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## Disclaimer
A common condition with a bimodal age distribution, occurring more frequently in the young and the old.

90% arise at Little's area of the anterior septum, the location of the Kiesselbach plexus.

Precipitating factors include dry weather and other causes of nasal mucosal inflammation or hyperaemia, such as allergy, viral rhinitis, bacterial rhinosinusitis, dust, or chemicals. Although rare, neoplasm may also cause nosebleed.

Topical anaesthesia and vasoconstriction are essential for initial treatment of active bleeding. If initial measures fail, almost all episodes may be controlled with anterior or anterior-posterior packing techniques.

Bleeding may be refractory in the presence of coagulopathy.
Definition
Epistaxis, or nosebleed, is bleeding from the nasal cavity and/or nasopharynx and may be classified as anterior or posterior.[1] [2] [3] [4]

Epidemiology
Most people will experience epistaxis at some stage in their life. There is a bimodal age distribution with increased prevalence in children and the aged. There is neither racial nor gender predilection, excepting that, as men are more likely to experience trauma, there is some increased likelihood via this mechanism.

Nosebleeds occur more frequently in the drier, colder months, and in less humid environments. This is because dry air facilitates excoriation and cracking of the nasal mucosa, vessel trauma, and subsequent epistaxis.[1] [2] [3] [4] [5]

Aetiology
Ninety percent of epistaxis is caused by bleeding originating from blood vessels in Little's area, located at the anterior inferior septum. This area contains a confluence of vessels from the various nasal sources called the Kiesselbach plexus.
Posterior epistaxis originates from the posterior nasal cavity or nasopharynx.[3] [4]

Vessels may bleed due to:

- Mucosal compromise
- Impairment of vasoconstriction and inadequate activation of the clotting mechanism.

Neoplasm represents an atypical and, if located in a paranasal sinus, elusive cause of nosebleed and includes:

- Sinus tumours: associated with exposure to wood dust and certain chemicals
- Juvenile nasal angiofibroma: a rare nasopharyngeal tumour of young men that can produce significant posterior haemorrhage.[6] [7]

Adults with nosebleed often have elevated blood pressure (BP), although difficulty exists in determining whether hypertension is a causative factor or whether the elevated BP is secondary to anxiety. Conclusive proof is lacking.[8] [9] [10] [11] [12]

Also debated is whether atherosclerotic change, secondary to hypertension, increases vessel fragility. In the manner that elevated BP impairs intraoperative surgical haemostasis, it may be reasonably inferred that it would similarly prolong and worsen active nasal bleeding.[8] [9] [10] [11] [12]

Pathophysiology

The physiological demands of the nose require a robust blood supply. Loss of mucosal integrity, for any reason, exposes underlying vessels, which may be violated and bleed.

Vasoconstriction and activation of the clotting mechanism normally regains haemostasis. Impairment of these processes may prolong bleeding.

Classification

Commonly used classification according to site of bleeding source

Anterior epistaxis:

- Accounts for approximately 90% of nosebleeds
- Usually originates from the Kiesselbach plexus, a rich vascular anastomosis located at the anterior nasal septum; this region is called Little's area.

Posterior epistaxis:

- Originates from the posterior nasal cavity or nasopharynx[3] [4]
- Posterior nasal and nasopharyngeal vessels often have a larger calibre and may produce more active bleeding.
Commonly used classification according to cause of bleeding

- Erosion or injury to mucosa resulting in blood vessel exposure and bleeding.
- Fracture or other trauma disrupting the mucosa in atypical areas of the nose, such as lateral nasal wall with nasal fracture.
- Neoplasm: uncommon cause of nosebleed. The diagnosis should be considered when epistaxis occurs without a typical anterior or posterior source.
Primary prevention

Primary preventive measures include:

• Avoiding picking or rubbing inside the nose
• Home humidification
• Application of petroleum jelly, saline spray, or saline nasal gels, in order to discourage intranasal excoriation and thereby help preserve mucosal integrity.

Secondary prevention

Secondary preventive measures are the same as primary preventive measures.

Further preventive measures include avoiding, if possible, medicine that impairs clotting, such as cold medicines containing aspirin, and NSAIDs, particularly in people who have recurrent epistaxis. These drugs do not initiate nosebleeds but may prolong bleeding.

Medicines that impair clotting should also be avoided, if possible, during healing. [1] [2] [17]
Case history

Case history #1
A 7-year-old girl presents with frequent nosebleeds, worse on the left. There is no active bleeding on presentation. Her mother reports previous treatment with clinic cautery using silver nitrate. She has concerns about the cautery being repeated as it was painful for the child. Examination shows small blood vessels in the most anterior septal mucosa, bilaterally.

Case history #2
A 50-year-old man arrives at the emergency department with an active nosebleed. This began on the right side but now he has blood in both nares as well as in the throat. He carries a towel partly covered with blood, which he uses to catch blood dripping from the nose and expectorated from the throat. He appears anxious with a pulse of 96 bpm and a BP of 165/95 mmHg.

Other presentations
Rarely, nosebleeds may drain posteriorly to cause haemoptysis or haematemesis.

Step-by-step diagnostic approach
Diagnosis of epistaxis is usually readily apparent, as the patient presents with bleeding from the nose. However, occasionally epistaxis may be initially confused for haematemesis or haemoptysis.

It is best to assemble equipment and other necessary treatment before starting the examination, as examination and treatment proceed concurrently.

Preparation for assessment and treatment of acute epistaxis
Appropriate equipment remains key for the assessment and treatment of epistaxis. Various initial measures are required in order to prepare for patient assessment:

- Medical personnel should wear gloves, safety glasses, and protective clothing
- Patient's clothing is covered with a gown to avoid staining
- The patient is given a large bucket or basin plus nasal tissues to catch blood
- The patient sits upright and can incline the head forward or back, whichever is most comfortable
- As an initial measure, and while obtaining equipment, the entire lower compressible cartilage portion of the nose is pinched to compress a potential anterior bleeding source
- The patient is asked to blow the nose to clear the nasal airway of clot.

Further measures include:

- Headlight and suction (12 French Frazier tip suction): these are essential
- Application of a local anaesthetic mixed with a vasoconstrictor: facilitates inspection of the nose while also slowing bleeding
- Identification of a bleeding point may be followed by immediate application of silver nitrate cautery.
Urgent considerations

Epistaxis is almost always a localised process. However, the physician should remember that, in very rare cases, anaemia or hypovolaemia may occur. This is more likely if:

- There is severe bleeding
- The patient is older
- The patient is unwell or frail.

Again, this is rare, but such patients need urgent resuscitation. Oxygen supplementation, intravenous access, urgent FBC, clotting studies, and blood type for transfusion are required, along with the maintenance of airway, breathing, and circulation (ABC). These patients may present with:

- Lightheadedness
- Dizziness
- Syncope
- Hypotension
- Tachycardia
- Pallor.

Generally, these measures are not required in most people presenting with epistaxis.

Presence of risk factors

Risk factors strongly associated with epistaxis include: dry weather, low humidity, oxygen dependence, mechanical irritation to the nose, intranasal foreign bodies, and trauma to the nose or face. There may be a history of excessive bleeding suggesting the possibility of a coagulopathy. Patients may be taking medications, including herbal remedies, that delay clotting or that interfere with anticoagulant drugs. Antiplatelet drugs such as aspirin are a risk factor for epistaxis, and patients taking aspirin require more frequent surgical intervention to stop bleeding. Enquiry is made of other nasal-related symptoms that might suggest bacterial rhinosinusitis or history of nasal polyps.

Epistaxis may occasionally be associated with granulomatous conditions such as sarcoid and Wegener's granulomatosis.

History and clinical presentation of acute epistaxis

Identification of bleeding site:

- Patients often present with blood in both sides of the nose, as well as dripping from the nostril and down the back of the throat
- Enquiry is made on which side the bleeding first started, and whether it came from the anterior nares (suggesting anterior site), or from the throat (suggesting posterior site)
- If occurring during sleep or when supine, most or all of the blood drains to the throat, whether originating from the front or back of the nose
- Although patients may feel that bleeding originates high up or back in the nose, it is worth remembering that 90% of nosebleeds occur from the anterior septum despite the patient's history
- It is important to note the presence of any septal deviation. This may increase the risk of epistaxis, either on the side of the deviation (by making the septal mucosa more exposed), or on the opposite side (mucosa may become dried if this nostril provides most of the airflow). Septal deviation may also make nasal packing placement more difficult.
Identification of cause of bleeding:

- Risk factors strongly associated with epistaxis need to be considered
- Neoplasm (extremely rare cause of nosebleed) may be suggested by hypoesthesia in the distribution of the second branch of the trigeminal nerve, or by pain at the lesion or in the same distribution.

**Examination in acute epistaxis**

- The patient gently blows the nose to clear old blood and large clots. Examination with headlight and nasal speculum (anterior rhinoscopy) is performed. Nasal suctioning with Frazier suction facilitates inspection. In the absence of nasal speculum, simply elevating the tip of the nose with a finger may give a reasonable view of the front of the nasal cavity.
- Active bleeding may prevent evaluation. In this case, mucosal vasoconstriction (decongestion) is helpful both diagnostically and therapeutically. A topical vasoconstrictor may be applied, such as oxymetazoline 0.05%. Sometimes bleeding prevents instillation into the nose. Rapid alternation of nasal suction (or nose blowing) and intranasal spraying of this medicine may be necessary. This exceeds the typical dosage on the manufacturer's label. However, active bleeding prevents much of the medicine from reaching the mucosa. Also, these much larger doses are routinely used in nasal and sinus surgery via spray and on pledgets, as described, without difficulty.
- The vasoconstrictor may also be generously applied to strips of cotton or neurosurgical pledgets, and placed in the nose after initial application by spraying. Typically 3 cotton strips or pledgets are placed per side.

**Investigations for acute epistaxis**

Laboratory investigations are not usually necessary, although they may be required in certain specific circumstances:

- Haematocrit or FBC is obtained if there is concern about anaemia from excessive blood loss or clotting abnormality
- Coagulation studies (PT, activated partial thromboplastin time, platelet function tests) are only required in the presence of atypical persistence, recurrence, or recalcitrance to treatment
- Urea, serum creatinine, and LFTs are usually only performed if there is concern about the patient's general medical condition. Impaired liver function may result in impaired clotting.

Imaging is also not normally necessary but is indicated, following control of bleeding, in specific circumstances:
• If a tumour is suspected, MRI of the head is obtained. This has the ability to differentiate between soft tissue of neoplasm versus fluid (e.g., blood or mucus)
• CT scan of the paranasal sinuses is the imaging modality of choice when epistaxis is secondary to facial trauma. Bony structures may be viewed clearly with axial and coronal facial CT scan. Contrast may be used with CT scan if tumour is suspected, but this type of imaging is not as good as MRI because it shows only intermediate density for both tissue and fluid. Therefore it is often unable to differentiate sinusitis from neoplasm
• Plain sinus x-rays yield little information except the non-specific finding of sinus opacification, and are generally not recommended. Rarely, the late finding of bony erosion or displacement from tumour might be found.[1] [2] [3] [4] [5]

Further specialist investigations for acute epistaxis
Not only are nasal endoscopy and nasopharyngoscopy indicated when an obvious epistaxis source has not been seen, but they are also used to examine for tumour. When performed by a trained consultant, they also provide the opportunity for therapeutic intervention in the form of endonasal cauter or laser ablation (laser for vessels from hereditary haemorrhagic telangiectasia). If more than simple anterior or mid-nasal cauter is needed, then the procedure requires a general anaesthetic or intravenous sedation.

Internal and external carotid angiography is considered for refractory and complicated epistaxis despite otolaryngology involvement. It is indicated if there is persistent epistaxis despite nasal packing. Blood supply to the nose is displayed and vascular anomalies may be identified. The procedure allows interventional embolisation of feeder vessels.

Recurrent epistaxis
The patient may present with recurrent epistaxis that is not currently active. This is a common scenario in children. Patients may have a history of bleeding from both sides of the nose. If so, the physician needs to determine which side has the worst bleeding, as this would be the side selected for cauter. Similar treatment of the other side needs to be deferred for about 4 weeks until the initial cauter site has healed.

Recurrent episodes may also occur in people with coagulation disorders, neoplasms, and familial hereditary haemorrhagic telangiectasia. A thorough history is required to inquire about these disorders. If they are suspected, appropriate investigations, as described for the situation of acute epistaxis, are indicated.

[VIDEO: Venepuncture and phlebotomy animated demonstration]

Risk factors

Strong

dry weather and low humidity
• Often occurring in colder months.
• Can dry nasal mucosa, resulting in excoriation and cracking.
• Underlying blood vessels are exposed and traumatised, so that they crack and bleed.[1] [2] [3] [4] [5]
oxygen dependence

- Oxygen via nasal cannulae (particularly if not humidified) can cause drying of the anterior nasal septum.
- Prongs of cannulae can cause direct mucosal trauma when tips rub against the septal surface.

nasal and other facial fracture

- Laceration and avulsion of intranasal tissues may occur with nasal fracture and maxillofacial trauma.
- Results in atypical bleeding sites, such as at the lateral nasal wall.
- Facial fractures (even if non-displaced) may produce bleeding from torn sinus mucosa.[1] [2] [3] [4] [5]

other nasal trauma

- Nose picking or overly vigorous rubbing during nose blowing can excoriate mucosa (mainly on septum).
- Prevents healing of any existing injury.

primary coagulopathy (e.g., haemophilia)

- Not a primary causative factor but very clinically significant.
- Results in persistent nosebleed requiring medical attention.
- Often recalcitrant to initial treatment.

familial hereditary haemorrhagic telangiectasia

- An autosomal dominant condition.
- Blood vessels lack the elastic and muscular layer normally present in their walls.
- Patients have multiple telangiectasias throughout the entire aerodigestive mucosal surfaces.
- Vessels lack the ability to vasoconstrict normally in the presence of trauma and bleeding.[14] [15]

juvenile nasal angiofibroma

- A rare condition of young (usually adolescent) men, presenting with nasal obstruction and severe epistaxis.[6] [7]

Weak septal deviation

- May increase likelihood of epistaxis.
- Septal mucosa may be exposed to drying and irritation on side of deviation if there is marked anterior deflection.
- If deviation causes unilateral obstruction, the contralateral side may experience drying because it carries the majority of the airflow.[1] [2] [3] [4] [5]

nasal foreign body

- Causes direct irritation.
- More common in children and in people with cognitive impairment or psychiatric illness.
- Classically presents as purulent unilateral rhinorrhea rather than bleeding.
- Mucosal inflammation and ulceration can result in bleeding.[1] [2]

rhinitis

- Allergic rhinitis and infective rhinosinusitis can cause hyperaemia, encouraging bleeding.
Epistaxis

Diagnosis

nasal polyp

- Results in mucosal irritation, which increases vascularity and opportunity for bleeding.
- Trauma to a polyp, or its amputation, may cause bleeding.

environmental irritants

- Exposure to dust, chemicals, and cigarette smoke may result in mucosal hyperaemia, friability, and excoriation, with attendant increased potential for bleeding.

topical nasal drugs

- Use of both prescribed (e.g., nasal corticosteroid) and illicit (e.g., cocaine) drugs may result in mucosal irritation and bleeding.

acquired coagulopathy (e.g., use of aspirin, anticoagulant, NSAIDs)

- Aspirin has been shown to be a risk factor for epistaxis.[13] Other agents that promote bleeding, such as clopidogrel and warfarin (especially in overdose) may also be implicated.
- Results in persistent nosebleed requiring medical attention.
- May be recalcitrant to initial treatment.

barotrauma

- Pressure change, such as occurs during air travel or underwater diving, is associated with epistaxis.

ulceration secondary to infection (e.g., herpes zoster, or bacterial infection)

- There may be a previous history of herpetic infection if recurrent.
- Bacterial or viral culture may help to confirm the diagnosis.

forceful coughing

- An uncommon cause of epistaxis.

sinonasal neoplasm

- Although rare, may cause bleeding.
- Associated with exposure to wood dust and certain chemicals.[3] [4]
- Examination and nasal endoscopy are usually remarkable for the absence of any evident vessels.
- There may be some fullness of one of the lateral nasal walls.

chronic granulomatous disease

- Although not a common cause, diseases such as Wegener’s granulomatosis and sarcoidosis can be associated with epistaxis.
- Usually seen as multiple bleeding points in conjunction with widespread mucosal changes or septal perforation.

History & examination factors

Key diagnostic factors

presence of risk factors (common)

- Risk factors strongly associated with epistaxis include dry weather, low humidity, oxygen dependence, mechanical irritation to the nose, intranasal foreign bodies, and trauma to the nose or face.
Epistaxis Diagnosis

- Also strongly associated with epistaxis, coagulopathy (suggested by a history of excessive menstruation, bleeding following surgery, or easy bruising) may result in a nosebleed that is recalcitrant to treatment and recurrent.
- There may be a family history of bleeding or a history of drugs that impair clotting.

blood at both sides of nose (common)
- Blood is usually found on both sides of the nose by the time a patient presents with active epistaxis.
- The initial side of bleeding should be identified.
- For routine clinic cautery of quiescent epistaxis, the worst side is selected, as only one side may be treated at a time to avoid septal perforation.

Other diagnostic factors

bleeding starting at the nares (common)
- Suggests an anterior site for the source of bleeding.
- Anterior epistaxis quickly causes blood in the pharynx, so identifying whether a bleed started in the front or down the throat is helpful.
- Anterior epistaxis will present in the throat if originating while the patient is supine.

recurrent epistaxis (common)
- Occasional self-limited epistaxis is common and probably non-specific.
- Recurrent significant nosebleed suggests anterior vessel on affected side.
- A common presentation in children.

septal deviation (common)
- May increase likelihood for epistaxis.
- Should be noted because it may impair placement of packing, or mucosal damage may occur due to abrasion while packing is placed.

tachycardia (common)
- May be due to hypovolaemia, anaemia, anxiety, or pain (from packing placement or cautery).

bleeding starting in the throat (uncommon)
- Suggests a posterior site as the source of bleeding.
- Anterior epistaxis will present in the throat if originating while the patient is supine.

hypotension (uncommon)
- Signifies significant blood loss.

syncope (uncommon)
- Signifies significant blood loss.

dizziness or lightheadedness (uncommon)
- Suggests significant blood loss.

pallor (uncommon)
- May be due to anaemia, hypovolaemia, or vasovagal response.
Epistaxis

hypoaesthesia and pain in the distribution of the second branch of the trigeminal nerve (uncommon)

- Suggest neoplasm as a cause of epistaxis.
- Neoplasm is an extremely rare cause of nosebleed.

### Diagnostic tests

#### 1st test to order

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>clinical diagnosis</td>
<td>current nosebleed or history of nosebleeds</td>
</tr>
</tbody>
</table>
  - Diagnosis is based on patient history and examination. |

#### Other tests to consider

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBC</td>
<td>haemoglobin and haematocrit usually normal; low if prolonged or large amount of bleeding</td>
</tr>
</tbody>
</table>
  - Usually necessary only in unusual or persistent/recurrent epistaxis. |
  - Time for volume equilibration since time of blood loss must be allowed. |
  - Bedside point-of-care test for haemoglobin may be used to screen for anaemia. |
| coagulation studies (PT, activated partial thromboplastin time, platelet function tests) | usually normal; abnormal if coagulopathy |
  - Only performed if epistaxis is atypically persistent, recurrent, or recalcitrant to treatment. |
  - Coagulopathy may be due to primary condition or acquired (such as medicine impairing clotting mechanisms). |
| urea, serum creatinine                 | usually normal; abnormal if liver disease, renal disease, volume depletion |
  - Only performed if there is concern about the patient's general medical condition. |
| LFTs                                    | usually normal; abnormal if underlying liver disease                  |
  - Only performed if there is concern about the patient's general medical condition or if there are unexplained clotting abnormalities. |
  - Measurement of gamma-glutamyl transpeptidase (GGT) can be useful if high alcohol intake is suspected. |
| autoimmune screen/autoantibodies      | usually normal; abnormal in the presence of certain granulomatous diseases |
  - Anti-neutrophil cytoplasmic antibodies (ANCA) can be used to assess for Wegener's granulomatosis, serum ACE (sarcoid). |
### Test | Result
---|---
**CT scan of paranasal sinuses**  
- Rarely indicated.  
- Imaging modality of choice for trauma to view bony structures with axial and coronal facial CT.  
- Contrast may be used if concern about neoplasm, but often unable to differentiate sinusitis from neoplasm.  
**normal; may demonstrate:** fracture; expansile, erosive process suggesting neoplasm; sinus opacification if sinusitis or neoplasm; intranasal soft-tissue density if polyposis present

**MRI of head**  
- Very rarely indicated.  
- Useful for differentiating sinus opacification due to sinusitis from opacification due to neoplasm.  
- Poor imaging of fractures as bone not visualised well.  
**normal; may demonstrate:** neoplasm; sinus opacification if sinusitis; intranasal soft-tissue density if polyposis; fracture

**internal and external carotid angiography**  
- For refractory and complicated epistaxis despite otolaryngology involvement.  
- Indicated if persistent epistaxis despite packing.  
- Obtained when embolisation or surgical management are anticipated.  
- Magnetic resonance angiography, CT angiography, or traditional angiography are options, although the latter can be performed by an interventional radiologist and embolisation accomplished simultaneously.  
**vascular structure to the nose displayed, may identify vascular anomaly**

**nasal endoscopy and nasopharyngoscopy**  
- Very useful diagnostic modality when obvious epistaxis source not seen, and to examine for tumour.  
- Therapeutic option for endonasal cautery or laser ablation (laser for vessels from hereditary haemorrhagic telangiectasias).  
- Requires general anaesthetic or intravenous sedation for more than simple anterior or mid-nasal cavity cautery.  
**demonstrates bleeding site and may demonstrate neoplasm**

**plain nasal or sinus x-ray**  
- The cheapest and most readily available radiographic study, so may be performed but is not generally recommended.  
- Nasal x-ray unhelpful for fracture as this is a clinical diagnosis.  
- Plain sinus and facial x-ray not optimally sensitive for trauma or neoplasm.  
**normal or may demonstrate fracture, or expansion or erosion of structures due to neoplasm**
# Differential diagnosis

<table>
<thead>
<tr>
<th>Condition</th>
<th>Differentiating signs / symptoms</th>
<th>Differentiating tests</th>
</tr>
</thead>
</table>
| Haemoptysis | • Patients with haemoptysis may have other respiratory signs and symptoms, such as cough, dyspnoea, wheeze, abnormal breath sounds on chest auscultation. | • Usually only an initial confusion and clinically apparent after a more thorough patient examination.  
• Chest x-ray or CT may be abnormal in patients with haemoptysis. Some bleeding sources require bronchoscopy for identification (e.g., pulmonary blood vessel that cannot be seen on imaging). |
| Haematemesis | • Patients with haematemesis more likely to have other gastrointestinal (GI) signs and symptoms, such as abdominal pain, melaena, history of peptic ulcer disease. | • Usually only an initial confusion and clinically apparent after a more thorough patient examination.  
• Upper GI endoscopy helpful in detecting bleeding source. |

## Diagnostic criteria

### Persistence of bleeding

**Typical epistaxis:**

• Usually less profuse and responds to pressure, vasoconstrictor application, cauter, or nasal packing.

**Recalcitrant epistaxis:**

• May be more profuse; bleeding persists despite nasal packing  
• Patient more likely to have a coagulopathy, which, although not actually the primary cause of bleeding, leads to bleeding that is recalcitrant to all the normal measures  
• Possible causes of coagulopathy include primary disorders of coagulation (e.g., haemophilia), liver disease, and medicines that impair clotting (e.g., warfarin, aspirin, NSAIDs)  
• Abnormal blood vessels: hereditary haemorrhagic telangiectasia patients have both frequent and more persistent epistaxis.
Step-by-step treatment approach

The main goals of treatment are:

- The immediate management of the presenting bleeding
- The treatment of any underlying cause
- The prevention of recurrence.

Examination and treatment of epistaxis often proceeds concurrently.

Urgent considerations

Generally, resuscitation is not required in most people presenting with epistaxis, but is required in the rare instance of haemodynamic compromise. This is more likely if:

- There is severe bleeding
- The patient is older
- The patient is unwell or frail.

Such patients need urgent resuscitation. Oxygen supplementation, intravenous access, urgent FBC, platelets, clotting studies, and blood type for transfusion are required, along with the maintenance of airway, breathing, and circulation (ABC). These patients may present with:

- Lightheadedness
- Dizziness
- Syncope
- Hypotension
- Tachycardia
- Pallor.

Initial measures for acute active bleeding

As an initial measure the entire lower compressible cartilage of the nose is pinched to apply pressure to possible anterior bleeding sites. Also, liberal application of a topical vasoconstrictor (decongestant), such as oxymetazoline, can be accomplished before the actual evaluation begins.

Application of a vasoconstrictor (decongestant) may be both diagnostic and therapeutic, to help visualise the epistaxis site and encourage haemostasis. These agents also shrink mucosal thickness, allowing more open nasal space should placement of a pack be required. This can reduce mucosal trauma incurred during insertion of a pack and thereby decrease secondary bleeding sites from disrupted mucous membrane.

Initial assessment may reveal an obvious underlying cause or exacerbating factor.

Active bleeding persistent despite initial measures

Application of a combination of topical anaesthetic, such as 4% lidocaine, and vasoconstrictor (decongestant) is useful at this stage. Topical anaesthetic makes the procedure more humane for the patient and less stressful for the physician. Also, efficacious pack placement may be compromised if the procedure hurts excessively and the patient remains uncooperative. Some physicians may extemporaneously prepare a mixture of anaesthetic and decongestant in the clinic or emergency
Epistaxis

Treatment

department. Oxymetazoline is suggested rather than phenylephrine as the latter seems more likely to cause hypertension or possibly angina in susceptible patients. Some physicians simply remove the top from a spray bottle of oxymetazoline, add an equal volume of the lidocaine, and replace the top; however, consultant advice is recommended.

The patient blows the nose to clear blood and clots; suction may be used. Active bleeding may necessitate the rapid alternation between clearing of blood and liberal application of the topical vasoconstrictor and anaesthetic. Next, small neurosurgical pledgets or strips of cotton are saturated well with the mixture and placed horizontally in the nose with bayonet forceps, and left for 10 to 15 minutes. The patient compresses the nose if necessary.

[Fig-2]

Underlying causes may become apparent at this stage. Local causes such as foreign body, polyp, and ulceration to the skin around the nose are treated accordingly.[17]

**Bleeding source visible**

Although most frequently used for clinic treatment of recurrent epistaxis when bleeding is quiescent, silver nitrate cautery may occasionally treat minor anterior active epistaxis if a specific site is identified.1[B]Evidence

Silver nitrate is applied via commercially manufactured sticks or applicators. This compound degrades over time and must be kept in an airtight, lightproof container. Lack of evident activity may indicate need to use fresher silver nitrate.

- The agent is applied to vessels or haemorrhagic areas of concern, and excess is removed with a cotton tip applicator.
- Treatment may remain uncomfortable even with adequate application of topical vasoconstrictor and anaesthetic.
- Petroleum jelly is applied afterward for moisturisation.2[B]Evidence
- It is important to avoid cautery at the same location on both sides of the septum. This deprives the septal cartilage of its blood supply (from the mucosal covering) and may result in septal perforation if done bilaterally.
- Routine post-treatment instructions are provided.[1] [2] [19]

**Bleeding source visible, but not amenable to silver nitrate cautery**

Electrocautery is indicated for brisker bleeding that is resistant to silver nitrate treatment. This procedure is usually reserved for the ear, nose, and throat (ENT) consultant. It requires injection of local anaesthetic plus vasoconstrictor, such as 1% or 2% lidocaine with epinephrine (adrenaline) 1:100,000, in addition to topical anaesthetic. Monopolar and bipolar cautery are both effective. Suction monopolar cautery (if available) evacuates blood and enhances effect, as cautery is ineffective in a wet, blood-filled field. Routine post-treatment instructions are provided.

**Source visible, but cautery failing to control bleeding, or source not visible and not suspected to be posterior**

Anterior nasal packing is used for active bleeding when the source cannot be visualised or treated with cautery. There are 2 types of packing method, traditional packing and expanding nasal sponges.
Traditional packing involves horizontal layering of 12-mm (half-inch) cotton gauze saturated with petroleum jelly or antibiotic ointment.2[B]Evidence Because of concerns that packing material may become displaced, patients are managed in hospital. The pack is usually removed at 24 hours but may remain in place for several days to allow:

- Healing of the original bleeding site
- Re-mucosalisation of any secondary sites from pack insertion trauma
- Regeneration of functional platelets or clotting factors in patients on medicines that impair coagulation.

Expanding nasal sponges have become available in a variety of sizes and forms and are more convenient than traditional packing, particularly for physicians who infrequently place nasal packing, because they are easier to position than the traditional gauze packing. Nasal sponges are usually left in place for 24 hours. The patient may be admitted or discharged home according to local protocols.[20]

As epistaxis generally originates on one side, packing is unilateral. Bilateral packing is only indicated in the unusual situation of true haemorrhage from both sides, or when the history and examination fail to identify whether the bleeding is from the right or the left.

Although proof of benefit does not exist, oral antibiotics may be considered while packing remains in place. There is impaired sinus drainage and aeration, with attendant risk of infection. The blood-saturated pack can (though rarely does) result in toxic shock syndrome. Antimicrobials have potential for benefit with minimal risk. The medicine selected should have activity against typical sinusitis pathogens and Staphylococcus aureus. Trimethoprim/sulfamethoxazole, amoxicillin/clavulanate, or cefaclor may be used. Macrolides or quinolones are other options in the case of allergy to penicillin or cephalosporins. Analgesics should be prescribed, as appropriate, for discomfort: paracetamol and hydrocodone combinations or similar medicines are recommended. Drugs containing aspirin, or NSAIDs, should be avoided. Tranexamic acid may be a useful adjunct, indeed evidence from one randomised trial suggests that topical tranexamic acid may be more effective than anterior packing; however, this study requires corroboration.[21]

Details of traditional gauze anterior nasal pack

For traditional packs, both dry and petroleum jelly-saturated gauze are available.2[B]Evidence

Although no study has shown protective benefit from toxic shock syndrome by application of topical antibiotic ointment, its use is reasonable and commonplace. Mupirocin ointment has an effect against Staphylococcus aureus, a strain of which is responsible for toxic shock syndrome, so it is often used. Chlorhexidine-neomycin cream may also be used. The gauze may be generously coated with antibiotic ointment or bismuth iodoform paraffin paste (BIPP) in place of plain petroleum jelly.

- Bayonet forceps layer the gauze horizontally, first along the floor of the nose and successively superiorly to fill the nose.
- Each layer of packing is compressed downward after placement to increase pressure on the nasal cavity walls. Depending on nasal size, 2 m (72 inches) or more may be required for one side of the nose. Following placement, the lower, cartilaginous portion of the nose appears distended.
Details of expanding nasal sponge packing

Ease and rapidity of placement has encouraged the popularity of expanding nasal sponges. These are manufactured with and without a longitudinal tube or straw. Those without the tube are typically 2 to 3 mm thick in compressed form, though they expand to up to 1 cm when saturated with fluid. Presence of the straw increases dry thickness to about 5 mm. Manufacturers provide a variety of shapes and lengths. The 1 cm x 8 cm or 10 cm sizes work well in most cases. The longitudinal tube is intended to decompress the nasopharynx to prevent uncomfortable pressurisation when the soft palate elevates during swallowing with bilateral packing. Their greater thickness has the disadvantage of potentially increased difficulty, pain, and mucosal excoriation during placement. Certain sponge packs are available with a syringe-type applicator (e.g., the 'Rhino Rocket'). This type of device is popular due to its ease of placement, though it has less expanded thickness than some other packs and may provide less effective mucosal pressure.

To insert the expanding sponge:

- The nose is inspected for septal deviation that may impair placement; forcing a pack along a septal spur or deflection can result in mucosal injury and bleeding from these secondary sites
- The sponge pack is trimmed as necessary and coated with petroleum jelly or antibiotic ointment and then slid posteriorly in the nose with bayonet forceps
- In the case of a horizontal septal spur or deflection, the pack may be trimmed longitudinally, and the two pieces placed separately above and below the spur.
Anterior packing failing to control bleeding, or posterior source suspected

Anterior-posterior nasal packing is indicated:

- For known posterior bleeding
- In case of failure of a properly placed anterior pack to control haemorrhage.

Anterior packing accompanies posterior packing to reinforce the pressure at the posterior choanal area and prevent anterior blood flow. Greater patient discomfort warrants consideration of intravenous analgesic (narcotic) and anti-emetic prior to packing. Opiates should be used with great caution in older and shocked patients.

A variety of posterior pack options exist, though the methods described below provide both effectiveness and ease of placement. These are:

- The double-balloon epistaxis device
- The traditional gauze anterior pack with the Foley urinary catheter placed posteriorly.

Details of double-balloon epistaxis device

Commercially available, double-balloon catheters have a 15 mL distal balloon (similar to that of a Foley catheter) for the posterior packing component, and a proximal 30 mL balloon to provide anterior packing and occlude the nostril. Their popularity lies in their relative ease of placement. Disadvantages include thickness and rigidity of their shafts (which may prevent passage through a narrowed side of the nose) and potentially less effective pressure on the nasal mucosa.

Deployment of these devices includes:

- Lubrication with petroleum jelly, antibiotic ointment, or water-based lubricant jelly\footnote{Evidence}
- Insertion, such that the distal balloon enters the nasopharynx
- Inflation of the distal balloon (typically with 7 to 8 mL of water), pulling it forward to lodge in the posterior choana
- Filling the anterior balloon with about 15 mL of water until it occludes the nostril.

Great care is required to place padding between the external portion of the catheter and the nostril. This provides anterior traction to keep the distal balloon positioned. Significant cosmetic deformity from alar and columellar notching may occur from direct catheter pressure on tissue. A piece of gauze wrapped around the shaft between the nose and the Y-junction of the catheter works well.
The double-balloon catheter fails to control bleeding on occasion and may need replacement with a traditional anterior-posterior pack. Alternatively, a narrowed nasal cavity from septal deviation may preclude passage of the thicker double-balloon catheter, and require use of a thinner, more flexible Foley catheter.

**Details of traditional gauze anterior pack with the Foley urinary catheter placed posteriorly**

The Foley-type urinary catheter is probably the easiest means of placing a traditional anterior pack posteriorly.

- A size 12 French catheter is lubricated with petroleum jelly, antibiotic ointment, or water-based lubricant jelly, and passed to the nasopharynx, where the balloon is inflated with 7 to 8 mL of water.
- Anterior traction positions and lodges the balloon in the posterior nasal choana.
- An assistant maintains a steady anterior pull on the catheter to maintain its position, while a traditional gauze pack is placed as described above for anterior packing.
- A piece of gauze, wrapped around the catheter shaft, provides padding to prevent pressure necrosis at the nostril. Silk tape, wrapped around this bolster, maintains its shape.
- An umbilical clamp is secured against the bolster with adequate tension maintained to keep the balloon in the posterior choana.
- Several silk sutures are tied around the catheter shaft in front of the umbilical clamp to prevent leakage of water from the catheter. Then excess shaft length may be trimmed for patient comfort.
- The physician prescribes similar analgesics and antibiotics as for anterior packing. Antibiotics selected should have activity against typical sinusitis pathogens and *Staphylococcus aureus*.
Trimethoprim/sulfamethoxazole, amoxicillin/clavulanate, or cefaclor may be used. Macrolides or quinolones are other options in the case of allergy to penicillin or cephalosporins. Analgesics such as paracetamol and hydrocodone combinations are recommended. Drugs containing aspirin, or NSAIDs, should be avoided.

There has been concern about posterior packs causing hypoxia, and the need for monitoring in an intensive care unit (ICU) setting while the packs remain in place. Some authors recommend observation of patients in the ICU while posterior packing is in place. Others feel that this is appropriate specifically for older people and patients with comorbidities. Clinical judgment of a patient’s condition may even occasionally suggest hospitalisation with anterior packing. However, this is unnecessary in most cases and may not represent the best use of valuable medical resources.[1] [2] [4] [5] [17] [22] [23]

**Further analgesia and local anaesthetic**

Nasal packing remains quite uncomfortable, even with good topical anaesthesia. If an intravenous line is available, use of a parenteral opioid analgesic facilitates packing of the nose, particularly posteriorly. Opiates should be used with great caution in older and shocked patients.
Epistaxis

Treatment

- Pretreatment with an anti-emetic avoids nausea and emesis. Ondansetron avoids sedation associated with medicines such as promethazine.
- Ketorolac should not be used as it will impair platelet formation.
- Lidocaine 1% or 2% with epinephrine (adrenaline) 1:100,000 may be infiltrated in the vicinity of a bleeding site. There is haemostatic benefit from the epinephrine (adrenaline) and possibly from hydrostatic tissue pressure of the infiltrated volume of medicine. This method is a requirement before electrocautery is undertaken but may be used with other treatments.
- Posterior analgesia and vasoconstriction may be facilitated by local anaesthetic infiltration into the greater palatine foramen. This block technique should be used with caution and only in experienced hands because it is painful and has the rare potential for blindness. This is rarely used.

Nasal pack removal

After nasal packing in the emergency department or primary care physician’s clinic, otolaryngology follow-up allows for nasal endoscopy and more thorough examination as warranted. Also, referral to the otolaryngology department for nasal pack removal may be valuable as the otolaryngology clinic is more likely than the primary care physician’s clinic to have necessary items for management of any re-bleeding should it occur.

Most sources recommend removal of packing after 3 to 5 days to allow healing of the original and possibly secondary (from excoriation of packing placement) bleeding sites. This also allows time to generate functional platelets and clotting factors in patients taking anticoagulant-type drugs.

Application of a mixture of topical vasoconstrictor (oxymetazoline 0.05%) with lidocaine 4% to the sponge pack facilitates removal. Saturating the pack promotes its softening and lubrication, shrinks adjacent mucosa via vasoconstriction, and provides some analgesia. This seems to discourage mucosal trauma and re-bleeding with pack removal.

Cautery (usually silver nitrate) may be indicated following pack removal for suspicious vessels or friable, haemorrhagic sites.[17] Evidence

Persistent bleeding despite anterior and posterior nasal packing

Nasal packing and cauter y will successfully treat most nosebleeds. Otolaryngology referral is indicated when these techniques fail. Various procedures may be used to manage persistent bleeding. The choice will depend on availability of appropriate resources and expertise:[24] [25] [26] [27] [28] [29] [30]

- Endoscopic management of epistaxis sites
- Angiography and embolisation with interventional radiology
- Open surgical ligation.

Endoscopic management of epistaxis sites

The advent of rigid nasal endoscopy has greatly improved visualisation and access to the nose. Suction cauter y under direct visualisation may control some nosebleeds located posteriorly. Similarly, surgical dissection and surgical clip ligation of the sphenopalatine artery (SPA) may be accomplished under direct endoscopic vision.[26] [27] SPA ligation is the mainstay of treatment when conservative management of posterior epistaxis has failed.[31] It is usually performed under a general anaesthetic but can be accomplished under sedation with local anaesthetic.
Angiography and embolisation with interventional radiology

This procedure offers another means of interrupting the arterial supply. This avoids the need for surgery but involves some risk of occlusion of adjacent vessels and the potential for cerebrovascular accident. If contemplated, this technique should be tried before transantral ligation because the latter often occludes access vessels necessary for successful embolisation.\[29\] [33] [30]

Open surgical ligation

Open surgical ligation is rarely required, but may be indicated when endoscopic surgery or angiography with embolisation have failed or are not available. Two approaches are as follows.

- Transantral vessel ligation: this is the traditional means for surgical control of vessels feeding the nasal cavity, though it has been largely superseded by endoscopic SPA ligation. Access is obtained by a sub-labial approach and removal of both anterior and posterior walls of the maxillary sinus. This approach provides access to the internal maxillary vessels, which are ligated with surgical vascular clips. Simple ligation of the external carotid artery fails due to extensive collateral flow among regional vessels and contralateral connection. Access is obtained by a sub-labial approach and removal of both anterior and posterior walls of the maxillary sinus. This provides access to vessels, which are similarly ligated with surgical vascular clips.
- Ethmoidal artery ligation: bleeding from high in the nose may respond to ligation of the anterior and posterior ethmoidal arteries. A Lynch incision at the lateral aspect of the nasion medial to the upper lid and medial canthus provides surgical access.\[4\] [24] [25] [28] [29]

Recurrent but quiescent epistaxis

The patient may present with recurrent epistaxis that is not currently active. This is a common scenario in children. Silver nitrate cautery may be used.\[1\][Evidence] Patients may have a history of bleeding from both sides of the nose. If so, the physician needs to determine which side has the worst bleeding, as this would be the side selected for cautery. It is important to avoid cautery at the same location on both sides of the septum. This deprives the septal cartilage of its blood supply (from the mucosal covering) and may result in septal perforation if done bilaterally. Similar treatment of the other side needs to be deferred for about 4 weeks until the initial cautery site has healed.

Younger children may not tolerate simple clinic cautery even with good topical anaesthesia and occasionally require brief general anaesthetic.

Silver nitrate cautery has been compared with antiseptic creams in children with recurrent epistaxis.\[18\] [3][Evidence] A Cochrane review of interventions in children is inconclusive, but does suggest that if silver nitrate cautery is used, a 75% preparation may be more effective and less painful than 95%.\[18\] Petroleum jelly has been compared with no treatment.\[2][Evidence] The evidence for antiseptic creams and petroleum jelly is still limited, and high-quality randomised controlled trials with longer follow-up periods are required.\[18\] A late double-blind study suggests that silver nitrate cautery plus antiseptic cream confers greater benefit than antiseptic cream alone.\[35\]

Recurrent episodes may also occur in people with coagulation disorders, neoplasms, and familial hereditary haemorrhagic telangiectasia. Neoplasm requires treatment of the underlying tumour. Preoperative embolisation reduces blood loss in some cases: for example, juvenile nasal angiofibroma.\[6\]
Hereditary haemorrhagic telangiectasia patients have a lifelong proclivity for bleeding from dilated, fragile mucosal vessels. Periodic prophylactic silver nitrate, electrocautery, or laser treatment may ablate vessels. On occasion, the nasal septum is re-lined with a skin graft (septal dermoplasty).[14] [15] [36] Coagulation disorders require management depending on the underlying cause.

### Treatment details overview

Consult your local pharmaceutical database for comprehensive drug information including contraindications, drug interactions, and alternative dosing. (see Disclaimer)

<table>
<thead>
<tr>
<th>Acute</th>
<th>(summary)</th>
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<tbody>
<tr>
<td>Patient group</td>
<td>Tx line</td>
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<tr>
<td>active epistaxis: initial measures</td>
<td>1st</td>
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<td></td>
<td>adjunct</td>
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<td>adjunct</td>
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<td>active epistaxis: persistent bleeding despite initial measures</td>
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<th>Ongoing</th>
<th>(summary)</th>
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<tbody>
<tr>
<td>Patient group</td>
<td>Tx line</td>
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<tr>
<td>quiescent but recurrent epistaxis</td>
<td>1st</td>
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<td></td>
<td>plus</td>
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## Treatment options

### Acute

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<thead>
<tr>
<th>Patient group</th>
<th>Tx line</th>
<th>Treatment</th>
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<tbody>
<tr>
<td>active epistaxis: initial measures</td>
<td>1st</td>
<td>anterior septal pressure plus vasoconstrictor nasal spray</td>
</tr>
<tr>
<td></td>
<td></td>
<td>» Liberal application of topical vasoconstrictor such as oxymetazoline 0.05% can be accomplished before the actual evaluation. This method exceeds the general dose on the label; however, this is suggested to achieve adequate vasoconstriction in the case of blood coating the mucosa and the dilutive effect of active bleeding.</td>
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<td>» This may begin to slow bleeding.</td>
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<td></td>
<td></td>
<td>» The entire lower compressible cartilage of the nose is pinched to apply pressure to possible anterior bleeding sites.</td>
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<td></td>
<td><strong>Primary options</strong></td>
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<td></td>
<td>» oxymetazoline nasal: (0.05%) apply to the affected nostril liberally as a single dose prior to local examination</td>
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<tr>
<td></td>
<td><strong>adjunct</strong></td>
<td>resuscitation and supportive care</td>
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<td></td>
<td></td>
<td>» Haemodynamic compromise occurs very rarely with epistaxis.</td>
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<td></td>
<td></td>
<td>» However, when it does occur, patients may be pale with signs of hypovolaemia and circulatory compromise.</td>
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<td>» Urgent resuscitation is required with oxygen supplementation, intravenous access, fluid replacement, possible blood transfusion.</td>
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<td></td>
<td>» Airway, breathing, and circulation (ABC) is maintained.</td>
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<td>» This is more likely to occur in the older, frail patient and when there is severe bleeding.</td>
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<tr>
<td></td>
<td><strong>adjunct</strong></td>
<td>treatment of underlying coagulopathy</td>
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<tr>
<td></td>
<td></td>
<td>» Initial assessment may reveal an obvious underlying cause or exacerbating factor, such as coagulopathy. This will require specific management.</td>
</tr>
<tr>
<td>Acute</td>
<td>Tx line</td>
<td>Treatment</td>
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</tr>
<tr>
<td>Patient group</td>
<td>1st</td>
<td>topical anaesthetic and vasoconstrictor</td>
</tr>
<tr>
<td>active epistaxis: persistent bleeding despite initial measures</td>
<td></td>
<td>» Application of a combination of topical anaesthetic, such as 4% lidocaine, and vasoconstrictor (decongestant) is useful at this stage.</td>
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<tr>
<td></td>
<td></td>
<td>» Topical vasoconstrictors (decongestants), such as 0.05% oxymetazoline, may slow bleeding and facilitate examination.</td>
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<td></td>
<td></td>
<td>» Topical anaesthetic such as 4% lidocaine is helpful if pack placement is required, making it more comfortable for the patient and less stressful for the patient and physician.</td>
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<td></td>
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<td>» Some physicians may extemporaneously prepare a mixture of anaesthetic and decongestant in the clinic or emergency department. Some physicians simply remove the top from a spray bottle of oxymetazoline, add an equal volume of the lidocaine and replace the top; however, consultant advice is recommended.</td>
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<td>» The mixture is sprayed into the nose, or small neurosurgical pledgets or strips of cotton are saturated with the mixture, placed horizontally in the nose with bayonet forceps, and left for 10 to 15 minutes. [Fig-2]</td>
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<td></td>
<td>plus</td>
<td>treatment of underlying local cause</td>
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<td></td>
<td></td>
<td>» Underlying causes may become apparent at this stage.</td>
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<td></td>
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<td>» Local causes (e.g., foreign body, polyp, ulceration to the skin around the nose) are treated accordingly.</td>
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<td></td>
<td></td>
<td>» Post-treatment nosebleed instruction sheet is provided.</td>
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<tr>
<td>adjunct</td>
<td>cautery</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>» Although most frequently used for clinic treatment of recurrent epistaxis when bleeding is quiescent, silver nitrate cautery may occasionally treat minor anterior active epistaxis if a specific site is identified.1[B]Evidence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>» The agent is applied to vessels or hemorrhagic areas of concern and excess removed with a cotton tip applicator.</td>
</tr>
<tr>
<td>Acute Patient group</td>
<td>Tx line</td>
<td>Treatment</td>
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<tr>
<td></td>
<td>Treatment may remain uncomfortable even with adequate application of topical vasoconstrictor and anaesthetic.</td>
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</tr>
<tr>
<td></td>
<td>Petroleum jelly is applied afterward for moisturisation.2Evidence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If important to avoid cautery at the same location on both sides of the septum. This deprives the septal cartilage of its blood supply (from the mucosal covering) and may result in septal perforation if done bilaterally.</td>
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<tr>
<td></td>
<td>Routine post-treatment instructions are provided.[1] [2] [19]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrocautery is indicated for brisker bleeding that is resistant to silver nitrate treatment. This procedure is usually reserved for an ear, nose, and throat (ENT) consultant.</td>
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</table>

**2nd anterior nasal packing or double-balloon catheter or traditional anterior-posterior pack**

| Packing is the initial treatment for most active anterior nosebleeds. |
| Traditional packing involves horizontal layering of 12 mm (half-inch) cotton gauze saturated with petroleum jelly or antibiotic ointment.3Evidence 2Evidence |
| Expanding nasal sponges have become available in a variety of sizes and forms and are more convenient, particularly for physicians who infrequently place nasal packing, as they are easier to position than the traditional gauze packing. |

[Fig-3]

[Fig-8]

| A variety of posterior pack options exist, though 2 methods provide both effectiveness and ease of placement. These are the double-balloon epistaxis device and the traditional gauze anterior pack with the Foley urinary catheter placed posteriorly. Posterior packing has traditionally involved hospitalization, though, in practice, this is indicated for patients who are unwell, frail, or with pulmonary compromise. Greater patient discomfort warrants consideration of intravenous analgesic (narcotic) and anti-emetic prior to posterior packing. |
### Acute Epistaxis

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Tx line</th>
<th>Treatment</th>
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<tbody>
<tr>
<td>Acute</td>
<td>Tx line</td>
<td>Opiates should be used with great caution in older and shocked patients. [Fig-9] plus antibiotics and analgesia</td>
</tr>
</tbody>
</table>

**plus antibiotics and analgesia**

- Topical mupirocin and oral antibiotics active against *Staphylococcus aureus* and sinusitis pathogens are recommended, as is appropriate pain medicine. Macrolides or quinolones may be used if patient is allergic to beta-lactam antibiotics. The gauze may be generously coated with antibiotic ointment or bismuth iodoform paraffin paste (BIPP) in place of plain petroleum jelly.

#### Primary options

- **trimethoprim/sulfamethoxazole**: 160/800 mg orally twice daily for 5-7 days
  - or -
  - **amoxicillin/clavulanate**: 500 mg orally twice daily for 5-7 days
    - Dose refers to amoxicillin component.
  - or -
  - **cefuroxime**: 250-500 mg orally twice daily for 5-7 days

--AND--

- **paracetamol/hydrocodone**: 500-1000 mg orally every 4-6 hours when required, maximum 4000 mg/day
  - Dose refers to paracetamol component.

--AND--

- **mupirocin topical**: (2% ointment) to generously saturate nasal packing before placement
  - or -
  - **chlorhexidine/neomycin**: (0.1%/0.5% cream) to generously saturate nasal packing before placement

**OR**

#### Secondary options

- **clarithromycin**: 500 mg orally twice daily for 4-7 days
  - or -
  - **azithromycin**: 500 mg orally once daily on day 1, followed by 250 mg once daily for 4 days
  - or -
### Acute

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Tx line</th>
<th>Treatment</th>
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</thead>
</table>
|               |         | » **levofloxacin**: 500 mg orally once daily for 5-7 days  
- or -  
» **moxifloxacin**: 400 mg orally once daily for 5-7 days  
--AND--  
» **paracetamol/hydrocodone**: 500-1000 mg orally every 4-6 hours when required, maximum 4000 mg/day  
Dose refers to paracetamol component.  
--AND--  
» **mupirocin topical**: (2% ointment) to generously saturate nasal packing before placement  
- or -  
» **chlorhexidine/neomycin**: (0.1%/0.5% cream) to generously saturate nasal packing before placement |

<table>
<thead>
<tr>
<th>adjunct</th>
<th><strong>intravenous sedation and anti-emetic</strong></th>
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<tbody>
<tr>
<td></td>
<td>» Greater patient discomfort with posterior nasal packing warrants consideration of intravenous opioid analgesic and anti-emetic prior to packing.</td>
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</table>

<table>
<thead>
<tr>
<th>Primary options</th>
</tr>
</thead>
</table>
| » **morphine sulfate**: 5-10 mg intravenously every 2-4 hours when required  
- and -  
» **ondansetron**: 4-8 mg intravenously every 8 hours when required |

<table>
<thead>
<tr>
<th>adjunct</th>
<th><strong>local anaesthetic</strong></th>
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</table>
|         | » Lidocaine 1% or 2% with epinephrine (adrenaline) 1:100,000 may be infiltrated in the vicinity of a bleeding site.  
» There is haemostatic benefit from the epinephrine (adrenaline) and possibly from hydrostatic tissue pressure of the infiltrated volume of medicine.  
» Posterior analgesia and vasoconstriction may be facilitated by local anaesthetic infiltration into the greater palatine foramen. This block technique should be used with caution and only in experienced hands because it is painful and has the rare potential for blindness. Rarely used. |

<table>
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<tr>
<th>3rd</th>
<th><strong>endoscopic management, or embolisation by interventional radiologist</strong></th>
</tr>
</thead>
</table>
|     | » Posterior epistaxis may be amenable to endoscopically guided electrocautery (usually
Epistaxis

Acute

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<tr>
<th>Patient group</th>
<th>Tx line</th>
<th>Treatment</th>
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<td>monopolar suction cautery). Similarly, surgical dissection and surgical clip ligation of the sphenopalatine artery may be accomplished under direct endoscopic vision. These procedures normally require general anaesthetic or at least conscious sedation in the operating room. Packing is therefore the more amenable primary option.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>» Angiography and embolisation offers another means of interrupting the arterial supply. This avoids the need for surgery but involves some risk of occlusion of adjacent vessels and the potential for cerebrovascular accident. If contemplated, this technique should be tried before transantral ligation because this surgery often occludes access vessels necessary for successful embolisation.</td>
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<tr>
<td></td>
<td></td>
<td>4th open surgical ligation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>» Transantral vessel ligation or ethmoidal artery ligation may be performed.</td>
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Ongoing

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Tx line</th>
<th>Treatment</th>
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<tr>
<td>quiescent but recurrent epistaxis</td>
<td>1st</td>
<td>treatment of underlying cause</td>
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<tr>
<td></td>
<td></td>
<td>» Hereditary haemorrhagic telangiectasia: may perform resurfacing of the septum (septal dermoplasty) and periodic prophylactic ablation of nasal vessels with vascular laser.[14] [15] [36]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>» Neoplasms and trauma must be addressed according to the particular nature of the patient's disease.</td>
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<td></td>
<td></td>
<td>» Coagulopathy may need to be corrected with transfusion of platelets, clotting factors.</td>
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<tr>
<td></td>
<td>plus</td>
<td>silver nitrate cautery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>» This is a common scenario in children.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>» The physician needs to determine which side has the worst bleeding, as this would be the side selected for cautery. It is important to avoid cautery at the same location on both sides of the septum. This deprives the septal cartilage of its blood supply (from the mucosal covering) and may result in septal perforation if done bilaterally.</td>
</tr>
</tbody>
</table>
Similar treatment of the other side needs to be deferred for about 4 weeks until the initial cautery site has healed.

» Younger children may not tolerate simple clinic cautery even with good topical anaesthesia and thus require brief general anaesthetic.

» Silver nitrate cautery has been compared with antiseptic creams in children with recurrent epistaxis.[18] A Cochrane review of interventions in children is inconclusive, but does suggest that if silver nitrate cautery is used, a 75% preparation may be more effective and less painful than 95%.[18] Petroleum jelly has been compared with no treatment.2 Evidence The evidence for antiseptic creams and petroleum jelly is still limited and high-quality randomised controlled trials with longer follow-up periods are required.[18] [34] [37] A late double-blind study suggests that silver nitrate cautery plus antiseptic cream confers greater benefit than antiseptic cream alone.[35]
Recommendations

Monitoring

Following investigation and treatment for acute epistaxis, patients require no periodic monitoring except those with hereditary haemorrhagic telangiectasia. These patients may need periodic cautery as telangiectasias develop.

Some authors recommend observation in the intensive care unit of patients while posterior packing is in place. Others feel that this is appropriate specifically for older people and patients with comorbidities.

Patient instructions

Patient education, such as printed handouts, should be provided. Typical information includes:

- Details on the causes of nosebleeds
- Basic nasal anatomy, including the fact that most nosebleeds arise from the front of the nose
- Advice on home treatment of nosebleed: squeeze the nostrils together while sitting upright for 20 minutes, then use moisturising techniques
- A summary of the medical treatment of nosebleeds
- Advice concerning care for the nose after treatment.

Advice on care for the nose following treatment includes the following:

- Petroleum jelly: may be applied to the front of the septum, inside the nostril, with a cotton-tipped applicator or a finger, 4 times daily for about 3 weeks
- Saltwater nasal spray: may be purchased in pharmacies or similar stores and sprayed into the nose throughout the day to keep it moist
- Humidifier: placing a humidifier near the bed helps to prevent drying at night
- Minor bleeding: may be expected during the initial healing period; patients may self-treat with pressure and topical decongestants
- Nasal decongestant spray: may be sprayed on to a small cotton wool ball and placed on the bleeding area for 10 to 15 minutes, if bleeding recurs at the front of the nose
Follow up

- Avoidance of aspirin or NSAIDs and other anticoagulant medicines: for 3 to 4 weeks as medically appropriate
- Trauma: avoidance of vigorous nose blowing, rubbing, or picking during healing
- Allergy: if the nosebleed is related to allergy, it is important to treat this
- Follow-up: recommended on an as-needed basis only, so long as there are no continued problems.

This advice is appropriate for all epistaxis situations, whether or not there has been any treatment. Similarly, the prophylactic use of aggressive moisturisation during dry, cold months may reduce the frequency of epistaxis in patients with a history of this problem. Patients are encouraged to keep the information available for future reference.

**Complications**

<table>
<thead>
<tr>
<th>Complications</th>
<th>Timeframe</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>acute bacterial rhinosinusitis</td>
<td>short term</td>
<td>medium</td>
</tr>
<tr>
<td>Nasal packing impairs normal sinus mucosal clearance and may predispose to sinusitis.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May occur in the first week after packing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cardiovascular compromise associated with extensive bleeding</td>
<td>short term</td>
<td>low</td>
</tr>
<tr>
<td>Though unlikely, blood loss and stress of treatment may precipitate hypotension or cardiac ischaemia in the presence of coronary artery disease.</td>
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<td></td>
</tr>
<tr>
<td>Urgent resuscitation and supportive care is required.</td>
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<td></td>
</tr>
<tr>
<td>septal perforation associated with bilateral cauter y</td>
<td>short term</td>
<td>low</td>
</tr>
<tr>
<td>It is important to avoid cauter y at the same location on both sides of the septum. This deprives the septal cartilage of its blood supply (from the mucosal covering) and may result in septal perforation if done bilaterally.</td>
<td></td>
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<tr>
<td>May occur in the first month after cauter y.</td>
<td></td>
<td></td>
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<tr>
<td>toxic shock syndrome</td>
<td>short term</td>
<td>low</td>
</tr>
<tr>
<td>Very rare.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May occur in the first week after nasal packing.</td>
<td></td>
<td></td>
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<tr>
<td>Topical mupirocin and oral antibiotics are suggested as a prophylactic measure though they have no demonstrated benefit.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hypoxia</td>
<td>short term</td>
<td>low</td>
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</tbody>
</table>

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Epistaxis

<table>
<thead>
<tr>
<th>Complications</th>
<th>Timeframe</th>
<th>Likelihood</th>
</tr>
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<tbody>
<tr>
<td>May occur while posterior packing is in place.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posterior packing may reduce respiration through either nasal obstruction or a postulated nasopulmonary reflex.</td>
<td></td>
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<tr>
<td>Some authors recommend observation in the intensive care unit (ICU) of patients while posterior packing is in place.</td>
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<td></td>
</tr>
<tr>
<td>aspiration pneumonia or pneumonitis</td>
<td>short term</td>
<td>low</td>
</tr>
<tr>
<td>Aspiration of blood may cause pneumonia or pneumonitis.</td>
<td></td>
<td></td>
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<tr>
<td>These serious complications are fortunately extremely uncommon.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cerebrovascular accident (CVA) associated with interventional embolisation</td>
<td>short term</td>
<td>low</td>
</tr>
<tr>
<td>Embolisation carries a low risk of CVA.</td>
<td></td>
<td></td>
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<tr>
<td>Although a serious complication, it is extremely uncommon.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>recurrent epistaxis</td>
<td>variable</td>
<td>medium</td>
</tr>
<tr>
<td>Children seem more prone to require repeat cautery.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underlying disorders, such as neoplasm, hereditary haemorrhagic telangiectasia, and coagulation disorders, are more likely to result in recurrent bleeding.</td>
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</tr>
<tr>
<td>Patients require investigation to exclude these underlying conditions.</td>
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<td></td>
</tr>
<tr>
<td>re-bleeding on nasal pack removal</td>
<td>variable</td>
<td>low</td>
</tr>
<tr>
<td>Referral to the otolaryngology department for nasal pack removal may be valuable in case any re-bleeding should occur.</td>
<td></td>
<td></td>
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<tr>
<td>Application of topical vasoconstrictor and lidocaine seems to discourage mucosal trauma and re-bleeding with pack removal.</td>
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<td></td>
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<tr>
<td>Cautery (usually silver nitrate) may be indicated following pack removal for suspicious vessels or friable, haemorrhagic sites.[17] [B]Evidence</td>
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</tbody>
</table>

Prognosis

The majority of patients respond to treatment, particularly to packing. Some require periodic cautery of anterior blood vessels or planned cautery of the opposite side scheduled at 4 to 6 weeks after the initial location is treated. Children seem more prone to require repeat cautery.
Evidence scores

1. Reducing nosebleeds: there is medium-quality clinical evidence that silver nitrate cautery is as effective as antiseptic cream at reducing the number of nosebleeds at 8 weeks in children with recurrent epistaxis.
   **Evidence level B:** Randomized controlled trials (RCTs) of <200 participants, methodologically flawed RCTs of >200 participants, methodologically flawed systematic reviews (SRs) or good quality observational (cohort) studies.

2. Complete control of recurrent epistaxis in children: there is medium-quality evidence that there is no significant difference in the frequency of complete control of recurrent epistaxis at 8 weeks when petroleum jelly, applied to the nostrils twice daily for 4 weeks, is compared with no treatment in children with recurrent epistaxis. The evidence comes from a single randomised controlled trial.[18]
   **Evidence level B:** Randomized controlled trials (RCTs) of <200 participants, methodologically flawed RCTs of >200 participants, methodologically flawed systematic reviews (SRs) or good quality observational (cohort) studies.

3. Partially successful control of recurrent epistaxis in children: there is medium-quality evidence that antiseptic cream (chlorhexidine hydrochloride 0.1%, neomycin sulfate 3250 units/g) applied to the nostrils twice daily for 4 weeks may be as effective at partially controlling bleeding at 8 weeks in children with recurrent epistaxis as silver nitrate cautery. However, this evidence comes from a single small randomised controlled trial.[34]
   **Evidence level B:** Randomized controlled trials (RCTs) of <200 participants, methodologically flawed RCTs of >200 participants, methodologically flawed systematic reviews (SRs) or good quality observational (cohort) studies.
Key articles


References


Figure 1: Nasal vasculature demonstrating the vessels that form the Kiesselbach plexus

From the collection of David A. Randall, Springfield Ear Nose Throat and Facial Plastic Surgery, MO

Figure 2: Nasal pledgets for application of decongestant and local anaesthetic
Figure 3: Expanding nasal sponge tampons

From the collection of David A. Randall, Springfield Ear Nose Throat and Facial Plastic Surgery, MO
**Figure 4:** Expanding nasal sponge pack in place

From the collection of David A. Randall, Springfield Ear Nose Throat and Facial Plastic Surgery, MO

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**Figure 5:** Deflated and inflated double-balloon nasal catheter

From the collection of David A. Randall, Springfield Ear Nose Throat and Facial Plastic Surgery, MO
Figure 6: Double-balloon nasal catheter in place

From the collection of David A. Randall, Springfield Ear Nose Throat and Facial Plastic Surgery, MO
Horizontally layered \( \frac{1}{2} \)" gauze packing saturated with mupirocin ointment

Gauze packing of nostril wrapped around Foley

Foley balloon in posterior choana

Umbilical clamp

0 – Silk ties around shaft of Foley catheter with remainder of catheter trimmed off

**Figure 7: Anterior-posterior traditional Foley catheter-gauze pack**

*From the collection of David A. Randall, Springfield Ear Nose Throat and Facial Plastic Surgery, MO*
Figure 8: Expanding nasal sponge pack in place

From the collection of David A. Randall, Springfield Ear Nose Throat and Facial Plastic Surgery, MO
Figure 9: Double-balloon nasal catheter in place
From the collection of David A. Randall, Springfield Ear Nose Throat and Facial Plastic Surgery, MO

Figure 10: Anterior-posterior traditional Foley catheter-gauze pack
From the collection of David A. Randall, Springfield Ear Nose Throat and Facial Plastic Surgery, MO
Figure 11: Diagram of bleeding sites in nose to accompany written patient information

Produced by David A. Randall, Springfield Ear Nose Throat and Facial Plastic Surgery, MO
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