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Aortic Dissection

A 76-year-old male comes to the emergency room with sudden onset of severe chest pain. The pain is 10/10 in severity, tearing in quality, and radiates to the back. He is a known diabetic for 10 years and has been hypertensive for 8 years. His medications include insulin, metoprolol and hydrochlorothiazide. His vitals are: HR 86/min, BP 166/96 mmHg in his right arm and 136/70 in his left arm, Temp 37°C (98.6°F), and RR 14/min. On auscultation, lung fields are clear and heart sounds are normal without any murmurs. What is the most accurate test for diagnosis in this patient?

A. **Chest X-Ray**

B. **ECG**

C. **Transesophageal echocardiogram (TEE)**

D. **Computerized tomography without contrast**

E. **D-dimer**

Figure 1

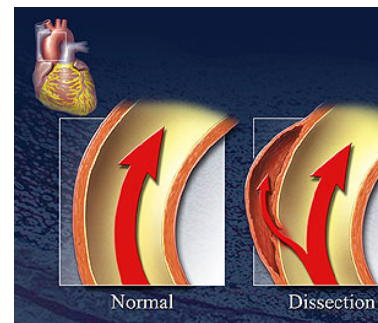http://www2.hawaii.edu/~zinner/101/students/RonnieAorticDissection/aorta.html

Aortic dissection begins when a tear forms in the aortic intima. Blood then passes into the aortic media through the tear, separating the intima from the media and adventitia, which leads to a false lumen. This can expand down to the abdominal aorta causing malperfusion.

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

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The correct answer is C. TEE shows increased diagnostic accuracy compared to the other options. CTA is comparable to TEE; however, choice D specifies the lack of contrast. D-dimer, EKG, and CXR are used for screening.

Pathophysiology

Aortic dissection begins when a tear forms in the aortic intima. Blood then passes into the aortic media through the tear, separating the intima from the media and adventitia, which leads to a false lumen (Figure 1). Most tears begin in the ascending aorta and involve other portions of the thoracoabdominal portions of the aorta. Less commonly, intimal tears occur around the subclavian artery and extend into the descending aorta. This is believed to occur due to shear forces being highest in this area. After the dissection, the "false" lumen begins to expand due to variables such as blood pressure, size of the tear, depth of the dissection, and percent of aortic circumference involved. Occasionally, the dissection can extend and result in malperfusion of aortic branches due to obstruction of branching vessels. Dissections are classified using two systems, most commonly the Stanford classifies dissections starting at the ascending aorta as type A and all others as type B (Figure 2).

Discussion

Aortic dissection occurs in about 3 out of 100,000 persons per year[2]. Patients tend to be males in the 60-80 years age range[3]. High risk conditions typically related to aortic dissection include the following: hypertension, trauma, collagen disorders (Marfan Syndrome, Ehlers-Danlos, annuloaortic ectasia), preexisting aortic aneurysm, bicuspid aortic valve, aortic surgery, coarctation of the aorta, Turner's Syndrome, Vasculitis (Takayasu, syphilitic aortitis, giant cell arteritis), and pregnancy and delivery.

Signs and symptoms of aortic dissection include chest or back pain described as severe, "tearing", sharp/knife-like pain of sudden onset. Patients can uncommonly present without pain, particularly if they are older males with diabetes, history of aneurysm or cardiovascular surgery.

DeBakey classification
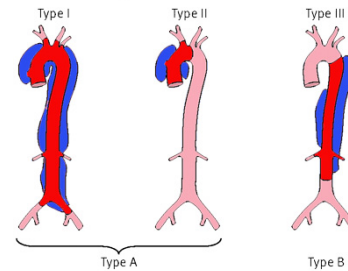
Stanford classification

Figure 2

http://www.emed.ie/Cardiovascular/Vasc/Aortic_Dissection.php

Others findings include pulse deficits, new diastolic heart murmur, focal neurological deficits, hypotension or hypertension, and syncope.

Work-up

D-Dimer - This test currently has a 97% sensitivity and specificity of 56%. Effectively, a negative d-dimer can rule out aortic dissection on a patient[4].

EKG - Obtained for initial evaluation of chest pain. Since dissection does not usually involve the Ostia, no EKG changes are seen that typically show signs of ischemia. Rarely, dissection can lead to ischemia and EKG becomes less helpful for evaluation.

Chest X-ray - Most common abnormality seen in aortic dissection is widening of the cardiac silhouette, appearing in 60-90% of cases (Figure 3). About 20% of cases show radiographic evidence of pleural effusion[5].

CTA/MRA - Used for diagnosis in hemodynamically stable patients. CTA more commonly used compared to MRA due to lower cost and ease of access. Choice of study is dependent on practitioner and institution.

TEE - Used diagnostically in hemodynamically unstable patients due to its portability, easily performed in ED, and yields a diagnosis within minutes.

For a list of educational lectures, grand rounds, workshops, and didactics please visit
BrowardER.com and **click** on the *"Conference"* link.

All are welcome to attend!

Figure 3

http://www.emed.ie/Cardiovascular/Vasc/Aortic_Dissection.php

Treatment

Ascending (Type A) Aortic Dissection- Surgical emergency with operative mortality ranging from 7% to 36%. This is well below 50% with medical management[6].

Descending (Type B) Aortic Dissection- If uncomplicated, this is best managed medically by setting a blood pressure control goal of <120/80 using B-Blockers, nitrates and analgesia. 5 year survival is 60 to 80 percent. If the dissection is complicated or patient is unstable, surgical intervention should be performed[6].

Take Home Points

- Aortic dissection presents with anterior chest pain or back pain described as sharp, severe and "tearing" in quality.
- Aortic dissection is an uncommon yet very severe acute illness that involves a tear in the wall of the artery that can lead to severe complications.
- Dissections are classified using two systems - most commonly the Stanford classification is used, which groups dissections starting at the ascending aorta as type A and all others as type B.
- Routine blood tests are generally non-diagnostic - imaging is best for diagnosis and classification.
- Type A dissections go to surgery emergently, while Type B may be managed medically if the patient is stable.
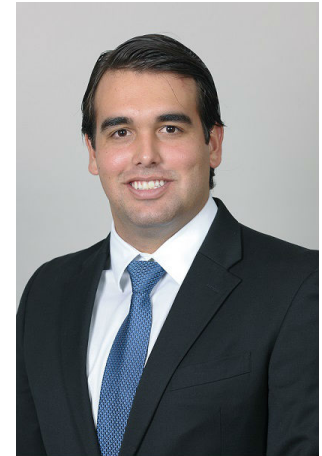
ABOUT THE AUTHOR

This month's case was written by Juan Lopez. Juan is a 4th year medical student from FIU-HWCOM. Juan did his rotation at BHMC in November 2016 and plans to pursue a career in Internal Medicine after graduation.

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