**Introduction**

**Background**

Epistaxis is defined as acute hemorrhage from the nostril, nasal cavity, or nasopharynx. It is a frequent ED complaint and often causes significant anxiety in patients and clinicians. However, more than 90% of patients who present to the ED with epistaxis may be successfully treated by an emergency physician (EP).

**Pathophysiology**

Epistaxis is classified on the basis of the primary bleeding site as anterior or posterior. Hemorrhage is most commonly anterior, originating from the nasal septum. A common source of anterior epistaxis is the Kiesselbach plexus, an anastomotic network of vessels on the anterior portion of the nasal septum, also referred to as Little’s area. It receives blood supply from both the internal and external carotid arteries. Anterior bleeding may also originate anterior to the inferior turbinate. Posterior hemorrhage originates from branches of the sphenopalatine artery in the posterior nasal cavity or nasopharynx.

**Frequency**

**United States**

Data may be difficult to obtain on the true incidence of epistaxis due to the fact that not all cases are seen in the emergency department. However, when multiple sources are reviewed, the lifelong incidence of epistaxis in the general population is about 60%, with less than 10% seeking medical attention.

**Mortality/Morbidity**

- Mortality is rare and is usually due to complications from hypovolemia, with severe hemorrhage or underlying disease states.
- Increased morbidity is associated with nasal packing. Posterior packing can potentially cause airway compromise and respiratory depression. Packing in any location may lead to infection.

**Sex**

- No sex predilection exists for nosebleeds.

**Age**

- Bimodal incidence exists, with peaks in those aged 2-10 years and 50-80 years.

**Clinical**

**History**
Controlling significant bleeding or hemodynamic instability should take precedence over obtaining a lengthy history.

Note the duration, severity of the hemorrhage, and the side of initial bleeding.

Inquire about previous epistaxis, hypertension, hepatic or other systemic disease, family history, easy bruising, or prolonged bleeding after minor surgical procedures. Recurrent episodes of epistaxis, even if self-limited, should raise suspicion for significant nasal pathology.

Use of medications, especially aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs), warfarin, heparin, ticlopidine, and dipyridamole should be documented, as these not only predispose to epistaxis but make treatment more difficult.

**Physical**

- Approximately 90% of nosebleeds can be visualized in the anterior portion of the nasal cavity.
- Massive epistaxis may be confused with hemoptysis or hematemesis. Blood dripping from the posterior nasopharynx confirms a nasal source.
- Perform a thorough and methodical examination of the nasal cavity.
  - Blowing the nose decreases the effects of local fibrinolysis and removes clots, permitting a better examination. Application of a vasoconstrictor prior to the examination may reduce hemorrhage and help to pinpoint the precise bleeding site. Topical application of a local anesthetic reduces pain associated with the examination and nasal packing.
  - Gently insert a nasal speculum and spread the naris vertically. This permits visualization of most anterior bleeding sources.
- A posterior source is suggested by failure to visualize an anterior source, by hemorrhage from both nares, and by visualization of blood draining in the posterior pharynx.

**Causes**

- Most cases of epistaxis do not have an easily identifiable cause.
- Local trauma (ie, nose picking) is the most common cause, followed by facial trauma, foreign bodies, nasal or sinus infections, and prolonged inhalation of dry air. A disturbance of normal nasal airflow, as occurs in a deviated nasal septum, may also be a cause of epistaxis.
- Iatrogenic causes include nasogastric and nasotracheal intubation.
- Topical nasal drugs such as antihistamines and corticosteroids, especially when applied directly to the nasal septum instead of the lateral walls, may cause mild epistaxis.
- Children usually present with epistaxis due to local irritation or recent upper respiratory infection (URI).
- Oral anticoagulants and coagulopathy due to splenomegaly, thrombocytopenia, platelet disorders, liver disease, renal failure, chronic alcohol use, or AIDS-related conditions predispose to epistaxis.
- Inherited coagulopathies such as von Willebrand disease, hemophilia A, and hemophilia B.[1]
- The relationship between hypertension and epistaxis is often misunderstood. Patients with epistaxis commonly present with an elevated blood pressure. Epistaxis is more common in hypertensive patients perhaps owing to vascular fragility from long-standing disease. Hypertension, however, is rarely a direct cause of epistaxis. More commonly, epistaxis and the associated anxiety cause an acute elevation of blood pressure. Therapy, therefore, should be focused on controlling hemorrhage and reducing anxiety as primary
means of blood pressure reduction.

- Epistaxis is more prevalent in dry climates and during cold weather due to the dehumidification of the nasal mucosa by home heating systems.

- Vascular abnormalities that contribute to epistaxis may include the following:
  - Sclerotic vessels
  - Hereditary hemorrhagic telangiectasia
  - Arteriovenous malformation
  - Neoplasm
  - Aneurysms
  - Septal perforation, deviation
  - Endometriosis

### Differential Diagnoses

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### Other Problems to Be Considered

- Chemical irritants
- Hepatic failure
- Leukemia
- Osler-Weber-Rendu syndrome
- Rhinitis
- Thrombocytopenia
- Heparin toxicity
- Ticlopidine toxicity
- Dipyridamole toxicity
- Trauma
- Tumor

### Workup

#### Laboratory Studies

- Routine laboratory studies are rarely indicated or helpful for nosebleeds but are recommended in the presence of major bleeding or if a coagulopathy is suspected.
  - Obtain a hematocrit count and type and cross if a history of persistent heavy bleeding is present.
  - Obtain a complete blood count (CBC) if a history of recurrent epistaxis, a platelet disorder, or neoplasia is present.
  - The bleeding time is an excellent screening test if suspicion of a bleeding disorder is present.
Obtain the international normalized ratio (INR)/prothrombin time (PT) if the patient is taking warfarin or if liver disease is suspected.

**Imaging Studies**

- Sinus films are rarely indicated for a nosebleed.
- CT scanning and/or nasopharyngoscopy may be performed if a tumor is the suspected cause of bleeding.
- Angiography is rarely indicated.

**Treatment**

**Emergency Department Care**

- As always, first address the patient's airway, breathing, and circulation (ABCs). Rarely, severe epistaxis may necessitate endotracheal intubation.

- Stable patients should be instructed to grasp and pinch their entire nose, maintaining continuous pressure for at least 10 minutes. Make sure to compress the soft nose tissues against the nasal septum. Pinching the hard, incompressible nasal bones will not aide hemorrhage control.

- Gowns, gloves, and protective eyewear should be worn. Adequate light is best provided by a headlamp with an adjustable narrow beam. Patients should be positioned comfortably in a seated position, holding a basin under their chin.

- Patients with significant hemorrhage should receive an IV line and crystalloid infusion, as well as continuous cardiac monitoring and pulse oximetry. Patients frequently present with an elevated blood pressure; however, a significant reduction can usually be obtained with analgesia and mild sedation alone. Specific antihypertensive therapy is rarely required and should be avoided in the setting of significant hemorrhage.

- Insert pledgets soaked with an anesthetic-vasoconstrictor solution into the nasal cavity to anesthetize and shrink nasal mucosa. Soak pledgets in 4% topical cocaine solution or a solution of 4% lidocaine and topical epinephrine (1:10,000) and place them into the nasal cavity. Allow them to remain in place for 10-15 minutes.

- If a bleeding point is easily identified, gentle chemical cautery may be performed after the application of adequate topical anesthesia. The tip of a silver nitrate stick is rolled over mucosa until a grey eschar forms. To avoid septal necrosis or perforation, only one side of the septum should be cauterized at a time. To be effective, cautery should be performed after bleeding is controlled. Thermal cautery using an electric cautery device is reserved for more aggressive bleeding under local or general anesthesia.[1]

- If attempts to control hemorrhage with pressure or cautery fail, the nose should be packed. Options include traditional nasal packing, a prefabricated nasal sponge, an epistaxis balloon, or absorbable materials.
  - Traditional (Vaseline gauze) packing: This traditional method of anterior nasal packing has been supplanted by readily available and more easily placed tampons and balloons. It is commonly performed incorrectly, using an insufficient amount of packing placed primarily in the anterior naris. Placed in this way, the gauze serves as a plug rather than as a hemostatic pack. Physicians inexperienced in proper placement of a gauze pack should use a nasal tampon or balloon. The proper technique for placement of a gauze pack is as follows:
    1. Grasp the gauze ribbon, about 6 inches from its end, with bayonet forceps. Place it in the nasal cavity as far back as possible, ensuring that the free end protrudes from the nose. On the first pass, the gauze is pressed onto the floor of nasopharynx with closed bayonets.
    2. Next, grasp the ribbon about 4-5 inches from the nasal alae and reposition the nasal
speculum so that the lower blade holds the ribbon against lower border of nasal alae. Bring a second strip into the nose and press downward.

3. Continue this process, layering the gauze from inferior to superior until the naris is completely packed. Both ends of ribbon must protrude from the naris and should be secured with tape. If this does not stop the bleeding, consider bilateral nasal packing.

   - Compressed sponge (Merocel): Trim the sponge to fit snugly through the naris. Moisten the tip with surgical lubricant or topical antibiotic ointment. Firmly grasp the length of the sponge with bayonet forceps, spread the naris vertically with a nasal speculum, and advance the sponge along the floor of the nasal cavity. Once wet with blood or a small amount of saline, the sponge expands to fill the nasal cavity and tamponade bleeding. See Media files 1 and 2.
Compressed sponge - Merocel.
Merocel placed in left nostril for anterior packing.

- Anterior epistaxis balloons (Rapid Rhino): Anterior epistaxis balloons are available in different lengths. A carboxycellulose outer layer promotes platelet aggregation. The balloons are as efficacious as nasal tampons with superior ease and patient comfort on insertion and removal. To insert, soak the knit outer layer of the balloon with water, insert along the floor of the nasal cavity, and inflate slowly with air until the bleeding stops. See Media files 3 and 4.
Rapid Rhino - 5.5 cm for anterior nasal packing.
Rapid Rhino bilateral - 7.5 cm for anterior/posterior nasal packing.

- Absorbable materials such as oxidized cellulose (Surgicel), gelatin foam (Gelfoam), and gelatin and thrombin combination (FloSeal) are suitable alternatives to nasal packing for anterior bleeds. They directly tamponade bleeding sites, increase clot formation, and protect the nasal mucosa from desiccation or further trauma. They are easy to use, comfortable, and conform to the irregularity of the nasal contours.\(^2,4\)

- Posterior epistaxis balloons: Posterior epistaxis balloons generally have separate anterior and posterior balloons.
  - After passing the posterior balloon through the naris and into the posterior nasal cavity, inflate it with 4-5 mL of sterile water and gently pull it forward to fit snugly in the posterior choana.
After bleeding into the posterior pharynx has been controlled, fill the anterior balloon with sterile water until the bleeding completely stops.

- Avoid overinflation because pressure necrosis or damage to the septum may result. Record the amount of fluid placed in each balloon.
- If a Foley catheter is used, place a 12-16F catheter with a 30-mL balloon into the nose along the floor of the nasopharynx, until the tip is visible in the posterior pharynx.
- Slowly inflate the balloon with 15 mL of sterile water, pull it anteriorly until it firmly sets against the posterior choanae, and secure it in place with an umbilical clamp. Use a buttress clamp with cotton gauze to avoid pressure necrosis on the nasal alae or columella. Finally, an anterior nasal pack should be placed.

- For additional information, see Nasal Pack, Anterior Epistaxis and Nasal Pack, Posterior Epistaxis.

**Consultations**

Epistaxis that requires posterior packing should be managed in cooperation with an ear, nose, and throat (ENT) specialist. Because of multiple possible complications, admission is required, usually in a monitored setting.

Consultation with a hematologist is indicated for patients with bleeding dyscrasias or coagulopathies.

**Medication**

Patients discharged from the hospital with anterior packing should receive follow-up care with an ENT specialist within 48-72 h. Nasal packing prevents drainage of sinuses. Consider placing patients on a broad-spectrum antibiotic to cover all likely pathogens in the context of the clinical setting.

Oral analgesics should be prescribed to assure quality patient care.

**Antibiotics**

Consider giving patients a penicillin or first-generation cephalosporin.

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**Amoxicillin (Biomox, Trimox)**

Treats infections caused by susceptible organisms and used as prophylaxis in minor procedures.

**Dosing**

**Adult**

250-500 mg PO q8h; not to exceed 3 g/d

**Pediatric**

20-50 mg/kg/d PO q8h

**Interactions**

Reduces the efficacy of oral contraceptives

**Contraindications**

Documented hypersensitivity

**Precautions**

**Pregnancy**

B - Fetal risk not confirmed in studies in humans but has been shown in some studies in animals
Precautions
Adjust dose in renal impairment

Cephalexin (Keflex)
First-generation cephalosporin, which is primarily active against skin flora. Used for skin structure coverage and as prophylaxis in minor procedures.

Dosing
Adult
250-1000 mg PO q6h; not to exceed 4 g/d

Pediatric
25-50 mg/kg/d PO q6h; not to exceed 3 g/d

Interactions
Coadministration with aminoglycosides increases nephrotoxic potential

Contraindications
Documented hypersensitivity

Precautions
Pregnancy
B - Fetal risk not confirmed in studies in humans but has been shown in some studies in animals

Precautions
Adjust dose in renal impairment

Analgesics
Pain control is essential to quality patient care. It ensures patient comfort, promotes pulmonary toilet, and enables physical therapy regimens. Most analgesics have sedating properties, which are beneficial for patients who have painful skin lesions. Avoid NSAIDs and aspirin.

Acetaminophen (Tylenol, Aspirin Free Anacin, Feverall)
DOC for treating pain in documented hypersensitivity to aspirin, upper GI disease, or concurrent administration of oral anticoagulants.

Dosing
Adult
325-650 mg PO q4-6h or 1000 mg PO tid/qid; not to exceed 4 g/d

Pediatric
<12 years: 10-15 mg/kg/dose PO q4-6h prn; not to exceed 2.6 g/d
>12 years: 650 mg PO q4h; not to exceed 5 doses in 24 h

Interactions
Rifampin can reduce analgesic effects; coadministration with barbiturates, carbamazepine, hydantoins, and isoniazid may increase hepatotoxicity
**Contraindications**
Documented hypersensitivity

**Precautions**

**Pregnancy**

B - Fetal risk not confirmed in studies in humans but has been shown in some studies in animals

**Precautions**

Hepatotoxicity possible in chronic alcoholism following various dose levels; severe or recurrent pain or high or continued fever may indicate a serious illness; contained in many OTC products, and combined use with these products may result in cumulative doses exceeding recommended maximum dose

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**Hydrocodone bitartrate and acetaminophen (Vicodin ES)**

For the relief of moderate to severe pain.

**Dosing**

**Adult**
1-2 tablet or cap PO q4-6h prn for pain

**Pediatric**

<12 years: Based on acetaminophen dose of 10-15 g/kg/dose PO q4-6h prn; not to exceed 10 mg/dose of hydrocodone bitartrate or 2.6 g/d of acetaminophen

>12 years: Based on acetaminophen dose of 750 mg PO q4h; not to exceed 5 doses q24h

**Interactions**

Phenothiazines may decrease the analgesic effects; toxicity increases with coadministration of CNS depressants or tricyclic antidepressants

**Contraindications**
Documented hypersensitivity

**Precautions**

**Pregnancy**

C - Fetal risk revealed in studies in animals but not established or not studied in humans; may use if benefits outweigh risk to fetus

**Precautions**

Tabs contain metabisulfite, which may cause allergic reactions

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**Follow-up**

**Further Inpatient Care**

- Admit patients with posterior packing. Elderly patients or patients with cardiac disorders or chronic obstructive pulmonary disease (COPD) should receive supplemental oxygen and be admitted to a monitored setting.

- Significant or uncontrolled bleeding from a posterior site may require operative management; this occurs in about 30% of cases. Interventional radiology embolization of involved arteries and surgical ligation of
Further Outpatient Care

- Patients discharged with anterior packing should receive follow-up care with an ENT specialist within 48-72 hours. Nasal packing increases the risk of sinusitis or toxic shock syndrome.
- Patients discharged with nasal packing should be prescribed a penicillin or first-generation cephalosporin. Oral analgesics should also be prescribed.
- Advise patients to avoid aspirin, aspirin-containing products, and NSAIDs.
- Patients who take warfarin may generally continue their current regimen unchanged. Temporary discontinuation of warfarin or active reversal of coagulopathy is indicated only in cases of uncontrolled hemorrhage and supratherapeutic INR.
- Give patients specific written follow-up instructions.

Complications

- Sinusitis
- Septal hematoma/perforation
- External nasal deformity
- Mucosal pressure necrosis
- Vasovagal episode
- Balloon migration
- Aspiration

Prognosis

- With proper treatment, prognosis is excellent.

Patient Education

- For rebleeding or future nosebleeds, patients should be instructed to firmly pinch their entire nose for 10-15 minutes. Ice packs do not help.[5]
- Encourage nasal hydration with topical gels, lotions, or ointments to moisturize mucosa and promote healing of friable areas. Humidifiers or vaporizers in bedrooms may increase ambient humidity.[3,2]
- For excellent patient education resources, visit eMedicine's Ears, Nose, and Throat Center. Also, see eMedicine's patient education article Nosebleeds.

Miscellaneous

Medicolegal Pitfalls

- Posterior nasal packing is particularly uncomfortable for the patient and promotes hypoxia and
hypoventilation. Failure to admit and appropriately monitor all patients who require posterior packing may result in significant mortality.

- Attempts at nasal packing may result in significant slowing but not cessation of hemorrhage. Failure to completely control hemorrhage is an absolute indication for consultation with an ENT specialist in the ED.

- Nasal packing can lead to serious infection. Patients discharged with anterior nasal packs should be started on oral antibiotics.

- Tumors or other serious pathology are infrequent causes of epistaxis. However, all patients who present with epistaxis should have follow-up care arranged with an ENT specialist for a complete nasopharyngeal examination. Recurrent unilateral epistaxis should particularly raise concern for neoplasm.[1]

**Multimedia**
Media file 2: Merocel placed in left nostril for anterior packing.
Media file 3: Rapid Rhino - 5.5 cm for anterior nasal packing.
Media file 4: Rapid Rhino bilateral - 7.5 cm for anterior/posterior nasal packing.

References


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Steven C Dronen, MD, FAAEM is a member of the following medical societies: American Academy of Emergency Medicine and Society for Academic Emergency Medicine
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Further Reading
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