Aug 30: Epistaxis

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Vacation: Caroline ; Preceptor: Kacker

1. **(Deya)** Draw the vascular supply to the nasal mucosa with notation of the vessels of origin. What is Kiesselbach’s plexus and where is it located?

Vessels of origin:
1. Internal Carotid Artery – supplies ethmoid branches of the ophthalmic a. (1st branch of ICA)
   a. Posterior ethmoidal a. (absent in 31% of cadaver dissections)
   b. Anterior ethmoidal a. (absent in 10% of cadaver dissections)
2. External Carotid Artery
   a. Facial a.: supplies the superior labial a.
   b. Internal maxillary a.: supplies the sphenopalatine a. and descending palatine a

Kiesselbach’s Plexus: site of an abundant plexus of vessels at the anterior nasal septum, supplied by both systems

2. **(Dara)** What are the local causes of epistaxis?

1. **Vascular**
   - ICA aneurysms
   - extradural aneurysms
   - cavernous sinus aneurysms
2. **Infectious/Inflammatory:** Rhinitis/Sinusitis
3. **Trauma**
   - nose picking
   - nasal fracture
   - nasogastric/nasotracheal intubation
   - trauma to sinuses, orbits, middle ear, base of skull
   - barotrauma
4. **Iatrogenic**
   - FESS
   - rhinoplasty
   - nasal reconstruction
5. **Neoplasm**
   - juvenile nasopharyngeal angiofibroma
   - inverted papilloma
   - SCCA

6. **Dessication**
   - cold dry air or dry heat
   - nasal O2
   - anatomic abnormalities (septal spurs, deviations, perforations)
   - atrophic rhinitis

7. **Foreign Bodies/other**
   - nasal foreign bodies
   - chemical (cocaine, nasal sprays, ammonia)

3. **(Dara)** Outline and discuss systemic diseases that predispose to epistaxis.

1. **Vascular**
   - hypertension/arteriosclerosis
   - Hereditary Hemorrhagic Telangiectasias (OWR)
2. **Infection/Inflammation**
   - TB
   - Syphilis
   - Wegener’s Granulomatosis
   - Periarteritis nodosa
   - SLE
3. **Coagulopathy**
   - Thrombocytopenia
   - Platelet dysfunction from systemic disease such as uremia from renal failure or from drugs (coumadin, NSAIDs, ASA, Plavix, Herbal Supplements)
   - Clotting factor deficiencies. Hemophilia, Von Willebrand’s disease, hepatic failure
   - Hematologic malignancies
Aug 30: Epistaxis

4. (Amy) A patient presents to the ER with epistaxis. What information do you want to obtain from the history? Role of hypertension in epistaxis?
Ensuring an adequate airway and hemodynamic stability should be the initial concern in an epistaxis patient.

Once the ABCs have been secured, important elements in the history:
· Duration, quantity, and site of bleeding. If bilateral, is one side worse?
· Signs of posterior bleeding, such as expectorated blood or hematemesis
· Possible inciting events, such as trauma or use of intranasal medications or illicit drugs
· Previous history of epistaxis and what type of treatments patient has required
· If bleeding has been severe or recurrent, even if self-limited, consider nasal pathology or systemic disease (ask about syncope or near-syncope suggestive of CV compromise)
· Past medical history of coagulopathy or increased bleeding (renal failure, liver disease, poorly controlled HTN), hematologic disorders (von Willebrand's disease, hemophilia, leukemia), vascular abnormalities (HHT, AVM, endometriosis)
· Medications can predispose to epistaxis and also make treatment more difficult.
· Medications affecting coagulation cascade: aspirin, NSAIDs, warfarin, heparin, dipyridamol, and vitamins and supplements that prolong bleeding time (vitamin E).
· Anti-hypertensives and medicines that affect catecholamine catabolism (MAO-I) can interact with anesthetics and vasoconstrictors during treatment.
· History of prior or recent nasal trauma, surgery, nasogastric tube, or nasotracheal intubation.

The relationship between hypertension and epistaxis is controversial. No clear relationship between hypertension and the frequency or severity of epistaxis has been shown. Patients are more likely to be acutely hypertensive during an epistaxis episode; however, hypertension is unlikely the direct cause of epistaxis. Treatment should focus on controlling hemorrhage and then managing blood pressure.

5. (Rosow) What will you look for on physical examination? How will you localize the site of bleeding?

Check the patient's vital signs, as high systolic blood pressures will decrease the success of any interventions. A patient with active nasal bleeding should be suctioned out and decongested. Anterior rhinoscopy with nasal speculum and suction can localize a bleeding source in Kiesselbach's plexus or on the anterior surface of a turbinate. In an office patient who is not bleeding vigorously, endoscopic exam may also be used. In addition to looking for the source of bleeding, physical examination may also reveal pathologic causes for bleeding, such as an anterior septal perforation, trauma, telangiectasias, excoriations, excessively dry mucosa, or tumors. After suctioning the nasal cavity, the posterior oropharynx should be inspected; continued bleeding from this site, particularly in older patients, may indicate a posterior plexus bleed.

6. (Kathy) Which laboratory tests would you order in evaluating a patient with epistaxis?

You should order a CBC, PT, and PTT initially to rule out hematopoietic malignancies or coagulopathy. The CBC will also give you a baseline Hct, and a platelet count. A type and screen should also be sent, in anticipation of the need for transfusion in a profuse bleed. Additional tests may need to be ordered if a coagulation disorder is suspected (bleeding time, liver function tests, thyroid function tests, fibrinogen, fibrin split products, D-dimer, von Willebrand’s factor).

7. (Josh) Is there a role for radiologic studies in the work up of epistaxis?

Imaging is not routinely obtained for the diagnosis and management of epistaxis. Imaging may be obtained if the history raises suspicion for unusual pathology. An adolescent male with frequent severe epistaxis is suspicious for JNA, juvenile nasopharyngeal angiofibroma. If physical exam is insufficient, CT with contrast, MRI, MRA, or carotid angiography is indicated. Also, concern about possible sinonasal malignancy warrant a CT scan. A patient with a known history of HHT presenting with epistaxis and hemoptysis should raise concern about a pulmonary hemorrhage and a prompt chest CT should be obtained. Finally, when arterial embolization has been selected as a therapeutic option for persistent epistaxis, diagnostic angiography of the carotid system precedes the embolization procedure to allow for localization of the bleed.

8. (Scott) In evaluating a patient with epistaxis, you find the origin of hemorrhage to be at the anterior septal mucosa. How will you manage this patient?

Source: Kiesselbach plexus, or Little area, is located on the anterior cartilaginous septum and is the location of most anterior epistaxis. Many of the arteries supplying the septum have anastomotic connections at this site.

Treatment: Topical anesthetics and vasoconstrictors, such as 4% lidocaine and 0.05% oxymetazolmine, are applied via aerosolizing spray or cotton pledgets. Clots are then suctioned out and a thorough examination is performed.
Aug 30: Epistaxis

- **Cautery**: Bleeding from the Little area is frequently treated with silver nitrate cauterization. Manage the vessels leading to the site before managing the actual bleeding site. Avoid random and aggressive cautery and cautery on opposing surfaces of the septum, to prevent septal perforation. Electrocautery using an insulated suction cautery unit can also be used for more severe bleedings. After the bleeding has been controlled, instruct the patient to use nasal saline spray and antibiotic ointment and to avoid strenuous activities for 7-10 days. NSAIDs are not to be used if at all possible. Digital manipulation of the nose is to be avoided. A topical vasoconstrictor may be used if minor bleeding recurs with the dislodging of the eschar.

- **Anterior packing**: Nasal packing can be used to treat epistaxis that is not responsive to cautery. Two types of packing, anterior and posterior, can be placed.
  - Absorbable materials (eg, Gelfoam, Surgicel) may be used in patients with coagulopathy to avoid trauma upon packing removal.
  - If absorbable packing does not suffice, Merocel packing can be used. Placing one on each side of the septum can be useful to apply pressure along the septum for good hemostasis. They should be coated with an antibiotic ointment and can be hydrated with a topical vasoconstrictor.
  - Vaseline gauze (1/2 in X 72 in) can be used if Mercocel packing is ineffective. Layer it tightly and far enough posteriorly to provide adequate pressure.
  - All packings should be removed in 3-4 days.
  - For all patients with packing, administer prophylactic antibiotics and instruct them to avoid physical strain for 1 week.

- **EUA nose and septoplasty**: Bleeding sites can be cauterized under endoscopic guidance, a deviated septum can be straightened, spurs can be removed, and meticulous packing can be placed. In addition, arterial ligation may be performed at the same time if these steps fail to control the bleeding.

- **Arterial ligation**: The specific vessel(s) to be ligated depends on the location of the epistaxis. In general, the closer the ligation is to the bleeding site, the more effective the procedure tends to be.

9. (Tai) When is a posterior pack indicated? How do you construct and place a posterior pack? How long do you leave it in place? What are the complications of a posterior pack?

**Indications:**
- Failure of anterior packing
- High suspicion of posterior bleed: patients spitting out blood, older patient with atherosclerosis, no visible anterior bleeding site
- Patient with bleeding diathesis: hereditary hemorrhagic telangectasia, Von Willebrand disease, Hemophilia, Anticoagulation, Antiplatelet therapy
- Temporizing measure until more definitive therapies are obtained: endoscopic ligation, IR embo

- **Posterior packing**: Pass catheter through one nostril (or both nostrils), through the nasopharynx, and out the mouth. A gauze pack secured to the end of the catheter and positioned in the posterior nasopharynx by pulling back on the catheter until the pack is seated in the posterior choana, sealing the posterior nasal passage and applying pressure to the site of the posterior bleeding

- **Balloon systems**: effective and less complicated than the packing procedure. 2% mucopoliricin to device and insert into affected nostril until reaches nasopharynx. Inflate posterior balloon with 7 to 10 mL of saline, and withdraw catheter so balloon sits in the posterior nasal cavity. Inflate anterior balloon with 15 to 30 mL of saline in the anterior nasal cavity to prevent retrograde travel of the posterior balloon and airway obstruction. Use umbilical clamp across the stalk of the balloon adjacent to the nostril to further prevent dislodgement; Apply padding (eg, Xeroform wrap, iodoform strips) to prevent alar necrosis. Balloon packs generally are left in place for two to five days. As with anterior packing, tissue necrosis can occur if a posterior pack is inserted improperly or balloons are overinflated.

- **Foley catheter (10 to 14 French) with a 30-mL balloon**: Insert catheter into bleeding nostril and visualize in the oropharynx. Inflated balloon with ~ 10 mL of saline, and withdraw through the nostril, pulling the balloon up and forward. With traction maintained on the balloon, the anterior nasal cavity then is packed. Traction is maintained by placing an umbilical clamp on the catheter beyond the nostrils, which should be padded to prevent soft tissue damage. As with anterior epistaxis, topical antistaphylococcal antibiotic ointment may be used to prevent toxic shock syndrome.

- **Complications**: alar necrosis from clamp, toxic shock, sinusitis, nasal septal necrosis, abscesses, neurogenic syncope. Must admit all patients with posterior packing because of risk of reflex bradydysrhythmia from stimulation of deep posterior oropharynx and for airway observation.
Aug 30: Epistaxis

10. (Vicki) A patient with posterior epistaxis continues to bleed. What are the options at this point? Pros and cons of each.

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**Epistat** – There are 2 chambers for posterior packs. Inflate the posterior chamber (the smaller one) with up to 10 cc of WATER/SALINE and pull forward until it fits in the choana. Fill the anterior chamber (up to 30 cc) second. Be sure to record the amount in each chamber. Admit patient for cardiac monitoring. Another choice if you don’t have an epistat is the foley catheter. Use a 12-16F with 15 cc of fluid and secure with a clamp anteriorly. Place an anterior pack separately. Protect the alae and columella with xeroform

Complications: septal perforation, synchia, sinusitis, toxic shock syndrome, eustachian tube dysfunction, dysphagia, aspiration, damage to columella and alae, hypoventiltion, sudden death

**Endoscopy** – Cauterization, septoplasty, packing

Complications: see above

**Embolization** – Internal maxillary artery

Complications - Facial pain, trismus, facial paralysis, skin necrosis, stroke, groin hematoma

**Surgical ligation** – Several places for ligation. External carotid artery can be ligated distal to the take off of the superior thyroid artery. Ligation of the internal maxillary artery is usually more successful. It can be accessed through the posterior wall of the maxillary sinus either via a Caldwell Luc approach, transnasal or transoral. The three terminal branches (sphenopalatine, descending palatine and pharyngeal) are clipped. The internal system can be accessed through a Lynch incision. The anterior ethmoid artery is 24 mm behind the anterior lacrimal crest. The posterior ethmoid artery is 12 mm behind the anterior (CLIP this; DO NOT CAUTERIZE). 6 more mm is the optic nerve.

Complications: anesthesia, oral antral fistula, CN V2 deficit, dental injury, sinusitis, lacrimal duct injury, telecanthus


HHT, absence of elastic fibers and incomplete smooth muscle in walls of blood vessels. Two types, with HHT2 being a TGB-b related gene. Affects skin, mucous membranes, viscera. Thus associated with GI bleeding, oropharyngeal lesions, retinal bleeding, and pulmonary AV fistulas. Most (90%) patients have recurrent epistaxis. Normal PT/PTT.

Among the treatment strategies employed are hormone therapy with estrogen and progesterone, antifibrinolytic agents (e.g. aminocaproic acid), embolization, and brachytherapy with 192-Iridium. Segmental dermoplasty – skin grafts to nasal mucosa. Closure of the nasal cavity has been also tried. Nd:YAG lasers have also been used as photocoagulation


Trial with Argon Plasma laser. 12 patients tx as outpt. 8 pts underwent second tx. All tx’s done as outpt with topical and local anesthesia (injected). One patient required packing after procedure and was hospitalized as a precaution overnight. 4 weeks after tx, All pts reported lower bleeding frequency after tx

*Laryngoscope 2001;111:894*. “Radiofrequency Is a Safe and Effective Treatment of Turbinate Hypertrophy”

Not sure how this relates to HHT.