

Fulminant post-tonsillectomy haemorrhage caused by aberrant course of the external carotid artery

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Abstract

Haemorrhage, throat pain and otalgia are common complications following tonsillectomy. Haemorrhage is rarely life-threatening but in this paper we describe a fulminant secondary haemorrhage due to an aberrant external carotid artery in an eight-year-old boy. Acute surgical intervention with ligation of the external carotid artery was needed to control the bleeding.

Key words: Tonsillectomy; Post-operative Haemorrhage; Carotid Arteries, Ligation

Introduction

Tonsillectomy is one of the most commonly performed operations in otorhinolaryngology. The most common complication, besides pain and otalgia, is post-operative haemorrhage, which may be either primary or secondary. Primary haemorrhage is defined as haemorrhage within 24 hours of the surgery whereas secondary haemorrhage occurs later than 24 hours after the operation. Primary or reactionary haemorrhage rates vary between less than 1 per cent and 3 per cent in the recent literature, whereas secondary haemorrhage rates vary between 1 per cent and 5 per cent.^{1–5}

The purpose of this study is to describe a case with an unusual cause of secondary haemorrhage.

Case report

An eight-year-old boy presented as an emergency with bleeding from the mouth. Four days earlier, he had undergone an adenotonsillectomy for recurrent infection without any apparent complications. The surgeon achieved haemostasis by electro-cauterization leaving a ligature at the base of both tonsillar fossae. On admission the patient had had three episodes of haemorrhage but, at the time of arrival, active bleeding had stopped 10 min previously. On examination, he had clotted blood in his right tonsil area which was removed and no bleeding point was visible. The patient was admitted for observation and left the hospital the next day without any further bleeding.

Five days later the patient was re-admitted with further bleeding. The haemoglobin level was down to 4.0 mmol/l (normal: 6.7–10.6 mmol/l), indicating

massive haemorrhage. The tonsil areas were re-explored under general anaesthesia and in both areas residual tonsillar tissue was excised and haemostasis achieved by electro-cauterization. The coagulation parameters did not show any abnormalities (Table I). After one night of observation the patient returned home without any further bleeding.

Three days later the patient presented for the third time with spontaneous oral bleeding. He looked pale, no blood was visible in the oropharynx but the haemoglobin level had fallen to 2.9 mmol/l. Three units of packed red blood cells were administered and observation with further conservative management was continued.

Three days later the patient was found on the ward bleeding profusely from his mouth and in hypovolaemic shock. He was intubated immediately and transferred to the operating theatre where the tonsil areas were re-explored and the haemorrhage controlled by placing an index finger in the right tonsil fossa. The patient was given seven packs of red blood cells. On exploration a non-pulsating flow of blood was seen originating from the right tonsil area but attempts at cauterization and intra-oral ligation

TABLE I
COAGULATION PARAMETERS

	Measured value	Normal value
Thrombocytes	460.10 ⁹ E/l	150–450.10 ⁹ E/l
Factor VIII	>120%	50–150%
Anti-plasmin	86%	75–125%
APTT	27.5 s	26–36 s
Fibrinogen	2.4 g/l	1.7–3.5 g/l

APTT = activated partial thromboplastin time

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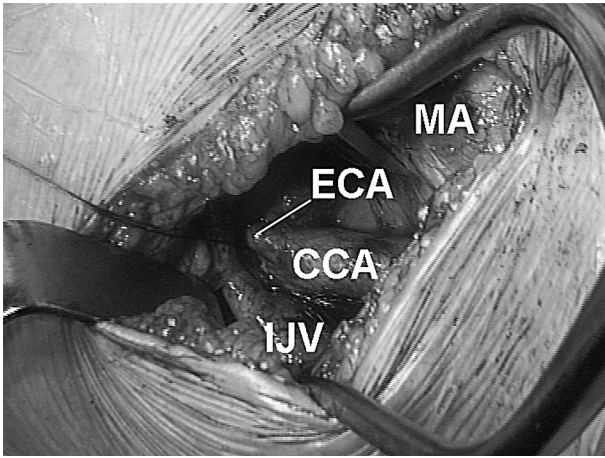


FIG. 1

Intra-operative view with exposure of the major vessels in the neck on the right side. MA = mandibular angle, ECA = external carotid artery, CCA = common carotid artery, IJV = internal jugular vein. Note that the mandibular angle is pushed aside by the right blade of the retractor. The external carotid artery is marked by a suture.

failed. A vascular surgeon was called, the neck was incised medially to the right sternocleidomastoid muscle and the common carotid artery was identified and explored. The bifurcation appeared to be located at the level of the right mandibular angle (Figure 1). Distally to the superior thyroid artery the external carotid artery (ECA) was occluded as a trial, after which the intra-oral bleeding largely stopped. The artery was then ligated with an absorbable ligature and the neck closed. Some minor bleeding in the right tonsil area was controlled with cautery and haemostasis was achieved. The estimated blood loss was 2000 ml.

The patient was discharged from hospital three days later with a haemoglobin level of 7.5 mmol/l. Two weeks later he was reviewed and was discharged from follow up.

- **Massive bleeding following adenotonsillectomy is uncommon, but not unknown**
- **In this case, ligation of the external carotid artery was required to control recurrent haemorrhage**
- **Strategies for controlling such situations are briefly reviewed**

Discussion

Post-operative bleeding following tonsillectomy is associated with the age of the patient (> 11 years), a history of chronic infection, a large intra-operative blood loss (> 50 cm³), post-operative hypertension (mean arterial pressure [MAP] > 100 mmHg)⁷ and dissection by bipolar diathermy.⁸ Our patient had none of these risk factors. Other factors remain controversial but it seems that the sex of the patient,

the experience of the surgeon, the pre-operative haematocrit level, the addition of an adenoidectomy, the method of haemostasis, total operation time, post-operative fever and pulse rate,⁷ the post-operative use of antibiotics,^{7,9} the prothrombin time,¹⁰ the use of disposable instruments¹¹ and the hair colour of the patient – and in particular whether the patient is red haired – are not risk factors.¹² Whatever the origin, haemorrhage requiring post-operative intervention with further electro-cauterization or intra-oral ligation is relatively uncommon. Thus, in one large series of 5539 patients, further surgery was only required in 145 or 2.6 per cent of cases⁶ – although direct intervention is not unknown and five patients (0.09 per cent) in this same series required ligation of the external carotid artery to control bleeding.⁶ Ligation has also been reported, from the same centre, as being necessary to control bleeding following adenoidectomy in a patient with an ‘aberrant vessel’.¹³

Aberrations in the normal vascular architecture that may cause fulminant haemorrhage after surgery are clearly important. The bifurcation of the common carotid artery is normally located in the neck at the level of the cephalic border of the thyroidal cartilage and the branches, the lingual, palatine, facial, and pharyngeal arteries, supply the adjacent oropharynx and pharyngeal walls. Aberrant courses of these vessels are largely unpredictable although they may be associated with velocardiofacial syndrome (VCFS) and MacKenzie-Stepner *et al.*¹⁴ described dilated courses of the common, internal and external carotid arteries on arteriograms in such patients. They also demonstrated pulsations in the pharyngeal wall in these cases. However, our patient did not demonstrate any clinical symptoms of this syndrome.

To control such bleeding, ligation of the external carotid artery may be necessary although arteriography with simultaneous selective embolization of the bleeding vessel has been described by Levy *et al.*¹⁵ who described a case where lingual artery embolization was required. This was not an option for us although, when the situation permits, arteriography and embolization would be preferable as it allows the exact site of bleeding and any aberrant course of the offending vessel to be identified. It also avoids scarring in the neck.¹⁶

In conclusion, post-tonsillectomy haemorrhage is a potentially lethal complication of a relatively innocent and frequently performed operation. Prolonged observation and further intervention is always indicated – especially if bleeding is recurrent – and arteriography with selective embolization of the bleeding vessel is a therapeutic option. However, if this is not available, or if the situation is acute, ligation of the external carotid may be necessary to control the bleeding.

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