

Multiple carotid stenting for extended thoracic aorta dissection after initial aortic surgical repair

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Abstract

Acute aortic dissection is one of the most common catastrophes affecting the aorta. Aortic branch occlusion occurs in up to one third of patients with aortic dissection and is associated with increased risk for early death and serious complications. A 67-year-old man without history of cardiovascular disease was referred to our center for acute aortic type A dissection and was treated with a 28-mm Vascul-teck prosthesis. During the early postoperative period, he felt left hemiparesis, and an angio-computed tomography showed a progression of the dissection to the right common carotid artery and left brachiocephalic trunk: the abdominal aorta with the celiac trunk. We felt that the patient should receive conservative management, except for the carotid involvement, for which an endovascular approach was planned. After carefully engaging the carotid ostia with a modified no-touch technique, a self-expandable stent and a balloon-expandable stent were deployed to seal the left common and internal carotid artery dissection, whereas two self-expandable stents were implanted within the right internal carotid artery. Angiographic control demonstrated complete sealing of the carotid dissections. The patient recovered quickly after the intervention and was discharged after 2 days without any neurologic or vascular complication. The patient did extremely well at two 3-month follow-ups, and coverage of the descending thoracic aorta dissection was scheduled to be performed in the next 2 months. This case suggests that endovascular techniques may offer a reliable and effective answer to extended dissections, helping decrease the risk for neurologic or visceral complications and reducing the operative risk for further complete surgical or endovascular aortic repair.

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1. Introduction

Acute aortic dissection is one of the most common catastrophes affecting the aorta. Aortic branch occlusion occurs in up to one third of patients with aortic dissection and is associated with an increased risk for early death and serious complications [1]. Surgery is the first line of therapy

but is associated with high mortality and morbidity rates. Postoperative stroke is known to be an independent predictor of late mortality, and the best management for this complication is still being debated on [2,3]. We present a case of bilateral carotid extension of a repaired ascending thoracic dissection managed with bilateral carotid stenting.

2. Case report

A 67-year-old man without history of cardiovascular disease was referred to our center for acute aortic type A

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dissection and was surgically treated with a 28-mm Vasculteck aortic prosthesis. No major risk factor was present, except for moderate hypertension. During the early postoperative period, the patient felt left hemiparesis, and a cerebral computed tomography revealed multiple ischemic foci that were suggestive of a progression of the aortic dissection. An echo Doppler procedure demonstrated a bilateral dissection of the carotid artery, and an angio-computed tomography showed a progression of the dissection to the right common carotid artery and left brachiocephalic trunk (Figs. 1 and 2): the abdominal aorta with the celiac trunk and the left renal artery originating from the false lumen and the iliac arteries. Because the patient was hemodynamically unstable, we felt that endovascular management, including stenting of dissected carotid arteries, would be enough to stabilize cerebral symptoms and allow for prompt recovery.

An aortic arch and bilateral carotid artery angiography was performed through a right femoral approach with a 4-F sheath by pigtail and Judkins Right diagnostic catheters; angiography confirmed the dissection of the common carotid artery and the descending thoracic aorta. The right common and the left common carotid arteries were engaged with a 4-F diagnostic Judkins Right catheter over a Terumo guidewire (Terumo, Tokyo, Japan) to minimize potential vessel damage. Before advancing the wire, we performed contrast injection to check for correct positioning within the true lumen. The diagnostic catheter was then exchanged for a 90° MPA-1 guiding catheter over a Hi-Torque Supracor guidewire (Guidant, Santa Clara, CA, USA) previously positioned



Fig. 1. Digital angiogram in the anteroposterior view showing dissection of both carotid arteries (white arrows) and subclavian and descending thoracic aortae (black arrows).



Fig. 2. Final angiographic control image after stent repair showing complete sealing of both carotid dissections.

in the external carotid artery. Without distal protection devices, a BMW heavyweight (Guidant) was advanced beyond the dissection within the left carotid artery and a 9×30-mm self-expandable Precise stent (Cordis Corp, Miami, FL, USA) was deployed in the internal carotid artery. Thus, a 9×30-mm Genesis stent (Cordis) was deployed within the ostium of the left common carotid artery and expanded with a 7×20-mm Avion Plus balloon (Invatech, Roncadelle, Brescia, Italy). Based on the same technique, a 9×40-mm Carotid Wallstent (Boston Scientific, Natwick, MA, USA) and an 8×30-mm Precise stent were successfully deployed within the right internal carotid artery. Angiographic control demonstrated complete sealing of both carotid dissections. The patient recovered quickly after the intervention and was discharged after 2 days without any neurologic or vascular complication. He did extremely well at two 3-month follow-ups, and coverage of the descending thoracic aorta dissection was scheduled to be performed in the next 2 months.

3. Discussion

Current management of type A acute aortic dissection is surgical [1,4]. Hybrid treatments, including endovascular solutions, have been proposed and are at an early stage of evaluation to decrease perioperative mortality, which is reported to range from 7% to 30% in different experiences [5].

Endovascular techniques may be useful not only in assisting aortic repair but also in solving extensions to the

epiaortic vessel, renal arteries, or visceral arteries, which are predictors of unfavorable events. In our case, multiple carotid dissections after surgical repair of a type A aortic dissection were successfully repaired with endovascular stenting. Although carotid stenting for spontaneous dissections is well known [6], few other cases about stenting of carotid dissections as an extension of an aortic dissection are reported in literature; previous cases include use of simple PTA, as in the case of Kubota et al. [7], and stenting, as in the cases of Muller-Lung et al. [8] and Pavkov et al. [9]. Similar to our case, in these cases, no protection device was used; we agree with other authors that any kind of protection device should not be used. The use of protection devices in such cases is a controversial point: their deployment may be problematic because of the difficulty with defining the true and the false lumina, whereas they are probably not much useful because of the different nature and pathophysiology of the dissection with respect to atherosclerotic plaque. In a different manner, all previous cases regarded monolateral carotid dissection.

This is the first, to the best of our knowledge, report on the use of bilateral carotid artery stenting to seal multiple extensions of an aortic dissection. Our case suggests that endovascular techniques may offer a reliable and effective answer to extended dissections, helping decrease the risk for neurologic or visceral complications and reducing the operative risk for further complete surgical or endovascular aortic repair.

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