

# Epistaxis in adults: a clinical review

***Epistaxis can be encountered in a wide range of specialties, and it is vital that doctors and nurses can identify the causes and manage it effectively. When managed correctly the potential morbidity and mortality can be significantly reduced.***

**E**pistaxis is spontaneous bleeding from the nose. It occurs in all ages, with peaks during childhood and old age. Most cases are managed in primary care, with only a small proportion reaching hospitals and ear, nose and throat departments. While the majority of cases are mild and self-limiting, a proportion of cases are severe and lead to significant morbidity and mortality. These severe cases are responsible for one third of all ear, nose and throat emergency admissions (Walker et al, 2007). Review of the Scottish Audit of Surgical Mortality shows death from epistaxis to be a recurring problem in hospital ear, nose and throat departments. The need for hospital admission and the duration of stay are directly related to initial and subsequent treatment.

## How is epistaxis classified?

Epistaxis can be classified by clinical presentation (Maran and Lund, 1990). It is a condition common in childhood, becoming less common in early adulthood, then peaking in the 6th decade. This variation with age is sufficiently pronounced to classify epistaxis as childhood (under 16 years of age) or adult (over 16 years of age). Adult epistaxis presents significant problems for accident and emergency and ear, nose and throat departments. Between 70 and 80% of all cases of adult epistaxis are idiopathic, spontaneous bleeds without any proven cause (Stell, 1977). These cases are classified as primary epistaxis. A small proportion have a definite cause, for example, blood dyscrasia, trauma, surgery or anticoagulant overdose. These cases are classified as secondary epistaxis.

The distinction between primary and secondary epistaxis is important, as the management of each is different.

## How common is it?

Adult primary epistaxis is a challenging condition. It can occur in any age group, but predominantly affects the elderly, with the median age of the epistaxis population being 70 years. Between 7 and 14% of adults experience epistaxis at some point, but only the most severe 6% of these cases are seen by ear, nose and throat doctors (Weiss, 1972; Lepore, 1993). The remainder are dealt with in primary care or accident and emergency departments.

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The rate of admission to ear, nose and throat units is 30 per 100 000 of the population served per annum.

## Anatomy of the nose

The nose is supplied via arterial branches of the internal and external carotid arteries. These branches anastomose extensively within the nose. The area most commonly implicated in epistaxis is known as Little's area or Kiesselbach's plexus (MacKenzie, 1914). This lies at the anterior part of the septum and is easily accessible for treatment (e.g. cautery). In the posterior regions of the nose, the vessels are larger than those in Little's area, and bleeding from here is often very difficult to control.

## What causes epistaxis?

The aetiology of primary epistaxis is unknown, but there are several systemic factors which may be important.

## Chronobiology

The frequency of admission to hospital with epistaxis is greatest between autumn and winter (Nunez et al, 1990), when there are fluctuations in both environmental temperature and humidity (Danielides et al, 2002). A chronobiological rhythm is also observed at the circadian level where onset of bleeding and hospital admissions show a biphasic pattern with peaks in the morning and late evening (Mehanna et al, 1998; Manfredini et al, 2000).

## Non-steroidal anti-inflammatory drugs

The action of non-steroidal anti-inflammatory drugs is mediated via an antiplatelet aggregation effect because of altered platelet membrane physiology (McGarry, 1990; Watson and Sheno, 1990; Livesey et al, 1995). Both prescribed and self-administered non-steroidal anti-inflammatory drugs are associated with adult epistaxis.

## Alcohol

The use of alcohol can be associated with a prolongation of the bleeding time despite normal platelet counts and coagulation factor activity. Epistaxis patients are more likely to consume alcohol than matched control patients and are more likely to have consumed alcohol within 24 hours of hospital admission than other emergency admissions (McGarry et al, 1994, 1995).

## Hypertension

While this has long been considered a cause of epistaxis, studies have failed to prove this (Lubianco-Neto et al, 1998). Attempts to correlate epistaxis with secondary

effects of hypertension or with the severity of hypertension have proved inconclusive (Lubianco-Neto et al, 1999). Elevated blood pressure in patients admitted to hospital with epistaxis is almost universal, but this may be a result of anxiety associated with the epistaxis and the invasive techniques used to control the bleeding.

### Abnormalities of nasal septum

Septal abnormalities are common and can affect up to 80% of the general population (Roblin and Eccles, 2002). Therefore, any association between epistaxis and septal abnormalities could be chance. There is no clear evidence to prove such an association, although septal deviation does seem to make therapy for epistaxis more difficult.

### So how do we manage epistaxis?

As with any haemorrhagic condition the primary step in management is resuscitation. Following adequate resuscitation, bleeding should be slowed, the nasal cavity examined and a treatment plan established.

### Resuscitation

A high percentage of elderly patients will have co-existent cardiovascular disease, so prompt and adequate resuscitation is vital. Kotecha et al (1996) found that 64% of the patients seen by ear, nose and throat are referred via an accident and emergency department. First aid should be administered by the Hippocratic technique, i.e. pinching the ala nasi to compress the nostrils. In one study of accident and emergency staff, only 43% of trained medical and nursing staff could correctly demonstrate this technique (McGarry and Moulton, 1993), which is based on the observation that most bleeds occur from Little's area, thus direct pressure over this area should help. *Figure 1* shows correct and incorrect application of this technique.

History and examination help in assessing the amount of the blood loss and determining any predisposing factors. Intravenous access should be established in all but the most minor bleeds, and baseline full blood count and group and save taken. Routine coagulation studies in the absence of a positive history are not indicated (Padgham, 1990; Smith et al, 1998).

### Primary care and accident and emergency management

Following the initial assessment and appropriate resuscitation, the Hippocratic technique should be performed for approximately 10 minutes. If bleeding continues, cotton wool soaked in a vasoconstrictor, e.g. xylometazoline or co-phenylcaine, should be applied inside the nose. If the bleeding stops, the nose should be examined using a torch or an otoscope. Any bleeding points seen should be cauterized using silver nitrate. The indiscriminate, non-specific use of silver nitrate cauterization should be discouraged, and only used when a specific bleeding point can be seen. If bleeding continues, or is severe, then referral to ear, nose and throat is appropriate (*Figure 2*).

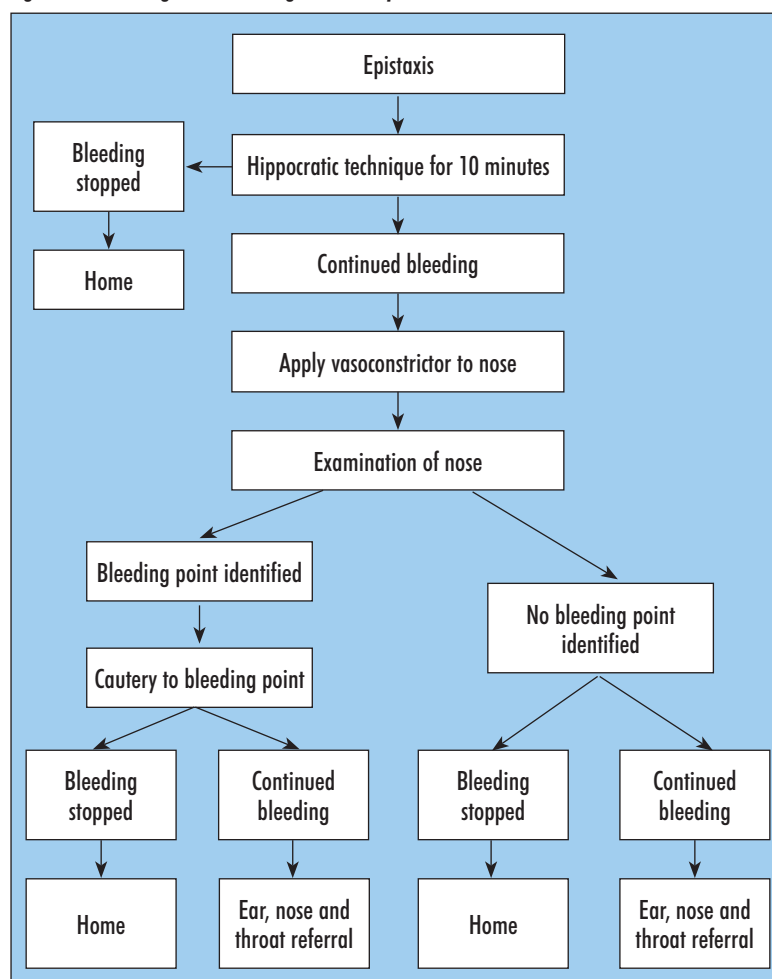


**Figure 1. a. Correct Hippocratic method. b. Incorrect Hippocratic method.**

### Ear, nose and throat assessment

Actively bleeding patients should be in the semi-recumbent position and managed with nursing assistance. Protective clothing and visors should be worn by everyone involved to avoid blood contamination (Carney et al, 1995). Basic equipment will include a couch or reclining chair, headlight, suction, vasoconstrictor solutions and a

**Figure 2. Flow diagram for management of epistaxis.**



selection of packs, tampons and cautery apparatus. A headlight might not be sufficient to locate the vessel and so most specialized departments should also have nasal endoscopy equipment and bipolar electrodiathermy.

### Specialized management for continued bleeding

Treatment can be divided into direct and indirect therapies. Direct therapies involve finding and treating the actual bleeding point, whereas indirect therapies do not require identification of the bleeding point. Direct therapy has obvious theoretical advantages over the indirect treatments (Pearson, 1983).

#### Direct management

Currently, only one in five cases admitted to ear, nose and throat departments are managed by direct control of the bleeding point (Kotecha et al, 1996). This low proportion may be because of a perceived difficulty in locating the bleeding point within the nose, or may be because the majority of cases are managed by the most junior members of the ear, nose and throat department. Epistaxis from the anterior part of the nose is controlled in most cases with direct cautery, as the bleeding point is easily identified. The use of nasal packs in Little's area bleeds is not warranted and therefore should not be used.

A thorough examination using a headlight should identify most bleeding points from the posterior part of the nose, and these can be controlled using bipolar diathermy, chemical cautery, electrocautery or direct pressure from a small pack placed over the bleeding point (McGarry, 1991).

If the bleeding point is not identified on initial examination of the nose, then examination with a nasal endoscope is indicated. This will identify the source of bleeding in a further 80% of cases (McGarry, 1991; O'Leary-Stickney et al, 1992; Wurman et al, 1998; O'Donnell et al, 1999), and once directly treated discharge is possible.

#### Indirect management

Failure to find the bleeding point is an indication for indirect management. This will normally involve nasal packing. Nasal packs can be placed anteriorly or posteriorly.

Traditionally the nose was packed with ribbon gauze impregnated with petroleum jelly or bismuth iodoform paraffin paste (BIPP). The pack is left in situ for between 24 and 72 hours (Tan and Calhoun, 1999). Modern variations on anterior packing products include tampons (Merocel, Invotec, USA; Kaltostat, Convatec, Deeside) and balloon catheters (Brighton, Eschmann, West Sussex; Epistat, Medtronic, Hertfordshire).

Complications of packing include sinusitis, septal perforation, alar necrosis, hypoxia and myocardial infarction. Re-bleeding with indirect therapies is common.

Continued bleeding, or a further bleed, is an indication for further examination of the nose.

#### Systemic medical therapy

Tranexamic acid and epsilon aminocaproic acid are systemic inhibitors of fibrinolysis. Tranexamic acid reduces the severity and risk of rebleeding in epistaxis. These drugs do not increase fibrin deposition and therefore do not increase the risk of thrombosis. Pre-existing thromboembolic disease is a contraindication, and their use is reserved for recurrent or refractory cases (Peterson, 1974).

#### Surgical management

If the above techniques fail to control the bleeding then surgical intervention is required. Endoscopic diathermy of the bleeding point under local or general anaesthetic may control the bleeding but, if unsuccessful, ligation techniques, septal surgery techniques, posterior packing or embolization techniques may be used. Endoscopic sphenopalatine artery ligation is the ligation of choice (White, 1996; Sharp et al, 1997) (Figure 3). The artery is exposed at the sphenopalatine foramen and a special ligaclip is applied to the arterial trunk. Alternatively the artery can be coagulated using bipolar diathermy.

Embolization is an interventional radiological technique which uses gelatin or microcoils which are delivered angiographically to the bleeding vessels to achieve occlusion. Success rates of embolization are similar to those of ligation, but complications are more likely.

#### Secondary epistaxis

This can often be caused by coagulopathy secondary to liver disease, leukaemia or myelosuppression, and close liaison with haematologists and physicians is vital. Other causes include trauma, nasal surgery, warfarin, hereditary haemorrhagic telangiectasia and nasal tumours.

#### Warfarin

Between 9 and 17% of patients admitted with epistaxis are taking warfarin (Kotecha et al, 1996; Srinivasan et al, 1997).

Bleeding can be a result of overdose or loss of control, but can also occur in patients with an international normalized ratio (INR) within the therapeutic range.

Figure 3. Endoscopic ligation of sphenopalatine artery.



Bleeding is often from multiple sites and therefore direct therapies tend not to be successful. Following adequate resuscitation, anterior nasal packs should be inserted and the patient discussed with the haematology team.

Haemostatic dressings with fibrin glue have been used to control large areas of bleeding or those with constant ooze (Walshe et al, 2001).

Warfarin should not be reduced, stopped or reversed without careful consideration of the medical history, and should take into account the severity of the epistaxis. If the INR is within the therapeutic range, and the bleeding is controlled, it may be safe to continue the warfarin (Srinivasan et al, 1997).

### What about recurrent epistaxis?

Recurrent epistaxis is more commonly seen in children, but in adults, recurrent bleeding usually has a secondary cause. Bleeding is usually minor rather than life-threatening, and rarely seen by the time the patient presents.

A full history and examination should exclude factors such as aspirin use, liver disease, bleeding from septal perforations or nasal tumours. Patients using topical nasal steroid sprays can often suffer minor recurrent epistaxis.

If a bleeding point can be identified, cautery is used. Often only an area of vestibulitis is found. In paediatric studies topical antiseptic creams have been shown to be as effective as cautery. However, the efficacy of topical antiseptic cream remains unproven in adults (McGarry, 2004).

### Conclusions

Epistaxis is a common and multifactorial emergency. Distinguishing primary from secondary epistaxis is important in the management. Stepwise incremental therapies aimed at locating the bleeding point and early referral to ear, nose and throat reduce morbidity. **BJHM**

*Conflict of interest: none.*

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### KEY POINTS

- Primary and secondary epistaxis are different conditions requiring different management. Continued bleeding after primary care intervention should trigger ear, nose and throat referral.
- Direct therapy specific to the bleeding point should be first-line management, and can reduce hospital stay and morbidity.
- Indirect therapy, e.g. packs, should be used only after failure to identify a bleeding point, or failure to control bleeding directly.
- Continued bleeding after indirect therapy is an indication for surgical intervention.
- Unusually severe or persistent bleeding should prompt further investigations for a secondary cause.