Unusual association of diseases/symptoms

Dissecting out the cause: a case of concurrent acute myocardial infarction and stroke

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Correspondence to Dr Tuan Le Nguyen, nguyenletuan@hotmail.com**Summary**

Acute type I aortic dissection is an uncommon but potentially fatal condition requiring prompt recognition of symptoms and generally surgical intervention. A history of chronic hypertension is the major predisposing risk factor for aortic dissection. Commonly patients experience acute chest pain, but myocardial infarction or stroke due to the dissection involving the coronary or carotid arteries are rare and serious life-threatening complications. The authors describe the case of a 60-year-old male presenting with concomitant features of acute myocardial infarction and cerebrovascular accident resulting from an extensive acute aortic dissection.

BACKGROUND

Myocardial infarction, cardiac tamponade and stroke are serious and imminently life-threatening complications of an extensive type I aortic dissection. Prompt recognition, appropriate resuscitation and urgent surgical intervention is vital for survival. We believe this may be the first described presentation of a patient surviving an acute aortic dissection complicated by myocardial infarction, cardiac tamponade and stroke.

CASE PRESENTATION

A 60-year-old male presented with symptoms of acute ischaemic chest pain, nausea, presyncope, acute dysarthria, left arm weakness and confusion. He had a history of a left frontal intracerebral bleed, from cerebral amyloid

angiopathy, resulting in residual right-sided hemiparesis. The patient also had hypertension controlled adequately on antihypertensive therapy. There was no history of coronary artery disease, diabetes mellitus, smoking or family history of ischaemic heart disease. On presentation, he was hypotensive (blood pressure 80/50 mm Hg), bradycardic (45 bpm) and hypothermic (34.8°C). There were no cardiac murmurs and normal vesicular breath sounds on auscultation.

INVESTIGATIONS

Serial ECGs revealed poor R-wave progression with dynamic infero-lateral ST depression and T wave inversion during episodes of ischaemic chest pain. There was an acute rise in his cardiac biomarkers with troponin T levels

Figure 1 Cerebral MRI (A) T2 Flair and (B) Diffuse weighted images – White arrows indicate areas of acute infarct. Black arrows show area of encephalomalacia and surrounding gliosis from an old intracerebral haematoma.

Figure 2 (A) Transoesophageal echocardiogram showing dissection flap (arrow) extending to aortic root and encroaching on aortic valve and right coronary artery origin. (B) Transthoracic echocardiogram indicates the pericardial effusion (PE) and significantly dilated aorta (Ao). LA, left atrium; LV, left ventricle; RV, right ventricle.

Figure 3 CT aortogram – demonstrating aortic dissection (arrows) extend superiorly to the brachiocephalic and left common carotid arteries, and inferiorly to aortic root and right coronary artery (RCA). There is a moderate pericardial effusion (PE).

increasing from 0.01 ng/ml to 0.20 ng/ml. He developed acute renal failure on subsequent blood tests, with a rise in serum creatinine from 90 mmol/l to 183 mmol/l over 12 h.

Chest x-ray showed right lower zone airspace opacification and moderate cardiomegaly. There was a large area of encephalomalacia, indicating an old area of infarct, without evidence of haemorrhage on the initial head CT. The diagnosis of an acute cerebrovascular accident was later confirmed during hospital admission by a cerebral MRI, showing areas of acute stroke on diffuse weighted imaging (white arrows) on the right hemisphere and encephalomalacia in the left frontal lobe (black arrows) (figure 1).

Transthoracic echocardiography revealed a moderate-sized pericardial effusion with features of tamponade, mild aortic regurgitation and a moderately dilated ascending aorta (figure 2).

Transoesophageal echocardiography demonstrated a type I (De Baeyer classification) ascending thoracic aortic aneurysm with an aortic dissection flap (white arrow), proximally extending into the aortic root, intermittently pushing on the right coronary cusp and a large false lumen extending into the arch of aorta (figure 2). These features were confirmed on a subsequent CT thoracic angiogram displaying the distal extension of the aortic dissection extending into the brachiocephalic and left common carotid arteries (figure 3).

TREATMENT

The patient subsequently underwent successful emergency cardiothoracic surgery. The surgery involved replacement of the ascending thoracic aorta with a valve sparing Dacron graft. The dissected ostial right coronary artery did not require bypass grafting. Histopathological examination following surgery, showed degenerative cystic medial changes (black arrows), with a dissection through the media layer (figure 4).

OUTCOME AND FOLLOW-UP

Following a protracted recuperation period in hospital, the patient was discharged with good neurological and cardiac recovery.

DISCUSSION

Acute thoracic aortic dissection is a condition that often carries a poor prognosis, in particular type I, with significant haemodynamic instability and life-threatening complications. The peak incidence is in the 60–80 year old age groups with a higher occurrence in males. The main predisposing risk factors for aortic dissection is a history of chronic hypertension (accounting for up to 75% of cases), atherosclerosis (31%) and previous cardiothoracic surgery (18%).¹ Various connective tissue and collagen disorders contribute to presentations in younger patients.

Arterial vasculature, including the aorta, undergo dynamic structural remodelling to maintain their strength

Figure 4 Histopathological sections revealing aortic dissection (AoD) of tunica media (TM) layer. There are myxoid changes within the tunica media (black arrows) . TI, tunica intima.

and integrity. Aneurysmal formation, in sporadic cases, can occur from an imbalance of collagen synthesis and degradation. Ischaemic changes to the vessel can lead to degenerative loss of smooth muscle cells and damage to the extracellular matrix structure. Histologically, this appearance is known as cystic medial degeneration often without inflammatory changes in the wall of the aorta.

The clinical features of acute aortic dissection are often variable, the most common being chest pain. Some may present with features mimicking acute myocardial infarction, heart failure, syncope or stroke symptoms, which may give clues to the extent of the dissection. Rarely in the literature have there been reported cases of concurrent myocardial infarction and stroke.^{2 3}

Surgical intervention, in type I aortic dissection, is the treatment of choice given potentially fatal clinical sequelae that may follow. Mehta *et al* identified a predictive model based on a review of the data from the International Registry of acute aortic dissection, indicating poor prognostic preoperative factors for surgery.⁴ These factors included age ≥ 70 years, female sex, abrupt onset of chest pain, abnormal ECG, pulse deficit, renal failure, hypotension/shock or tamponade.⁴ The importance of considering acute aortic dissection in working up patients with suggestive symptoms and risk factors may give the best possible chance for a favourable outcome.

Learning points

- Thoracic aortic dissection can present with a variety of common symptoms including chest pain, stroke like symptoms and collapse.
- Thoracic aortic dissection can present as myocardial infarction and cerebrovascular accidents.
- Early suspicion of aortic dissection can lead to prompt diagnosis and treatment leading to a more favourable outcome.
- Type I thoracic aortic dissection is generally a surgical emergency.

Competing interests None.

Patient consent Obtained.

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