Case report

Delayed post-traumatic aneurysms of aorta, carotid and innominate arteries

Bruno Chiappinia,*, Giorgio Arpesellaa, Carlotta Barbarab, Angelo Pierangeli

aDepartment of Cardiovascular Surgery, Policlinico S. Orsola, University of Bologna, via Massarenti, 9–40138 Bologna, Italy
bDepartment of Neuroradiology, Bellaria Hospital, Bologna, Italy

Received 27 June 2001; received in revised form 20 August 2001; accepted 31 August 2001

Abstract

We report here, to our knowledge, the first successful case of combined treatment (surgical and by interventional neuroradiology) in a patient with delayed post-traumatic aneurysms of the aorta, carotid and innominate arteries. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Aneurysm; Aorta; Innominate artery

1. Introduction

On January 1988, a 19-year-old white man was brought to the emergency room with multiple trauma, owing to a car accident. On admission he was watchful oriented. He had severe soft-tissue facial injuries with fractures of maxilla and the temporal bone of the skull. He also had right femoral bone fracture. The neurologic examination revealed normal reflexes. A CT of the head revealed the presence of a left temporal extradural hematoma which was drained surgically. Six months later, a radiography of the thorax demonstrated an enlargement of the thoracic aorta and an angiography confirmed the aneurysm of the aorta at the isthmus, which extended from 2 cm downstream the subclavian artery. Both the aortic arch and descending thoracic aorta, were considered as normal. Therefore, 9 months later, the aneurysm was resected and the aorta was successfully repaired; the aneurysm was approached through a left posterolateral thoracotomy through the fourth interspace, the aorta downstream was dissected for placement of a clamp; then the aorta between the left carotid and subclavian arteries was encircled; the vagus and recurrent nerves were dissected off the aneurysmal wall and retracted medi- ally and a 20 mm woven Dacron graft (USCI De Bakey soft woven Dacron, Bard Cardiosurgery Division, Billerica, MA) was placed after the aneurysm was excised, using the clamp-and-repair approach. The patient was discharged 11 days after the operation and he continued to do well until February 2000, when he presented a transient right hemi-plegia, hoarseness of voice, complaining dysphagia and headache. An angiography revealed an innominate artery aneurysm, involving the origin of the right subclavian artery and right common carotid artery and a 3 cm saccular aneurysm of the left internal carotid artery (Fig. 1A,B). Then we performed the stenting of the left internal carotid artery with a 30 mm 6 easy wallstent (Boston Scientific, Switzerland). The anatomy and the relations among the innominate, right subclavian and right common carotid arteries hindered the stenting, because the stent should had have a conic shape, to fit the diameters of the innominate and subclavian arteries. So 7 months later, we decided to resect the aneurysm, without extracorporeal circulation. The patient was given 1.5 mg/kg of heparin; both the right common carotid and innominate arteries were clamped. The aneurysm was opened and we found the remnants of an intimal tear in the lateral wall. Then we put a 5 mm tubular shunt (Comesa, Italy) proximally, in the transected innominate artery and distally, in the carotid artery, to perfuse the brain during the repair. The innominate artery was debrided and it was repaired placing an end-to-end 8 mm Dacron graft (Sulzer Vascutek Ltd., Renfrewshire, Scotland) between the innominate and right common carotid arteries and a side graft to the right subclavian artery, with 4/0 Prolene continuous suture. The shunt was removed, just prior to competition of each repair. A good pulsation was noted distally, after release of the clamps. Postoperatively, the patient awakened promptly with no neurological deficits, the hospital course was

* Corresponding author. Tel.: +39-347-514-7032.
E-mail address: bruno_chiappini@hotmail.com (B. Chiappini).
uncomplicated; upper extremity blood pressures were equal and a palpable right carotid pulse was present. So he was discharged on postoperative day 6 and a recent aortography revealed an excellent result, 6 months after the operation (Fig. 2A,B).

2. Comment

A review of the literature since 1960 showed 70 cases which were caused by blunt trauma. There are four cases, in which the diagnosis of innominate injury was delayed. Heggtveist et al. [1] described a patient who had diagnosis of innominate artery aneurysm 8 months after a motor vehicle collision. A second patient returned to hospital 2 years following a motor vehicle collision, complaining cough, numbness and weakness in the distribution of the right ulnar nerve: aortography revealed an innominate artery aneurysm. Lim et al. [2] described an innominate aneurysm in a man after a head on motorcycle crash, complaining of a rubbing sensation in his left chest on deep inspiration and dysphagia. The fourth patient presented a continuous chest pain for 2 months after a motor vehicle collision: a large innominate pseudoaneurysm was found [3]. The patient described in our case report is unique in two respects: the delayed presentation of the aneurysms and the combined approach. This is the first case of surgical and interventional neuroradiologic repair of post-traumatic aneurysm of more than one arch vessel. The conclusion that these aneurysms are post-traumatic is supported by the absence of clinical history of hypertension and histologic findings indicating a degenerative or inflammatory etiology in the resected aneurysm. Most cases of injury of the intrathoracic aortic vessels have been repaired with the cardiopulmonary bypass. In our case, we performed first the stenting of left internal carotid artery because the surgical approach to the distal extracranial arteries is difficult and usually the proximal binding of the carotid artery and an extracranial bypass must be performed; 7 months later we performed the aneurysmect-

Fig. 1. Preoperative angiography showing the innominate (A) and left carotid artery (B) aneurysms.

Fig. 2. Postoperative angiography (A) the woven Dacron graft end-to-end between the innominate and right common carotid arteries and end-to-side to the right subclavian artery; (B) the shunt in the left internal carotid artery.
omy, maintaining cerebral circulation by means of a shunt. Pretre et al. [4] reported an additional technique of innominate repair, using a close EEG monitoring: they inserted the shunt only if there were EEG changes with test clamping of the arteries. The need to use a shunt repairing these injuries, has been questioned by some authors but we believe that the use of a shunt is an important factor in achieving a successful result, because it simplifies the operation and it avoids the risks of extracorporeal circulation and systemic anticoagulation in a patient with multiple trauma (and high risk of bleeding).

References