

Percutaneous Revascularization of a Sole Arch Artery for Symptomatic Cerebral Ischemia Resulting from Neck Irradiation

José E. Cohen MD^{1,2}, Samuel Moscovici MD¹ and Eyal Itshayek MD¹

Departments of ¹Neurosurgery and ²Radiology, Hadassah-Hebrew University Medical Center, Jerusalem, Israel

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Patients who received neck radiation for the treatment of head and neck malignancies are at increased risk of developing radiation-induced carotid artery occlusive disease [1,2]. In recent years, the combination of high-dose radiation and radical surgical resection has improved the survival in patients suffering from neck malignancies. As a result, radiation-induced supra-aortic trunk stenoses have emerged as a more common clinical problem.

We describe a patient who received neck radiation for oropharynx carcinoma and developed symptomatic multiple

supra-aortic trunk occlusions. The left vertebral artery, which had become a sole arch artery, presented a severe stenosis that was treated endovascularly.

PATIENT DESCRIPTION

A 45 year old man presented with a 2-year history of headaches and dizziness, episodes of sudden blindness, episodes of fluctuating dysarthria associated with right-side weakness, and progressive gait imbalance. He had a history of oropharynx squamous cell carcinoma grade III treated with radiotherapy during childhood. Two years earlier a biopsy had revealed tumor recurrence and he underwent a new radiotherapy cycle.

Head computed tomography showed multiple hypodensities on watershed and periventricular topography. Doppler ultrasound detected complete bilateral carotid occlusions. CT angiogram con-

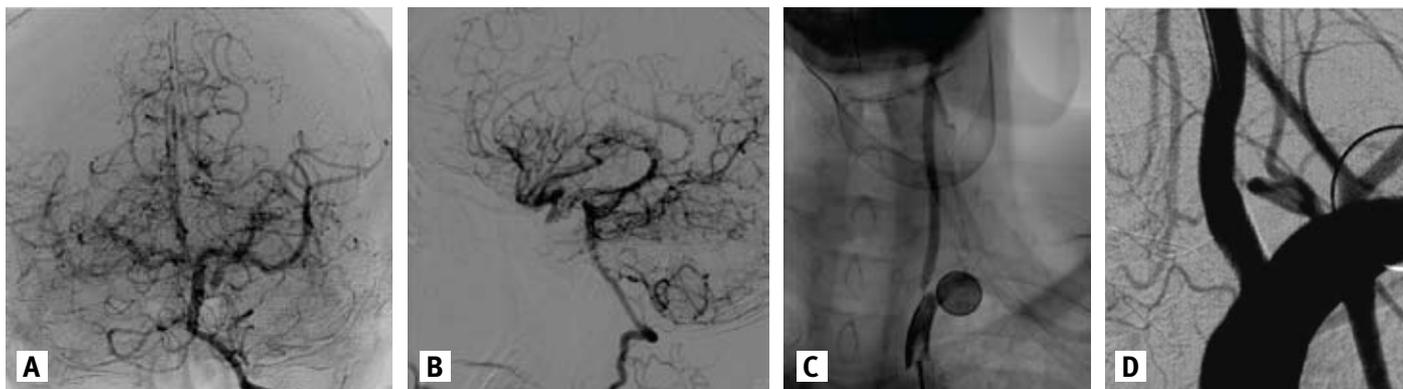
firmed bilateral carotid occlusion and showed right vertebral artery occlusion as well as severe ostial stenosis of the left vertebral artery.

Under local anesthesia, selective left subclavian artery angiogram showed the brain and posterior fossa structures fully supplied by the left vertebral artery [Figures A & B]. This sole arch artery presented a tight ostial stenosis [Figure C]. Stent-assisted angioplasty of the ostial vertebral artery stenosis under distal filter protection was successfully performed [Figure D]. A 4 x 8 mm paclitaxel-eluting stent was implanted.

The patient was kept on aspirin (100 mg per os once a day) and clopidogrel (75 mg per os once a day). One day after the procedure, he was discharged without headaches and dizziness, and with marked improvement in speech fluency, vision acuity and gait. The patient was stable with no sign of restenosis on

Diagnostic angiogram in a 45 year old man with radiation-induced stenosis of the supra-aortic trunk arteries, leaving the left vertebral artery as the sole arch artery. Angiography of the left subclavian artery during brachial cuff

compression shows the vertebrobasilar and carotid systems supplied by the left vertebral artery. **[A]** Anteroposterior and **[B]** lateral views. **[C]** The vertebral artery presents a severe ostial stenosis. **[D]** Postangioplasty image.



angiography 2 months after discharge and at physical examination 8 months following the procedure.

COMMENT

Neck irradiation is a known risk factor for atherosclerotic disease of the supra-aortic trunks. The average period of onset of stroke posterior to receiving radiation is 12.3 ± 9.0 years [2]. Surgical treatment for post-radiation carotid stenosis can be challenging and far more complicated than a regular carotid endarterectomy performed in a non-operated, non-irradiated neck. A previously irradiated and/or operated neck presents many obstacles to a proper dissection due to adhesions, fibrosis, and postoperative anatomic modifications. Furthermore, radiation stenosis may involve long arterial segments or multiple segments requiring extensive surgical exposures. This has led several investigators to propose the endovascular approach for these lesions [1].

Stent-assisted carotid angioplasty is routinely performed with the aid of protection devices in order to reduce the incidence of stroke in relation to procedural emboli dislodgement. The use of protection devices in selected cases of vertebral artery angioplasty has also been recommended [3].

Recently, the use of short drug-eluting stents for significant ostial vertebral artery stenoses was found to be safe, with a marked decrease in mid-term incidence of restenosis when compared to bare metal stents [4]. Validation in prospective, randomized multicenter trials is still necessary.

Stent fracture, thought to be related to excessive mechanical stress due to extreme flexion or compression of the vessel or overexpansion of the stent at implantation, is a potential complication that requires further investigation [4].

This unusual case of post-radiation symptomatic stenosis of sole arch artery successfully recanalized by endovascular

means contributes to the existing body of evidence on post-irradiation vascular stenosis management.

Corresponding author:

Dr. J.E. Cohen

Dept. of Neurosurgery, Hadassah-Hebrew University Medical Center, P.O. Box 12000, Jerusalem 91120, Israel

Phone: (972-2) 677-7092

Fax: (972-2) 641-6281

email: jcohenns@yahoo.com

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