CASE REPORT

An easy miss: aortic dissection in a 'healthy' male

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SUMMARY

Aortic dissection is an uncommon cause of chest discomfort that can be rapidly fatal without early diagnosis and prompt treatment. In this report, we present a man with no risk factors who presented with chest discomfort not typical of a dissection, absent pulse and blood pressure differential and a normal chest radiograph. He eventually was diagnosed with an extensive Type-A aortic dissection. We discuss diagnostic clues, classification of aortic dissection and possible treatment options.

BACKGROUND

Aortic dissection is one of the conditions presenting with chest discomfort requiring emergent care. The mortality rate is very high with 40% of people dying immediately and an additional 1% dying per hour over the first several hours.¹ Early recognition and rapid intervention are keys to patient survival.

CASE PRESENTATION

A 59-year-old man presented to our emergency room (ER) 10 min after experiencing sudden onset of severe, pressure-like, persistent, non-radiating chest pain, just after eating calamari and drinking beer. This was accompanied by vague abdominal discomfort, nausea and vomiting. He was well prior to these symptoms. He had no sick contacts and his colleague who shared his dinner did not get sick. He had no medical history and regularly saw his primary care physician. Family history was unremarkable. He denied smoking cigarettes but reported occasional alcohol and remote marijuana use.

At the ER, patient continued to have episodes of vomiting and started to have bloody stools. Vital signs included a blood pressure (BP) of 145/43 mm Hg, with no significant difference between arms, heart rate of 60, respiratory rate of 16 and temperature of 36.9 C. Patient was in moderate distress due to abdominal discomfort. There was no murmur noted on cardiac exam. Other remarkable findings on exam included twitching of his jaws bilaterally, bounding pulses and epigastric tenderness without guarding.

INVESTIGATIONS

Complete blood count, comprehensive metabolic profile and troponin level were all normal except for a borderline elevated creatinine (1.21 mg/dL or 106.99 µmol/L) and an elevated total bilirubin

(3.5 mg/dL or 59.85 µmol/L). Chest X-ray (figure 1) was normal. ECG (figure 2) revealed sinus bradycardia (heart rate was 46) without ischaemic changes. Intravenous atropine was administered and the patient's heart rate responded to 60s. Patient was admitted to the cardiac intensive care unit for monitoring for asymptomatic bradycardia. Given persistent vomiting and abdominal pain, CT scan of the abdomen with contrast (figure 3A and B) was requested to explore possible aetiologies. This showed aortic dissection involving the lower thoracic aorta with extension into the bilateral common iliac arteries.

The findings suggestive of aortic regurgitation (bounding pulse, wide pulse pressure) and renal failure suggested possible Type A. Thus, we proceeded with performing the CT angiography (figure 4A, B and C), which showed Type-A aortic dissection involving the ascending aorta, the aortic arch, the right common carotid and left proximal internal carotid, the descending aorta, right renal artery and the mesenteric arteries.

TREATMENT

Patient was immediately taken to the operating room for emergent repair of ascending aortic dissection and his torn aortic valve was repaired. After 2 days, patient's vital signs stabilised but creatinine continued to go up. A visceral interventional radiology arteriogram was performed. This showed that the dissection flap was occluding the right renal

Figure 1 Plain film of the chest.

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Figure 2 ECG on admission.

artery origin and that the left renal artery was arising from the false lumen. A right renal artery stent was placed. Arteriogram on the mesenteric arteries did not show any dissection hence no stenting was performed.

OUTCOME AND FOLLOW-UP

Apart from a brief episode of atrial fibrillation and postoperative pneumonia, patient recovered well. Haematochezia stopped without needing further interventional procedure. Creatinine and lactic acid levels improved. Patient recovered well symptomatically. He was eventually discharged home on postoperative day 15. A subsequent genetic test for Marfan's disease came back negative.

DISCUSSION

Aortic dissection occurs when there is a disruption of the media layer of the aorta with bleeding within and along the wall of the aorta resulting in separation of the layers of the aorta. The Stanford classification system categorises dissections into two groups based on the extent of dissection. Type-A aortic dissection involves the ascending aorta, whereas Type-B aortic dissection does not. The mean age of patients with aortic dissection is 63 years (95% CI 61.8 to 64.4) according to the International Registry of Acute Aortic Dissection registry.² Other risk factors for aortic dissection include conditions that either increase shear stress along the aortic wall or result in the aortic medial degeneration. The former includes conditions like hypertension, pheochromocytoma, stimulant use, trauma and coarctation of the aorta. The latter includes connective tissue disorders like Marfan, Loeys-Dietz and Ehlers-Danlos syndromes and inflammatory vasculitides, among others.^{1,2}

Because of the increased mortality associated with aortic dissection, the diagnosis should be considered in all patients

Figure 4 A, B and C CT angiography of chest, abdomen and pelvis.

presenting with chest pain, back pain, abdominal pain, syncope or other symptoms consistent with perfusion deficit.¹

A prospective observational study involving 250 patients described a way of screening for aortic dissection using three variables, namely: (1) an abrupt onset of thoracic or abdominal pain with a sharp, tearing or ripping character (aortic

Figure 3 A and B CT abdomen with contrast.

pain); (2) mediastinal and/or aortic widening on chest radiograph and (3) a variation in palpable pulses (absence of a proximal extremity or carotid pulse) and/or BP (>20 mm Hg difference between the right and left arm). Low risk was defined as the absence of any of the three features and was associated with a probability of dissection of only 7%. Intermediate risk was defined as the isolated findings of aortic pain or positive chest radiograph and was associated with a probability of 31% and 39%, respectively. Finally, high risk was defined as combination of the three features and was associated with a probability of 83%–100%.³

The American College of Cardiology (ACC) guidelines also provide a screening pathway for aortic dissection based on three high-risk indicators: (1) high risk conditions, (2) high risk pain features and (3) high risk exam features. The presence of ≥ 2 , 1 or 0 indicators may be classified as high risk, intermediate risk or low risk, respectively. High-risk conditions include connective tissue diseases, family history of aortic disease and known aortic conditions. High-risk pain features include an abrupt onset, severe intensity and ripping/tearing/sharp or stabbing quality. High-risk exam features include a pulse deficit, systolic BP differential, focal neurological deficit, murmur of aortic insufficiency and hypotension.¹

Using either of the classifications above, our patient would have been classified as low-risk. With this risk and the absence of risk factors, imaging to check for aortic dissection may have been skipped and the diagnosis missed.

The sensitivity of diagnosing aortic dissection can be increased by recognition of organ complications related to the dissection. Cardiovascular complications include aortic insufficiency, syncope, pericardial tamponade, myocardial ischaemia/infarction and congestive heart failure. Neurological complications include ischaemic stroke, transient ischaemic attack, peripheral neuropathy, paraplegia/paraparesis and spinal

ischaemia. Pulmonary complications include pleural effusion and aortopulmonary fistula with haemorrhage. Gastrointestinal complications are mesenteric ischaemia or infarction and aortoenteric fistula with haemorrhage. Acute renal insufficiency may also result from renal ischaemia/infarction. Finally, extremities may also be involved leading to limb ischaemia depending on the extent of the dissection.¹

In our patient, unexplained findings prior to imaging that provided clues to aortic dissection included the haematochezia, possibly his jaw twitching, his wide pulse pressure, bounding pulses and new renal insufficiency. The wide pulse pressure and bounding pulses were thought to be (and later shown) secondary to aortic insufficiency, the most commonly recognised cardiac complication of aortic dissection reportedly occurring in 41% to 76% of cases.^{4–8} Haematochezia occurs infrequently in aortic dissection, but when it does it is usually a result of mesenteric ischaemia from poor perfusion due to systemic hypotension or dissection-related end-artery obstruction.⁴ The jaw twitching is difficult to correlate with his clinical scenario, other than a pain response and may not have been a neurological complication of his aortic dissection.

With a suspicion for aortic dissection, immediate imaging studies using CT scan or a transoesophageal echocardiography are warranted to confirm the diagnosis. Ascending aortic dissection requires urgent cardiovascular surgery while descending thoracic dissection can be managed medically in the setting of haemodynamic stability and absence of end-organ involvement.

The diagnosis of aortic dissection was difficult in our patient's case due to the absence of the typical risk factors with an ACC score of 1 initially on presentation. The signs and symptoms of organ complications and a high index of suspicion were keys to the diagnosis in this case.

Patient's perspective

- I first experienced a strange pressure in my chest in the middle of dinner with a business associate. My first thoughts were heartburn or something like that. However, the pressure continued, although non-painful—it was more of an odd unknown sensation, new to my experiences with my own body. For the first 2–3 min of the pressure feeling in my chest, I thought about heart attack symptoms as well as stroke symptoms while disconnecting temporarily from the table conversation with my business associate. I rejected the heart attack and stroke symptoms quickly. I started to have a mental 'conversation' between my conscious and subconscious about what was going on, if anything, and what I was feeling.
- After about 3 min, I initiated a conversation about what I was feeling or experiencing with my business associate. He quickly asked me a question about what I was feeling and I answered about the odd pressure in my chest and then he asked another question, at which time he said my eyes were starting to glaze over or look far away. He then asked if I wanted to go the emergency room. I hesitated about 10 s and then I said yes and we immediately got up and went for my car which was valet parked. I told him the ER at RUSH was a mile away and how to drive there. We left the restaurant approximately 5–6 min after I first felt the pressure. In retrospect I willed my body to get up and walk to the car. I remember giving directions to my business associate who was driving my car and half way to the ER, was the last thing I remember until I woke up 5 days later.
- I was told later by my business associate, that I had to be peeled out of my seat from the car and placed on a gurney when we arrived at the ER. I recall nothing while in the ER or until 5 days later when I 'awoke', except for a weird stressful extended dream/nightmare while I was in the ICU recovering, which is in itself a strange story. I believe the dream was related to high humidity and difficulty breathing which would relate to the days I had the pneumonia.
- I was also told later, that while in the ER for a bit my business associate went to visit me where I was being treated and then said I started to thrash around and hold my chest and say over and over 'I am dying, I am dying'. He then went to get the ER doctor to check on me, which is when we suspect the ER team started to realise the seriousness of my condition.
- In retrospect, I believe that subconsciously I had gone into total survival mode and it took not only the great efforts of the ER to maintain me presurgery and the surgical team to repair me and care for me postsurgery, but my own will to live to survive this event. And, no I do not recall seeing any white lights.

Learning points

- ▶ The usual risk factors for aortic dissection, such as hypertension, pregnancy or early post partum, older age (>60 years. old), aortic disorders and genetically mediated collagen disorders may or may not always be present.
- ▶ Guidelines and algorithms based on history exam are available to risk stratify patients suspected of aortic dissection.
- ▶ Prior to ruling out aortic dissection in low-risk patients, it is prudent to check for organ complications associated with aortic dissection, such as aortic insufficiency, mesenteric ischaemia, neurological deficits and renal insufficiency.

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