Aortoesophageal fistula as a late complication of aortic transection

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Acute aortic transection carries a high mortality, with death occurring in up to 90% of patients and with fewer than 5% surviving for longer than 14 days. Chronic false aneurysm develops in patients who survive an acute aortic rupture without operation.¹ Chronic traumatic aortic aneurysm involves either partial or complete disruption of at least the intima and media and develops 3 months or more after a major deceleration injury.

The natural history of chronic pseudoaneurysms is unclear. Most likely, thrombus develops within the disrupted portion of the aortic wall and then forms a fibrous wall that calcifies with time. Later on, it may expand or even rupture.

It has been reported that 20-year survival of patients with chronic traumatic aortic aneurysm is around 60%, with half having symptoms by 10 years and a third dying of late rupture.² Symptoms develop as a result of aneurysm expansion and its impact on surrounding structures. Back pain is the most common presentation. Other presenting features include dyspnea, hoarseness, paraplegia, hemoptysis, dysphagia, hematemesis, and sudden death.

We describe a case of successful repair of chronic traumatic aortic aneurysm that was initially seen with esophageal bleeding and collapse.

Clinical Summary

A 32-year old man was referred for surgical opinion after an episode of collapse. This episode was associated with hematemesis of around 300 mL. He had a good recovery after resuscitation with crystalloid solution. There was no previous history of hematemesis.

The medical history of note was that he had been shot in the left side of the chest with an air pistol when he was 14 years old and had been involved in a motorbike road crash (speed around 50 mph) when he was 17 years old. The latter incident required hospital admission because of lower limb fractures, but there was apparently no concern regarding chest injury.

Chest radiograph during this current admission revealed a calcific enlargement of the upper descending thoracic aorta. This was investigated further with a contrast computed tomographic scan, which revealed a chronic saccular aortic aneurysm just distal to the origin of the left subclavian artery with compression and involvement of the adjacent esophageal wall (Figure 1). The esophagus was adherent to the aneurysm and was distorted (Figure 2).

Figure 1. Sagittal view of reformatting computed tomographic scan showing chronic aortic aneurysm (CAA) with calcification in its wall, along with thrombus arising just distal to origin of left subclavian artery (LSA). AA, Aortic arch.

The patient underwent repair of this aneurysm by left thoracotomy through the fourth intercostal space. The clamp-and-sew technique was used. An interposition graft was used (woven Gelweave size 20 mm; Sulzer Vascutek Ltd, Renfrewshire, United Kingdom). The aneurysm was strongly tethered to the esophageal wall, and that part of the aneurysm was left attached to the esophagus.

The patient had an uneventful recovery, and diatrizoate meglumine (Gastrografin) swallow study on the fifth postoperative day did not reveal any esophageal leak. He was discharged to home on the ninth postoperative day.

Discussion

This patient most likely had sustained a nonfatal aortic transection after his road crash, 15 years before this episode. The mechanism leading to aortic damage is still under debate, with the initial “whiplash” theory (combination of traction, torsion, shear, bending, and bursting forces as a result of differential deceleration) replaced by the “osseous pinch” theory.³ The latter theory postulates that during the injury, the manubrium, first rib, and clavicular heads impact the vertebral column. The portion of the aorta overlying the spine (the isthmus and proximal descending aorta) is then sandwiched between the bones. Thus the arch and ascending aorta are rarely involved, whereas the aortic isthmus is affected in more than 90% of cases.² It

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Figure 2. Computed tomographic section of chest showing adherence and distortion of esophagus (*E*) by chronic aortic aneurysm (*CAA*). *T*, Trachea.

should be noted that the ligamentum arteriosum, the left main stem bronchus, and the paired intercostal arteries limit the mobility of the aorta at the isthmus.

Typically, aortic transection involves all three layers of the aortic wall in a transverse fashion. The aortic wall structure at the level of the transection does not differ from that of the uninvolved aorta. The adventitia provides most of the tensile strength, and there is no evidence to suggest that the adventitia at the aortic isthmus is weaker than the rest of the aorta. Atherosclerotic disease is an uncommon finding.

Previous reports of esophageal bleeding from aorto-esophageal fistula are rare. In their series of 6 patients, Myers and Silber⁴ reported 100% mortality. They added that the diagnosis was made during postmortem studies in all but 1 case.

Operative mortality for chronic traumatic aortic aneurysm repair is around 5%, with 90% and 85% 5- and 10-year survivals, respectively.^{2,5} Ideally, prompt diagnosis followed by immediate

repair is warranted when the initial alarm bell of fistula formation is sounded by mild esophageal bleeding.

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