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ENDOSCOPIC MANAGEMENT OF IDIOPATHIC SPONTANEOUS EPISTAXIS IN ADULTS

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Epistaxis is one of the most common rhinology emergencies. This chapter addresses emergency management of idiopathic epistaxis in adults, focusing on endoscopic source control. The authors do not focus on epistaxis associated with trauma, tumours, hereditary haemorrhagic telangiectasia, postoperative bleeding, or septal perforations.

Causes of idiopathic epistaxis in adults include mucosal trauma, dryness, septal deviation, inflammation, medications, and systemic factors e.g. hypertension. Red flags include recurrent unilateral epistaxis, nasal obstruction, a visible mass, telangiectasia, anaemia, and anticoagulants.

Readers are referred to the following chapters:

- Treatment of epistaxis in children
- Sphenopalatine artery (SPA) ligation
- Management of nasal fractures

Management depends on the severity of bleeding and the expertise available. In settings without ENT support, nasal packing is used as a haemostatic measure and may be either temporising or definitive. Ongoing bleeding despite packing requires escalation to ENT. Further management may include cautery of a visible anterior vessel, revision of anterior and/or posterior packing, endoscopic localisation and control of the bleeding source, or examination under general anaesthesia with repacking or cautery. When the source of bleeding is not apparent during the acute episode, subsequent nasal endoscopy must be performed to exclude underlying nasal or sinus pathology.

Arterial anatomy

Branches of the ophthalmic, maxillary and facial arteries supply different territories in the walls, floor and roof of the nasal cavities *(Figures 1, 2)*. They ramify to form anastomotic plexuses within and deep to the nasal mucosa. Anastomoses also exist between some larger arterial branches.

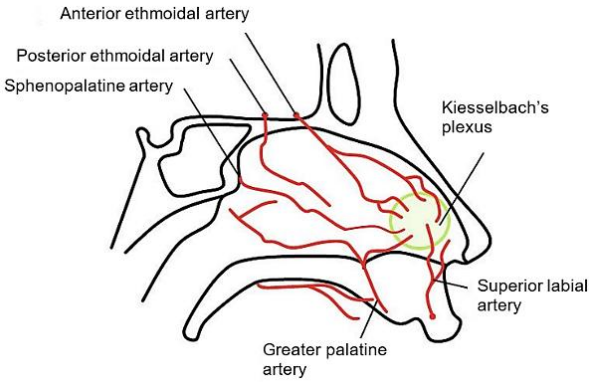

Figure 1: Arterial supply to the nasal septum

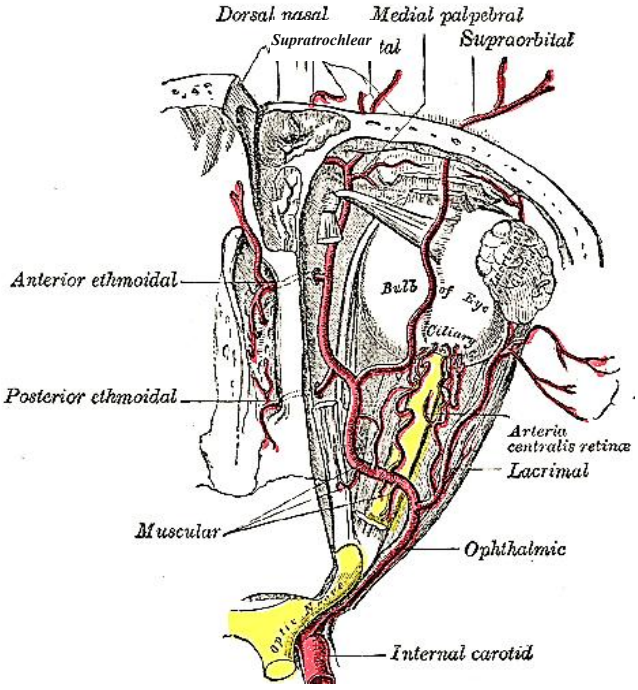

Figure 2: Ophthalmic artery gives rise to anterior and posterior ethmoidal arteries

Internal carotid system

- Anterior and posterior ethmoidal branches of the ophthalmic artery supply the ethmoidal and frontal sinuses and the roof of the nose, including the septum *(Figures 2, 3)*
- The anterior ethmoidal artery (AEA) supplies the anterosuperior septum and lateral nasal wall
- The posterior ethmoidal artery supplies the posterosuperior septum and lateral wall but is not clinically as significant as the AEA
- Branches from the internal carotid are not amenable to embolization

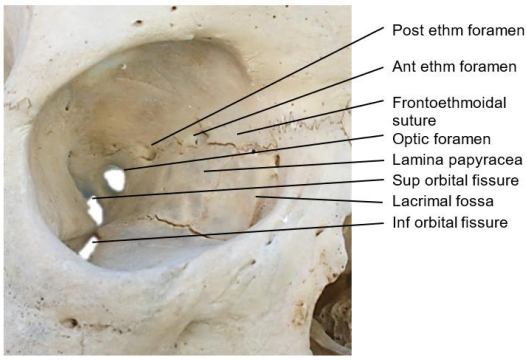

Figure 3: Right medial orbital wall illustrating the anterior and posterior ethmoidal foramina

External carotid system

- The sphenopalatine artery is the terminal branch of internal maxillary artery and supplies the posterior septum and lateral nasal wall
- The greater palatine artery (branch of internal maxillary artery) ascends via the incisive canal to supply the inferior septum
- The superior labial artery (branch of the facial artery) supplies the anterior septum and nasal vestibule

Arterial territories

- Anterior septum (Kiesselbach's plexus or Little's area) *(Figure 1)*
  - Convergence of anterior ethmoidal, superior labial, greater palatine, and sphenopalatine arteries
  - Most common site of epistaxis, especially in children (usually low flow) or in young adults
- Posterior septum (Woodruff's plexus)
  - Dominated by branches of the sphenopalatine artery
  - Access may be difficult; haemorrhage is often harder to control
- Lateral nasal wall
  - Supplied largely by the anterior ethmoidal artery (superiorly), and sphenopalatine branches (posterior and inferior)

Anterior versus posterior bleeds

Although anterior or posterior epistaxis is sometimes defined relative to anatomical landmarks (e.g. maxillary sinus ostium), this is often clinically unhelpful due to individual variation and extensive arterial anastomoses.

A ***useful practical definition*** as a guide to the site of the bleeder is based on where blood is first recognised with the patient upright and with the head in a neutral position: anterior bleeds flow to the anterior nares, whereas posterior bleeds flow to the pharynx. Note, however, that anterior bleeding vessels can also present with posterior bleeding (see Supplemental material, Video 3 in Kosugi et al.); the converse is less likely.

Clinical relevance

- ***Anterior bleeds*** are usually managed with cautery of Kiesselbach's plexus or anterior nasal packing

- ***Posterior bleeds*** might arise from posterior source vessels. Patients may require endoscopic sphenopalatine artery ligation and/or ethmoidal artery ligation, or embolisation, or transantral or external ligation of the feeder vessels via the neck. Access to the posterior nasal cavity may be difficult due to septal or middle turbinate deviations.

First aid measures

- Have suction, IV access and fluids and blood ready as appropriate, and secure the airway in massive posterior bleeds
- As many adult patients with epistaxis are elderly and frail, management of epistaxis should be instituted within a reasonable time
- Sit the patient upright with head flexed over a kidney dish
- Squeeze the soft part of the nose to compress Kiesselbach's plexus. For convenience to patients, a tongue depressor can be halved and taped at the broken end to create a "peg" which can be applied to the patient's nose
- Apply ice to the anterior hard palate (suck an ice cube) to encourage vasoconstriction of the greater palatine artery as it enters the incisive foramen [1,2] Evidence does not support application of ice packs to the external nose or the neck as it has little effect on blood flow to the nasal mucosa
- In selected severe bleeds where localisation may be obscured, some surgeons defer vasoconstrictors until initial inspection; however, topical vasoconstrictors remain an accepted first-line adjunct in guideline-based care [3]
- Note: Swallowed blood may cause nausea, haematemesis, melaena, and conceal the true volume of blood loss
- Caution: If it is difficult to insert nasal packing due to obstruction, the nasal cavity should be cleaned and examined for any structural abnormality as it may require an alternative packing strategy

Anterior nasal packing

- Rapid Rhino® 550 or 750 (unilateral or bilateral) balloons filled with air *Figure 4)*
- Merocel® packs *(Figure 5)*

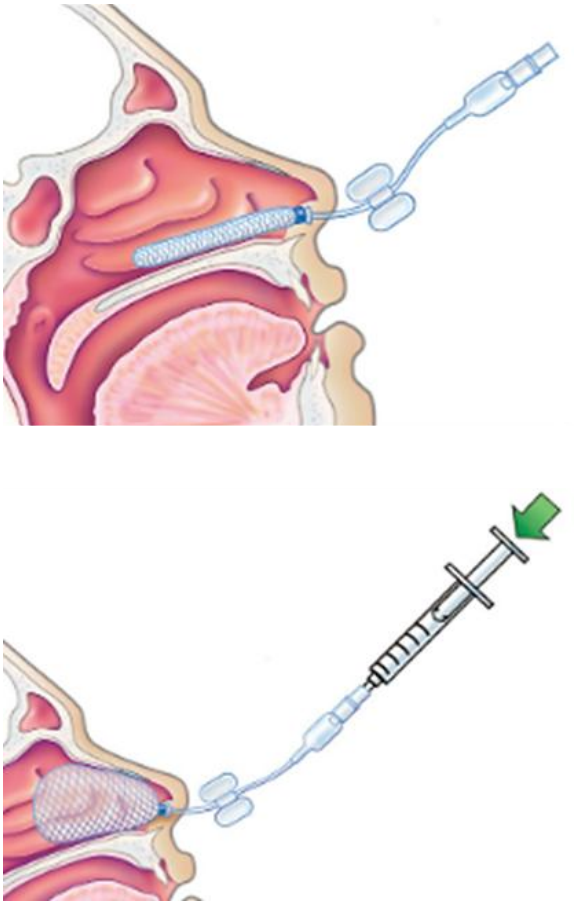

Figure 4: Rapid Rhino inflated in the nasal cavity to tamponade vessels
https://rapidrhino.com/rapid-rhino-product-usage-instructions/

Figure 5: Merocel® pack (hydrated and unhydrated)

- Ribbon gauze *(Figures 6-8)*
  - Impregnated with petroleum jelly or BIPP to minimise mucosal trauma and to ease removal
  - Use bayonet forceps and a nasal speculum to place the gauze in a layered, accordion-like fashion (see image below)
  - Place the gauze as far posteriorly as is possible with the first fold positioned posteriorly to avoid migration into the pharynx

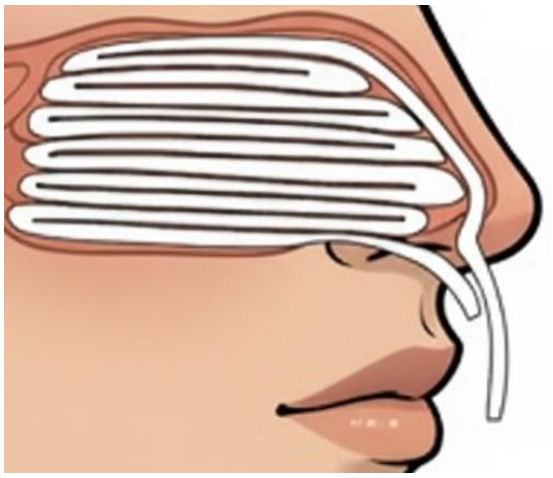

Figure 6: Gauze packed in a layered, accordion-like fashion

Figure 7: Bayonet forceps for epistaxis

Figure 8: Nasal speculum

Posterior nasal packing

- Posterior nasal packing is used for uncontrolled posterior epistaxis when anterior measures fail
- The Rapid Rhino® 900 has a balloon that can be inflated in the nasopharynx *(Figure 9)*

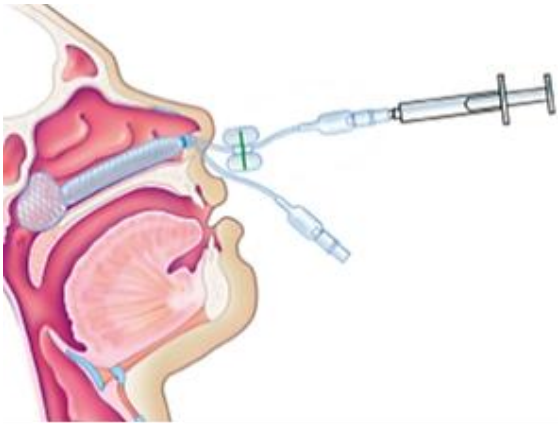

Figure 9: Rapid Rhino® 900

- Alternatively use a 10–14 Fr Foley catheter
- Pass it along the floor of the nose into the nasopharynx
- Inflate the balloon with 10-15mls water
- Withdraw the catheter until the balloon sits firmly against the posterior choana
- Insert an anterior pack of ribbon gauze with the catheter *in situ*
- Draw back on the catheter and tape it to the cheek, or knot the catheter, or apply an umbilical clamp
- Protect the nasal vestibule and alar skin from pressure necrosis with a gauze swab placed between the umbilical clamp and the anterior nares
- Keep it under moderate tension to tamponade the bleeding
- Posterior nasal packing is uncomfortable and carries risks such as airway compromise, pressure necrosis of the vestibule, and vagal responses

Clinical assessment

- History: unilateral/bilateral, duration, frequency, severity (trickle vs high flow), triggers, medication e.g. antiplatelet drugs, NSAIDs, anticoagulants, hypertension, coagulopathy, family history of hereditary haemorrhagic telangiectasia (HHT)
- Consider comorbidities
- As aspirin takes 7 days to washout, it is reasonable to manage epistaxis without ceasing it
- In anticoagulated patients, avoid routine reversal or withdrawal of anticoagulant/antiplatelet therapy before first line epistaxis management unless bleeding is life-threatening; decisions about pack removal and anticoagulation correction should be individualized
- Examination: vitals, airway, oral cavity, oropharynx, anterior rhinoscopy, nasal endoscopy if available

Investigations

- Minimum: Hb/FBC, group & screen if significant bleed, INR/PT/aPTT
- CT angiography if refractory/recurrent/atypical, suspected tumour/vascular lesion, or for preoperative planning

Initial endoscopic assessment

- Maintain normal blood pressure and cardiac output
- Blow the nose and irrigate to clean it
- Perform a comprehensive endoscopic examination
- A 4 mm 0-degree endoscope with a 10 Fr Frazier sucker *(Figures 10, 11)* are used in tandem to facilitate rapid clot evacuation and accurate localisation of the bleeding point
- A single focal bleeding point is often present even in dramatic bleeds and often is a focal 'nipple' *(Figure 12)*
- Control bleeding if possible

Figure 10: 4 mm 0-degree endoscope

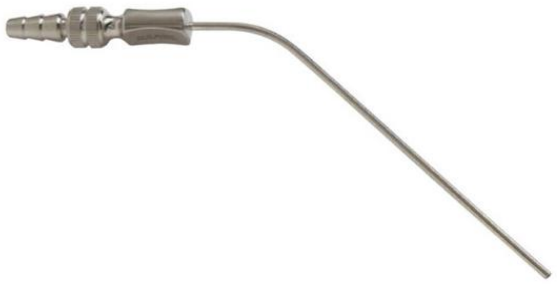

Figure 11:10 Fr Frazier sucker

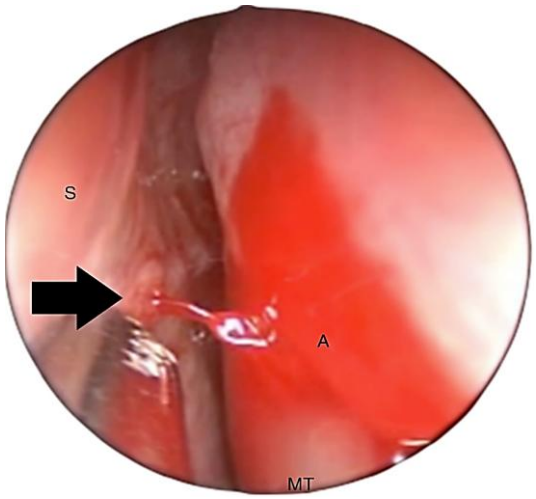

Figure 12: Left nasal septum bleeding source (nipple) from S-point. Reproduced from Kosugi et al [4]

Definitive endoscopic management

- Have another clinician to assist
- Cover the patient's torso with protective absorbent material

- Have the patient hold an emesis bag or kidney dish under the chin and provide paper towelling/tissues
- Wear appropriate PPE

Mnemonic: UNPACKS

- U: Upright & support
- N: Nasal packs out
- P: Purge & position
- A: Atraumatic irrigation; topical Anaesthetic; gently irrigate the nose with saline
- C: Camera + suction together
- K: Keep physiology normal: blood pressure/cardiac output; avoid decongestant solutions until complete endoscopic evaluation is done
- S: Stop the source / Step up: Apply 1:10,000 adrenaline pledgets and silver nitrate (~20 seconds) to bleeding point
- If uncontrolled or inaccessible, repack and escalate to theatre/tertiary options

Figure 13: Silver nitrate sticks

Step-by-step technique in clinic or procedure room

1. Ensure medically stable
2. Remove nasal packing and clean surfaces of nose
3. Clear the nose of blood clots
    - Blow the nose
    - Gently irrigate the nasal cavity with saline using an irrigation bottle, or with a 60 mL catheter-tip syringe
4. Topically anaesthetise the nose if required
5. Ask the patient to extend the head so that blood flows posteriorly and keeps the anterior nose clear of blood
6. Locate the bleeding source
    - Inspect Little's area using a Thudicum speculum and headlight
    - Conduct a thorough endoscopic examination using a rigid endoscope (typically 4 mm 0-degree Hopkins rod with camera adaptor and display)
    - Minimise mucosal trauma to reduce risk of adhesions
    - Use the rigid 10Fr Frazier sucker and endoscope together *(Figures 10, 11)*
    - First insert the sucker to lift the nasal tip to insert the endoscope
    - Once past the nasal valve, use the endoscope to lift the nasal tip and advance the sucker under direct vision
    - Lateral traction can be applied to the upper cheek (Cottle's manoeuvre) to widen the nasal valve
    - Direct both instruments in unison to locate the bleeding source (*Table 1,* page 8)
    - If bleeding is minimal, narrow-band (blue light) imaging may be used in conjunction with a flexible nasendoscope to help identify a subtle vascular lesion, to differentiate benign vs malignant mucosal change, or to do targeted biopsies
7. Once the source has been identified, apply topical anaesthetic and/or decongestant spray to the source bleed plus areas of discomfort
8. Control the source
    - For high-flow bleeding, apply a cotton tip or pledget saturated in 1:10,000 adrenaline to the focal lesion ('nipple') *(Figure 14)*
    - Apply silver nitrate directly for approximately 20 seconds while rolling the stick, then irrigate/evacuate residual silver nitrate to avoid caus-

tic injury to the nose and skin around the nasal vestibule

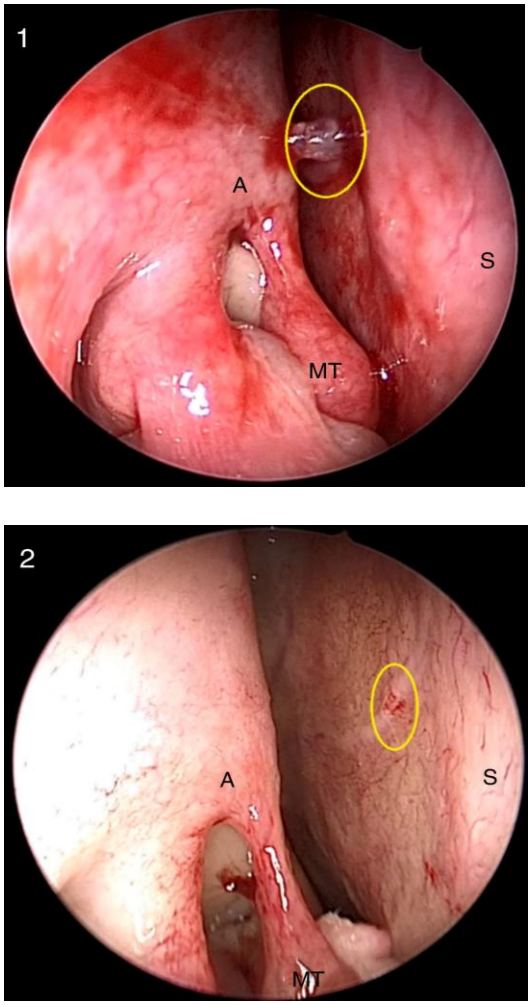

Figure 14: Image 1: S-point haemorrhage pre-vasoconstrictor; Image 2: S-point source lesion post-vasoconstrictor (adrenaline saturated gauze). Reproduced from Kosugi et al [4]

- Bipolar or monopolar cautery may be used when chemical cautery fails on at least two attempts; be mindful of critical anatomy that may be at risk of thermal injury
- Avoid chemical or electrical cautery to opposing sides of the nasal septum as it may cause a septal perforation
- If access is poor due to e.g. a deviated septum, consider flexible endoscopy or proceed to surgery under general anaesthesia

Management in theatre under general anaesthesia

- Indications
  - Persistent/recurrent epistaxis despite clinic-based source control or packing
  - Inability to visualise or tamponade source due to anatomical factors, poor patient cooperation, persistent high flow bleeding etc
  - To surgically improve access e.g. limited septoplasty, turbinate medialisation/ reduction
- Pack the nose and arrange urgent theatre
- Anaesthesia and cautery
  - Avoid hypotensive or low cardiac output anaesthesia as it may stop bleeding and hinder identification of the bleeding source
  - The authors prefer bipolar as it provides more targeted cautery and less penetration of thermal injury
  - Suction monopolar is also a good option as it is malleable and permits swift evacuation of blood thus enabling immediate coagulation. Select the "spray" function (non-contact) and avoid direct contact with tissue to reduce thermal injury to deeper structures
- *Table 1* summarises where adult epistaxis originates in the general population
- Targeted localisation: high septal bleeding and the "S-point" *(Figure 14)*
  - For bleeding high on the medial nasal cavity, examine Stamm's-point (S-point)
  - It is the superior nasal septum posterior to the septal swell body, around the middle turbinate axilla projection
  - The septal swell body may obstruct access

Table 1: Prevalence by 3 primary source areas

Anterior nasal septum
- Little's area / Kiesselbach's plexus
- 90–95% of epistaxis
- Amenable to basic emergency care ± cautery

Superior septum & superior lateral wall
- Ethmoidal territory (ICA)
- 1–5% (subset of non-anterior cases)
- Often underrecognized
- May be labelled "posterior/ unknown" without endoscopy

Lateral wall & posterior septum
- SPA territory (ECA)
- 5–10%
- Bulk of true posterior-pattern bleeds

Severe/refractory epistaxis (theatre-level systematic endoscopy)
- When evaluated under GA using structured protocol
  - Superior sources ~51%
  - Posterior sources ~26%
  - Site not identified ~30%
- Supports deliberate inspection of superior septal/lateral wall regions (AEA territory) and SPA territory in recurrent/severe adult epistaxis

- Escalation options
  - If the suspected vessel is in the ***sphenopalatine artery territory***, consider endoscopic sphenopalatine artery ligation
  - AEA ligation is typically performed via transcaruncular approach using bipolar cautery *(Figures 15, 16)*
  - An external approach via a Modified Lynch incision may also be used to ligate the AEA

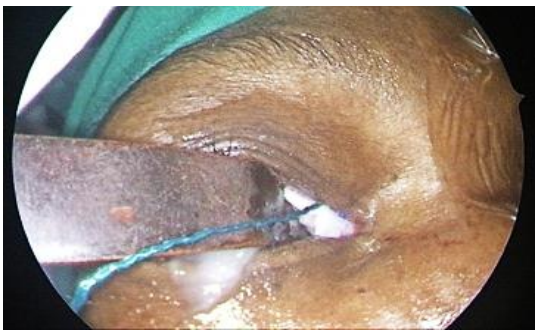

Figure 15: Retracting orbit to open precaruncular corridor (Right eye)

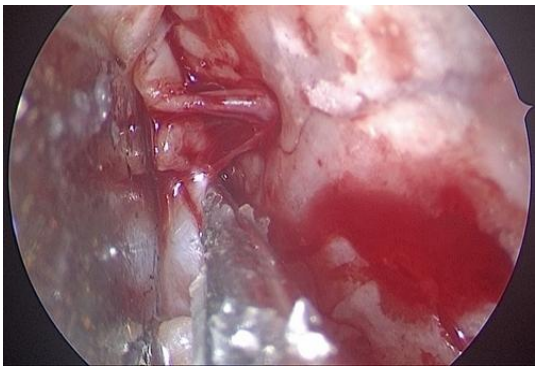

Figure 16: AEA exiting foramen in frontoethmoidal suture line which is in line with the nasion (right eye)

  - If the source remains inaccessible, consider interventional radiology
  - When interventional radiology is not available, then one may need to cauterise/clip/ligate the internal maxillary artery and its branches via a transantral (Caldwell Luc) approach, or to ligate the external carotid artery in the neck. A disadvantage of the latter procedure is that the internal maxillary artery and its branches cannot be embolised subsequently
- Ensure there is no cerebrospinal fluid leak if concern for skull base injury (e.g. fracture at superior skull base insertion of middle turbinate)
- Post-procedure management
  - Standard observations
  - Inspect oropharynx for evidence of ongoing bleeding

- Apply an emollient such as a topical ointment to anterior cautery wounds or a spray for more posterior sites and consider topical antibiotics if risk factors are identified
- Encourage humidification with saline sprays or washes or nebuliser or steam inhalation baths
- Studies report that sesame oil-based preparations outperform saline for symptomatic relief of nasal dryness and crusting

- Iron supplementation for anaemia

Nasal dressing and packing options

Nasal dressing and packing options for managing epistaxis range from traditional non-absorbable physical packing materials to modern absorbable and active haemostatic agents. Choice depends on severity (anterior vs posterior), tolerance, and underlying causes such as coagulopathy, cost and availability.

Category	Examples	Notes / typical use
Absorbable haemostatic agents (dissolvable)	• Gelatin-thrombin matrix (e.g., Floseal) • Oxidised regenerated cellulose (e.g., Surgicel) • Gelatin sponge (e.g., Gelfoam, Spongostan, Surgifoam) • Chitosan-based dressings (e.g., HemCon, Chitofix) • Hyaluronic acid / carboxymethylcellulose packs (e.g., NasoPore, NasoAid)	• Often do not require removal, reducing pain and risk of rebleeding • Useful for diffuse oozing; can be effective in coagulopathic patients
Non-absorbable packing (requires removal)	• Alginate (Kaltostat) • Inflatable balloon catheters (e.g., Rapid Rhino, Epistat) • PVA sponge (e.g., Merocel) • Ribbon gauze / petroleum gauze (± BIPP) • Foley catheter (posterior epistaxis)	• Highly effective; generally, less comfortable • Posterior systems often require admission and monitoring • Merocel packs come in shorter lengths (Kennedy Packs) or longer products can be cut to an appropriate length • Strings can be curled and taped onto the tip of the nose
Adjunct topical medication	Vasoconstrictor liquids (e.g., adrenaline / oxymetazoline / xylometazoline)	Use to shrink mucosa and improve access only when applied directly to mucosa (not to blood clot or active bleeding)

Week following cauterization

- Avoid picking or blowing the nose hard, and straining (stool softeners if needed)
- Humidify with saline nasal spray QID
- Nasal ointment at bedtime following saline spray by 10 mins if the eschar is anterior and accessible
- Sesame oil nasal spray in the morning following saline spray by 10 mins or glycerol added to saline sinus rinse if eschar unlikely to be softened by sesame oil nasal spray
- Safety net/when to return

- Notify the GP if anticoagulant/antiplatelet agents were withheld

Epistaxis in pregnancy

Phenylephrine has a mechanistic uteroplacental concern and is sometimes labelled "avoid/contraindicated." [5] If a topical vasoconstrictor is needed in a pregnant epistaxis patient, oxymetazoline is generally a more defensible first-line choice (short course, minimal dosing), while co-phenylcaine is harder to justify unless the procedural anaesthetic component is truly necessary and obstetric/medical context supports use. [6]

Nasal dressing and packing options

Nasal dressing and packing options for managing epistaxis range from traditional non-absorbable physical packing materials to modern absorbable and active haemostatic agents. Choice depends on severity (anterior vs posterior), tolerance, and underlying causes such as coagulopathy, cost and availability.

Considerations when choosing packing

- Posterior bleeds often require longer more specialised packing or foley catheters or double-balloon catheters and commonly require hospital admission
- In coagulopathy, absorbable non-traumatising materials (e.g., gelatin or cellulose) may reduce rebleeding when packs are removed
- Absorbable materials and/or *Merocel* packing are generally better tolerated than Rapid Rhinos or gauze packing
- The haemostatic coating of the *Rapid Rhino* should be activated with water, not with saline

Global reality

What has been presented in this chapter is not the reality for epistaxis treated globally. The majority is effectively managed without endoscopic equipment, specialised packing, double-balloon catheters, or endoscopic sphenopalatine artery ligation etc.

Epistaxis can be effectively treated in less resourced settings with simple interventions such as cautery of anterior septal bleeds visualised with a headlight and Thudicum speculum, tamponading bleeding with nasal packing with petroleum jelly or BIPP saturated ribbon gauze for 24-48hrs, and control of posterior epistaxis with a combination of Foley catheters inflated in the nasopharynx and anterior nasal packing with ribbon gauze. Refractory cases can be managed by cauterising or ligating the internal maxillary artery and its branches via a transantral (Caldwell Luc) approach, or ligating the AEA by external approaches, or ligating the external carotid artery in the neck.

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Other resources

YouTube videos

- Treatment of a bleeding nose (https://youtu.be/-wA0EkWre6U?si=uOHYOLxqJAFQOjle)
- Managing Recurrent Nasal Bleeding: Effective Treatment Strategies (https://youtu.be/X6i_g1mNm8A?si=uh7fkPwlIcOkDYvx)
- Recurrent nasal bleeding S point AEA (https://youtu.be/_bVCXxxZOQc?si=V66oSouf7z2V5wUl)
- Anterior Nasal Packing with Ribbon gauze (https://www.youtube.com/watch?v=PXVd9FDeUVs)

Related Open Access Atlas chapters

- Treatment of Epistaxis in Children https://vula.uct.ac.za/access/content/group/ba5fb1bd-be95-48e5-81be-586fbaeba29d/Treatment of epistaxis in children.pdf
- Sphenopalatine artery (SPA) ligation https://vula.uct.ac.za/access/content/group/ba5fb1bd-be95-48e5-81be-586fbaeba29d/Sphenopalatine%20artery%20_SPA_%20ligation.pdf
- External Ethmoidectomy and Frontal Trephine https://vula.uct.ac.za/access/content/group/ba5fb1bd-be95-48e5-81be-586fbaeba29d/External%20ethmoidectomy%20and%20frontal%20trephine.pdf
- Transorbital neuroendoscopic surgery (TONES) techniques for paranasal sinus and skull base pathology https://vula.uct.ac.za/access/content/group/ba5fb1bd-be95-48e5-81be-586fbaeba29d/Transorbital%20neuroendoscopic%20surgery%20_TONES_%20techniques%20for%20paranasal%20sinus%20and%20skull%20base%20pathology.pdf
- Caldwell-Luc (Radical Antrostomy), Inferior Meatal Antrostomy & Canine Fossa and Inferior Meatus Punctures https://vula.uct.ac.za/access/content/group/ba5fb1bd-be95-48e5-81be-586fbaeba29d/Caldwell Luc _radical antrostomy_ procedure canine fossa and inferior meatal puncture and inferior meatal antrostomy.pdf
- Basic FESS / endoscopic technique resources https://vula.uct.ac.za/access/content/group/ba5fb1bd-be95-48e5-81be-586fbaeba29d/Basic%20FESS%20-%20Step-by-step%20guide%20with%20surgical%20videos.pdf
- Management of nasal fractures https://vula.uct.ac.za/access/content/group/ba5fb1bd-be95-48e5-81be-586fbaeba29d/Management%20of%20nasal%20fractures.pdf
- Septoplasty https://vula.uct.ac.za/access/content/group/ba5fb1bd-be95-48e5-81be-586fbaeba29d/Septoplasty.pdf

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