TRANSCATHETER CLOSURE OF POST-COARTACTION ANEURYSM WITH DEVICE OCCLUSION OF THE ASCENDING AND DESCENDING AORTA IN A PATIENT WITH AN EXTRA-ANATOMIC BYPASS

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HISTORY AND PHYSICAL

36 year-old man with history of total anomalous pulmonary venous connection to the coronary sinus and patent ductus arteriosus who was operated on at the age of 4 months. Surgical ligation of the patent ductus arteriosus was complicated with a tear in the aorta which was treated with Teflon patch. A new surgery was required to treat an iatrogenic and significant aortic coarctation using a Dacron patch at the age of 3 years. A VVI demand pacemaker was implanted because of atrioventricular block when he was 23 years old. The patient was asymptomatic for years, but he started to complain of atypical chest pain a few months ago.

IMAGING

A computed tomography (CT) scan showed a bovine arch with a post-coarctation aneurysm (49 x 45 mm) which involved the origin of the subclavian artery. The diameter of the aortic isthmus pre-aneurysm was 10 mm. Aortic angiography confirmed the same findings and similar diameters. Figure 1A and 1B shows both imaging techniques.

INDICATION FOR INTERVENTION

Due to technical difficulties to implant a covered aortic endoprosthesis because of aortic arch hypoplasia (10 mm), surgical repaired was planned: (1) extra-anatomic conduit from ascending aorta to descending aorta + (2) distal aortic arch ligation + (3) distal aneurysm ligation + (4) subclavian artery ligation and (5) carotid-subclavian bypass (figure 1C). Surgery consisted of hemashield conduit (18 mm) implantation from ascending to descending aorta, left subclavian artery ligation and a 8 mm Goretex left carotid-subclavian bypass. However, surgeons were not able to ligate both, the distal aortic arch and the descending aorta. The result was that the aortic aneurysm was not excluded. A transcatheter aortic aneurysm exclusion was planned.

INTERVENTION

Left and right femoral arteries were cannulated. Aortograpy with a radiopaque markers pigtail was done to get accurate measurements. Aortic angiogram was done using a pigtail in the ascending aorta. A contralateral femoral artery was used to implant the aortic endoprosthesis. Distance from the aneurysm to the distal anastomosis of the conduit was 97 mm (2A). The first step was to implant an Endurant II 24 x 80 mm endoprosthesis (Medtronic Cardiovascular) at the level of the descending aorta proximal to the distal anastomosis of the extra-anatomic conduit to deploy an Amplatzer device avoiding an aortic erosion (2B). The second step was to deploy, through the endoprosthesis, an Amplatzer Vascular Plug II (18 mm) at the level of the aortic arch, distal to left carotid artery and proximal to the post-coarctation aneurysm (2C y D). Finally, a Amplatzer Septal Occluder device (24 mm) was implanted inside the endoprosthesis in the descending aorta for the aneurysm distal occlusion (2E). The result was a complete transcatheter exclusion of the aneursym, with a device in the ascending aorta and another one in the descending aorta (2F). AngioCT follow-up showed a complete exclusion of the post-coartaction aneurysm with a device in the aortic arch distal to the left

subclavian artery and another one inside the endoprosthesis in the descending aorta proximal to the extra-anatomic bypass (2G). After more than 5 years, the patient is asymptomatic with normal arterial pressure.

LEARNING POINTS OF THE PROCEDURE

This case shows a hybrid complex solution of an aneurysm post-aortic coarctation in a patient with a bovine arch and isthmic hypoplasia. After failing the complete surgically exclusion of the aneurysm, transcatheter approach was the solution in this challenging situation.

Figure 1.

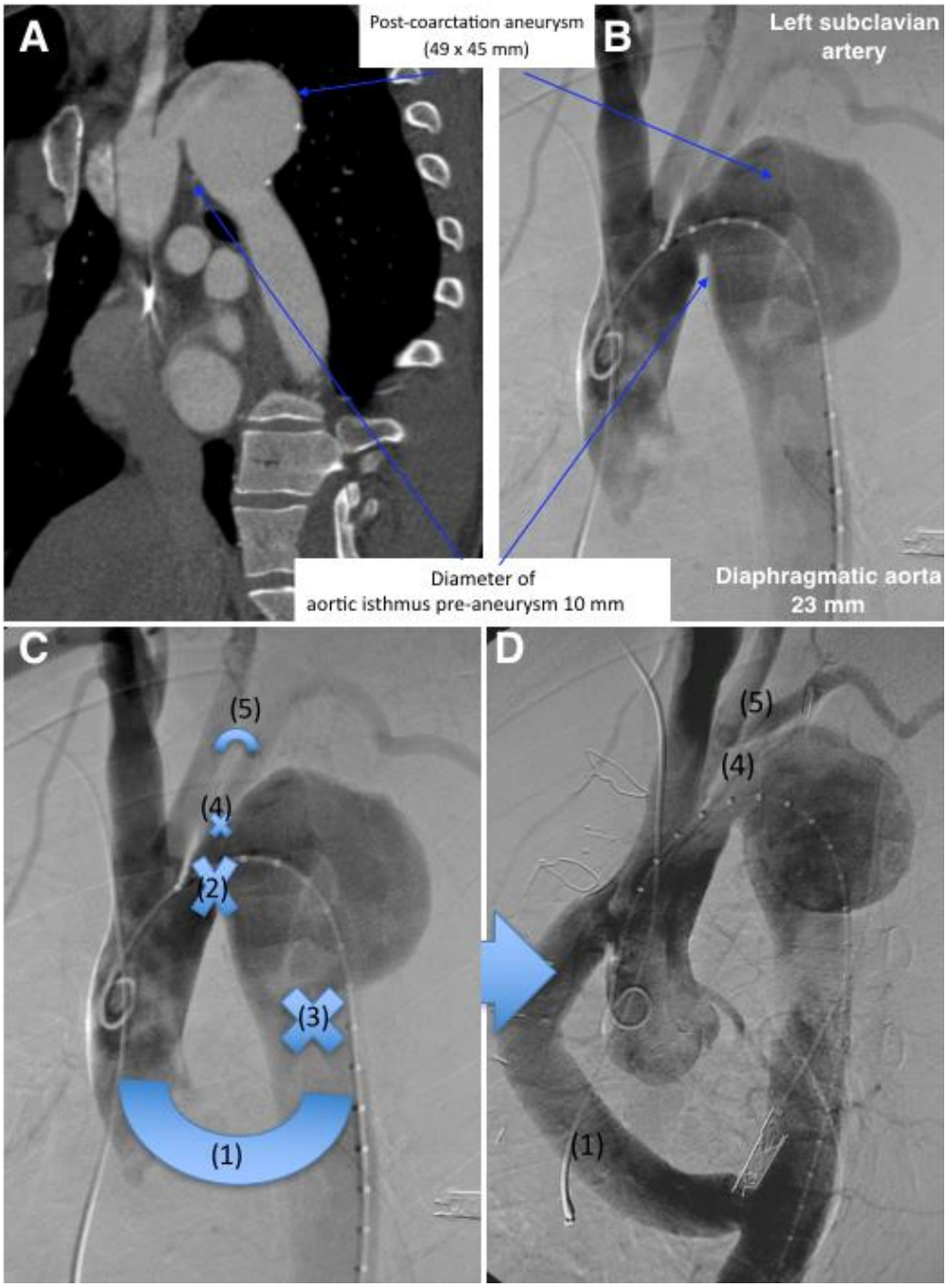

Figure 2: