Managing epistaxis in hospital

Epistaxis is defined as acute haemorrhage from the nostril, nasal cavity or nasopharynx. It is a frequent emergency in otolaryngology and this article will present an overview of the current concepts of the different levels of management of epistaxis.

Introduction

Epistaxis is a common problem and affects 60% of the general population. The condition has bimodal distribution, with incidence peaks at ages less than 10 years and older than 50 years (Kucik and Clenney, 2005). It is often managed by junior doctors and with the introduction of European working time directives and cross cover on-calls, over 90% of the patients who present with epistaxis will be treated by doctors with little training in its management.

Vascular anatomy of the nose

The nasal cavity has a rich vascular blood supply originating from the internal and external carotid arteries. The external carotid system supplies blood to the nose via the facial and internal maxillary arteries. The internal maxillary artery enters the pterygomaxillary fossa dividing into several branches with two arteries contributing to the blood supply of the nose, the sphenopalatine and descending palatine arteries (*Figure 1*). The sphenopalatine artery enters the nose near the posterior attachment of the middle turbinate to supply the lateral nasal wall. The descending palatine artery also supplies the lateral nasal wall before passing through the greater palatine canal. It then returns to the nose via a branch in the incisive foramen to provide blood to the anterior septum anastomosing with the labial vessels in Kiesselbach's plexus (also known as Little's area) on the anterior septum. This anastomotic area is the site of most anterior epistaxis. The internal carotid artery contributes to the blood supply of the internal nose through the anterior and posterior ethmoidal arteries, supplying the superior septum and lateral nasal wall (*Figure 1*) (Watkinson, 1997; Emanuel, 1998).

Mr Eslam Osman *is Consultant Otolaryngologist, Head and Neck Surgeon and* **Mr Andrew Swift** *is Consultant Otolaryngologist, Head and Neck Surgeon in the Department of Otorhinolaryngology and Head and Neck Surgery, University Hospital Aintree, Liverpool L9 7AL*

Correspondence to: Mr A Swift

Causes

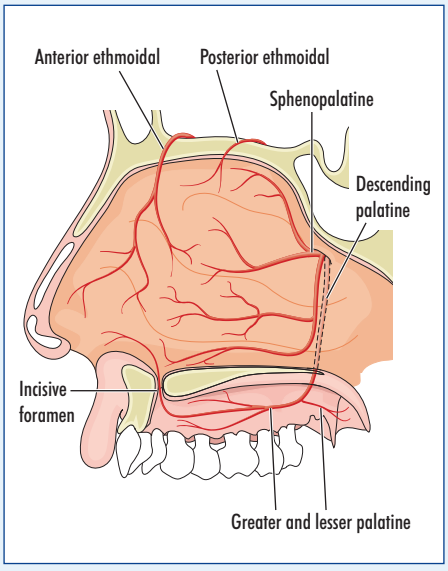
The aetiology of epistaxis can be divided into local and general causes (*Table 1*), however, often no cause for the bleeding can be identified (Pope and Hobbs, 2005).

Local causes

Local trauma is a common cause of epistaxis. Habitual nose rubbing and picking may produce anterior septal irritation, superficial ulceration and bleeding. This is a particularly common cause of epistaxis in children and patients with dementia. Inflammation of the nasal mucosa may produce epistaxis. This inflammation may be a result of viral upper respiratory infections, bacterial sinusitis or the nasal manifestations of allergic disease. Nasal septal deviation, spurs and perforations cause turbulent airflow, which can lead to mucosal dryness and epistaxis.

Benign and malignant neoplasms of the nose, sinuses and nasopharynx may present with epistaxis. Recurrent bouts of epistaxis or severe episodes of bleeding should prompt careful evaluation to exclude neoplastic causes. Nasopharyngeal angiofibroma is a rare benign tumour that affects young males. The triad of nasal obstruction, a nasopharyngeal mass and recurrent epistaxis usually indicates the presence of the tumour, which is morphologically benign but aggressive and destructive.

Figure 1. Vascular anatomy of lateral nasal wall.



Systemic causes

Arteriosclerosis and hypertension are responsible for the higher prevalence of epistaxis in elderly individuals. Coagulation defects may cause epistaxis that is difficult to manage until the underlying clotting disorder is corrected. Congenital coagulopathies (e.g. haemophilia, Von Willebrand disease) should be suspected in individuals with a positive family history, easy bruising, or prolonged bleeding from minor trauma or surgery. Acquired coagulopathies may be drug- or disease-mediated. Numerous medications affect coagulation as their intended therapeutic effect

Table 1. Causes of epistaxis

Local causes	Idiopathic	
	Trauma	Nasal trauma
		Nose picking
	Inflammation	Common cold
		Allergic rhinitis
		Bacterial rhinosinusitis
	Nasal septum	Septal deviation
		Septal perforation
	Neoplasia	Benign, e.g. angiofibroma
		Malignant, e.g. adenocarcinoma
Systemic causes	Cardiovascular disorders	Hypertension
		Atherosclerosis
	Haematological disorders	Congenital coagulopathies, e.g. haemophilia
		Acquired coagulopathies, e.g. drug-induced
	Hereditary haemorrhagic telangiectasia	

(aspirin and warfarin) or as a side effect (non-steroidal anti-inflammatory drugs). Liver disease is a common cause of impaired coagulation, with reduced levels of all coagulation factors except factor VIII. In the absence of liver disease, alcohol may be a factor in those with epistaxis (Kucik and Clenney, 2005; Pope and Hobbs, 2005).

Hereditary haemorrhagic telangiectasia

Hereditary haemorrhagic telangiectasia (HHT; Osler–Weber–Rendu disease) is an autosomal dominant disease manifested by diffuse mucocutaneous telangiectasias and arteriovenous malformations. Recurrent epistaxis is the most common manifestation of HHT and it is important that the diagnosis is considered in such cases (Begbie et al, 2003).

Site of epistaxis

Epistaxis is classified into anterior and posterior types. More than 80% of epistaxis are anterior epistaxis and arise from the Little's area. Anterior epistaxis generally occurs in children and young adults and is frequently caused by trauma and dryness. Posterior epistaxis accounts for the remaining 20% of cases. It is usually associated with sphenopalatine artery bleeding and occurs more frequently in adults over 50 years of age.

Management

History

An accurate patient history is necessary, but it may need to be done in conjunction with manoeuvres to control bleeding (*Table 2*).

Table 2. Key questions in history

Which side did the bleeding start?
Amount and duration of bleeding?
Has the patient had any previous episodes? How were they treated?
Does the patient have any bleeding disorder?
Does the patient have a family history of bleeding disorders?
Does the patient have significant medical problem, e.g. heart disease, alcohol abuse?
Does the patient take medication which affect blood clotting, e.g. aspirin, warfarin?

First aid management

Upon initial arrival at the accident and emergency (A&E) department, clinical assessment should include the airway, breathing and circulation with correction of hypovolaemia. The patient should sit with the head tilted forward and the mouth open so that they can spit out the blood instead of swallowing. Patients should be instructed to pinch the anterior cartilaginous part of the nose, maintaining continuous pressure for at least 10 minutes. The pulse and blood pressure should be checked and a large bore intravenous cannula inserted for venous access. Blood should be sent for full blood count and group and save if blood loss is thought to have been significant. A clotting screen should be sent if the patient is on anticoagulants or has liver disease. If the patient has lost a significant amount of his or her blood, it is important to send a blood sample for group and save.

Examination of the nose

Examination equipment should include a good light source, a nasal speculum, Zöllner and Yankauer suckers, a topical anaesthetic/vasoconstrictor spray, a rigid nasal endoscope, nasal packs and cautery. Gowns, gloves and protective eyewear must be worn. It has been shown that a high incidence of blood contamination occurs during the treatment of epistaxis, especially if a pack is required. A considerable proportion of blood splashes occurred in the facial area, implying a very real risk of viral transfer through the conjunctivae or buccal mucosa if no facial protection is worn (Carney et al, 1995).

While examining the nose it may be necessary to remove a previously inserted nasal pack. Every attempt is then made to identify the bleeding point. Co-phenylcaine (5% lidocaine and 0.5% phenylephrine) is widely used as a local anaesthetic in the nose. Little's area is a common site of bleeding that is easily seen with a Thudicum nasal speculum and head light. Bleeding further back in the nasal cavity may only be seen with a rigid endoscope after clearing the clots by asking the patient to blow the nose and applying a vasoconstrictor or anaesthetic spray. If a bleeding point is identified the vessel can be sealed by applying a silver nitrate probe directly to the vessel while avoiding damage to the surrounding mucosa. If attempts to control bleeding with pressure and/or cautery fails, the nose should be packed.

Nasal packing

Anterior nasal packing

Before inserting the pack adequate anaesthesia with co-phenylcaine is necessary. Various packing materials are available, including Merocel, Rapid Rhino (ArthroCare ENT, Harrogate), and Vaseline gauze (*Figure 2*). A popular choice is a Merocel compressed polyvinyl acetate sponge (Medtronic Xomed Surgical Products Inc, Watford) as this facilitates easy atraumatic rapid insertion while applying adequate tamponade when wet. The sponge should be coated with an antibiotic ointment before insertion and placed along the floor of the nasal cavity. Once wet with blood or a small amount of saline, the sponge expands to fill the nasal cavity and tamponade bleeding. It is usually removed after 24 hours if bleeding is controlled (*Table 3*).

Posterior nasal packing

A posterior pack is indicated only if bleeding cannot be controlled with a well-placed anterior pack (*Table 4*). This can be done with a Brighton balloon or Foley

Figure 2. a. An inflated Rapid Rhino pack and (b) a Brighton Balloon.

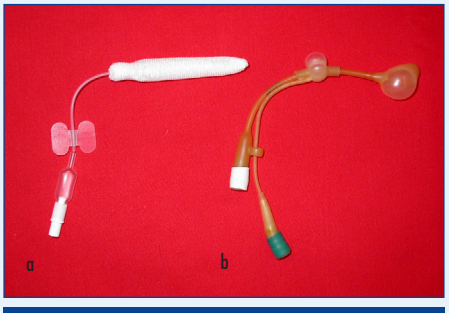


Table 3. Key points in anterior packing

Admit all patients with packing
Apply local anaesthetic before packing
Insert unilateral pack for unilateral bleeding
Insert the whole length of the pack into the nose
Prescribe prophylactic antibiotics if the pack is left inserted for more than 48 hours
Analgesia and sedation are of paramount importance

catheter. The Brighton balloon is the authors' first choice because it is easier to place and combine anterior and posterior compression. It is placed through the nostril on the bleeding side into the nasopharynx. The balloon is inflated with water, and gently pulled forward to fit snugly in the posterior choana. After bleeding into the posterior pharynx has been controlled, fill the anterior balloon with saline until the bleeding completely stops.

If a Foley catheter is used, secure it in place with an umbilical clamp. Use a cotton gauze to avoid pressure necrosis on the nasal alae or columella. Avoiding over inflation of the balloon is important because it can cause pain and displacement of the soft palate inferiorly, interfering with swallowing. It is important to prescribe adequate analgesia and sedation after inserting a pack and a systemic opiate is the ideal drug to induce this.

Surgical options

If the bleeding is not controlled with anterior and posterior packing the patient will need general anaesthetic and the following surgical options may need to be performed.

Examination under general anaesthesia to nose, nasal cautery and/or septoplasty

Lack of control of bleeding after packing the nose can arise from anatomical factors such as a deviated septum. Bleeding sites can be cauterized under endoscopic guidance, a deviated septum can be straightened, spurs can be removed, and meticulous packing can be placed. In addition, arterial ligation may be performed during the same setting if these steps fail to control the bleeding.

Surgical ligation

The specific vessel(s) to be ligated depend on the location of the epistaxis. In general, the closer the ligation is to the bleeding site, the more effective the procedure tends to be.

Table 4. Key points in posterior packing

Do not attempt posterior packing before anterior packing
Close monitoring of oxygenation
Prescribe prophylactic antibiotics from day 1
Posterior packs are often left in situ for 2 days

Sphenopalatine artery ligation

The current literature favours endoscopic sphenopalatine artery ligation. This procedure is performed under general anaesthesia and uses the endoscopic sinus surgery technique. The sphenopalatine artery is identified and clipped or sealed by diathermy close to its point of exit from the sphenopalatine foramen. This minimal access operation has largely superseded the following operative approaches that were once used to occlude the internal maxillary artery and the external carotid artery.

Internal maxillary artery ligation

The internal maxillary artery is accessed through the maxillary sinus. With the help of an operating microscope, the posterior sinus wall is removed, and the internal maxillary artery and three of its terminal branches are clipped.

Anterior ethmoid artery ligation

If bleeding occurs high in the nasal vault, consider ligation of the anterior ethmoid arteries. The artery is approached through an external ethmoidectomy incision. If clipping the artery does not stop the bleeding, then the posterior ethmoid artery may be ligated. It should be clipped, not cauterized, because it is only 6 mm anterior to the optic nerve.

External carotid ligation

Ligation of the external carotid artery can be performed with the patient under local or general anaesthesia. A horizontal skin incision is made in the neck. The external carotid artery is identified by its branches and is ligated just distal to the superior thyroid artery.

Embolization

Embolization is an alternative to surgical ligation in patients unable to tolerate general anaesthetic or as a second-line treatment if surgery fails to control epistaxis. Selective embolization of the internal maxillary artery and sometimes the facial artery may be performed. It is limited by the availability of an experienced interventional radiologist.

Conclusions

Epistaxis is a common complaint, suffered by approximately 60% of the population. It is extremely distressing, and may be associated with significant morbidity and mortality. Despite multiple local and systemic causes, no cause is found in the majority of patients.

Trainees should receive instruction on the treatment of epistaxis that includes effective first aid management, anterior nasal packing and also when to refer for specialist advice. Insertion of a posterior nasal pack may be needed when local measures and an anterior pack has not controlled bleeding. Advances in management that limit the morbidity of epistaxis include site-specific cautery under endoscopic control and sphenopalatine artery occlusion. Although the traditional well-established methods of controlling epistaxis are usually effective, it is important not to under-estimate the importance and morbidity of this condition. BJHM

Conflict of interest: none.

Begbie ME, Wallace GM, Shovlin CL (2003) Hereditary haemorrhagic telangiectasia (Osler-Weber-Rendu syndrome): a view from the 21st century. *Postgrad Med J* **79:** 18–24

Carney AS, Weir J, Baldwin DL (1995) Contamination with blood during management of epistaxis. *BMJ* **311:** 1064

Emanuel JM (1998) Epistaxis. In: Krause CJ, ed. *Otolaryngology-Head and Neck Surgery.* 3rd edn. Mosby Year Book Inc, London: 852–65

Kucik CJ, Clenney T (2005) Management of epistaxis. *Am Fam Physician* **71:** 305–11

Pope LE, Hobbs CG (2005) Epistaxis: an update on current management. *Postgrad Med J* **81:** 309–14

Watkinson JC (1997) Epistaxis. In: Kerr AG, ed. *Scott-Brown's Otolaryngology-rhinology.* 6th edn. Butterworth-Heinemann, Oxford: 4/18/10–4/18/17

KEY POINTS

- Epistaxis is a common hospital emergency.
- Most epistaxis arise from the anterior nasal cavity.
- Risk factors for epistaxis should be sought and identified.
- Trainees will need to acquire skills to manage this disorder in the new NHS.
- Rigid endoscopy after topical vasoconstriction will identify most active bleeding points.