Fatal cerebellar stroke following emergency endovascular stent grafting of a leaking thoracic aortic aneurysm: A case report

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Stent-grafting of thoracic aortic diseases has developed as an alternative therapeutic modality in thoracic aneurysm management. Postprocedural complications include mortality, endoleaks, paraplegia and stroke. Other complications that may arise in cases of over-stenting the origin of the left subclavian artery include left upper

limb ischemia, subclavian steal syndrome and stroke. Posterior circulation strokes due to vertebral artery insufficiency have been reported in the past. In the present case, a fatal stroke caused by a cerebellar infarct culminating in the death of a patient with a leaking thoracic aortic aneurysm is reported. Medical personnel as well as patients should be aware of this possible complication. Vigilance in assessing the contralateral cerebral circulation before the procedure is a prerequisite in less acute circumstances.

Key Words: Aneurysm; Endovascular; Stroke; Thoracic

Stent-grafting of thoracic aortic diseases has developed as a less-invasive alternative therapeutic modality, considering the high morbidity and mortality associated with conventional open surgery (1). However, a number of postprocedural complications have been described, including endoleak, transient postimplantation syndrome, paraplegia, stroke and death (2). Other complications related to stenting over the origin of the left subclavian artery include left upper limb ischemia and subclavian steal syndrome; these are usually well tolerated (3). The manipulation of guidewires and catheters in an atherosclerotic aortic arch can cause embolic events such as strokes, usually along the distribution of the middle cerebral artery; however, posterior circulation strokes due to vertebral artery insufficiency have been rarely reported (1).

In the present case, we report a fatal stroke caused by a cerebellar infarct culminating in the death of a patient with a leaking thoracic aortic aneurysm (TAA).

CASE PRESENTATION

A 76-year-old patient, with no significant comorbidities except for hypertension, was admitted to the accident and emergency department with sudden onset of severe interscapular pain. A chest x-ray revealed widening of the mediastinum with a left-sided hemothorax (Figure 1).

Figure 1) Chest x-ray showing widening of the mediastinum with a left-sided hemothorax

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Figure 2) Computed tomography scan showing a leaking thoracic aortic aneurysm

A computed tomography (CT) scan confirmed the diagnosis of a leaking TAA associated with a large hematoma distal to the origin of the left subclavian artery (LSA)(Figure 2).

The patient was resuscitated and underwent emergency endovascular repair under general anesthetic. Two thoracic stents, 40 mm in diameter (Zenith zteg-2p-40-216 and Zenith the-40-81, Cook Medical, Denmark) were deployed just distal to the origin of the left carotid artery, covering the ostium of the LSA. Postdeployment runs confirmed the patency of the left carotid artery (Figure 3). The patient was stable throughout the procedure and was extubated with no signs of a cerebrovascular event. Although there was no palpable pulse in the left arm, there were no signs of critical ischemia.

Postoperatively, the patient developed respiratory and renal failure, which was managed by reintubation and tracheostomy, followed by hemodialysis. Follow-up CT scan showed satisfactory stent position with no endoleak. On the fourth postoperative day, the patient became unresponsive and a CT scan showed an acute infarct affecting the left cerebellar hemisphere with a mass effect compressing and distorting the fourth ventricle (Figure 4). The patient died three days later.

DISCUSSION

Stent-graft implantation for treatment of TAA and aortic dissections distal to the aortic arch has been limited by the ostium of the left subclavian artery (LSA), because a proximal neck (landing zone) of at least 15 mm for secure stent-graft anchoring is necessary. In patients where the distance between LSA and TAA, or a primary entry tear in cases of aortic dissections, is too short, an additional landing zone can be created by stenting over the ostium of LSA with the covered part of the stent graft and positioning the proximal margin of the endoprosthesis directly distal to the ostium of the left carotid artery. A prophylactic carotid-subclavian bypass or LSA transposition may be required to maintain LSA perfusion (3).

Recently, there have been encouraging reports suggesting that covering the ostium of the LSA is well tolerated, with minimal complications (4). Other reports have limited this

Figure 3) Postprocedure angiography run showing exclusion of the aneurysm by the stent grafts

Figure 4) Computed tomography scan of the brain showing a left cerebellar infarct

manoeuvre to patients in which the right vertebral and carotid systems is of normal calibre and free of stenosis, as documented by duplex scan preoperatively (5).

In the present case, the patient suffered a posterior circulation cerebellar infarct where preinterventional evaluation of the contralateral vertebral and carotid systems was not possible at the time and in this acute setting.

The authors are not aware of a similar report of a fatal posterior circulation incident following thoracic stenting.

CONCLUSION

Fatal posterior cerebellar infarct following TAA stenting across the LSA origin is possible. Patients and medical personnel should be aware of this possible complication. Assessment of the cerebral circulation is mandatory to avoid

such a complication. Most modern vascular centres have spiral CT scanners that can obtain preoperative images from the neck to the groin with minimal amount of contrast. This would facilitate proper assessment both in the elective as well as in the acute situation.

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