Internal Carotid Artery Pseudoaneurysm after Tonsillectomy Treated by Endovascular Approach
A Case Report


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Summary

Surgery on the head and neck region may be complicated by vascular trauma, caused by direct injury on the vascular wall. Lesions of the arteries are more dangerous than the venous one. The traumatic lesion may cause laceration of the artery wall, spasm, dissection, arteriovenous fistula, occlusion or pseudoaneurysm.

We present a case of a child with a giant ICA pseudoaneurysm after tonsillectomy, manifested by pulsing mass and respiratory distress, which was treated by endovascular approach, occluding the lesion and the proximal artery with Histoacryl. We reinforce that the endovascular approach is the better way to treat most of the traumatic vascular lesions.

Introduction

Mortality after tonsillectomy is a rare condition and it has been described in 1 to 1000 and 1 to 170,000 procedures1-3. Almost 30% of the deaths are mainly related to the hemorrhage secondary to the lesion of the internal carotid artery (ICA) or the external carotid artery (ECA) and its branches4-6.

Inadvertent vascular trauma may occur during surgery on the head and neck area affecting arteries and veins and cause abnormal hemorrhage5-6. Venous lesions are well controlled by compression, tampon and electro coagulation. Arterial lesions are more difficult to control and in general profuse bleeding occurs. The arterial injury may develop arterial laceration, occlusion, spasm, dissection, arteriovenous fistula and pseudoaneurysm. Cerebral embolism may occur during the surgery in ICA lesions. Lesions like laceration, occlusion, and dissection, may resolve after the injury and they can complicate clinically only during the surgical procedure.

If the lesion is not well controlled during the surgery, furthermore hematoma may organize and develop a definite arteriovenous fistula (AVF) or pseudoaneurysm, which can enlarge and cause oral or nasal hemorrhage, as well as a mass that can grow rapidly, mainly in cases of pseudoaneurysm. Pulsation may occur in both situations and a systolic-diastolic bruit is frequent in case of AVF. The growing mass will progressively compress adjacent structures, causing pain and disturbing swallowing and breathing. This is a very dangerous situation, requiring urgent treatment mainly due the airway obstruction7-9.

The goal of the treatment is correct the lesion, preserving the carotid lumen, if possible. The direct surgical approach to the pseudoaneurysm is very difficult due to the deep location of the ICA and the anatomical distortion caused by the mass effect5-7. Surgical ligature
have a high rate of complications and should include trapping of ICA, that need a cervical and an intracranial approach, occluding the ICA below the ophthalmic artery.

The best treatment is by endovascular approach. In some cases, the ICA lumen can be preserved by using covered stents. If the occlusion of the ICA is necessary, an occlusion test should be done to verify if the polygon of the Willis is patent and efficient to preserve the cerebral vascularization of the ipsilateral hemisphere. Finally, if the polygon of the Willis is not patent, the best decision is by-pass followed by ICA occlusion.

The objective of this study is to present a child with an ICA pseudoaneurysm after tonsillectomy who was submitted to the endovascular treatment.

**Case Report**

A 30-month year-old girl was submitted to a tonsillectomy and she was discharged from the hospital in the same day. Five days after, the parents noticed a 1.5 cm right cervical mass with some episodes of fever according to the parents, although not confirmed by the use of a thermometer. The mass did not improve after 10 days of antibiotic therapy, but it continued to increase and a high respiratory distress became evident.

The girl was submitted to a lymph node biopsy which showed an inflammatory reaction. The respiratory distress was getting worse and the girl was brought to the emergency room, when a 10.0 cm right cervical mass was observed on the physical examination (figure 1). Her body temperature was 37°C. The ultrasound (US) of the neck and the computerized tomography (CT) showed a heterogeneous mass occupying the right carotid space, with different densities and compression of the nasopharynx and left deviation of the midline.

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**Figure 1** Clinical aspect of the right submandibular mass.

**Figure 2** CT without contrast showing the right internal carotid artery pseudoaneurysm and the distortion of the normal anatomy.

**Figure 3** CT image with contrast showing a large mass occupying the right carotid space, with different densities and compression of the nasopharynx and left deviation of the midline. The lesion extends itself to the masticatory, the posterior cervical and parotid spaces.
The symptoms and signs of a pseudoaneurysm are related to a usually rapid increasing mass, with pulsation, rarely presenting bruit, and that can bleed with a potential lethal risk. The natural history of the pseudoaneurysm is of maintaining the increasing mass with compression of adjacent structures. This distortion and compression of respiratory air...
pathway and vascular structures can induce brain ischemia and hypoxia. Through the surgical approach or even spontaneously through the oral or nasal mucosa, a massive bleeding can erupt and kill the patient. Because of this potential lethal risk, the treatment must be done the sooner the better. Actually, in the well equipped hospitals the angiogram must be performed as a medical urgency because it is the gold standard to define the local and type of the bleeding, as well as the brain collateral circulation, so a therapeutic strategy can be established.

Arterial ligatures should be avoided since they are not always effective and can increase the morbidity, although it has been described to treat mycotic pseudoaneurysm of the extracranial ICA.

The best treatment is the endovascular approach that in general requires the ICA occlusion. Recently, in some selected patients it is possible to preserve the ICA through the use of stents, recovered or not, associated to coils or not. The occlusion of the ICA can be done after an occlusion test showing a patent and efficient polygon of Willis in maintaining the pressure and blood flow in the occluded territory. In the case where the patient can not tolerate the ICA occlusion, there is the possibility of a STA-MCA by pass, followed by occlusion of the ICA.

In our patient the ICA was occluded immediately above the site of rupture, determined by hematoma or even by the surgical trauma, and the polygon of Willis was perfectly functional. The treatment of this case was limited to the ICA occlusion which was done by the NBCA. Coils could be used too, but there are more expensive. Detachable balloons are another alternative, but require a bigger guide catheter, with more risk of femoral complications in children.
Conclusions
ICA pseudoaneurysm is a rare complication of tonsillectomy, and is a life-threatening situation. The endovascular approach is a well-established treatment and the best one for most of these lesions. A careful study of the ICA pseudoaneurysm and the brain circulation must be performed before establishing the best therapeutic strategy. If the brain circulation can be compromised during the ICA occlusion, then a superficial temporal artery-MCA bypass followed by the occlusion of the ICA can be life saving.

References