

Case Report

Aneurysm of the descending thoracic aorta presenting with paraplegia which significantly resolved following surgical repair

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ABSTRACT

Spinal cord infarction secondary to dissecting thoracic aortic aneurysm is a relatively rare phenomenon; it is uncommon for descending aortic aneurysm to present with paraplegia. We report the case of 60 year old man presenting with sudden onset paraplegia secondary to spinal cord infarction caused by dissecting thoracic aortic aneurysm with intraluminal thrombus. Spinal MRI confirmed findings and he underwent emergency surgery. Post-operatively he displayed neurological improvement, and was mobilising with a frame by 2-month outpatient clinic review.

Keywords: Aneurysm, Descending aorta, Dissecting aneurysm, Aortic surgery, Aortic aneurysm, Paraplegia, Spinal cord ischaemia

INTRODUCTION

Most thoracic aortic aneurysms are asymptomatic and usually discovered incidentally on imaging studies.¹ Dissected thoracic aneurysm may not always present with symptoms of acute onset chest or back pain, malperfusion or haemodynamic instability; although paraplegia following thoracic aortic aneurysm repair is a well reported phenomenon, it is very rare for an asymptomatic thoracic aortic aneurysm to present with paraplegia. Present study is a report of a case in which paraplegia was the clinical manifestation of an otherwise asymptomatic descending thoracic aortic aneurysm, secondary to resultant spinal cord infarction.

CASE REPORT

A 60 year old man presented to the emergency department with acute onset lower-limb paralysis and urinary retention. On admission he was found to be haemodynamically stable and in sinus rhythm. Neurological examination identified complete paralysis in his lower limbs, with associated hyperreflexia and

hypersensitivity. His upper limb neurological examination and higher neurological functioning were clinically normal. Overall, the picture was suggestive of a high spinal cord lesion. The patient had a background history of type A aortic dissection repaired as an emergency 15 years beforehand, requiring an aortic root replacement and mechanical aortic valve. Chest X-ray is depicted in Figure 1.

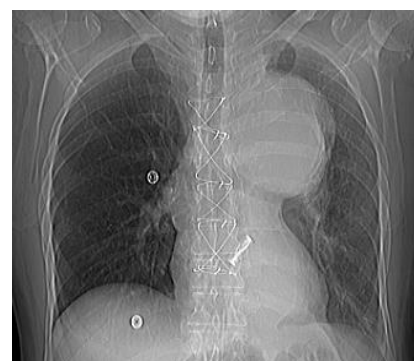


Figure 1: CXR on admission.

On admission CT scanning of the chest and abdomen were performed (Figure 2), confirming a large, dissected aneurysm of the descending thoracic aorta (DTA) from the mid aortic arch, lined with extensive thrombus. The largest part of the aneurysm was noted to be in the proximal descending aorta at >7cm diameter, with an associated 5cm pseudoaneurysm abutting the apex of the chest. The dissection involved the entire thoraco-abdominal length of the aorta and continued into both iliac arteries. The aorta was noted to taper down to 3.6 cm just above the coeliac axis, providing a suitable area for potential distal anastomosis. It was felt that limiting the extent of any resection to above the diaphragm would facilitate the patient's recovery, preventing further compromise to his lumbar and intercostal arteries and increasing chances of neurological rehabilitation. The patient underwent MRI scanning of his brain and spinal cord (Figure 3) for further assessment of his neurological deficit, showing an area of ill-defined high signal within the thoracic spinal cord at T5-T8 in keeping with oedema secondary to ischaemia and infarction.

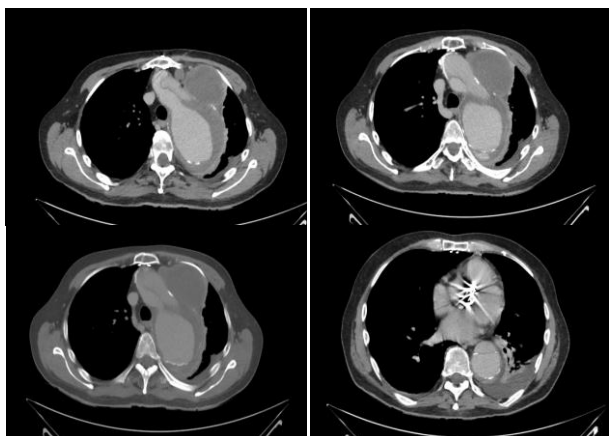


Figure 2: CT scan on admission. Chest CT scan confirmed a 9 cm aneurysm of the descending thoracic aorta DTA. Dissection extends from mid aortic arch with additional pseudoaneurysm in the proximal DTA and extensive thrombus lining.

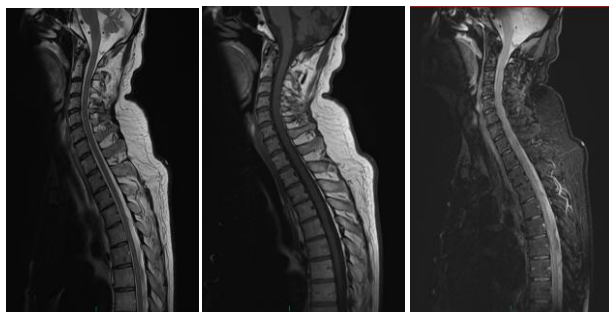


Figure 3: MRI of spine. MRI spine revealed ill-defined high signal within the thoracic spinal cord at T5-T8 in keeping with oedema secondary to ischaemia and infarction.

The patient was proceeded to surgery, a spinal drain was inserted, left thoracotomy performed via the 6th intercostal space and cardiopulmonary bypass instituted (Left femoral venous and arterial cannulation, LV apex vent), with core cooling commenced. At 20°C, a cross clamp was placed on the DTA 5cm above the diaphragm and lower body perfusion continued. Circulation was arrested to the proximal half of the body. The DTA aneurysm was opened, and extensive thrombus removed from within the false lumen. A large 3×3 cm opening was noted proximally leading into an anterior pseudoaneurysm. A 28 mm Vascutek Gelweave™ tube graft with a single side arm was anastomosed end to end at the origin of the left subclavian artery, with the distal end anastomosed above the diaphragm. Large intercostal arteries were anastomosed and there were other few small calibre with good retrograde blood flow intercostal arteries which were oversewn. Post-operatively MAP ≥80 was maintained. The patient made good progress, with repeat CT scanning showing satisfactory appearance of his prosthetic aortic valve, ascending aorta and DTA, with no signs of leak at the site of the anastomosis (Figure 4). After 2 weeks the patient was transferred to the spinal injuries' unit for ongoing rehabilitation, where he made a near full recovery. By the time of outpatient review at 2 months, patient had regained power and sensation in his legs and was noted to be mobilising with a frame.

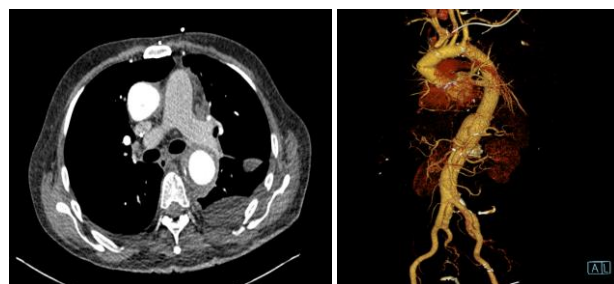


Figure 4: Post-surgery CT scan. Satisfactory appearance of the replaced DTA. No signs of leak at the site of the anastomosis.

DISCUSSION

Annually, there are estimated 3000-8000 new cases of chronic thoracic aortic aneurysm in the UK.² It is well known that thoracic aortic aneurysm is a life-threatening condition, with rupture being the most concerning potential consequence particularly the case for large aneurysms.³

Spinal cord injury is a known risk of thoracic aneurysm repair, caused by disruption of the vascular supply to segmental arteries.^{4,5} Paraparesis and paraplegia have been known to complicate surgical repair during surgery on the thoracic aorta, with many documented cases of ischaemic spinal cord syndrome yet it remains a rare complication with an incidence of 1.2%.^{6,7} If the lower thoracic spinal cord is vulnerable to ischaemia in a

controlled surgical environment, it would follow that ischaemia could also result from acute aortic dissection.⁸ However, it is exceedingly rare for an otherwise asymptomatic thoracic aortic aneurysm to present with paraparesis. Spinal cord infarction is in itself a rare entity, caused by a variety of pathological conditions but all characterised by sudden paralysis or sensory deficits below the level of injury.^{6,7,9} In the literature the most common consequence of spinal cord infarction is anterior spinal artery syndrome, which did not apply to our case as sensation to pain and touch remained intact.^{7,9}

The spinal cord is supplied by one anterior spinal artery, supplying the anterior two-thirds of the spinal cord, and two posterior spinal arteries.^{5,6,8} The anterior spinal artery arises from thoracic intercostal branches and lumbar radicular arteries, and has its narrowest diameter in the thoracic segment.^{7,9} In the majority of cases, the most prominent thoracic radicular artery, the artery of Adamkiewicz, arises from a left intercostal artery between T9 and T12 and supplies the anterior spinal artery.⁵⁻⁸ This is thus the main arterial supply to the lower thoracic spinal cord.¹⁰ Occlusion of this artery invariably results in ischaemic myelopathy and paralysis of the lower limbs, which is permanent in the majority of cases.^{8,10} However in our case, paralysis was transient and collateral supply through thoracic and sacral radicular arteries may have been responsible for revascularisation of the cord and the subsequent neurological recovery.⁵ Joo and Cummings also report a case of transient paralysis as the only presenting factor in a case of thoraco-abdominal dissection, which recovered fully following institution of medical therapy.⁸ Early intervention and surgical management in our case appeared to maximise neurological recovery, as the patient was transferred to theatre and underwent surgery without delay.

As current case report illustrates, dissection or acute dilatation of aortic aneurysm is not always associated with classic symptoms of chest/back pain, and isolated paralysis of the lower limbs may be the only presenting feature.¹⁰ Understanding the pathological process involved in spinal cord ischaemia resulting from aortic dissection allows us to consider the diagnosis in those presenting with isolated lower limb paralysis.⁸

CONCLUSION

Thoracic aortic aneurysm can present with paraplegia. Early recognition and surgery are of great importance in avoiding further neurological consequences.

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