

Prolonged Hypotension Following Innominate and Left Common Carotid Artery Bypass

Geoffrey Hobika, MD, and Jahan Porhomayon, MD, FCCP

THE AUTONOMIC NERVOUS system and carotid sinus baroreceptor activities play an important role in the regulation of arterial blood pressure and cardiovascular homeostasis. When these peripheral baroreceptors are exposed to a low- or high-pressure state, the changes in carotid sinus tension will lead to reduced or increased baroreceptor discharge and, subsequently, to altered sympathetic and vagal tone.¹⁻⁴

In clinical practice, this reflex is manipulated in the form of carotid massage for the treatment of supraventricular tachycardia. After carotid endarterectomy (CEA) or carotid artery stenting (CAS), carotid baroreceptors may be exposed to a relative increase in blood flow or wall tension, which can result in postoperative systemic hypotension (baroreceptor hyperactivity).⁵

The authors present a case of prolonged postoperative hypotension after innominate and left common carotid artery bypass for severe common brachiocephalic trunk stenosis in a patient with an aortic arch anomaly. They postulated that his prolonged postoperative hypotension was due to bilateral carotid baroreceptor dysfunction.

CASE REPORT

A 55-year-old man with a past medical history of hyperlipidemia and a 46-pack-year smoking history sought medical attention with symptoms of right arm claudication and amaurosis fugax involving his right eye. In his initial evaluation, the right arm pain during exertion raised concern for angina, and coronary ischemia was evaluated with a normal treadmill stress test, and echocardiography revealed normal left ventricular systolic function, wall motion, and no valvular issues. Then after an episode of amaurosis fugax, his vascular anatomy was studied, revealing an aortic arch variant in which both the innominate artery and the left common carotid artery had a common origin from the aorta (also referred to as a “common brachiocephalic trunk”) (Fig 1). The patient had a significant flow-limiting proximal stenosis involving the common brachiocephalic trunk, in effect causing significant reduction of blood flow to his left and right common carotid arteries as well as his right subclavian artery. His carotid arteries were without other flow-limiting atherosclerotic lesions. His left subclavian artery takeoff from the aorta was in a normal location and

without significant atherosclerotic disease. Physical examination revealed a diminished right radial pulse and a significant discrepancy in his upper extremity blood pressure recordings (left: 121/83 mmHg, right: 61/37 mmHg). Home medication included clopidogrel, simvastatin, and loratadine.

He came for elective bypass, and preoperatively, large-bore peripheral intravenous access was secured and a left radial arterial catheter was placed. The patient then was brought to the operating room and general anesthesia was induced; invasive arterial pressure monitors, including a pulmonary artery catheter and a right radial arterial catheter, were placed. Bilateral radial artery catheters were placed to assess the success of revascularization of the innominate artery.

Through a median sternotomy, the patient underwent an ascending aorta-to-innominate artery and left common carotid artery bypass. This was accomplished with a bifurcated Dacron graft anastomosed in an end-to-side manner from the ascending aorta to his right innominate and left common carotid arteries, which were each anastomosed each in an end-to-end manner (Fig 2).

After the completion of the bypass, the bilateral upper extremity blood pressures were equivalent to within 10 mmHg. Immediately, the post-bypass patient required multiple intravenous boluses of phenylephrine to maintain mean arterial pressure (MAP) above 65 mmHg (Fig 3). A strategy of low-dose inhalation anesthesia as well as infusion of low-dose propofol plus maintenance of baseline hemodynamics provided the necessary mechanisms for brain protection against cerebral ischemia.⁶ Additionally, healthy young individuals can tolerate temporary partial occlusion of the innominate artery because of sufficient collateral flow from the contralateral carotid and vertebral arteries. Upon arrival to the intensive care unit, the patient was intubated and became hemodynamically unstable, with systolic blood pressure decreasing to the 70 mmHg-to-80 mmHg range. Oxygenation, filling pressures, and cardiac output remained within normal parameters; however, systemic vascular resistance was reduced. Bleeding from the 2 mediastinal tubes that were placed intraoperatively was minimal. Hypotension was refractory to crystalloid boluses, and vasopressor therapy was initiated. Norepinephrine was started at 4 µg/min and titrated up to 16 µg/min. A vasopressin infusion was started at 0.04 U/min to maintain MAP above 65 mmHg. Vasopressin was discontinued on postoperative day (POD) 1. Electrocardiogram showed normal sinus rhythm with no ischemic changes or current of injury, and transthoracic echocardiogram did not reveal any new wall motion abnormality, cardiac tamponade, significant valvular abnormality, or reduced left ventricular end-diastolic/end-systolic volume. Dexamethasone, 4 mg, was given intravenously without improvement in MAP, suggesting adrenal insufficiency was not the etiology. Sepsis was ruled out after all culture results were negative. He was extubated on POD 1. The patient failed attempts to be weaned completely from vasopressor therapy, and he was maintained on norepinephrine infusion until POD 2, at which point he was transitioned to oral midodrine

From the Department of Anesthesiology, VA Western New York Healthcare System, State University of New York at Buffalo School of Medicine and Biomedical Sciences, Buffalo, NY.

Address reprint requests to Jahan Porhomayon, MD, FCCP, VA Medical Center, Room 203C, 3495 Bailey Avenue, Buffalo, NY 14215. E-mail: jahanpor@buffalo.edu

© 2016 Elsevier Inc. All rights reserved.

1053-0770/2602-0033\$36.00/0

<http://dx.doi.org/10.1053/j.jvca.2014.12.002>

Key words: innominate artery, carotid sinus/body, bypass, hypotension, carotid artery, baroreceptors

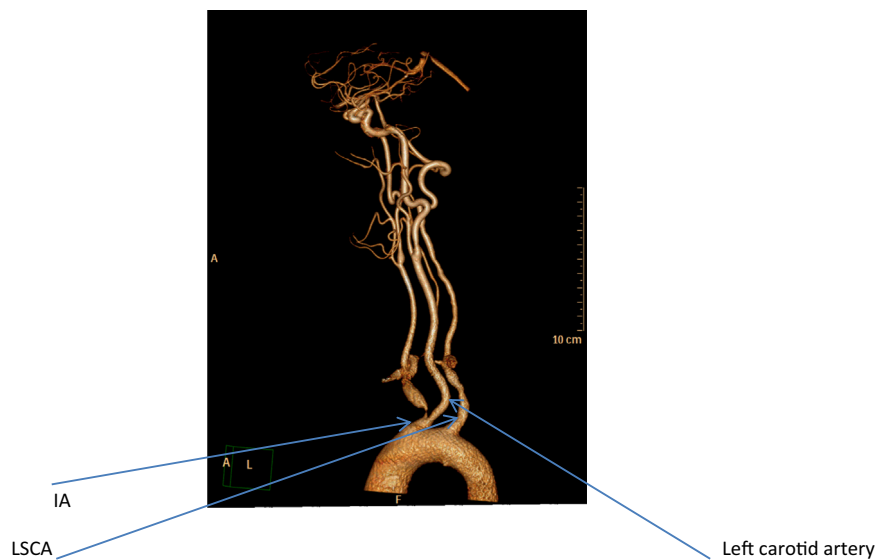


Fig. 1. Variant anatomy. There is a common origin of the left common carotid artery and innominate artery (bovine arch). IA, innominate artery; LSCA, left subclavian artery.

(an α_1 -adrenergic agonist). He was discharged to home on POD 6 with a 10-day taper of midodrine (10 mg BID for 5 days followed by 5 mg BID for 5 days), and he was without neurologic deficits. The patient was seen in follow-up on POD 20, which was 2 days after completion of his midodrine taper, and his blood pressure remained low at 83/62 mmHg.

DISCUSSION

This case highlights the role of baroreceptors in cardiovascular homeostasis and the way in which their function may

be altered by disease processes and surgery. Hypotension and hypertension are known complications that can occur after either CEA or CAS for carotid artery stenosis.⁷ It has been speculated widely that this is secondary to baroreceptor dysfunction. While these hemodynamic alterations may not be preventable, it is important to be aware that they can occur after these procedures, and are associated with increased morbidity and mortality. In a database review of more than 7,500 patients undergoing CEA, the use of intravenous vasoactive medications for postoperative hypotension was

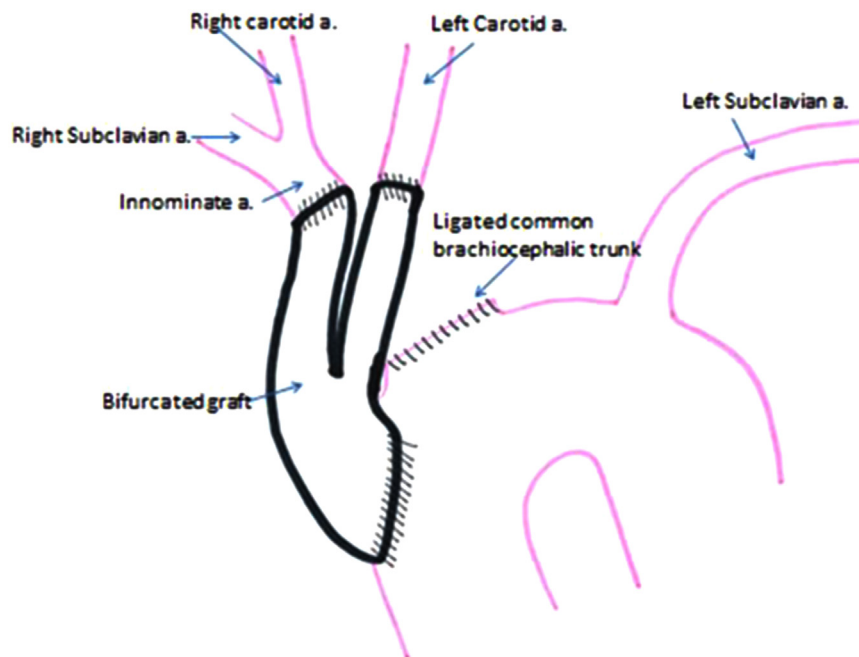


Fig 2. Schematic diagram of aortic arch bifurcated graft.

Download English Version:

<https://daneshyari.com/en/article/2759099>

Download Persian Version:

<https://daneshyari.com/article/2759099>

[Daneshyari.com](https://daneshyari.com)