

CASE REPORT

Carotid angioplasty with flow reversion in octogenarians: a case report

Angioplastia carotídea com reversão do fluxo em octogenários: relato de caso

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Abstract

Octogenarian patients submitted to carotid angioplasty present higher incidence of neurological events when compared to younger patients and to patients in this same age submitted to carotid endarterectomy. The higher complication rate could be related to anatomic and anatomopathological factors that increase technical difficulties and atheroembolic risk associated with the endovascular procedure. At the operating room, the patient was in dorsal decubitus position and submitted to general anesthesia. Limited transversal surgical access was carried out on the right neck base, with dissection, identification and restoration of the common carotid artery and internal jugular vein. A 8F sheath was implanted cranially oriented into the common carotid by Seldinger technique after endovenous injection of 10.000 UI of heparin. Another 8F sheath was implanted into the internal jugular vein in caudal orientation. Both sheath were connected by the use of infusion set segment. The common carotid artery was clamped with a silastic double lace, establishing reversion of blood flow in the internal carotid artery. The lesion was crossed by 0.014 x 190 cm wire and the carotid angioplasty was performed employing a 5 x 20 mm balloon and a stent (Wallstent® 7 x 50 – Boston Scientific) was introduced, positioned and released. Carotid angioplasty with transcervical flow reversal is a cost effective brain protection strategy, associated with low embolic potential in octagenarian patients with unfavorable anatomy.

Keywords: Carotid artery diseases, angioplasty, intracranial embolism.

Resumo

Pacientes octogenários submetidos à angioplastia carotídea apresentam maior incidência de eventos neurológicos quando comparados a grupos de pacientes mais jovens e a grupos da mesma faixa etária submetidos à endarterectomia carotídea. A maior taxa de complicações pode ser explicada por fatores anatômicos e anatomopatológicos que aumentam a dificuldade técnica e o risco de ateroembolismo do procedimento endovascular. O procedimento foi realizado no centro cirúrgico, com o paciente em decúbito dorsal e sob anestesia geral. Realizamos acesso cirúrgico transversal limitado, na base do pescoço à direita, com dissecação, identificação e reparo da artéria carótida comum e veia jugular interna. Foram administradas 10.000 U de heparina e puncionada a carótida comum pela técnica de Seldinger com introdução de bainha 8F em sentido cranial. Na sequência, foi puncionada a veia jugular interna com instalação de bainha 8F em sentido caudal. Em seguida, ambas as bainhas foram conectadas, utilizando-se um segmento de equipo de soró. A carótida comum foi fechada por cadaço duplo de silicone e o fluxo retrógrado pela carótida interna foi estabelecido. Subsequentemente, foi introduzido fio guia 0.014 x 190 cm com cruzamento da lesão, realizando-se angioplastia com balão 5 x 20 mm e em seguida stent (Wallstent® 7 x 50 – Boston Scientific) foi introduzido, posicionado e liberado. A angioplastia carotídea com reversão de fluxo, por via transcervical, constitui estratégia de proteção cerebral custo-eficiente e com menor potencial emboligênico em pacientes octogenários com anatomia desfavorável.

Palavras-chave: Doenças das artérias carótidas, angioplastia, embolia intracraniana.

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Introduction

Octogenarian patients submitted to carotid angioplasty present higher incidence of neurologic events in comparison to groups of younger patients and of patients at the same age submitted to carotid endarterectomy. The higher rate of complications may be explained by anatomic and anatomopathological factors that increase the technical difficulty and the risk of atheroembolism¹⁻⁷.

Distal cerebral protection systems present risk when crossing the lesion, and are also related to failures when the devices do not match the distal internal carotid artery diameter. Besides, experimental studies have shown association with distal thrombus formation when using these systems⁸.

An editorial recently published in this journal addressed the extensive controversy involving cerebral protection methods⁹.

These systems provide safety during the angioplasty procedure, and modalities with flow interruption and reversal have been described^{10,11}. In this paper, we describe a technique of angioplasty with brain flow reversal through transcervical approach.

Case report

We describe the case of an 86 year-old male patient with arterial hypertension, dyslipidemia, chronic obstructive pulmonary disease and coronary artery disease who had been submitted to myocardial revascularization in 2005. He reported radiotherapy for laryngeal carcinoma 25 years ago. In December 2008, he had a stroke with left hemiplegia followed by complete neurologic recovery within a week. Arterial color-assisted duplex ultrasound revealed the presence of more than 85% stenosis at the level of the right carotid bulb, classified according to the North American Symptomatic Carotid Endarterectomy Trial (NASCET) criteria. The patient was initially treated with acetylsalicylic acid (100 mg/day) and clopidogrel (75 mg/day).

We were only consulted three months after the ischemic event. Generally, a critical, irregular and lipid-rich carotid lesion receives immediate surgical treatment in our service. The option for the endovascular method was made due to the presence of actinic scars, type III aortic arch, cervical spondyloarthritis and the use of dual antiplatelet therapy. Under these circumstances, the transfemoral approach was not recommended. Instead, a transcervical approach using the technique of flow reversal in the right internal carotid artery was indicated as a strategy for cerebral protection.

The procedure was carried out in the operating room with the patient in a supine position, under general anesthesia. A transverse surgical incision was made at the base of the neck on the right side, with dissection, identification and control of the common carotid artery and internal jugular vein, as described by Enrique Criado¹².

A total of 10,000 U of heparin was administered, and the common carotid artery was punctured by means of Seldinger technique, with the introduction of an 8F sheath towards the skull. Afterwards, the internal jugular vein was punctured with placement of an 8F sheath caudad. Both sheaths were connected by infusion set (Figure 1). The common carotid artery was closed by a double silicon loop. Retrograde flow through the internal carotid artery was re-established and confirmed by angiography.

As to confirm the degree of the stenosis lesion, we performed anteroposterior and lateral angiography (Figure 2). Afterwards, a guide wire measuring 0,014 x 190 cm was introduced with lesion crossing, the angioplasty was performed with a 5 x 20 mm balloon and, then, a stent (Wallstent® 7 x 50 – Boston Scientific) was introduced, placed and released. Manual aspiration of 20 mL of blood was performed before releasing the flow of the carotid artery and interrupting the communication between the sheaths. Control angiography showed an excellent technical result (Figure 3).

Discussion

Carotid angioplasty in octogenarian patients is controversial. Several studies have demonstrated higher rates of complications in this population. Kastrup et al. compared



Figure 1 – Cervical access for carotid angioplasty by flow reversal technique

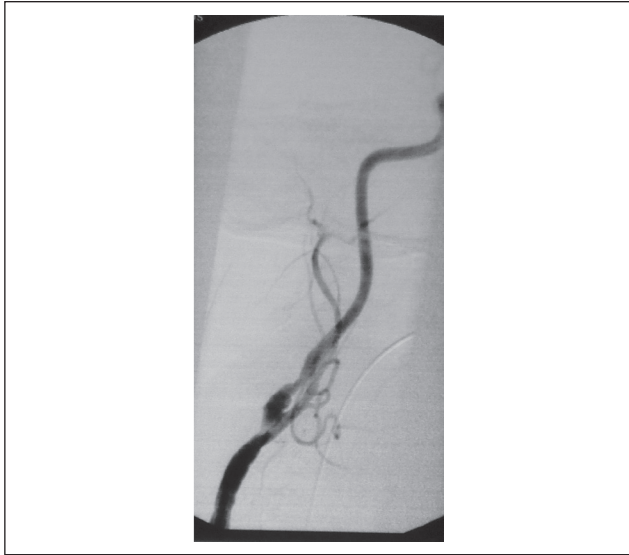


Figure 2 – Angiography demonstrating stenosis of the right internal carotid artery

the results of carotid angioplasty by transfemoral approach with stent implantation to the carotid endarterectomy, and demonstrated a higher incidence of ischemic strokes in the group treated by angioplasty (11.3%) when compared to the group of patients submitted to endarterectomy (1.8%)¹.

A study conducted by Lam et al. with 135 patients treated by endovascular technique showed a higher incidence of unfavorable morphology, calcified aortic arch and tortuous internal and common carotid arteries in the group of patients older than 80 years. The authors concluded that the presence of unfavorable anatomy is related to complications during carotid angioplasty, being more prevalent in octogenarians³.

The use of a filter for cerebral protection decreases the incidence of embolization during angioplasty; however, such filters require crossing of the lesion prior to the effective installation of the protection system. A study by Ohki et al. demonstrated embolization of fragments during crossing of the lesion and stent implantation, as they observed the presence of fragments that were not captured by the filter¹³.

Carotid angioplasty with flow reversal via transcervical approach prevents most of the problems observed with the use cerebral protection devices. Manipulation of the aortic arch and common carotid catheterization are avoided, and the tortuous common or internal carotid arteries do not hinder the establishment of flow reversal¹⁴.

In Spain, in a large series of carotid stent implantation by flow reversal technique via transcervical approach reported by Criado et al., no cases of larger ischemic stroke

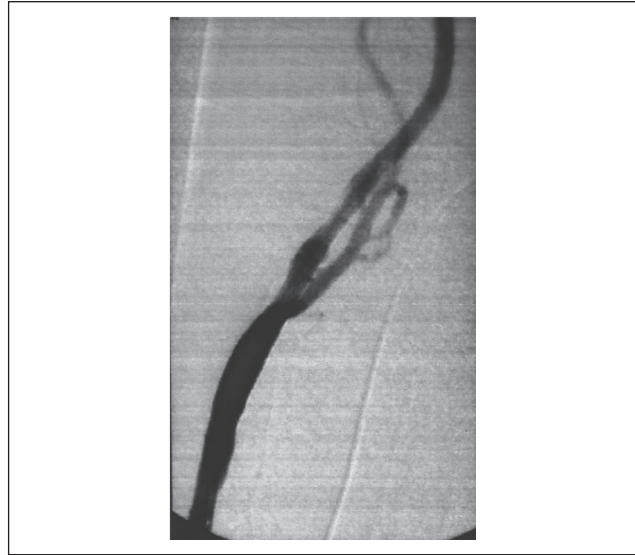


Figure 3 – Angiography after carotid angioplasty with stent implantation by flow reversal technique

or death were observed within 30 days, but one case of ipsilateral transient ischemic attack (TIA), one case of contralateral TIA and two cases of minor ischemic strokes were described¹⁵.

Matas et al. described a series of 62 carotid angioplasties with flow reversal presenting a 4.9% incidence of neurological complications within 30 days, but no death occurrences¹⁶.

Carotid angioplasty with flow reversal by transcervical approach constitutes a cost-effective strategy of cerebral protection that also presents lower potential of embolization in octogenarian patients who have unfavorable anatomy.

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Writing of the paper: BM and AVR
Critical analysis: BM, AVR and JMC
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