EM CASE OF THE WEEK

BROWARD HEALTH

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Descending Aortic Occlusion

A 64 year-old female with a past medical history of hypertension, hyperlipidemia, and eczema presents to the emergency department with 8/10 aching lower abdominal pain for the past 12 hours that is progressively worsening and radiates to her lower extremities. She reports associated nausea without vomiting and diarrhea. She denies chest pain, back pain, shortness of breath, fever, chills, or dizziness.

Initial vital signs include:

HR 92 bpm
RR 25 breaths/min
BP 206/113, temperature
97.2 F
Oxygen saturation: 95%

On physical exam, the patient is awake, but lethargic and is resting in bed with her eyes closed. She has abdominal tenderness to the bilateral lower quadrants. Extremities are cool to the touch with mottling of the skin (see photo). DP/PT pulses are 1+ bilaterally. The remainder of her exam is within normal limits. Initial laboratory results are shown on the right. Which of the following tests would be most likely to establish the diagnosis?

A. Blood cultures and lactic acid

B. Abdominal X-ray

C. Aortic Angiography

D. CT Angiography

E. Lactic Acid

Photo of patient's LLE (taken with patient's permission)

WBC	7.32x10^3/µL
RBC	4.33x10^6/µL
HGB	14.6g/dL
HCT	47.6%
Platelets	109x10^3/µL
PT	22.4s
INR	2.0s
PTT	55.0s
Sodium	141mmol/L
Potassium	6.3mmol/L
Hemolysis	1+
CO2	7 mmol/L
Cr	2.6
BUN	39
Anion Gap	27
AST	296
ALT	208
BNP	12,641

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The correct answer is D, CT Angiogram.
CT angiogram has a very high sensitivity and specificity for aortic pathology (including occlusions)

A. Blood cultures and lactic acid would be obtained in a patient with suspected sepsis or infective endocarditis. This is unlikely in our patient without a fever or cardiac murmur and without any clear risk factors or suggested sources of infection

B. Abdominal X-ray could be useful for suspected bowel obstruction or perforated viscus. This patient lacks distension or peritoneal findings on abdominal exam and did not report vomiting or constipation.

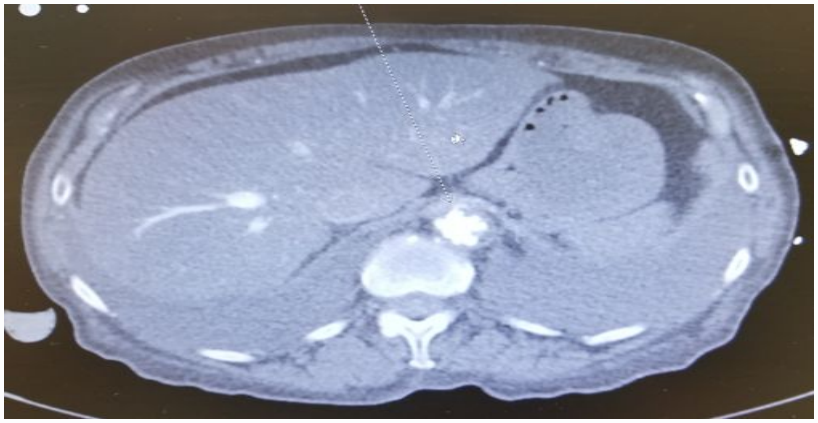
C. Aortic angiography is more invasive, more costly, and time-intensive modality for diagnosing aortic pathology and would not be appropriate in the acute setting.

Discussion

Aortic occlusion is a severe, life-threatening event that can have various presentations depending on the location of the occlusion[1,2]. Fortunately, it is a rare occurrence, with one study examining data from 1994-2014 demonstrating an incidence of 3.8 per 1-million-person years[1]. A differential should include more common presentations including aortic dissection, acute abdomen, mesenteric ischemia, aortic aneurysm, and stroke.

Aortic occlusion occurs most commonly from thrombosis in the setting of pre-existing atherosclerosis of the aorta (as with our patient), but saddle embolism at the aortic bifurcation and occlusion of prior surgical reconstruction also occur[1]. Cardiovascular disease, hypertension, and malignancy are common comorbidities[1,3]. Heart failure and atrial fibrillation may also be present, more commonly with embolic pathology[4]. These causes and risk factors reflect a growing population of the elderly with atherosclerotic disease[1,4,5].

Most patients present with bilateral acute limb pain and ischemic symptoms distal to the occlusion[1,5,6,7]. Additionally, paralysis due to spinal cord ischemia can occur, which potentially lead to a delay in diagnosis and treatment for a neurologic workup[2,3,4,5]. Mottling of extremities was present in only 15% of subjects in one study[6]. Additional ischemic complications of gastrointestinal malperfusion and renal infarction can occur. Rhabdomyolysis may further complicate aortic occlusion, impacting renal function[3]. Renal failure increases mortality significantly[3,6]. Prompt diagnosis is critical as increased duration of ischemia has been associated with increased mortality and the severity of reperfusion injuries such as compartment syndrome, muscle necrosis, hyperkalemia, kidney failure, arrhythmias, multiorgan failure, and death[4,9].



CT Angiography demonstrating Suprarenal Descending Aortic Occlusion

Treatment

A high index of suspicion is required for rapid recognition and treatment. The mainstays of treatment for aortic occlusion are thromboembolectomy or vascular bypass procedures based on the type of occlusion. In situ thrombosis is commonly treated with bypass surgery and embolus treated with embolectomy[1]. Additionally, patient characteristics and individual surgeon experience can influence treatment decisions[1,5]. Patients with occlusions above the SMA may require aorto-bifemoral bypass with grafts to visceral arteries[3]. Mortality rates within 30 days of patients undergoing surgery have been reported at 20.2%, though some debate is present as to whether this is improving with modern surgical techniques[4,5]. Mortality with conservative therapy has been reported to be as high as 75%[6]. As such, if appropriate services are not available, transfer to centers able to perform complex vascular surgery is advised[3].

Thrombolytic therapy may be a viable option for patients without significant motor deficits, occlusion limited to the distal abdominal aorta, graft stenosis, or hypercoagulable states[5,7,8]. However, these patients have a higher incidence of re-operation[5]. Anticoagulation therapy is recommended prior to surgery for embolic occlusion to minimize recurrent arterial embolism[5,8]. Hemodialysis may be required to treat renal failure necessitating placement of dialysis access catheters[3,9]. Palliative Care consultation should be considered in patients with severe comorbidities or presentations[3].

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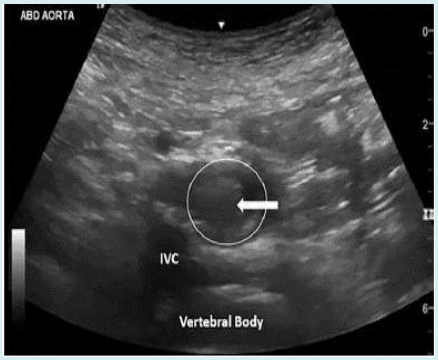
Utility of Bedside Ultrasound



Bloom et al. 2020. Image 1: POC Transverse US of Distal Aorta with thrombus. [Internet]. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7012567/

Bloom et al. 2020. Image 2: CT Angiography axial image demonstrating occlusive thrombus. [Internet]. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7012567/

CT Angiogram is currently the diagnostic study of choice for aortic occlusion with a sensitivity and specificity of 100%[11]. However, one case study demonstrated an aortic saddle embolism using point-of-care ultrasound (POCUS)[12].

POCUS has been used to evaluate other aortic pathologies including aneurysm and dissection. The use of Doppler may be used to improve visualization[12].

POCUS has potentially utility to reduce time to treatment for unstable patients but requires more robust research on its efficacy[12].

Take Home Points

- Aortic pathology (including aortic occlusion) should be suspected in any patient presenting with acute bilateral limb ischemia, motor and sensory deficits to BLE, or mottling of the skin.
- Risk factors include underlying cardiac disease, hypertension, and hypercoagulable states.
- CT angiogram should be obtained to diagnose and guide treatment.
- Treatment options include thromboembolectomy or vascular bypass in addition to anticoagulation.
- Monitor closely for complications of organ hypoperfusion (particularly renal function)

About the Author

This month's case was written by Nathaniel Williams. Nathaniel is a 4th year medical student from FIU HWCOM. He did his emergency medicine rotation at BHMC from May-June 2022. Nathaniel plans on pursuing a career in Emergency Medicine after graduation.

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