

# Hybrid treatment for correction of pseudoaneurysm after surgical treatment of aortic coarctation

*Tratamento híbrido para correção de pseudoaneurisma após tratamento cirúrgico de coarctação aórtica*

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## Abstract

The need for a new surgical procedure for correction of postoperative pseudoaneurysm of aortic coarctation makes the procedure especially challenging for the surgeon.ta abstract

**Descriptors:** Aortic coarctation. Aneurysm, false. Heart defects, congenital/surgery.

## Resumo

A necessidade de uma nova intervenção cirúrgica para correção de pseudoaneurisma pós-operatório de coarctação de aorta torna o procedimento especialmente desafiante para o cirurgião.

**Descritores:** Coarctação aórtica. Falso aneurisma. Cardiopatias congênicas/cirurgia.

## INTRODUCTION

Aortic coarctation (AoC) is defined as the narrowing of the aortic lumen secondary to hypertrophy of the middle layer of posterior lateral wall and located in the left hemi-aortic arch between the junction of the left subclavian artery and the ductus arteriosus, so hinders

irrigation to the bottom of the body. It is a common change between congenital heart disease and about 80% of cases are associated with bicuspid aortic valve [1]. Increases the work of the left ventricle and causes upper limb hypertension and lower limb hypotension.

The prevalence of recoarctation after surgery is around 60%, depends on the patient's age and time of

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Abbreviations, acronyms and symbols	
<b>AoC</b>	Aortic coarctation
<b>CPB</b>	Cardiopulmonary bypass
<b>TEE</b>	Transesophageal echocardiogram
<b>BP</b>	Bovine pericardium
<b>TCA</b>	Total circulatory arrest

outcome. However, aneurysm surgical site may occur in 50% of patients, particularly when using the flap dacron [2]. A variety of anatomical aneurysms indicates several mechanisms influencing its development. Another complication is pseudoaneurysm arising from the suture lines or at the isthmus of restenosis [3].

It was described by Morgagni in 1760, however, the first successful intervention occurred only in 1944 by Crafoord & Nylin [4]. From that time new operational strategies emerged with good results. Recently, endovascular treatment has become a new alternative in the treatment of aortic diseases, especially in acute aortic syndrome, with satisfactory results over the years. In AoC is also possible to intervene with endovascular and low mortality.

Meta-analysis compared endovascular treatment with conventional aortic coarctation. The outcome reintervention was more frequent in the group treated by endovascular approach [5]. However, this meta-analysis was based on scientific articles published before 1995, when the endovascular materials were coarser and simple.

Treating recoarctation is a challenge for the surgeon, especially in cases of pseudoaneurysm suture line in need of third surgical intervention. For this it is necessary to launch ideas of combined procedures between endovascular and conventional: it is the hybrid treatment [6]. It is this concept that we treat the patient in this short communication.

#### CLINICAL CASE

Male patient, 30 years, sought medical attention for evaluation of the hemoptoic framework seven months ago. In past medical history has a late follow-up of two surgical procedures for correction of AoC. The first intervention was aortoplasty using Teles' technique and the second a tube interposition of bovine pericardium (BP) between the aortic arch and the descending aorta.

The patient underwent computed tomography and angiography of the chest and thoracic aorta, respectively. The results of these tests showed AoC with stenosis greater than 90% in left hemiarch, presence of extra-anatomic BP pipe between the right anterolateral hemiarch and descending thoracic aorta. Near the distal anastomosis was observed a pseudoaneurysm of 42 mm in maximum

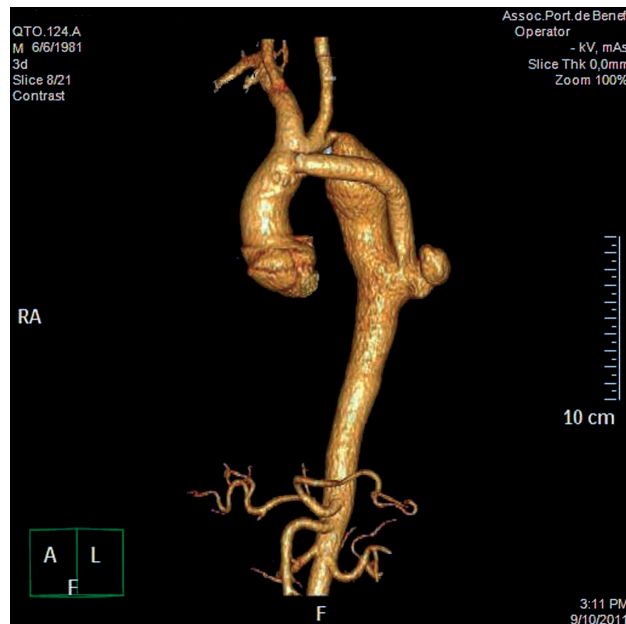


Fig. 1 - Preoperative angiography showing aortic coarctation and an aorto-aortic pseudoaneurysm with the distal anastomosis

transverse diameter associated with an pulmonary parenchymal opacity ground-glass appearance, suggesting a fistula (Figure 1).

Doppler echocardiogram demonstrated aortic coarctation with post-stenotic dilation, ascending aortic with moderate ectasia, aortic and mitral mild regurgitation and concentric moderate left ventricular hypertrophy.

The decision was a new intervention. However, the challenge was to decide on the best surgical strategy, endovascular or conventional? A conventional intervention was frightened by the following factors: third thoracotomy, pulmonary compliance and the site of the pseudoaneurysm. Already by endovascular was unfeasible because there is no ideal proximal stub in the left hemi-arch or BP pipe. Considering the seriousness and complexity of the disease, a multidisciplinary team, Heart Team, decided by the hybrid treatment.

The surgery began with left femoral artery puncture and introduction of the guide wire to the site of the pseudoaneurysm, maneuver aided by trans-esophageal echo (TEE). After full heparinization began cardiopulmonary bypass (CPB) with cannulation of the right axillary artery, interposition of a 8 mm Dacron tube, and bicaval venous cannulation type. Moderate hypothermia to 22°C and total circulatory arrest (TCA) were used strategies

for identification and reconstruction of the stenosed area with tube BP N° 27. The goal was to obtain a proximal stent surgical support. During the reconstruction of the left hemi-arch guidewire inserted progressed through the right femoral artery to the aortic arch. Thus it was possible to release the Self-Expandable Surgical Endoprosthesis Braile Biomédica® 28 mm in diameter and 11.5 cm length.

At the end of arterial reconstruction, CPB was resumed with warming of the patient, the PCT time was 27 minutes. We employed antegrade/retrograde, blood, isothermal and low volume cardioprotection. Extra-anatomic BP was occluded with bandages and sutures in the proximal and distal thirds before the resumption of the heartbeat. Although the post-examination control intervention is arteriography, in this case the first TEE examination was conducted to evaluate the stent, especially at the site of the pseudoaneurysm.

The images of the ETE were conclusive for the need

for another endoprosthesis according to the type I distal endoleak. Through the guide wire in the right femoral artery since the start of the intervention was possible to release a new Dominus Stent-Graft Endoprosthesis Braile Biomédica®, diameter 28 mm and length 7.5 cm, by endovascular approach. New control examinations were performed and demonstrated successful outcomes. Thus, the patient left CPB, time was 126 minutes and uneventful. The postoperative evolution was satisfactory, without hemoptoic episodes.

After up to two months following the hybrid treatment, the patient was asymptomatic and new imaging examinations were performed. Computed tomography and angiography showed the stents positioned without leakage, exclusion of the pseudoaneurysm and no suggestive signs of pleuropulmonary changes (Figure 2). The complexity of this case reaffirms the use of hybrid treatment and the importance of the Heart Team.

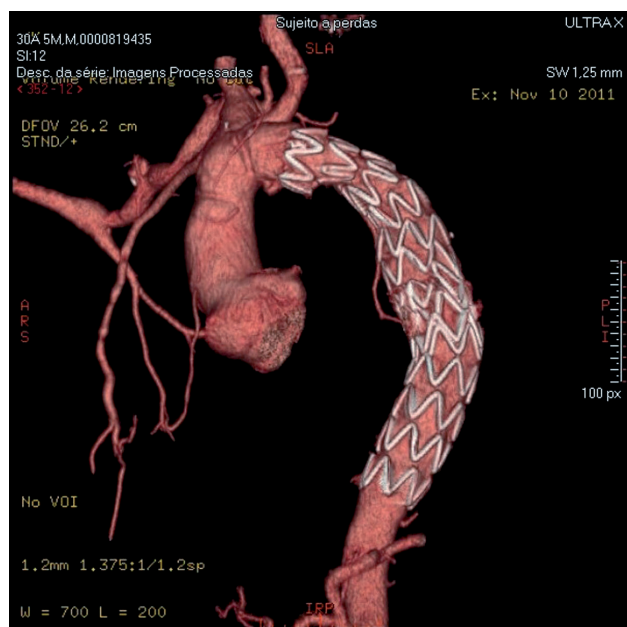


Fig.2. Postoperative angiography demonstrated correction of coarctation of the aorta and exclusion of pseudoaneurysms with stent and graft positioned from the proximal segment of the descending thoracic aorta to the middle distal segment

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