

Short Communication

Endoscopic ligation of anterior ethmoidal artery in treatment of epistaxis

T. J. WOOLFORD, M.D., F.R.C.S. (ORL), N. S. JONES, M.D., F.R.C.S.*

Abstract

Arterial ligation of the anterior ethmoidal artery may be required in cases of persistent epistaxis and conventional techniques involving open surgery carry a recognized morbidity. We describe an endoscopic, intranasal technique for ligation of the anterior ethmoidal artery. This technique was performed in a patient who had a severe epistaxis following nasal trauma. Her epistaxis persisted in spite of anterior and posterior nasal packing. Endoscopy showed the bleeding to originate high and lateral to the middle turbinate. Endoscopic exploration defined the frayed end of the anterior ethmoidal artery. A ligaclip was placed with immediate and persistent arrest of her epistaxis. No further nasal packs or treatment were required.

Key words: Epistaxis; Surgical Procedures, Endoscopic

Introduction

Epistaxis is a common condition with a prevalence in the general population of between 10 per cent and 12 per cent.¹ The management of epistaxis causes a significant workload for most Otorhinolaryngology departments, with a consultant in England or Wales on average admitting 10.2 patients with epistaxis for an average stay of 2.9 days over a three month period.² The majority of patients with epistaxis are managed by a combination of local cautery with some form of nasal packing, although this procedure is recognized to carry an associated morbidity causing much discomfort to the patient and on occasion life-threatening hypoxia.³

The development of nasal endoscopic techniques has enabled accurate localization and cautery of bleeding points and several authors describe using these techniques to successfully treat epistaxis.^{4–7} Submucous resection has also been advocated to treat epistaxis.¹ A prospective study by Cumberworth *et al.*⁸ suggested that a submucous resection was more successful and economic as a first-line treatment strategy in cases of persistent epistaxis when compared to delayed arterial ligation. Failure to control bleeding may require examination under anaesthesia with further cautery and packing. In a small number of patients (approximating to one per cent of those admitted) surgical intervention in the form of arterial ligation is required.^{2,9}

The arterial blood supply of the nose has been reviewed in detail.¹⁰ Blood supply is from the external carotid system (via the maxillary and sphenopalatine arteries) and the internal carotid system via the ethmoidal arteries. The level of the middle turbinate has traditionally been regarded as the dividing line between the internal and external carotid arterial supply, although Shaheen¹¹

suggested that the area supplied by the internal carotid system was actually considerably smaller than this. Evidence to support the difference in area supplied by the two systems is found in the disproportion between the small diameter of the anterior ethmoidal artery and the larger diameter of the sphenopalatine artery at the point where these vessels enter the nose.

Given the dominance of the external carotid arterial contribution, it would seem appropriate to interrupt this system for the majority cases of epistaxis where the site of bleeding is not discernible. This procedure is usually performed by ligation of the internal maxillary artery within the pterygopalatine fossa or ligation of the external carotid artery in the neck. More recently endoscopic techniques have been described where the sphenopalatine artery is ligated via the superior meatus¹² and in the sphenopalatine foramen via the middle meatus.¹³ The technique of endoscopic ligation of the sphenopalatine artery is advantageous from an anatomical perspective because the nasal blood supply is interrupted at a distal point thus preventing blood flow from the extensive anastomoses within the external carotid system.¹³

On rare occasions endoscopic examination of the nose reveals a bleeding point high in the middle meatus or from the cribriform plate area. In these cases interruption of the internal carotid system is more appropriate. This has conventionally been performed by the well-established technique of ligation of the anterior (and usually also posterior) ethmoidal artery via an external approach. The anterior ethmoidal artery can also be approached endonasally using the endoscope and we have used this method to identify and ligate this artery in cases of persistent epistaxis.

From the Departments of Otorhinolaryngology, Royal Hallamshire Hospital, Sheffield and the Queens Medical Centre,*, Nottingham, UK.

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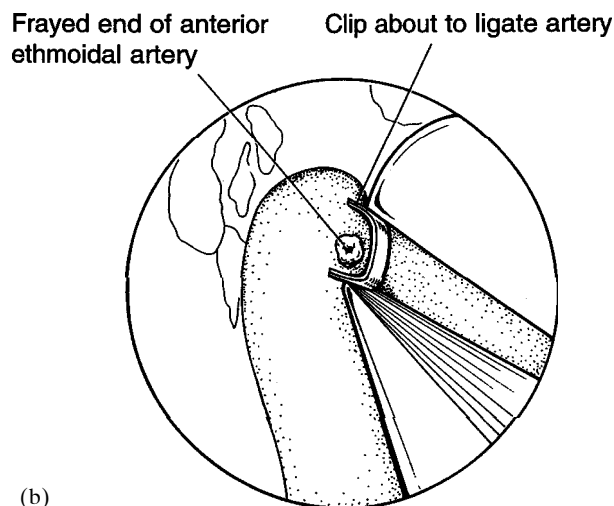
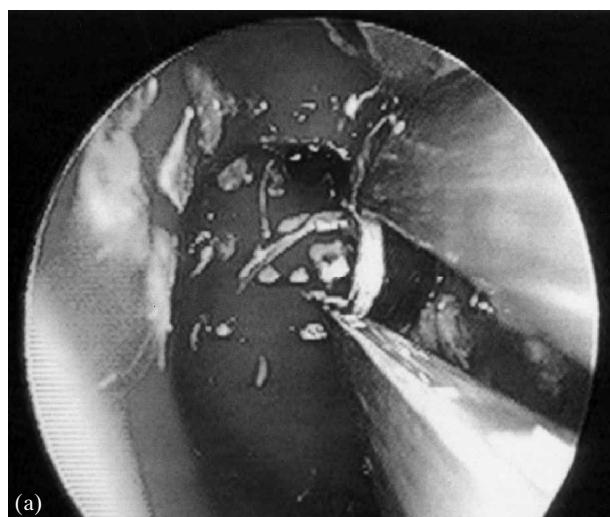


FIG. 1

The anterior ethmoidal artery is ligated via an endoscopic approach: endoscopic view (a) and line drawing (b).

Patient and surgical technique

Patient

A 33-year-old woman sustained nasal trauma which resulted in a brisk epistaxis. This was initially controlled using a combination of anterior and posterior packs. The patient continued to have intermittent brisk bleeds despite adjustment of her packs and was taken to the operating-theatre on the third day of admission.

Surgical techniques

After induction of anaesthesia the dressings and packs were removed. The patient was positioned with a pillow under the shoulders and the nose was prepared with Moffett's solution (two ml six per cent cocaine, one ml 1:1000 adrenaline, one ml eight per cent sodium bicarbonate and six ml normal saline).

In order to locate the anterior ethmoidal artery the frontal recess is first identified. The frontal recess is best approached from anterior to posterior, and instrumentation of the mucosa of the recess should be minimized to prevent future stenosis. A middle meatal antrostomy is fashioned to help access and to act as a landmark. Prominent agger nasi cells are also removed to improve access, and it may also be necessary to remove the anterior third of the middle turbinate to aid visibility. The frontal recess is then located by gentle anterior probing with a blunt-ending sucker lateral to the middle turbinate. Identification of the frontal recess may also be helped by following up the posterior edge of the uncinate process. In 50 per cent of individuals the top of the uncinate process inserts into the middle turbinate or skull base and shields anterior access to the frontal recess. In these patients it is necessary to remove the 'web' of the top of the uncinate process.

The anterior ethmoidal artery lies in a horizontal bony buttress behind the frontonasal recess, and this area may be narrowed by agger nasi air cells. The artery is usually separated from the recess by one air cell (which may be large or small). In this case the frayed end of the anterior ethmoidal artery was identified and ligated with a clip with immediate arrest of bleeding (Figure 1). No nasal packs were used. The patient was discharged two days later and there were no further episodes of epistaxis.

Discussion

Therapeutic intervention, such as accurate endoscopic cautery, is now possible reducing the need for nasal packing. In cases of persistent epistaxis where direct cautery is not possible, endoscopic examination also provides an anatomical basis for the most appropriate arterial ligation or cautery. Conventional operative techniques for arterial ligation carry a recognized surgical morbidity and an endoscopic approach may be advantageous. In the case of an external approach to ligation of the ethmoidal arteries the procedure may rarely be complicated by direct orbital trauma or disruption of the medial canthal ligament and inevitably results in facial bruising for several days and a facial scar.

In this report of an endoscopic approach to ligation of the anterior external artery no complications were recorded. The endoscopic surgical exposure required is limited and for those trained in endoscopic sinus surgery techniques there is therefore little risk of orbital or intracranial complications. A further possible advantage is a reduction in anaesthetic time required for endoscopic surgery compared to conventional surgery, particularly relevant in a patient group who are frequently significantly medically compromised.

Conclusion

The technique we describe will only be appropriate in a minority of cases of persistent epistaxis where the bleeding site is identified as anterior ethmoidal in origin. Clearly this technique does carry the recognized risks associated with endoscopic sinus surgery and should only be attempted by those experienced in such procedures. Although further evaluation is required, our initial experience suggests that endoscopic ligation of the anterior ethmoidal artery may be a useful technique in these selected cases.

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Address for correspondence:

Mr T. J. Woolford,
Consultant in Otorhinolaryngology,
Royal Hallamshire Hospital,
Sheffield S10 2JF, UK.

Mr T Woolford takes responsibility for the integrity of the content of the paper.

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