The Journal of Laryngology and Otology
March 1999, Vol. **113**, pp. 252–254

Complications resulting from treatment of severe posterior epistaxis

JOHN P. BENT, III, M.D., BRENNAN P. WOOD, B.S.

Abstract
Recent advances in nasal endoscopy and arterial embolization have improved the treatment of severe posterior epistaxis. This report reviews the therapeutic options, including a case of epistaxis that did not respond to nasal packing but was successfully controlled with superselective arterial embolization. The discussion includes an outline of potential complications of epistaxis treatment, including a case of nasal septal perforation.

Key words: Epistaxis; Embolization, therapeutic; Nasal septum; Fistula

Introduction

Epistaxis will strike approximately 60 per cent of the population at sometime or another. Fortunately, only six per cent of those affected by epistaxis require professional medical treatment (Elahi *et al.*, 1995). Most cases of epistaxis originate from the anterior portion of the nose and respond to nasal packing or chemical cautery. The traditional conservative treatments of local pressure, vasoconstrictors, and anterior and posterior packing commonly fail to provide haemostasis for severe posterior epistaxis. Anterior and posterior packing, commonly the current first-line treatment, has up to a 52 per cent failure rate (Schaitkin *et al.*, 1987). Furthermore, it causes patient discomfort, prolongs hospitalization and exposes the patient to multiple risks, such as hypoxia, sinusitis, otitis media, and toxic shock.

The nasal septum receives blood supply from multiple sources, both of internal and external carotid origin (Figure 1). Surgical ligation of the internal maxillary artery and/or the anterior and posterior ethmoid arteries has a success rate of approximately 80–90 per cent (Metson and Lane, 1988). Two other recently described options include endoscopic ligation of the sphenopalatine artery (White, 1996), and endoscopic intranasal cautery, which reduces hospitalization as compared to standard packing treatment (McGarry, 1991).

Sokoloff *et al.*, described selective arterial embolization under radiographic control as a viable option for any bleeding site supplied by an external carotid branch (Sokoloff *et al.*, 1974). Reported success rates ranged from 71–97 per cent (Vitek, 1991; Siniluoto *et al.*, 1993), and one recent article demonstrates that embolization therapy is as equally effective as arterial ligation (Elden *et al.*, 1994). Complication rates resemble those of arterial ligation, ranging from 13–48 per cent (Barlow *et al.*, 1997). Embolization offers the advantages of no surgery or general anaesthesia. The following case history describes a complication of nasal septal perforation following the conventional therapy of nasal packing combined with embolization therapy.

Case report

A 71-year-old white male treated over 20 years ago with radiation therapy for nasopharyngeal carcinoma developed persistent left posterior epistaxis. Because conventional anterior and posterior packing failed to control the bleeding, the patient underwent a septoplasty and repacking. He continued to bleed post-operatively and was referred to our institution.

Arteriography demonstrated a vascular blush from the sphenopalatine artery septal branch, originating from the left internal maxillary artery (Figure 2). Superselective

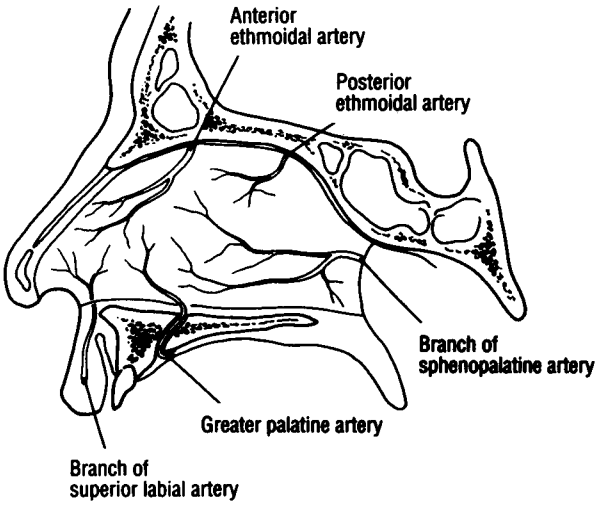

FIG. 1

Arterial anatomy of the nasal septum. Branches of the facial artery (superior labial) and the internal maxillary artery (sphenopalatine and greater palatine) are amenable to embolization. Because the anterior and posterior ethmoid arteries arise from the internal carotid artery via the ophthalmic artery, they can not be embolized without serious risk to vision.

From the Division of Otolaryngology, The Medical College of Georgia, Augusta, GA, USA.
Accepted for publication: 8 January 1999.

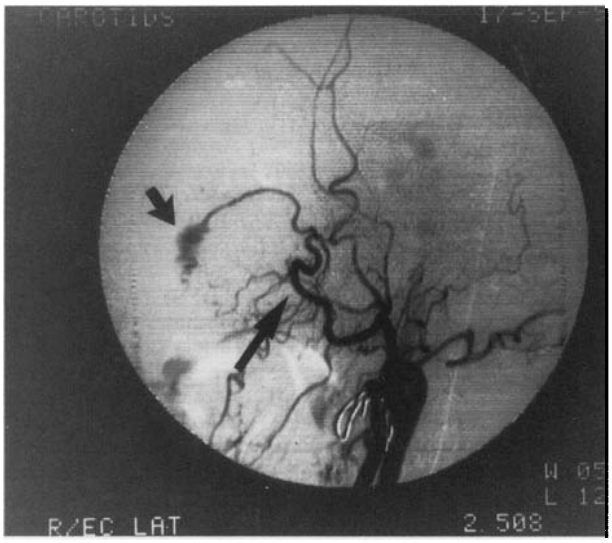

FIG. 2

The blush (small arrow) represents bleeding from the sphenopalatine branch of the internal maxillary artery (large arrow).

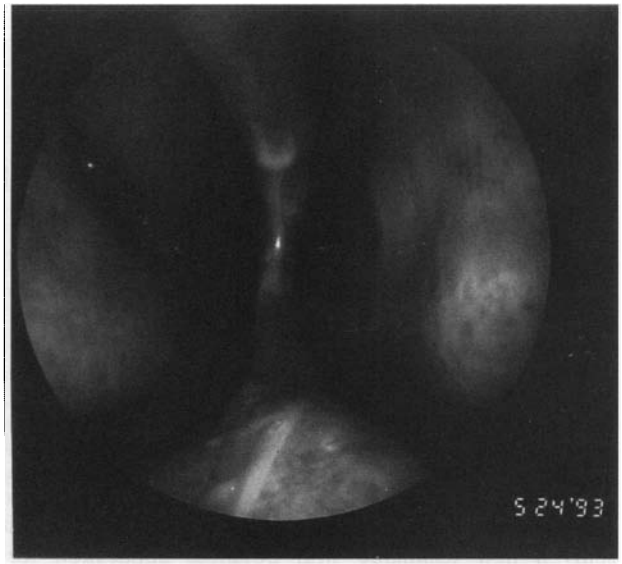

FIG. 4

Endoscopic view of the large septal perforation, through which the left and right inferior turbinates can be seen.

embolization using polyvinyl alcohol (150–250 microns) of the distal left internal maxillary artery resulted in decreased bleeding (Figure 3) but persistent venous oozing required replacement of the anterior and posterior packing. The packing was removed three days later without incident. Ten days after packing removal, the patient was noted to have a 2 cm area of necrosis of the posterior-inferior septum. Several weeks later this area became a perforation (Figure 4), which remains asymptomatic but unchanged in size five years post-embolization.

Discussion

Table I outlines several complications resulting from embolization therapy. Central neurological deficits may occur if polyvinyl alcohol circulates intracranially via external and internal carotid anastomosis or from the dislodgement of embolic plaques during catherization of the carotid artery. Post-embolization spasm of the accessory meningeal artery, a branch of either the internal maxillary or middle meningeal artery, may cause ischaemia and hypoaesthesia of the third division of the trigeminal nerve (Metson and Hanson, 1983). Similarly, occlusion of the petrosal artery, a branch of the middle meningeal artery, may cause ischaemia of the horizontal segment of the facial nerve, resulting in paralysis (Metson and Hanson, 1983; de Vries *et al.*, 1986).

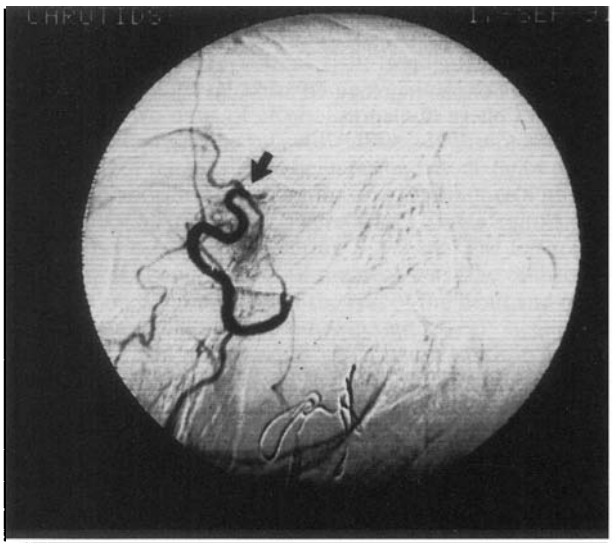

FIG. 3

No further bleeding of sphenopalatine artery after it has been embolized distal to its take-off from the internal maxillary artery (arrow).

Loss of vision after embolization results from anastomosis between the internal maxillary and ophthalmic artery branches. Pre-embolization angiographic demonstration of a choroidal blush may document such an anastomosis and help avoid this complication (Mames *et al.*, 1991).

Blood aspiration is always a concern in severe epistaxis. During embolization the patient must lie supine, which increases this risk. If there is a serious threat of blood aspiration, the patient's airway is controlled by endotracheal intubation prior to embolization.

The reported case of post-embolization columellar necrosis was attributed to surgical manipulation and repeated nasal packing (Breda *et al.*, 1989). As in our case report, the packing before and after embolization amplifies soft tissue ischaemia and therefore increases the risk of injury.

Despite the reported side-effects of embolization, there are numerous potential benefits. It avoids a general anaesthetic and a surgical incision. In the majority of cases, no post-embolization packing is necessary. Consequently, the procedure reduces the expense and duration of hospitalization and avoids the additional risks associated with surgery and nasal packing. Embolization is a proven

TABLE I

REPORTED COMPLICATIONS OF EMBOLIZATION FOR EPISTAXIS

1. Transient hemiparesis (Vitek, 1991)
2. Cranial nerve VII paralysis (de Vries *et al.*, 1986; Metson and Hanson, 1983)
3. Cranial nerve V3 hypoesthesia (de Vries *et al.*, 1986)
4. Blood aspiration (Sokoloff *et al.*, 1974)
5. Blindness (Mames *et al.*, 1991)
6. Necrosis of columella (Breda *et al.*, 1989)

https://doi.org/10.1017/S0022215100143701 Published online by Cambridge University Press

successful option after failed internal maxillary artery ligation, (Breda *et al.*, 1989) and the decision to embolize does not preclude the surgical option if bleeding persists.

Endoscopic electrocautery also effectively controls posterior epistaxis by enabling direct cauterization of a specific bleeding site (Wurman *et al.*, 1988; McGarry, 1991). Local anaesthetic may be used to avoid the risks associated with general anaesthesia, although we usually prefer to protect the airway with endotracheal intubation. In comparison to nasal packing and epistaxis balloon catheter use, nasal endoscopy with electrocautery leads to a lower incidence of re-bleeding, less need for general anaesthesia, fewer procedure-related complications and discomfort, a decreased hospital stay, and fewer treatment costs (McGarry, 1991). Temporary palatal numbness, presumably due to thermal injury to the greater palatine nerve, is the only complication reported to date with occurrence rates of eight per cent (Elwany and Abdel-Fatah, 1996).

Endoscopic ligation of the sphenopalatine artery represents a new technique with potential application for experienced endoscopic rhinologists confronted by epistaxis unresponsive to packing or endoscopic electrocautery (White, 1996). Pritikin *et al.* recently reported the endonasal ligation of the posterior branches of the internal maxillary artery at the sphenopalatine foramen with a 100 per cent success rate in controlling posterior epistaxis refractory to other forms of treatment and without any reported morbidity (Pritikin *et al.*, 1998).

Conclusions

Although various complications result from the use of nasal embolization, they are infrequent in occurrence and must be weighed against the potential benefits. It is a feasible alternative and often the treatment of choice for cases of high risk surgery. The clinician should maintain an awareness of all options for epistaxis management, including their technical difficulty, success rates, potential complications, and suitability for the circumstances of each individual case.

References

Barlow, D. W., Deleyiannis, F. W. B., Pinczower, E. F. (1997) Effectiveness of surgical management of epistaxis at a tertiary care center. *Laryngoscope* **107:** 21–24.

Breda, S. D., Choi, I. S., Pershy, M. S., Weiss, M. S. (1989) Embolization in the treatment of epistaxis after failure of internal maxillary artery litigation. *Laryngoscope* **99:** 809–813.

de Vries, N., Versluis, R. J. J., Valk, J., Snow, G. B. (1986) Facial nerve paralysis following embolization for severe epistaxis. *Journal of Laryngology and Otology* **148:** 209–218.

Elahi, M. M., Parnes, L. S., Fox, A. J., Pelz, D. M., Lee, D. H. (1995) Therapeutic embolization in the treatment of intractable epistaxis. *Archives of Otolaryngology – Head and Neck Surgery* **121:** 65–69.

Elden, L., Montanera, W., Terbrugge, K., Willinsky, R., Lasjaunias, P., Charles, D. (1994) Angiographic embolization for the treatment of epistaxis: a review of 108 cases. *Otolaryngology – Head and Neck Surgery* **111:** 44–50.

Elwany, S., Abdel-Fatah, H. (1996) Endoscopic control of posterior epistaxis. *Journal of Laryngology and Otology* **110:** 432–434.

Mames, R. N., Snady-McCoy, L., Guy, J. (1991) Central retinal and posterior ciliary artery occlusion after particle embolization of the external carotid artery system. *Ophthalmology* **98:** 527–531.

McGarry, G. W. (1991) Nasal endoscope in posterior epistaxis: a preliminary review. *Journal of Laryngology and Otology* **105:** 428–431.

Metson, R., Hanson, D. G. (1983) Bilateral facial paralysis following arterial embolization for epistaxis. *Otolaryngology – Head and Neck Surgery* **91:** 299–303.

Metson, R., Lane, R. (1988) Internal maxillary ligation for epistaxis: an analysis of failures. *Laryngoscope* **98:** 760–764.

Pritikin, J. B., Caldarelli, D. D., Panje, W. R. (1998) Endoscopic ligation of the internal maxillary artery for treatment of intractable posterior epistaxis. *Annals of Otology, Rhinology and Laryngology* **107:** 85–91.

Schaitkin, B., Strauss, M., Houch, J. R. (1987) Epistaxis: medical surgical therapy: a comparison of efficacy, complications, and economic considerations. *Laryngoscope* **97:** 1392–1397.

Siniluoto, T. M., Leinonen, A. S., Karttunen, A. I., Karjalainen, H. K., Jokinen, K. E. (1993) Embolization for the treatment of posterior epistaxis: an analysis of 31 cases. *Archives of Otolaryngology – Head and Neck Surgery* **119:** 837–841.

Sokoloff, J., Wickbom, I., McDonald, D., Brahme, F., Georgen, T. C., Goldberger, L. E. (1974) Therapeutic percutaneous embolization in posterior epistaxis. *Radiology* **111:** 285–287.

Vitek, J. (1991) Idiopathic intractable epistaxis: endovascular therapy. *Radiology* **181:** 113–116.

White, P. S. (1996) Endoscopic ligation of the sphenopalatine artery (ELSA): a preliminary description. *Journal of Laryngology and Otology* **110:** 27–30.

Wurman, L. H., Sack, J. G., Flannery, J. V., Paulson, T. O. (1988) Selective endoscopic electrocautery for posterior epistaxis. *Laryngoscope* **98:** 1348–1349.

Address for correspondence:
Brennan P. Wood, B.S.,
Division of Otolaryngology, BP 4154,
Medical College of Georgia,
Augusta, Ga. 30912–4060, USA.

Fax: +(706) 721–0112