

Simultaneous myocardial and supra-aortic trunks revascularization

Revascularização simultânea do miocárdio e dos troncos supra-aórticos

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DOI: 10.5935/1678-9741.20120025

RBCCV 44205-1366

Abstract

We report the case of a 58-year-old patient, with a three vessel disease with unstable angina. Due to refractory angina, she was referred to urgent coronary artery bypass graft (CABG). In the preoperative evaluation were found severe obstructive lesions in the brachiocephalic trunk origin, left common carotid origin and left internal carotid artery. The patient underwent CABG, supra-aortic trunks revascularization (extra-anatomic bypass) and carotid endarterectomy in the same procedure. She presented an uneventful recovery and was discharged home on the seventh postoperative day. Currently, two years after the procedure, she continues under follow-up, symptomless.

Descriptors: Angina, unstable. Myocardial revascularization. Carotid stenosis.

Resumo

Relatamos o caso de uma paciente de 58 anos com síndrome coronariana aguda, com acometimento triarterial. Em decorrência de angina refratária, foi indicada cirurgia de revascularização do miocárdio (RM) de urgência. Na avaliação pré-operatória, foram detectadas lesões obstrutivas na origem do tronco braquiocefálico, artérias carótida comum esquerda e carótida interna esquerda. A paciente foi submetida, concomitantemente, a RM e revascularização dos troncos supra-aórticos (*bypass* extra-anatômico), além de endarterectomia da artéria carótida interna esquerda. A paciente teve uma boa evolução, com alta hospitalar no sétimo dia pós-operatório. Atualmente, dois anos após o procedimento, encontra-se em acompanhamento ambulatorial, assintomática.

Descritores: Angina instável. Revascularização miocárdica. Estenose das carótidas.

INTRODUCTION

The prevalence of significant stenosis (> 80%) of internal carotid artery in patients undergoing coronary artery bypass grafting (CABG) can reach 12% and, notoriously, is associated with the risk of cerebrovascular accident (CVA), which varies from 11% to 18% [1]. In this situation, carotid endarterectomy before CABG or

concomitant decreases the risk of stroke. The prevalence of stenosis of the supra-aortic trunks (SAT) in patients undergoing CABG is much lower, about 0.1% to 0.2% [2], but it represents a challenge regarding the definition of the strategy used in its handling.

The objective of this study is to report the case of a patient with acute coronary syndrome, with triple vessel involvement, whose preoperative evaluation found

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Article received on October 24th, 2011
Article accepted on January 9th, 2012

Abbreviations, acronyms and abbreviations

EVA	Encephalic vascular accident
BIS	Bispectral index
LCCA	left common carotid artery
ECC	Extracorporeal circulation
ECG	Electrocardiogram
CABG	Coronary artery bypass graft
BCT	Brachiocephalic trunk
SAT	Supra-aortic trunks

significant stenoses (80%) generated the SAT associated with 90% stenosis of the left internal carotid artery which was surgically treated.

CASE REPORT

Female patient, 58 years, sought medical attention with signs of chest pain radiating to the left arm, starting at home. Similar pain triggered by exercise in the last four months was reported. The electrocardiogram (ECG) showed ST segment depression in precordial leads. The patient denied syncope, lypothymy or neurological symptoms. The patient underwent coronary angiography, which showed significant obstructive lesions in the anterior interventricular branch, diagonal and marginal left coronary artery and right coronary artery.

The patient developed recurrent pain, even with optimal medical treatment, and an emergency CABG was indicated. In the preoperative evaluation, the duplex scan of carotid arteries showed an obstructive lesion greater than 75% in the left internal carotid artery, but it did not detect lesions in the origin of the left common carotid artery (LCCA), or the brachiocephalic trunk (BCT). Arteriography confirmed a 90% non-ulcerated obstructing plaque in the proximal segment of the left internal carotid artery, besides highlighting obstructive plates of about 80%, without ulceration at the origin of the ECC and the BCT. The patient underwent CABG and revascularization of SAT, and also endarterectomy of the left internal carotid artery at the same time. The operation was performed under general anesthesia, habitual hemodynamic monitoring (invasive blood pressure and central venous pressure) and monitoring of the bispectral index (BIS). At first, after heparinization with 4 mg / kg, it was performed endarterectomy of the left internal carotid artery, without the use of shunt, using saphenous vein patch for the expansion of the carotid bulb. Subsequently, both ends of a Dacron graft to 8, Y-configuration, were terminolaterally anastomosed in both common carotid approximately 2 cm above the origin.

There were no changes in BIS values related to the clamping of the internal carotid artery during endarterectomy or the clamping of the common carotid arteries during the anastomosis with the Dacron graft bilaterally inserted. Then, to establish cardiopulmonary bypass (CPB), the distal ascending aorta was cannulated in the habitual way, and also the longer extension of the Dacron Y graft (anastomosed to the carotid arteries) for arterial flow (Figure 1).

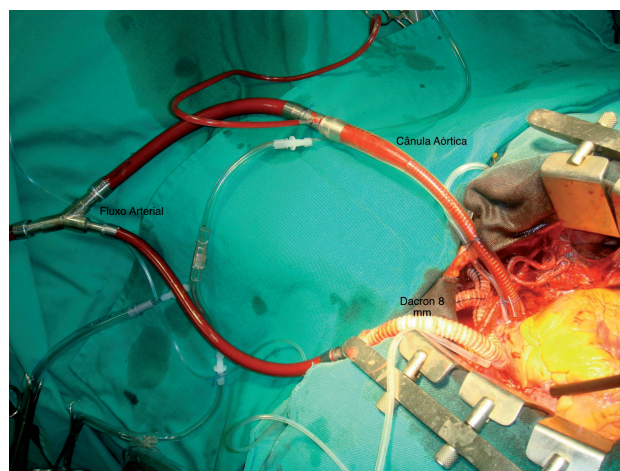


Fig. 1 - Photographic documentation of the preparation for ECC. System for infusion of the ascending aorta and Dacron graft anastomosed to both common carotid arteries

Myocardial revascularization was performed with ECC in moderate hypothermia (32 °C), and myocardial protection obtained with the infusion of blood cardioplegic solution (4:1) cold antegrade and retrograde induction every 15 minutes. Then, with a temperature of 32 °C, the ECC blood flow was stopped in the long extension of the Y Dacron graft (anastomosed to the carotid arteries) and the implant was performed using the dacron graft (Y to both carotid arteries) in the ascending aorta (Figure 2), with terminolateral anastomosis.

After that, we performed the opening of the aortic clamp, recovering the heartbeat and removing ECC. The closure of the chest was performed in the usual way, with mediastinal drainage. The cervicotomies were closed without the use of drains. In the immediate postoperative period, after extubation, antiaggregation was initiated with acetylsalicylic acid.

The patient had a good postoperative evolution, regarding both hemodynamic and neurologic aspects. She was discharged on the seventh day after surgery. Currently, two years after surgery, the patient is receiving outpatient treatment, showing no symptoms.

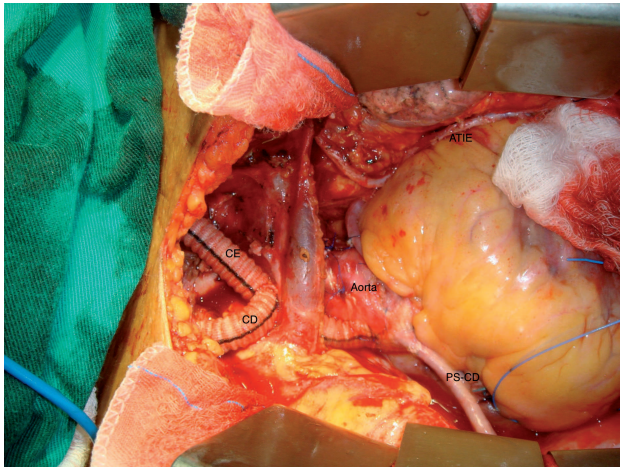


Fig. 2 - Photographic documentation of the perioperative period. ATIE- Left internal thoracic aorta; PS-CD - saphenous vein graft to right coronary artery; CD - Dacron graft anastomosed to the right common carotid artery; CE - Dacron graft anastomosed to the left common carotid artery

DISCUSSION

The presence of significant obstructive atherosclerotic disease of SAT in patients undergoing CABG is quite uncommon (0.1% to 0.2%), but it represents a formidable challenge when defining the surgical approach. The problem is that these patients present greatest risk for neurological events. In the literature, there is not any appropriate casuistry to examine this outcome in this population. Thus, the possible increased risk for neurological events is extrapolated from series of patients undergoing CABG and who have obstructive atherosclerotic disease in the internal carotid artery, subjected the brain low flow in the pre-and postoperative period. In these patients, endarterectomy performed simultaneously [3], or even preceding [4] CABG is associated with low incidence of neurological events. The present patient had significant stenosis (approximately 80%) at the origin of the LCCA and BTC associated with stenosis of the left internal carotid artery but no symptoms related to these obstructions were observed. The treatment of obstructive diseases of SAT is indicated, in most cases, in symptomatic patients. However, critical stenosis (greater than 80%) [5] in cases where the patient is subjected to sternotomy for other reasons, the treatment is recommended regardless of symptoms [6].

The particularities of the case described here is the concomitant presence of obstructive disease in two SAT, the left carotid bulb and acute coronary syndrome with an indication for emergency CABG. The decision to perform

the bypass for both common carotids, besides endarterectomy of the left carotid artery concomitant to CABG, was made considering the indications described above. It was also considered the likely low flow in the brain in the pre-and postoperative period consequent to the sum of obstructive lesions in the origin of the SAT and the left internal carotid artery, which could result in a neurological event. Following these principles, the SAT and revascularization of the left internal carotid endarterectomy was performed before initializing the ECC. Thus, the brain flow during ECC was ensured by the cannulation of the Dacron graft (anastomosed to the carotid arteries) (Figure 1).

Although we consider the possibility that this strategy could predispose to cerebral hyperperfusion syndrome [7] due to the function of cerebral blood flow during ECC, we chose to use it because the patient did not show reduced blood flow to the brain before the procedure, taking into consideration its asymptomatic aspects, and the low flow during ECC would represent a higher risk for a neurological event.

The chosen strategy for the treatment of obstructive disease of SAT, either endovascular, transsternal or transcervical surgical, it is also controversial [6]. The endovascular management of atherosclerotic stenoses of SAT has been suggested as an option with low morbidity. However, the medium and long term outcomes of this technique seems to be inferior than the extra-anatomic bypass [8]. In addition, the patient described above, we believe that the refractory angina was a high risk factor for the realization of endovascular treatment.

Surgical treatment of stenosis of SAT via cervical revascularization does not apply to all cases, besides having late results inferior than those presented to the treatment via transsternal revascularization. In addition, the patient described in this article presented a formal indication for CABG for sternotomy.

The extra-anatomic bypass of SAT performed via transsternal revascularization is associated with good late results, with acceptable levels of morbidity and mortality [7-9]. In the case described in this article, the bypass of the ascending aorta was performed to both common carotid arteries inserting Dacron graft. The common carotid arteries were isolated through two lateral small interventions. The anastomosis of Dacron graft were terminolaterally performed in both carotid arteries. In the literature [9], it is recommended the section of the carotid artery and anastomosis only in those cases with symptoms consistent with embolization or when obstruction plaques are ulcerated. In conclusion, the presence of obstructive disease of SAT in asymptomatic patients undergoing CABG is unusual and requires treatment planning aimed at minimizing the risk of cerebrovascular accident, without significantly increasing

the operative morbimortality. We believe that every case deserves evaluation and judgment according to its peculiarities. In the case described in this article, considering the need for urgent CABG, we believe that the best option was performing CABG and revascularization of SAT at the same time via transsternal revascularization associated with the endarterectomy of the left internal carotid artery.

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