

## 20 Questions about Aortic Emergencies

1. Called for a 'heart' you find a 65 yr man complaining of severe chest pain. While you are getting his vitals, he tells you that it was abrupt and severe in onset, and radiates between his shoulder blades. What life-threatening emergency could this represent (hint: see the title)?
2. You get a BP of 180/90 in the opposite arm that the first responders obtained a reading of 210/110. Why the difference (do not assume operator error)?
3. Attaching the patient to the ECG leads you notice significant ST elevation in leads II and III. Can you be unlucky enough to have both problems, or is this simply an atypical heart attack?
4. What other findings or physical exam clues might you see?
5. Where in the body do they occur?
6. What treatment can you offer such a patient?
7. Do all dissections require surgery?
8. What is the survival rate like for patients that require surgery?
9. Following this, you respond to a PI in which a 28 yo woman was T-boned by a semi You extricate her and transport her to the STAB room. Later, you learn she had a torn aorta. How can anyone survive a torn aorta?
10. Toward the end of the shift, you are called for a 65 yo man with back pain. It hit him fairly suddenly. He recalls he was lifting his car earlier that day, and believes he strained his back then. He looks slightly pale and diaphoretic. What area besides his back would you most like to examine?
11. Besides back pain, what are some common mis-diagnosis in patients with AAA?
12. Describe a classic patient who would have a AAA.
13. Can trying to palpate a AAA cause it to rupture?
14. Why do most AAAs occur in the lower abdomen?
15. How confident can you be about your ability to feel a AAA on abdominal palpation?
16. The patient recalls he was diagnosed with a AAA on a CT last year. Why wasn't it repaired before it ruptured?
17. What should you do for this patient (treatments/therapy)?
18. Enroute to the hospital, the patient drops his blood pressure to 60/palp. How has his chance of survival changed with the drop in blood pressure?
19. As you are going 'alpha' following the last call, you are sent on a GI bleed. A 76 yo man who had a AAA repaired 14 years ago threw up about 250cc of bright red blood just before you were called. What horrible possibility do you need to consider (while getting this patient to the hospital as quickly as possible)?
20. What is a 'dissecting aneurysm'?

## 20 Answers – Aortic Emergencies

1. Aortic dissection. The severe chest pain often seen with dissection is frequently mis-treated as acute MI. Both need to be considered, as well as pneumothorax, pericarditis, esophageal rupture, and other causes of acute chest pain.
2. A dissection occurs when blood forces its way in between the layers of the aortic wall, peeling the intima(inside lining) away, and flowing down both the usual aorta and its new path. As this tearing continues, it can involve the take-off points of all the major arteries, which may lead to BP differences between the arms (or arms to legs, or whatever).

3. This could be your unlucky day! The dissection often won't just travel downstream, it often works its way backwards; when it does it can block the coronary arteries-leading to a heart attack, rupture into the pericardium-causing tamponade, or cause damage to the aortic valve. These can be rapidly fatal complications.
4. Aside from the pain (85% of cases) which is usually severe, often described as migratory or tearing, and is maximal at onset, look for unequal arm pulses and blood pressure differentials, signs of poor limb perfusion, stroke (due to carotid involvement), possible paraplegia, and sometimes severe abdominal pain (due to lack of blood flow to the gut). Unfortunately, the majority of patients will just have the chest and/or back pain.
5. Dissections usually begin one of two places, either in the ascending aortic arch, or by the left subclavian artery. Once they start, they can go pretty much anywhere along the aorta.
6. Routine cardiac cares including oxygen, monitor, IV access, and nitro are appropriate. The main aim of therapy is to minimize additional tearing. Lowering the blood pressure is one way to help prevent additional tearing – consider checking with medic control if you suspect this, you may need more nitro. Aspirin is not given to confirmed dissections, but is often given when the patient is initially assessed and thought to have routine cardiac chest pain. Better to give it unless you discuss with medical control and it seems to be a clear-cut dissection.
7. No. Type A dissections – which involve the arch of the aorta are usually repaired. Type B dissections, which involve the descending aorta only are generally not surgically repaired unless the patient is young or has other extenuating circumstances. Interventional radiology will often place a stent across these lesions although there are nuances in regards to where exactly they can place a stent without blocking other arteries like the renal arteries.
8. Survival often depends on how sick the patient is going into surgery, but overall the survival rate is 78% for repairs of arch dissections, 88% for descending repairs. However, by ten years the mortality is 50% due to underlying cardiac disease, stroke, and renal failure (as well as occasional graft failure, etc.).
9. If the aorta tears through all its layers and ruptures into the chest, you couldn't be saved even if you happened to be driving a vascular surgeon to the doughnut shop. Ideally, you hope for a sort-of dissection; that the adventitia, the fibrous cover for the aorta, holds even though the other layers tear. These cases account for about 5-10% of traumatic aortic ruptures. If they are recognized and repaired, the outcome is quite good. If not, 50% of these persons die within 24h of the accident, and most of the rest over the next few days. Deceleration injuries (falls, MVC, etc.) are the most common mechanism. Time is absolutely of the essence in regards to fixing these as soon as they are recognized.
10. His belly. Palpating the aorta to determine if a AAA (abdominal aortic aneurysm) is present is an EXCELLENT idea! Although often not palpable, it is always good to check for AAA in the right setting.
11. Kidney stone (23%), muscular back pain (9%), GI problem (32%), sepsis (7%), MI (9%), and, interestingly, motor vehicle trauma (car goes off road due to driver's ruptured AAA) (7%). The majority of AAA ruptures occur retroperitoneally (toward the kidney) so they will often tamponade themselves off, at least temporarily – thus presenting with severe back pain and often normal blood pressure.
12. A white male age >60, smoker, with cardiac and hypertension history, often with a family history of AAA.
13. No.
14. Except in patients with syphilis (in whom thoracic aneurysms are more common), an aneurysm forms below the kidneys due to a larger pressure wave as the aorta tapers, smaller

amounts of elastin in the abdominal aortic wall, and more turbulent flow from pressure waves reflecting from the many branches of the abdominal aorta.

15. If you can feel the aorta, you can be very comfortable that a AAA is not present. Unfortunately, this is often possible only in relatively thin individuals. If you can't feel the aorta, or just feel pulsations, you cannot determine that there isn't a AAA.
16. You may have patients who know that they have a AAA. The risk of rupture warrants surgery only when aneurysms become symptomatic, enlarge to >5cm in a usual patient (or 6cm in a poor risk patient, sometimes even 4-5cm in a young patient), or have a saccular (local bulging) component.
17. Obtain large-bore IV access, provide O<sub>2</sub>, cardiac monitor, and get rolling!
18. His chance of dying just went from 20% to over 50%.
19. An aortoenteric fistula occurs when an infection in the graft causes erosion into the gut, basically providing communication from the aorta to the gut. The mother of all GI bleeds, this may be rapidly fatal, but sometimes will present with a 'sentinal bleed' when a smaller amount of blood is lost before the fatal bleed occurs hours to days later. These events luckily are much less common due to changes in AAA repair techniques, but still may be seen.
20. Most of the time you have either a dissection or an aneurysm, but not both. Sometimes after a dissection is treated without surgery an aneurysm can develop (up to 20%) at the site of the dissection. (Most of the time when you hear this term, it is being used incorrectly and the patient has one or the other.)