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A Giant Thoracic Aortic Aneurysm Treated by Frozen Elephant Trunk Technique

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Abstract **Case Report**

The treatment of complex aortic pathologies involving the ascending aorta, the aortic arch, and the descending aorta continues to be a challenging situation in aortic surgery. The frozen elephant trunk technique has been increasingly used but there still is an ongoing discussion within the surgical community about the optimal indications. We present herein a patient with a complex aortic aneurysm involving all three segments of the thoracic aorta. The device used is a hybrid prosthesis consisting of a proximal woven polyester graft and a distal self-expanding nitinol stent graft, which can be delivered antegrade into the descending aorta.

Keywords: Thoracic aortic aneurysm, frozen elephant trunk technique.

INTRODUCTION

The surgical management of patients with complex aortic pathologies including the entire thoracic aorta is a challenging situation in aortic surgery. In 1983, Borst [1] described the elephant trunk operation, which facilitated staged surgery on aneurysms involving the aortic arch and the descending aorta. This staged operation has a drawback which is represented by the fact that more than half of the patients did not arrive at the second surgical step, either because they died between the first and the second step or because some patients refused another surgical operation [2, 3]. The frozen elephant trunk (FET) is a newer, hybrid technique combining open and endovascular repair. It is typically performed in a single stage to replace the aortic arch and repair the proximal portion of the descending thoracic aorta.

CASE REPORT

A 45-year-old female patient presenting a giant ascending, arch, and descending aortic aneurysm, 8 years after undergoing mechanical Bentall procedure. This patient had no confirmation of any genetic syndromes. Clinically the patient has chest pain. The echocardiography confirms normal mechanical aortic valve function, and preserved Bentall prosthesis. The computed tomography scan revealed an ascending aortic aneurysm with a maximum diameter of 103mm, an arch aortic aneurysm with a maximum diameter of 97mm, and post isthmus descending aortic aneurysm with a maximum diameter of 56mm. (Figure 1, 2, 3).

Figure 1: Preoperative thoracic computed tomographic scan, transverse view, (With contrast agent) shows the ascending aortic (maximum diameter of 103mm), and descending aortic aneurysm (Maximum diameter of 56mm).

Figure 2: Preoperative computed tomographic scan, sagittal view, (with contrast agent) shows the ascending aortic, arch (maximum diameter of 97mm), and descending aortic aneurysm.

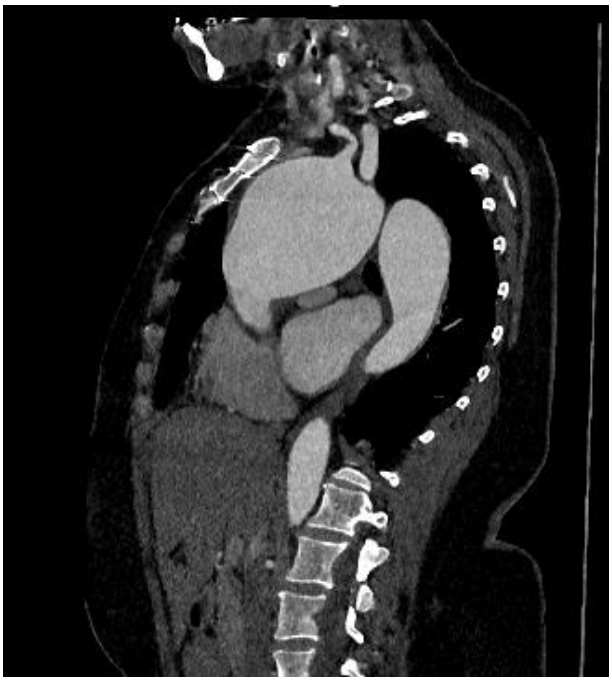

Figure 3: Three-dimensional computed tomographic aortic reconstruction. Shows the giant ascending aortic, arch, and descending aortic aneurysm

Our decision was to proceed a frozen elephant trunk technique using a hybrid prosthesis stent graft. The patient easily weaned from cardiopulmonary bypass and discharged from hospital without sequelae. Postoperative computed tomography scan revealed good result of this procedure (Figure 4, 5).

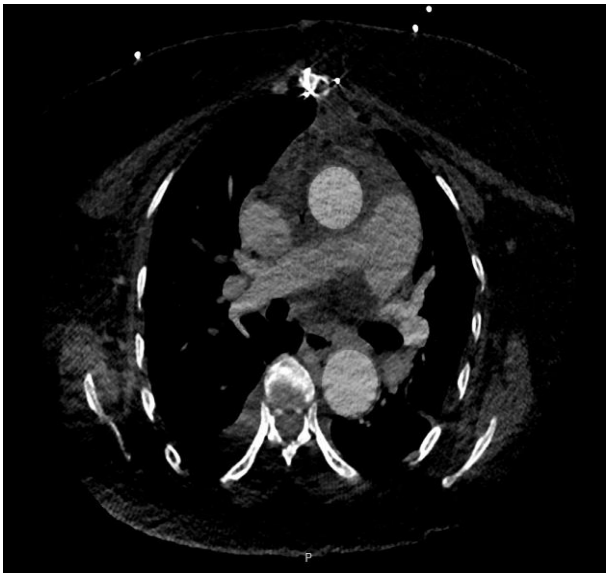

Figure 4: Postoperative thoracic computed tomographic scan, transverse view, (with contrast agent), showing the good result of the procedure of the frozen elephant trunk.

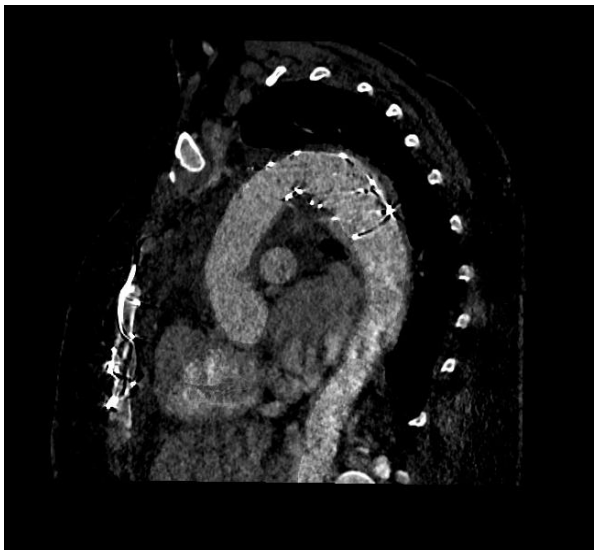

Figure 5: Postoperative computed tomographic scan, sagittal view, (with contrast agent), showing the good result of the procedure of the hybrid prosthesis

DISCUSSION

Giant ascending aortic aneurysms associated with arch and descending aortic aneurysm is rare when it is not associated with any genetic syndrome.

The 2010 ACCF/AHA/AATS/ACR/ASA/SCA /SCAI/SIR/STS/SVM guidelines for the diagnosis and management of patients with Thoracic Aortic Disease, suggest a Class I surgery of the ascending aortic aneurysm (Level of Evidence: C), to avoid dissection, rupture and death for these patients [1]. They suggest also a Class IIa elephant trunk procedure to treat aortic arch and proximal descending thoracic aortic aneurysms (Level of Evidence: B) [4].

The treatment of this complex pathology of the thoracic aorta is simplified by the introduction of a hybrid prosthesis [5].

CONCLUSION

The use of the frozen elephant trunk technique is a feasible and efficient option in the treatment of complex aortic pathologies. These techniques effectively combine surgical and interventional technologies with low perioperative morbidity.

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