SHORT REPORT

Operative Treatment of a Pseudoaneurysm of the Internal Carotid Artery in a 9-Year-Old Boy

A. Pulges, T. Ellervee, K. Varik, V. Järvi, M. Leht, I. Kutman and P. Pöder

Clinic of Cardiovascular and Thoracic Surgery, Department of Pediatric Surgery, Department of Radiology, and Clinic of Anaesthesiology and Intensive Care, University of Tartu, Puusepa 8, Tartu 51014, Estonia

Key Words: False aneurysm; Carotid surgery; Blunt injury.

Introduction

Blunt injury of the carotid artery accounts for 3–10% of all injuries of the carotid artery. Mortality rates of these injuries have been reported to be as high as 20–40%, while permanent neurological deficiencies occur in 40–80%. Blunt carotid injuries may cause not only spasm, intimal rupture or mural contusion, but they can also lead to more serious lesions such as dissection resulting in a pseudoaneurysm, or occlusion of the involved carotid artery. The most commonly affected site is the internal carotid artery (ICA) directly distal to the bifurcation, whereas the distal portion of the ICA is less commonly injured. We report a case of a pseudoaneurysm of the ICA in a 9-year-old boy.

Case Report

A 9-year-old boy was referred to Tartu University Clinics for profuse epistaxis. The patient was conscious, his blood pressure was 100/70 mmHg, and a heart rate of 110. During clinical examination a peritonsillar mass was detected on the right side. The episode of epistaxis was treated by right anterior gauze nasal packing and posterior (nasopharyngeal) nasal packing. Six months earlier, the patient had sustained an injury to the neck region during sledging. After the accident there had been four or five episodes of epistaxis. Fifteen days before admission he had had fever (temperature up to 40°C), a painful throat and swallowing, and the family doctor suspected parotitis. The leucocyte count was 17.27 × 10^9 l⁻¹ and the CRP was 21 mg/l. A contrast enhanced CT carried out 18 days after the onset of symptoms revealed a pseudoaneurysm of the right ICA (Fig. 1). Immediately after the CT, angiography of the extra- and intracranial arteries was performed and this confirmed the CT findings (Fig. 2). The patient was taken to the operating theatre for an emergency operation. Intraoperatively, the right common carotid artery and ICA were dissected free; the proximal part of the ICA was controlled by direct clamping. The distal part of the ICA was controlled with an intraluminal balloon catheter. For better access to the distal part of the internal carotid artery, the parotid gland was elevated, the styloid process removed and the carotid canal was widened. A transverse defect was detected in the internal carotid artery, which involved one third of the diameter of the vessel. The internal carotid artery was resected (approximately to a length of 1 cm) in the region of the pseudoaneurysm and an anastomosis was performed end-to-end with interrupted sutures (Fig. 3). During the clamping period no temporary bypass was used because of the existence of an open circle of Willis seen on angiography. Clamping time was 25 min. For anatomical and technical reasons, no histological specimens were taken from the aneurysm sac. As signs of active infection were not observed during the operation, no bacteriological specimens were taken. On the sixth postoperative day Doppler-ultrasonography of the extracranial arteries was...
performed to check the patency of the ICA in the region of the end-to-end anastomosis. During the recovery period no neurological deficit (including mandibular dysfunction) was detected. The patient was discharged on the seventh postoperative day. An MRA was performed 4 years after operation which showed no stenosis in the region of the anastomosis (Fig. 4).

Discussion

Profuse epistaxis is a life-threatening complication of pseudoaneurysm of the ICA. Prompt surgical treatment, using endovascular techniques (e.g. uncovered endovascular stents with packing of the embolisation coils into the pseudoaneurysm sac, or autologous vein-covered stents, or stent-grafts), or open surgical strategies (e.g. ligation or resection of the pseudoa—

Fig. 1. Contrast CT demonstrating a homogenous and strongly enhancing structure (3.4 × 2.5 × 4.5 cm) in the right internal carotid artery. The neighbouring structures were displaced but not infiltrated.

Fig. 2. An angiogram showing a pseudoaneurysm in the distal portion of the ICA.

Fig. 3. Line drawings: (A) describing the exposed internal carotid artery (ICA), external carotid artery (ECA), common carotid artery (CCA), the styloid process (SP) and the pseudoaneurysm (PA); (B) showing the removed styloid process (RSP), the widened carotid canal (WCC) and rupture of the ICA (R) and (C) performed end-to-end anastomosis (A).

EJVES Extra, 2004
neurysm and performing of an end-to-end anastomosis, or autologous graft implantation) are mandatory.4–6 There is no universal strategy for the treatment of a pseudoaneurysm of the ICA, especially in children. It has been reported previously that surgical ligation or coil embolisation of the ICA is associated with neurological morbidity in 28% of cases and with death in 0–40% of cases, while the mortality rate for repair of the ICA is 2%. However, another fact to be considered is that more than 50% of children have an adequate collateral circulation and they can tolerate a unilateral occlusion of the ICA.7 Moreover, repeated episodes of epistaxis can lead to an infected pseudo-aneurysm of the ICA, in which case stent implantation is contraindicated. Additionally, the growing vessels in children can cause an endoleak or displacement of the stent graft. Resection of the pseudoaneurysm and reconstructive surgery, involving the distal portion of the internal carotid artery, are challenging tasks for vascular surgeons. During the operation, we used several manoeuvres for the adequate exposure of the upper end of the ICA to allow arterial repair rather than ligation, and this is the main teaching point of the case. A good result at 4-year follow-up confirmed that this was a secure decision.

References


Accepted 3 June 2004