an arterial phase of aorta with an active leak (yellow arrow).

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