Epistaxis
Current Trends in Management

David M. Poetker, MD, MA
Professor
Rhinology and Sinus Surgery
Medical College of Wisconsin

Learner Objectives
• After this presentation you should:
  – 1) understand various topical therapies for epistaxis
  – 2) be able to utilize various packing options
  – 3) be familiar with surgical options of epistaxis

Patient 1
• 45 yo male with 3 hour history of right sided epistaxis
• Steady drip, right side only
• Started after a forceful nose blowing
• No history of this before
• Not done/tried anything
Patient 1

- No past history of epistaxis
  - No easy bleeding, bruising, etc
- No nasal trauma, etc
- No PMH
  - No bleeding issues, no HTN, etc
- No PSH
- No meds
- No allergies
- No NSAIDs

Recurrent Epistaxis

- Topical therapies for uncomplicated spontaneous epistaxis:
  - Topical vasoconstrictors
  - Topical ointments/creams
  - Topical cauterization
  - Dissolvable hemostatic agents
  - Packing, balloon tamponade

Recurrent Epistaxis

- Vasoconstrictors

  - 60 ER patients
  - 65% resolved with oxymetazoline alone
  - 18% resolved with oxymetazoline/silver nitrate
  - 17% required packing
Recurrent Epistaxis

  – 5 Randomized controlled studies; n=468 patients
  – 0.5% neomycin+0.1% chlorhexidine cream vs. no therapy
  – Petroleum jelly vs. no therapy
  – No specific differences between treatments
  – 75% vs 95% silver nitrate nasal cautery
    • 88% resolution vs. 65% (P = 0.01)

Recurrent Epistaxis

• Mupirocin ointment:
  • Why not petroleum jelly?
    – 16 rabbits: 3 petrolatum or paraffin based ointments (Mupirocin nasal, bacitracin, tetracycline) consistently induced myospherulosis (lipogranuloma) at 2 and 4 weeks. Mupirocin (water soluble) did not induce changes.
  • Sindwani R et al. Myospherulosis following sinus surgery: pathological curiosity or important clinical entity? Laryngoscope. 2003.
    – Higher rates of adhesion formation in patients with myospherulosis vs. controls. (n=32, 50% vs. 18%).

Recurrent Epistaxis

• Topical tranexamic acid:
    – 29 trials involving 2612 participants
      • (28 trials surgery, 1 trial outpatient tx of epistaxis)
  – Topical tranexamic acid reduces bleeding in surgical patients
    – 216 patients: anterior packing vs. topical injectable TXA
    – Bleeding stopped in 10 minutes: 71% TXA vs. 31.2% anterior pack
    – Higher patient satisfaction in TXA patients.
Silver Nitrate

- Cauterizes by destroying tissue
  - Very easy to cause more tissue damage
  - Septal perforations possible
- Causes rhinorrhea
  - Runs into vestibule and upper lip
- Avoid in a coagulopathic patient
  - More tissue damage, more bleeding

Recurrent Epistaxis

- Silver nitrate:
    - N=24 patients treated in ED. 54% success with no recurrence
  - Complications
    - Septal perforation
    - Synechiae
    - Silver tattooing
Alternate Scenario

- Same patient but,
- Random occurrence
- Always LEFT sided
- “Start and stop for no reason”
- “Gushers”

Nasal Endoscopy
Teliangectasia Treatment

• Coblation
  – Low temperatures (<60°C) cause less thermal injury
  – Should theoretically reduce crusting/scarring and minimize risk of septal perforation.
  – Removes lesions and achieves hemostasis with same instrument.

Greater Palatine Artery

- IF: incisive foramen
- GPF: greater palatine foramen
- LPF: lesser palatine foramen
- \(^{\circ}\): Angle formed by the GPF with the midline
- a: mid-sagittal line
- b: line joining right and left GPF
- pn: posterior nasal aperture


A-B = Mucosa
B-C = GP Canal
C-D = Pterygopalatine fossa

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Greater Palatine Artery

- Greater palatine foramen to sphenopalatine foramen
  - Women 27 mm
  - Men 28 mm
- Shortest measured distance from the greater palatine foramen to the orbital floor was 31 mm
  - Woman with a distance of 27 mm to her sphenopalatine foramen.

Greater Palatine Artery Injection

- **Technique:**
  - 25 gauge needle
    - 1.5 inch
  - Bend needle
    - 25 mm (1 inch) from tip
    - 45-60 degrees
  - Insert into GPF
  - Aspirate, then inject
    - 1-2 cc
    - 1% lido 1:100,000 epi

Complications of GPA Injection

- Mercuri – reported intravascular injection, intraorbital nerve injury, and anesthesia or injury of the orbital nerves
- Sved et al. – complication rate over 10 years in 101 patients.
  - 36% incidence of diplopia
  - Secondary from diffusion of anesthetic solution through the inferior orbital fissure?
  - 10% incidence of ptosis
  - Secondary from anesthesia of the oculomotor nerve?
  - 11% of anesthetic failures
  - 1% incidence of suspected neural trauma to the palatine nerves
  - All transient, and no permanent complications

Questions?
Patient 2

- 83 yo M with 4 hour history of left sided epistaxis
- On Coumadin for atrial fibrillation and thromboembolic CVAs
- Exam?
- Labs?

Patient 2

- INR
- Scenario 1 – INR 6.5
- Scenario 2 – INR 2.5

Patient 2

- Scenario 1, INR 6.5
- Must treat medically
  - FFP, Vitamin K, green leafy vegetables, etc
- Same is true for thrombocytopenic patients, patients on heparin, platelet inhibitors, etc.
- Must correct medical cause of bleeding
Patient 2

- Scenario 2, INR 2.5
  - Therapeutic for patient
- Now what?
- Pressure unsuccessful
- What about packing?
- What are the types of packs available?

Anterior nasal packing

- Types of packing
  - Traditional ribbon gauze
  - Polyvinyl alcohol sponges
  - Expandable sponges with balloons

Nasal Packing

- **Advantages** of Non-dissolvable packing
  - Quick
  - Easy
  - Effective
  - Usually outpatient (unless bilateral)
- **Disadvantages**
  - Traumatic insertion
  - Uncomfortable
  - Need for removal
  - Potential for toxic shock syndrome
  - May distort anatomy (lateralize middle turb)
  - Holding pressure? Rhinorockets
• 6 studies, 990 patients
  – 1° outcomes were s/s of infections in patients who underwent nasal packing for epistaxis or septoplasty
• No reports of TSS
• No difference in purulent drainage in septoplasty patients
• Poor data, underpowered studies
• Must weigh pros and cons in specific patients
Prospective study of the risk of not using prophylactic antibiotics in nasal packing for epistaxis

C. PEPPER, S.L.O, A TOMA
ENT Department, St George’s Hospital, London, UK

Abstract
Background: There is wide variation in UK prescribing practice regarding prophylactic antibiotics for nasal packing in spontaneous epistaxis. There are the published cases of serious complications in each patient.

Methods: The data was obtained by searching the literature on PubMed and Compendex, using the keywords “prophylactic antibiotics” and “nasal packing”. The search was limited to studies published in English from 1990 to 2010.

Results: A total of 20 studies were included. The results showed that prophylactic antibiotics are generally not used in spontaneous epistaxis. However, in the few studies that did use antibiotics, the patients were at risk of multiple factors, such as age, underlying medical conditions, and the presence of nasal packing.

Conclusion: Prophylactic antibiotics should be considered in patients at risk of serious complications, such as immune compromised patients or patients with underlying medical conditions.

Are Prophylactic Antibiotics Necessary for Anterior Nasal Packing in Epistaxis?

• Systematic review
  – Poor evidence
• No reports of TSS ever occurring from anterior nasal packing
• Consider side effects of antibiotics
• Consider reserving for immune compromised or sick patients

Questions?
Patient 3

- 59 yo F brought in by ambulance for bilateral bleed.
- Patient is currently withdrawing from alcohol
- Known history of esophageal varices
- Anterior pressure not helping
- Now what?

Patient 3

- Labs – INR elevated consistent with liver disease
- Start banana bag, vitamin K, etc.
- How do you manage the bleeding?

Patient 3

- High association of posterior bleeds in alcoholics
- Related to varices?
- Need posterior nasal packing
Posterior Packing

- Posterior nasal packing
  - Known posterior epistaxis
  - Failed anterior packing
  - Significant discomfort during placement
  - Anterior pack necessary as well

- Types of packing
  - Balloons/ Foley catheter
  - Traditional ribbon gauze & posterior pack
  - Combinations

Posterior Packing

- Advantages of posterior packing
  - Often effective at hemostasis
  - Avoids OR

- Disadvantages of posterior packing
  - Uncomfortable placement & while in place
  - Tissue damage with placement & from pressure
  - Risk of TSS
  - Needs to be removed, may rebleed when removed
  - “Nasopulmonary reflex”
  - Risk of displacement and aspiration (rare)
  - Requires inpatient monitoring

Nasopulmonary Reflex

- Proposed in 1960-70’s to explain mortality associated with posterior packing
- Several studies demonstrate fall in pO₂ while packing in place
- The significance of this decrease and its true physiologic consequence is controversial

(Loftus et al, 1994)
Nasopulmonary Reflex

- Loftius et al monitored 1200 patient hours of continuous pulse oximetry in 19 pts.
- 2 desats: 1 pt with withdrawal, 1 aspirated clot
- Previous studies
  - Mean pO₂'s of 58, 70, 74, 75
  - pO₂ of 70 is low 90's oxygen saturation
- Validity of nasopulmonary reflex is questionable

Patient 3

- Have to worry about columellar and soft palate necrosis

Patient 3

- What if the anterior/posterior pack fails
- Now what?
Patient 3

- Options
  - Interrupt blood supply
- Surgery
  - Ligate bleeding vessel
- Interventional Radiology
  - Occlude bleeding vessel

Endoscopic Sphenopalatine Artery Ligation

Left Sphenopalatine Artery
Sphenopalatine Artery

- Sphenopalatine artery seen on axial CT

Images courtesy of Nathan Sauter, MD

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Sphenopalatine Artery

- Sphenopalatine artery and greater palatine artery seen on sagittal CT

Images courtesy of Nathan Sauter, MD

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Transnasal Endoscopic Sphenopalatine Artery Ligation (TESPAL) Technique

- Excellent option for difficult bleeds
  - May be done with or without maxillary antrostomy
  - Standard sinus instrumentation, endoscopic bipolar
  - Able to ligate/cauterize all branches of SPA
- Minimally invasive, mucosa preserving approach
- May evaluate for other sources of bleeding
- Minimal pain
- Good long term results, few complications
Transnasal Endoscopic Sphenopalatine Artery Ligation (TESPAL)

- Surgically relevant anatomy of SPA
  - SPA present just posterior to crista ethmoidalis
  - SPF may open into middle (~80%) or superior meatus (~20)
- Simmen et al., 2006: dissection of 77 cadaver heads
  - 97% had at least two branches proximal to crista
  - Only 2 specimens demonstrated single trunk
  - 47% with three or more branches
  - 37% with four or more branches
  - One specimen with 10 branches
  - Branches may exit through separate foramina (~10%)
  - Crista ethmoidalis anterior to SPF in 98% cases

Transnasal Endoscopic Sphenopalatine Artery Ligation (TESPAL)

- Outcomes:
  - Gede et al., 2013
    - Study of all TESPAL procedures performed in Denmark over 5 year period
    - Total 42 patients available for follow-up telephone interview
    - Mean follow up 6.7 years
    - 78% no recurrence of epistaxis
    - 10% required revision surgery

TESPAL vs. packing

- Moshaver et al 2004: Randomized trial comparing early TESPAL with posterior packing
  - TESPAL successful 89% cases
  - Significantly shorter hospital stay and reduced costs compared to posterior packing
- Dedhia et al., 2012 TESPAL vs. posterior nasal packing
  - Standard decision tree economic analysis
  - $6450 for TESPAL vs. $8246 for posterior nasal packing with 3 day hospital stay ($1796/patient in favor of TESPAL)
  - This increases to $6283/patient in favor of TESPAL when 5 day hospital stay
  - Slight advantage ($437/patient) for packing over TESPAL when 2 day hospital stay

Anterior & Post Ethmoid Art Ligation

- Anterior ethmoid artery is 14-22 mm posterior to maxillolacrimal suture
- Posterior ethmoid artery is 4-7 mm anterior to optic nerve
IMA Ligation

Therapeutic Options: Surgical

- Ligation of external carotid
- May be necessary in exsanguinating epistaxis
- May be performed under local anesthesia if necessary (poor surgical candidates)
- Poor control of collateral circulation
Embolization

- Introduced by Sokoloff et al in 1974
- Embolized maxillary artery
- Addition of facial artery improves success
- Materials
  - Polyvinyl alcohol of various size particle
  - Gelfoam
  - Coils
- Control of hemorrhage in 75-97%

Embolization

- Advantages
  - Local anesthesia
  - Treat surgically inaccessible vessels
  - Treat surgical failures
- Disadvantages
  - Rare but serious complications
    - Stroke, blindness, death
  - Local tissue destruction (nasal mucosa, skin, palate)
  - Not universally available
  - Contraindicated in severe atherosclerosis
  - No control of ethmoid arteries
    - Branches of Ophthalmic artery – risk of blindness

TESPAL vs. endovascular embolization

- Rudmik, Leung 2014: TESPAL vs Embolization
  - Complex, modeling based economic evaluation using a decision tree analysis with 2 week time horizon
  - TESPAL slightly less effective but significantly less expensive compared to embolization
  - TESPAL $12,484 per 0.68 effectiveness vs Embolization $22,324 per 0.70 effectiveness
  - Embo vs. TESPAL ICER $492,028, higher than any willingness to pay

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Questions?

Patient 4

- 64 yo Male with known history of HHT comes in for 8 hours of persistent bleeding
- All right sided
- Bleeds daily, usually last 5-10 minutes
- What do you know about HHT?
- What do you want to do with this guy?

Hereditary Hemorrhagic Telangiectasia

- HHT aka Osler-Weber-Rendu disease
- Autosomal dominant
- Family history, mucocutaneous telangiectasias, and epistaxis
- Epistaxis is presenting symptom in 90%
- 62% present by age 16, 100% by age 40
HHT

- Diagnosis of HHT (based on Shovlin et al 2000).
- **Definite** when three or more findings are present
- **Possible** or suspected when two findings are present
- **Unlikely** when one finding is present.
- The findings include:
  - Nosebleeds
  - Mucocutaneous telangiectases: multiple, at characteristic sites, including lips, oral cavity, fingers, and nose
  - Visceral arteriovenous malformation (AVM):
    - Pulmonary, Cerebral, Hepatic, Spinal, Gastrointestinal
  - Family history: a first-degree relative in whom HHT has been diagnosed

HHT

- HHT pathology
  - Thin vessel walls due to no smooth muscle
  - Increased angiogenesis
  - AV fistulae
  - Mucosal fragility
- Insignificant trauma induces epistaxis
- Most common disease of vascular structures leading to recurrent epistaxis
- Conservative therapy initially
HHT

- Less is more
- Hold pressure
- Do not pack with anything removable
- Consider Floseal, Posisept, or Sinufoam
- Call ENT
- Consider embolization
  - Temporary improvement but hard to get all terminal branches

Any Questions?

Summary - Do

- Be selective
  - Trim a sponge and place directly over spot
- Be creative
  - Thrombin injected into a sponge
- Start conservatively
  - No algorithm will work for all patients
  - Base management on a case by case basis
- Manage medical issues first
Summary – Do Not

• Do not:
  – Rush patients to the OR
  – Silver nitrate everything
  – Treat all patients the same

Thank you!