



Case report

Endovascular management of iatrogenic cervical internal carotid artery pseudoaneurysm in a 9-year-old child: Case report and literature review



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ABSTRACT

Extracranial internal carotid artery (ICA) pseudoaneurysms are uncommon in the pediatric population and are usually secondary to direct trauma to the vessel. Treatment options include surgery (ligation), anticoagulation therapy and endovascular treatment. Endovascular covered stents have shown good results in adult populations, resulting in occlusion of the aneurysm and preservation of the artery without significant complications. However, there have been only limited reports in the literature reporting endovascular carotid stent placement in the pediatric population. We report a case of a 9-year-old boy patient, who developed a cervical ICA pseudoaneurysm after a parapharyngeal tumor resection. He was successfully treated by primary endovascular covered stent placement. During a follow-up of 6 months the patient has been asymptomatic, without any adverse event. Additionally, a literature review is done.

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1. Introduction

Extracranial internal carotid artery pseudoaneurysm is an uncommon entity in the pediatric population [1–3]. Although covered stents have been documented as a therapeutic alternative in carotid blow out syndrome in adults [4–6], experience in endovascular carotid stenting in the pediatric population is limited and there are few case reports available on the literature [7]. Long-term results of endovascular internal carotid stenting in children are unknown, and the treatment of stent-related complications can be complex. We present a case of endovascular carotid stenting for iatrogenic carotid pseudoaneurysm in a 9 year-old boy.

2. Case report

A 9-year-old male was referred to our department with a 7-month history of a painless, progressive growth mass on the left palatine tonsil. A head and neck contrast-enhanced computed

tomography revealed a heterogeneous mass of 63 × 40 × 52 mm contour lobed, with heterogeneous enhancement, which was located in the nasopharynx and spread to pterygomaxillary fossa, limited posteriorly by the left carotid vessels (Fig. 1). A biopsy of the lesion was carried out and histopathological report was chordoma. The patient underwent a transoral endoscopic resection of the tumor. Due to the large size of the lesion (130 cc), intratumoral decompression was performed with microdebrider, for subsequent extralesional dissection with PEAK PlasmaBlade(TM). During dissection of the posterior margin of the tumor, a bleeding from an inadvertent carotid artery puncture was satisfactorily controlled with hemostatic matrix (FloSeal®), Fibrin tissue adhesive (Beriplast®) and oxidized regenerated cellulose patch (Surgicel®) (Fig. 2). The patient had a favorable postoperative course with discharge at day 9 after surgery. However, after 2 days of discharge, he was readmitted due to a sudden, profuse, self-limited oral bleeding. Patient's physical examination revealed stigmata of bleeding in oral cavity without a specific site of bleeding. Once he was stabilized, an angiography was performed, which showed a pseudoaneurysm of 4mm in the cervical segment of the left internal carotid artery (Fig. 3). Carotid artery ligation was not an option, due to the patient's age and the risk of stroke. Taking into account that at the age

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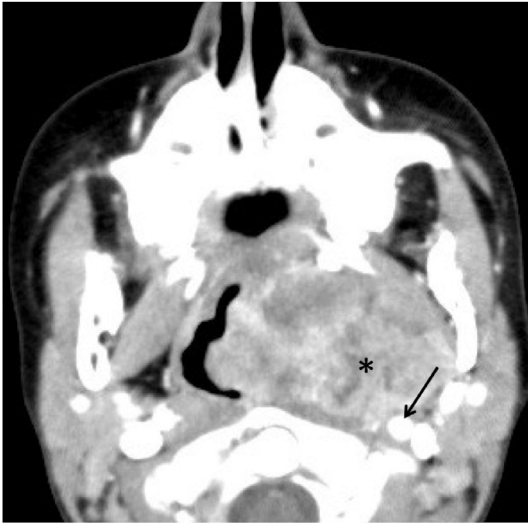


Fig. 1. Presurgical Axial CT images. Angiography demonstrating proximity of the tumor (chordoma) (asterisk) with the left extracranial internal carotid artery (arrow).

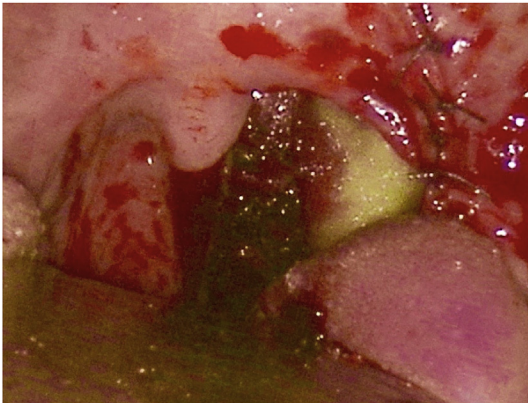


Fig. 2. Hemostasis with human thrombin glue after endoscopic transoral dissection of the tumor from the left parapharyngeal space.

of the patient ICA has reached full diameter, the use of a covered stent was proposed. Therefore, we pursued primary endovascular stent placement to exclude this lesion from the circulation. Femoral artery access was obtained with an 7-F vascular sheath. The patient then received a bolus of heparin to conserve an activated coagulation time of 250 seconds. After passing a wire across the aneurysm, a 5 × 5 cm Viabahn stent graft (W.L. Gore & Associates, Inc.) was introduced through the 7-F sheath. The stent was centered completely covering the lesion (Fig. 4). He did well after the procedure without complication and was discharged home with subcutaneous heparin (20mg each day by 2 weeks) and 100mg of aspirin by day indefinitely. The patient is followed clinically without complications. During a follow-up of 6 months the patient has been asymptomatic, without any adverse event. A MRI performed at 5 months revealed no recurrence or stenosis (Fig. 5).

3. Discussion

A pseudoaneurysm is a blood-filled cavity contiguous to a vessel with a persistent connection to the arterial lumen [1,8]. Its cause is usually an injury to the arterial vessel wall (intima or adventitia) [9]. Two sources of injury have been described, a partial tear of the

(A)



(B)

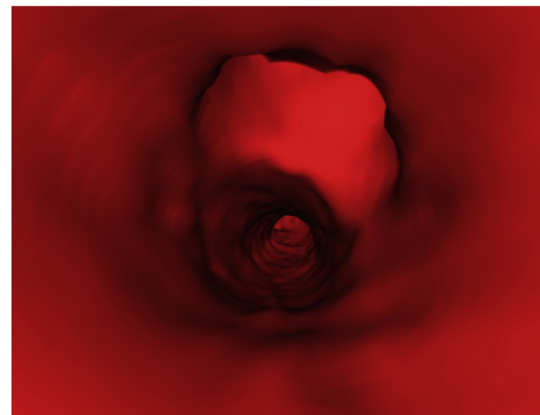


Fig. 3. Pseudoaneurysm of the left extracranial internal carotid artery (arrow), on a conventional digital subtraction angiography (A), with 3-D reconstruction (B).

vessel wall causing thinning and protrusion of the remaining intact layers [10], or a localized disruption of the arterial wall [8,11], forming a periarterial hematoma encapsulated by reactive fibrotic tissue. The center of the hematoma liquefies creating a potential space for blood flow and enlargement of an aneurysmal sac [5,9,12].

Pseudoaneurysms of the internal carotid artery (ICA) are infrequent, accounting for 5.6% of all carotid aneurysms [13], and extracranial location is more unusual, representing only 0.4–1% of all extracranial aneurysms. Most of them have been reported in adult population, with few sporadic reports in children [2].

Trauma is the main cause of ICA pseudoaneurysm [14], and multiple mechanisms of traumatic carotid artery injury have been described, including direct trauma, intra-oral trauma, hyperextension or rotation of the head with widening of supra-aortic vessels, and skull base fractures [15]. Other causes of extracranial ICA pseudoaneurysm are infections, iatrogenic injury, spontaneous carotid dissection, local tumor invasion, arteriosclerosis, radiation

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