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DOCTORS IN TRAINING

Management of epistaxis: a guide for junior doctors

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Abstract

Epistaxis is commonly seen as an acute presentation to the emergency department. The level of severity can range from a minor ooze to a life-threatening bleed. The initial management is often the responsibility of junior doctors working in otolaryngology or the emergency department, so they must be familiar with the initial steps in treating this often distressing condition. The COVID-19 pandemic has complicated matters further as much of the management takes place in the upper airway. This article outlines the key considerations in the management of epistaxis, especially during the COVID-19 pandemic.

Key words: COVID-19; Emergency department; Epistaxis; Junior doctors

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Introduction

Epistaxis is a common presenting complaint to the emergency department, with close to 25 000 patients seen in the NHS each year (National ENT Trainee Research Network, 2017), and can range from a minor ooze to a life-threatening bleed. The high incidence means that it is important for junior doctors to be familiar with the initial steps in the management of epistaxis. It displays a bimodal age distribution, in the young and the elderly, and has multiple aetiologies (Purkey et al, 2014).

On being alerted to an epistaxis, there are some important 'red flags' to be aware of:

- Heavy epistaxis in older patients with comorbidities (such as hypertension)
- Patients taking anticoagulant or antiplatelet medications
- Patients with traumatic facial injuries where normal nasal anatomy may be compromised
- Patients in whom haemostasis cannot be achieved with high quality nasal packing.

There are many possible causes of epistaxis – the most important common causes to consider are shown in Table 1. When clerking a patient with epistaxis it is important to establish if there are any red flags by asking about severity, onset and any anticoagulation medications the patient may be taking. Asking about frequency, which nostril the bleed appeared from initially and any relevant family history, particularly relating to coagulopathies, is also key.

Regardless of the cause or whether the red flags are present or not, the initial measures to gain control of the situation remain the same in almost all cases. Implementing a stepwise approach allows clinicians to achieve haemostasis.

Table 1. Important common causes of epistaxis for a junior doctor to consider

Local	Idiopathic	Spontaneous nose bleeds, particularly in older patients, with no obvious trigger	
	Trauma	Facial injuries	Sports injuries, fighting
		Local trauma to the nasal mucosa	Nose picking (particularly in children)
			Foreign body
	Iatrogenic	Anticoagulant or antiplatelet medications	
		Nasal surgery	
Systemic	Medications	Anticoagulant or antiplatelet medications	
	Haematological	Coagulopathies	Deficiencies or familial bleeding dyscrasias
	Other	Hypertension	

Adapted from Pope and Hobbs (2005); Qureishi and Burton (2012); Tunkel et al (2020)

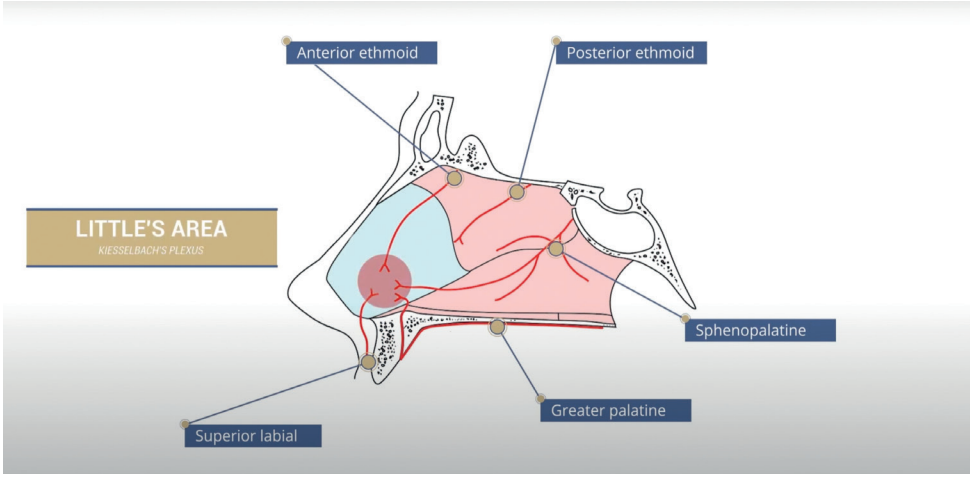

Figure 1. Arterial anatomy of the nasal septum, highlighting Little's area (red circle).

A large proportion (~90%) of nose bleeds will be caused by an anteriorly located bleeding point or prominent blood vessel (Padgham, 1990). The main anatomy to be aware of for these is the convening blood vessels of Kiesselbach's plexus (also known as Little's area; Figure 1). The exposed nature of this area makes it vulnerable to minor trauma, such as nose picking, the evidence for which is largely anecdotal, but is considered by many to be a common cause of epistaxis in children (Tunkel et al, 2020). These vessels are also accessible via anterior rhinoscopy and bleeds here can usually be controlled without the need to use nasal packing devices. The remainder of bleeds are from a more posterior location in the nasal cavity and are more likely to require nasal packing devices or surgical management.

There are other, much rarer causes of epistaxis such as sinonasal malignancy or hereditary haemorrhagic telangiectasia. However, these should not form part of a junior doctor's initial diagnostic thinking at the expense of the much more common causes and presentations highlighted above.

Scenario: a patient presenting with epistaxis

Initial management

The priority is to ensure that the patient is stable, so an initial ABCDE assessment should be made (Table 2). As with any haemorrhage, the key is to control the bleeding and the best place to start is with simple first aid measures. This applies whether the patient is in the emergency department, the ward or the community.

Ask the patient to lean forward to allow any blood to escape from the mouth; this improves airway safety and avoids ingestion of blood (Figure 2). Pinching the fleshy part of the nose allows pressure haemostasis and acts as a good temporary solution while equipment is being gathered should additional measures be required. Applying ice to the forehead, neck or even held in the mouth can be helpful as it causes vasoconstriction and slows bleeding down. A useful way to remember these steps is to consider them as the three Fs; forward, fleshy and frozen.

Once the haemorrhage has been controlled with pressure, the full ABCDE assessment (Table 2) can take place as per the advanced life support (ALS) guidelines published by Resuscitation Council UK (2015). This allows an early decision regarding whether the bleed is having a systemic effect. Patients who are tachycardic, tachypnoeic and hypotensive require stabilisation in addition to haemorrhage control. Applying oxygen, ensuring that there is intravenous access in the form of two centrally-located wide bore cannulae, taking bloods at the same time, and providing a fluid challenge are critical steps in the management of severe epistaxis. Blood tests that are commonly requested include full blood count, urea and electrolytes, liver function tests, coagulation screening and international normalised ratio, and group and save or cross matching.

Patients who are bleeding heavily and not responding to simple measures will need escalation and may require assistance, so involve a colleague or call ear nose and throat early

Table 2. An ABCDE approach with epistaxis-specific advice

	Findings to consider in epistaxis
Ca Catastrophic haemorrhage	■ An obvious catastrophic haemorrhage must be controlled with pressure. Call for help early, other members of the team can continue with the assessment while the haemorrhage is controlled
A Airway	■ Blood and clots may obstruct the airway and require suction ■ In extreme cases, a definitive airway may be required which will be provided by anaesthetists
B Breathing	■ Elevated respiratory rate may be a result of stress or hypovolaemic shock ■ High flow oxygen can still be given to a patient with an epistaxis, but the mask may need to be held slightly away from the face while the haemorrhage is managed
C Circulation	■ Tachycardia may be present as a result of stress or hypovolaemia ■ Low blood pressure is also a sign of hypovolaemic shock ■ If the patient is in shock, fluid resuscitation and blood product replacement should not be delayed ■ Conversely, high blood pressure is more reassuring, but is likely to worsen the haemorrhage. If the systolic pressure is >180 mmHg then a stat dose of amlodipine 5 mg may be appropriate
D Disability	■ A patient who has reduced conscious level and a large epistaxis is likely to be suffering hypovolaemic shock. Anaesthetists should be called to maintain the airway and to offer inotropic support ■ Review a patient's medications for anticoagulants which may be contributing
E Exposure	■ If the bleed has been caused by significant trauma, the patient may have other injuries which need to be addressed

Adapted from Resuscitation Council UK (2015)

Figure 2. Correct first aid technique. This should be used, uninterrupted, for at least 20 minutes where possible.

to avoid patient deterioration. Stratification of level of care is important in these patients, but only a minority will need high dependency or intensive care unit admissions. If the patient is in the community then they will require transfer to the emergency department, most likely via an ambulance. Ward-based patients may be treated on the ward, although much of the equipment that will be discussed is found in the emergency department or with the ear nose and throat team.

Specialist management techniques

There are lots of different options available to definitively achieve haemostasis. These include medications (both topical and systemic), interventions or minor procedures, nasal packing and surgical management. Specialist equipment (Figure 3) is required, which should be available in most emergency departments. In addition to these it is important to use a good headlight to allow the use of both hands. Good coordination is required to shine the light where it is needed but as with most skills it can be developed with repeated practice.

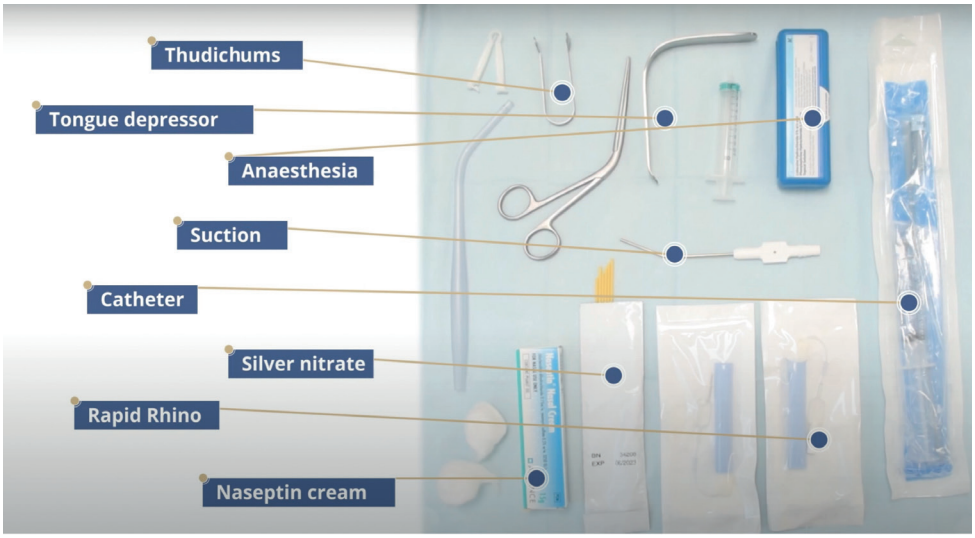

Figure 3. Useful equipment for the management of epistaxis.

Inspection of the nasal space should be a focused search for a focal bleeding point or prominent blood vessels. These are most commonly seen in Little's area, where the arteries of the nasal septum convene (Figure 1). It may have the appearance of tortuous capillary blood vessels or an area of raised mucosa with the lumen of a blood vessel visible.

Topical medications

These are beneficial in facilitating adequate examination of the nasal cavity. Applying adrenaline or oxymetalozine causes vasoconstriction, and mixing it with lidocaine provides local anaesthesia should cautery or packing be needed. However, co-phenylcaine is even better as it is pre-mixed, commonly found in emergency departments, and provides both vasoconstriction and local anaesthesia.

A substance called FloSeal can be helpful but is not considered a first-line option. It is a haemostatic matrix of human thrombin which is applied to bleeding areas. It has a vast array of uses within surgery such as cardiovascular and spinal procedures. It claims to stop bleeding within 2 minutes on average and is 96% effective within 10 minutes (Baxter, 2021).

Systemic medications

Tranexamic acid can be helpful in the management of a torrential bleed but is rarely required in patients with lighter bleeds. Provision of blood products may be helpful in patients who have specific deficiencies or whose haemoglobin levels have significantly dropped. Analgesia is very important in these patients as they will inevitably need the next step of intervention.

Procedures and interventions

Nasal cautery: If an obvious bleeding point can be identified it is often prudent to attempt nasal cautery by applying silver nitrate to the area, causing a chemical reaction. This combines with water to form nitric acid and silver hydroxide (Fauquier ENT, 2012). This can be all it takes to stop the epistaxis but there are some important points to consider.

- It is painful, so make sure local anaesthetic is applied first
- It may cause the patient to sneeze, so ensure tissues are given to the patient and the clinician is well covered. If the COVID-19 status of the patient is unknown, then full personal protective equipment should be worn
- It can make the bleeding worse before it becomes better as direct contact with an open vessel may traumatise the vessel
- It is possible to leave a silver hydroxide tattoo if altered secretions drip down, so protect the philtrum and lip with gauze or Vaseline
- Working peripherally to centrally around an offending blood vessel can pick off feeder vessels and make the final touches of cautery much easier. However, this

should be targeted and care should be taken not to simply 'paint' the mucosa as this could worsen the epistaxis

- Heavy bleeds may not respond well to this method of control as the cautery will discolour the blood and make visualisation more difficult, preventing the desired effect of cautery to the mucosal surface.

Nasal packing: If nasal cautery is unsuccessful or too difficult to attempt, a nasal pack may be indicated. There are various types of nasal packs available (Figure 4) but the aim is to tamponade the offending vessel to arrest the bleed. They are very popular, but are sometimes used in place of a considered approach in which the aforementioned options may have been effective. Practicing and becoming proficient in the earlier steps can prevent nasal packs being used, which may reduce inappropriate admissions to hospital.

Dissolvable nasal sponge packs (such as Nasopore) can be used for light bleeds but are far more commonly used in elective nasal surgery rather than an emergency situation.

Non-dissolvable nasal packs (such as Merocel) may be used in the emergency situation but can be painful to insert. They undergo a structural change on contact with liquids making them soft rather than rigid, which makes insertion difficult. Do not hydrate these before insertion as this will make it very difficult to pass them any further than the nostril.

By far the most widely encountered option is the inflatable non-dissolvable nasal pack (such as Rapid Rhinos). This finger-shaped, gauze-covered balloon comes in several sizes and offers the option to control more posteriorly located bleeding points. Escalating through the sizes may be required and bilateral packing might be necessary to gain adequate control. The gauze is impregnated with a mildly haemostatic lubricant which is activated by contact with water so these packs should be soaked for 30 seconds before use. Inflation with 10 ml of air is recommended but more may be required. There is a bubble reservoir near the syringe valve to check the pressures, which should feel firm to touch to ensure the air is not escaping.

The angle of approach needs to be in line with the floor of the nose (Figure 5), which is typically horizontal when the patient is sitting up straight. On some occasions nasal packs are inserted at an angle which does not adequately control a bleed but the presence of the pack may give a false sense of security to a reviewing healthcare professional. Nasal packs are painful and it is very important to provide analgesia while they are in place. This reduces patient anxiety and helps to stabilise hypertension or tachycardia, further helping to control the bleed. Infection can develop around a nasal pack as static blood is an optimal medium for organisms to replicate in. Starting antibiotics may not be necessary for every patient who has a nasal pack, but if a patient needs multiple packs (or remains packed for more than 48 hours) then using antibiotics may be appropriate. Refer to the trust antibiotic guidelines for the most appropriate antimicrobial medication to use. A useful way to remember these steps is to consider them as the three As; angle of approach, analgesia and antibiotics.

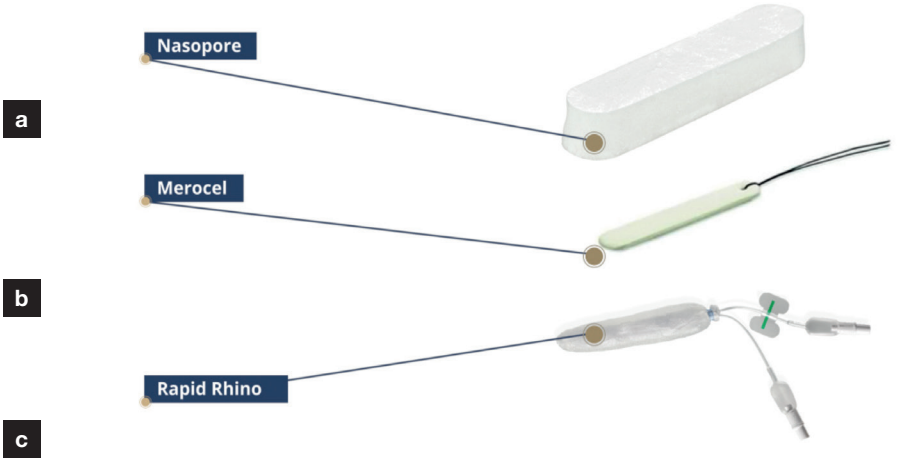

Figure 4. Nasal packing devices. a. Nasopore: dissolvable nasal packing. b. Merocel: non-dissolvable nasal tampon packing. c. Rapid Rhino balloon nasal packing.

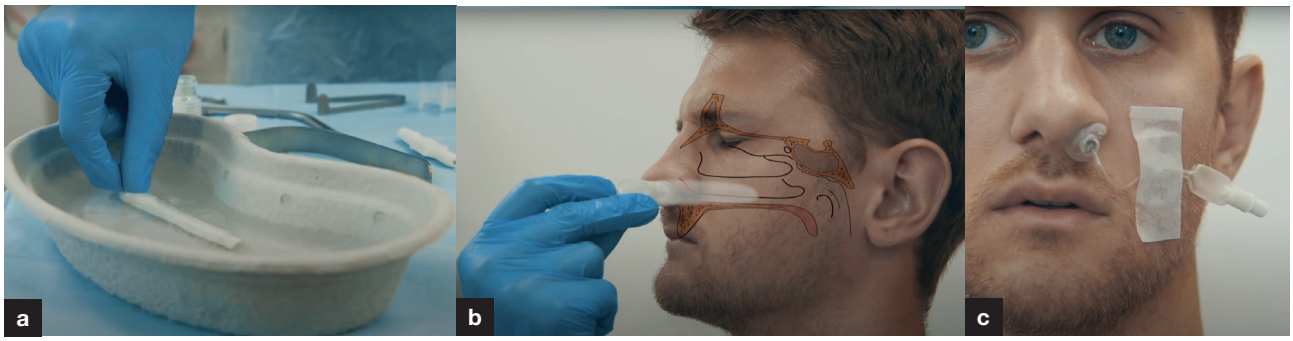

Figure 5. Instructions for inserting a nasal pack. a. Soak. b. Hold at a horizontal angle and insert to the base. c. Tape to the face.

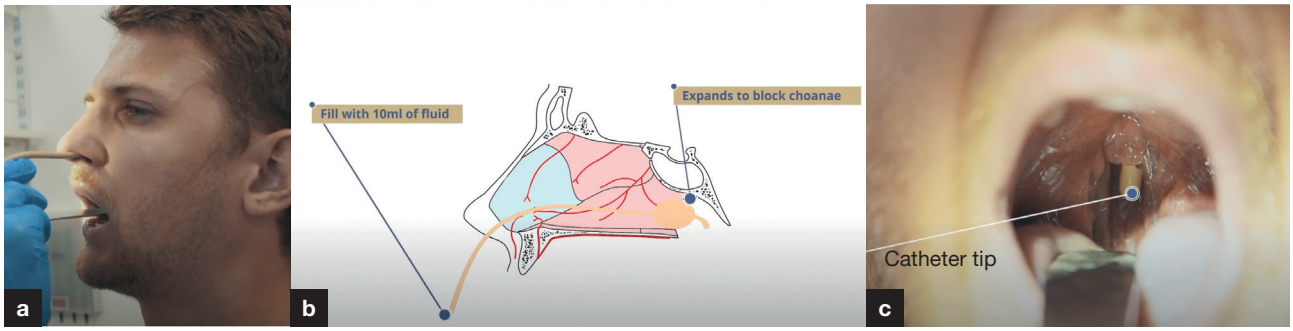

Figure 6. Managing a posterior bleed with a catheter. a. Insert along the base of the nose. b. Visualise the tip at the back of the throat. c. Inflate with water and pull back.

Escalation to the ear nose and throat registrar

By this time, the ear nose and throat team should have been informed. A skilled ear nose and throat senior house officer and certainly an ear nose and throat registrar may escalate to insert a more traditional form of nasal packing for posterior bleeds which have proven difficult to control by the means outlined so far. This involves a Foley urinary catheter being passed to the post-nasal space where it is inflated and abutted against the posterior nasal choana with traction (Figure 6). The rest of the nasal cavity is filled with layers of ribbon gauze covered in adrenaline, Vaseline or BIPP (bisthmus iodoform paraffin paste). This is an advanced skill.

Patients who continue to bleed despite posterior packing with a catheter usually require surgery to achieve haemostasis. The intricacies of surgical management of epistaxis are beyond the scope of this article but consist of electrocautery and named arterial ligations (sphenopalatine, anterior ethmoidal, maxillary, or as a last resort the external carotid artery). If these fail then the possibility of performing coil embolisation should be discussed with the interventional radiologists.

Adaptations and considerations during the COVID-19 pandemic

The management of epistaxis involves a number of potential risks for the spread of COVID-19 and ENT UK have issued guidelines on the subject (Davies et al, 2020). The upper airway is heavily involved and the patient is likely to cough or sneeze during any procedure involving the nose, rendering the situation an aerosol-generating procedure. The number of staff members present should be kept to a minimum and full personal protective equipment (including FFP3 mask or equivalent) should be used.

Where possible it would be prudent to attempt to use dissolvable packs rather than the more painful non-dissolvable packs as these are more likely to promote droplet spread and generation of aerosols. However, this is not always possible and the patient may require, or already have, a non-dissolvable pack in situ. Historically these patients would remain in hospital for at least 24 hours before the packs are removed. However, selected patients can be discharged home with the pack in place and brought back the following day for review by ear nose and throat and pack removal. This reduces the number of patients in hospital and keeps beds free for more acutely unwell patients. Evidence

Key points

- Epistaxis can be life-threatening and should be taken seriously. An A–E assessment will ensure patient safety.
- The principles of epistaxis management are similar to those for any haemorrhage. Pressure will stop the bleeding – the difficulty with the nose is applying pressure to the correct part. Packs, dissolvable or non-dissolvable, will help with this.
- It is important to establish if a bleed is anterior or posterior.
- Use a stepwise approach, moving from first aid to cautery, packing and finally surgery.
- Medication such as tranexamic acid can be a useful adjunct to procedural techniques.

suggests that there is no increase in re-presentations when patients are discharged with non-dissolvable packs in situ (Hardman et al, 2021).

Conclusions

Epistaxis is commonly encountered by staff working in acute areas. Managing it confidently takes practice but is a rewarding skill to develop. Rarely these bleeds can be life-threatening and occasionally surgical management is required. Sticking to basic principles such as a systematic ABCDE management strategy will permit safe treatment of the patient. The three Fs and the three As are important considerations which form part of an arsenal against epistaxis. It is important to ensure that the correct personal protective equipment is worn as procedures can generate aerosols. Many of the techniques discussed may be used alone or in conjunction with one another, for example, after nasal cautery in an elderly patient on anticoagulation, the clinician may choose to add FloSeal and a dissolvable pack to reduce the risk of further bleeding. If there are concerns about a bleed requiring input beyond the clinician's competence or skill set, escalation to on-call ear nose and throat staff is highly recommended.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

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Top tips

- Many patients have not used correct first aid before presenting to hospital. For most bleeds, it is worth trying this first.
- Following the three Fs and the three As will generate good skills.
- Insertion of non-dissolvable packs and inflation of a Rapid Rhino are very painful procedures, so give analgesia if there is time, warn the patient and make sure they are resting their head against something first.
- During the COVID-19 pandemic, it is desirable to keep admissions to a minimum. Local guidelines should be adhered to, but evidence suggests it is safe to discharge selected patients with non-dissolvable packs in situ, returning for ear nose and throat review the following day.

Curriculum checklist

This article addresses the following requirements from the otolaryngology curriculum:

- Managing an acute speciality-related take
- Management of critical conditions
- To understand the aetiology, presenting symptoms and signs and management of epistaxis.

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