Black: doctor's lecture.
Gray: 427 booklet.

# NOSE Ⅳ

# -Epistaxis, Nasal Septum, and Turbinate Hypertrophy–

## EPISTAXIS

90% don't present to the hospital as it bleeds for a little time then stops spontaneously.

**A. CAUSES:**

1. Nasal corna. (?)
2. Nasal picking.
3. Foreign bodies.
4. Forceful blowing.
5. Adenoid.
6. Infection, allergic rhinitis, URTI → commonest cause.
7. Chemical irritation.
8. Medications.
9. Weather: drying of nasal mucosa.
   - Dry weather: (winter in western)
   - Low humidity and warm weather: (summers in here)
10. Deviated septum.
11. Bleeding polyp.
12. Inverted papilloma.
13. Neoplasm of the nose or sinuses.
14. Tumors of the nasopharynx (especially angiofibroma, or could be carcinoma. Asses if adult patient present with espistaxis)

    ANGIOFIBROMA
    - Adult, male, unilateral, severe nasal bleeding not easy to stop → think angiofibroma.
    - CT scan with contrast → to know feeding vessel.
    - Never take biopsy from bloody area → take immediately to OR.
    - Treatment: *external carotid* embolization, wait 10 days or couple of weeks to shrink but before collateral form, then resect.
    - Radio or chemotherapy *not* done nowadays.
15. Systemic Causes:
    - Hypertension.
    - Endocrine.
    - Pregnancy.
    - Pheochromocytoma.
    - Hereditary Hemorrhagic telangiectasia (HHT) AKA Osler-Weber-Rendu disease. (Rare)
    - Anticoagulant medications.
    - Coagulopathies (thrombocytopenia) "seen usually in hematology not ENT"

**B. NASAL BLOOD SUPPLY:**

a. *Internal* and *external carotid* arteries contribute:
   i. *Anterior* and *posterior ethmoid* "branches of *ophthalmic artery* → branch of *internal carotid"*
   ii. *Sphenopalatine* artery "branch of *maxillary* which in a branch of *external carotid*"

b. Many arteries and venous anastmosis: (where we expect the bleeding to come from – due to a lot of blood supply)
   1. Little's area (Kiesselbach's plexus) → anterior part of he septum.
   2. Woodroof area→ Posterior part of the septum.
   [Vascular supply of medial and lateral walls is similar]

**C. TYPES:**

1. **Anterior**:
   a. Young adults and children.
   b. Usually due to nasal mucosal dryness.
   c. May be alarming: can't see the blood readily, it disappears.
   d. 90% don't come to the hospital.
   e. If it's anterior → usually a small cut or ulcer anteriorly is seen by examination.
   f. Management (conservative):
      i. Digital pressure for 5-10 minutes. Up to 20 minutes.
      ii. Silver nitrate cautering of bleeding vessels.
      iii. Topical anticoagulants: ①collagen absorbable hemostat (used in fragile patients "hemophilia, leukemia, liver disease…" not on routine cases. Because taking in and out packing will cause trauma) ②non-absorbable (routinely).
      iv. Anterior nasal packing → for refractory epistaxis.
      Sponges like merocel packing or gauze packing.
      Anterior nasal packing → admission or not.

2. **Posterior**:
   a. Elderly.
   b. Causes:
      i. Hypertension, systemic diseases "common and contributing factors"
      ii. Septal deviation.
      iii. Bleeding in posterior nasopharynx.
   c. More challenging to control.
   d. Management:
      i. IV pain medication. (not necessarily IV)
      ii. Topical anesthesia.
      iii. Anxiolytic, antiemetic. (might be needed)
      iv. Vasoconstrictors: to improve visualization.
      By endoscope, you can find the posterior bleeding site but general anesthesia is needed → done in OR.
      It may be very hard to locate, or comes and goes so …

v. **Posterior nasal packing** with Folly's catheters.
2 folly catheters in the nose then inflate them put the posterior to stop the bleeding. (An outpatient procedure).

(There's a risk of ischemic heart attack "nasocardiac reflex" as they are usually hypertensive predisposed to cardiac arrest → admit, assess the saturation, high oxygen and humidity for prevention)

- If folly catheter is inflated too much posteriorly → may injure nasopharynx → atrophy or eustachiam tube closure and middle ear problem (middle ear effusion most likely just like barotraumas injury).
- If the bleeding point is not seen → most likely of posterior origin → its an ENT emergency and needs to be admitted.

If bleeding not controlled after packing …

vi. ①Great palatine foramen blockage, ②septoplasty, ③endoscopic cauterization, ④embolization (invasive embolization for *external* carotid <u>not</u> internal), ⑤external carotid ligation (identify two branches before ligation to know for sure its *external* <u>not</u> internal)

[go by sequence]

Patient still bleeds…

vii. Transsphenoid artery ligation (anterior and poterior ethmoid, sphenopalatine…) "anterior and posterior packing even with ligation" Sometimes even after all ligation, patient bleed…

**D. MANAGEMENT:**

1. **History** is very important (Previous nasal bleeding, trauma, family "Osler-Weber-Rendu, hemophilia…etc; ", hypertension, diabetes, cardiovascular, hepatic disease, anticoagulants, duration… etc;).
2. **Physical examination**: Blood pressure (vital signs)
3. Apply *direct pressure* on external nose → to help decrease the bleeding. "first step ask the patient to pinch the external nose and sit in a sneezing position"
4. *Vasoconstrictor* spray mixed with *local anesthesia* "to reduce the pain"
5. Identify the *bleeding source* if possible. (Anterior little's area is easy to identify while the woodroof is hard to identify)
6. *Assess blood loss* (vital signs)
    a. Hematocrit → on spot, relay on it. (but not hemoglobin because hemoconcentration won't change at first)
    b. Heart rate (tachycardia): first thing to rise. Could be due to other reasons as anxiety.
    c. Blood pressure: once dropping, its too late (hypovolemic shock)
    d. Clots → indication for severity "big loss".
7. *Cross match* and prepare for transfusion.
8. *Volume expanders* (Saline or dextran) "sometimes until needed blood components available"
9. *Topical decongestants.*

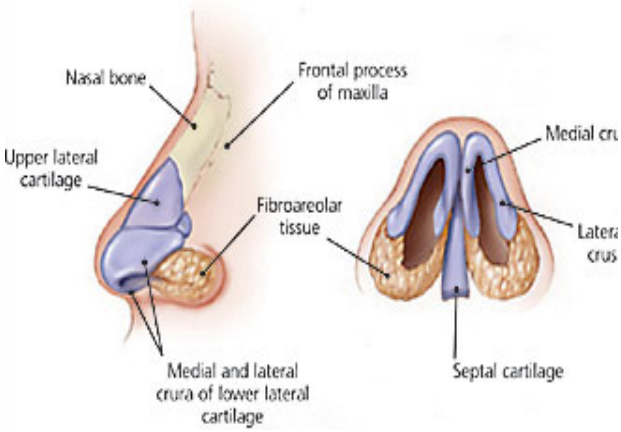
10. Nasal *specula, suctions,* and *syringes.*
11. *Cautery* (if needed)
12. *Packing:*
    - Both sides even if bleeding from one side → to counteract pressure.
    - Gauze (in old days) and Merocel (nowadays).
    - *Merocel*: compress when dry and expand when wet (blood or saline → compact and stop bleeding)
    - Leave packing 1 or 2 days after the bleeding stops.
    - Antibiotic → because of increase in secretions and infections.
      If packing (anterior and/or posterior) more than 24 hours → give antibiotics (cause drainage blockage may lead to infection. In all patients)
    - Not too loose or too tight.

In general:
- Usually unilateral.
- In most cases, bleeding is mild and stopped spontaneously. (Clean, send home then 2-3 days follow up).
- 95% of the cases controlled by anterior and posterior packing.
- 5% of bleeding cases wont stop by packing or cauterization.
- 2% of them stop bleeding by anterior ethmoidal artery ligation.
- 2% do not respond to any of the procedures mentioned above → Caid-luc approach (ligation of posterior ethmoidal artery in ptrygoid fossa through maxillary sinus).
- 1% is due to sinus tumor (angiofibroma), which is difficult to treat, and excision of tumor.
- In serious bleeding (mostly in old aged) → CT scan to check nasopharyngeal carcinoma or maxillary sinus tumor. (after you secure the patient).

**Emergency nasal obstructions:**
1. Septal hematoma: drain immediately cause it involves mucosa "elevating it"
2. Septal abscess: could extend to the brain "intacranial infection"
3. Mucormycosis: invasive fungal sinusitis (vascular necrosis) → debridement.
4. Bleeding: epistaxis. (nasal emergency but not an obstruction one)

# NASAL SEPTUM

## ANATOMY




- Septum is composed of anterior cartilaginous part and posterior bony part.
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- **Cartilaginous septum** is quadrilateral, composed of:
  a. Septal cartilage: big one.
  b. Vomer nasal cartilage: smallest strip of cartilage.
  c. Medial crura of alar (lower lateral cartilage): the anterior part seen of the nose.
- Cartilage is soft, absorbs trauma protecting other structures.
- Small membranous septum –only membrane no septum- (located in the vestibule itself) between crura and …. → Allowing movement of crura against the septum to absorb trauma and shock.
- Medial crura are forming part of the septal cartilage so they deviate with septal deviation. And they correct with correction of septal deviation as well.

- **Bony septum:**
  1. Vomer (lower part): attached to sphenoid, floor of the nose, maxillary crest.
  2. Cribriform of ethmoid: have to be gentle not to crack the cribriform plate (fibrous) → intracranial complications.

- Septum articulating points:
  - Nasal spine of *frontal* bone → *superior*.
  - Anterior wall of *sphenoid* → *posterior*.
  - Crest of the *nasal*, *maxillary* and *palatine* → *inferior* (floor).

- Medical importance of ethmoid: arising from mesoethmoid, calcifying by age of 17 → don't intervene surgically in children as it may intervene with the growth centers (septum contains growth center of the nose). Wait until adulthood unless a severe case → limited septoplasty may be needed.

- Blood supply:
  - Blood vessels run in the mucosal layer covering the cartilage.
  - Facial artery → main artery of the nose.
  - Nose above the level of middle turbinate → anterior and posterior ethmoidal arteries (terminal branches of internal carotid artery).
  - Nose below the level of middle turbinate → ①sphenopalatine, ②greater palatine and ③superior labial arteries (external carotid artery).

## SEPTAL DEVIATION

- 80% of population have deviated nasal septum → normal as long as it's not symptomatic (it doesn't force mouth-breathing. Ask if mouth-breathing in sleep cause it's not controlled)
- Nasal obstruction → overcame by nasal cycle: autonomicnervous system control of vessels → one obstructs "vessels engorge and enlarge " the other open " vasoconstrict and decongest"
- Treat underlying cause in nasal obstruction (allergy, infection…) but in cases of septum deviation, only when severe enough and causing symptoms (obstruction), which is constant and *not* alternating (nasal cycle).
- Any part of the septum can be deviated except the *posterior free border of the choana* (always in the mid line).
- Common areas of infection: along the articulation between the vomer and perpendicular plate of ethmoid and so forth → affecting growth (one grows more than the other) → septum deviates. **[?]**

**Types of septal deviation:**

1. Congenital.
2. Trauma.
3. Common defects.
4. Spur (extra bone growth)
5. Crest.
6. Dislocation.

**Symptoms:** Unilateral or bilateral. (When air hits the deviated septum)

1. Obstruction: Most common, and what it usually presented by.
2. Epistaxis: 2nd common.
3. Recurrent sinusitis: rare.
4. Hyposmia: rare.

**Diagnosis:**

1. Anterior rhinoscopy (binocular: both eyes so seeing *height, width* and *depth*) → better than endoscopy in septal deviation.
2. Endoscopy (monocular: seeing with one eye so seeing only *width* and *height*)
3. CT (views better)

- Usually convex and concave sides (deviation) but sometimes only convex part with sharp projection of the septum (spur)
- Caudal-end dislocation: cosmetic.

**Surgical management:**

1. Septoplasty: correction. (better: less chance of complications and perforation)
    - An incision → elevating mucoperichondrium and mucoperosteum → cut (freeing) → going to the other side → resection of deviated septum (cutting the elongated part and putting it in the center)

        - Preserving *L-strut* (1 cm) because it **supports** the tip and dorsum (if resicted leads to complications:
            1. Saddle deformity (cosmetic only)
            2. Synichiae (adhesions between medial and lateral walls)

        (Silastic sheet to prevent attachment between two surface areas)
    2. Sub-mucous resection: removing the deviated part.
- Indications for surgery:
    1. Symptomatic (obstruction, epistaxis)
    2. Sinusitis: septoplasty if its obstructing the way to the sinuses.
- Complications:
    a. Perforation: (IMP.)
        - Causing *crusting* and *bleeding*. *Wheezing* if small and anterior.
        - Seen by CT.
        - Treatment:
            1. Silastic button (blocking the perforation → symptoms of dryness and bleeding disappear)
            2. Surgical closure: rotational flaps (high failure rate)
    b. Saddle and nasal deformities.
    c. Resicting cartilage anteriorly → blurred fracture → CSF leakage. **[?]**
    d. Septal hematoma.
    e. Septal abscess.
    f. Anosmia.
    g. Bleeding.
    h. Injuring cribriform plate → CSF rhinorrhea.
- X-rays *not* used.
- CT → bone involvement or mass.
- Endoscopy → routine for: nasal, sinuses, and turbinate cases.
- Septal Mucosal Resection (SMR) → *not* used nowadays.
- Septoplasty → used.

## SEPTAL HEMATOMA

- Not common.
- Mostly in patients with **traumatic** adenoid (e.g. hit on the nose)
- Mostly bilateral (even if it looks unilateral, check and drain other side cause could be a hidden small one)
- *Mucosal septal flap* elevated → septal hematoma.
- **Diagnosis:** History (trauma) and CT.
- Once diagnosed → drain blood then *silastic sheet* OR *transfixion incision* to prevent re-accumulation of blood.
- Treat underlying cause.
- If untreated can lead to: *septal abscess*, *cavernous sinus thrombosis*, *saddle deformity* (because septal blood supply comes from perichondrium and periosteum so hematoma separates the two → nasal absorption → saddle deformity)
- **Management:**
    1. Drain.
    2. Pack and prophylactic antibiotic.

## TURBINATE HYPERTROPHY

- **Causes:**
  1. Turbinate infection.
  2. Allergies.
  3. Compensation of septal deviation on the concave side.
  4. Dysfunction (with tracheostomy or laryngectomy).
- **Manifestation:**
  1. Obstruction.
  2. Mouth bleeding.
  3. Manifestations of whatever underlying cause (infections, allergies…)

- In anterior rhinoscopy, *anterior part of inferior turbinate* is the only one seen of all turbinates.
- Turbinate have some *smell* fibers.
- Investigations same as septal deviation (CT mainly, endoscopy must, X-ray not needed, MRI?)
- Turbinates problems mainly in *inferior* or *middle* ones.

- **Treatment:**
  - Treat underlying cause.
  - Surgical: good outcome and doesn't recur.

  1. **Submucus Maxillary Resection (SMR)**
  2. **Turbinoplasty**
     - Taking out the non-functional part, and leaving the functional one.
  3. **Submucosal Diathermy (SMD):**
     - Cautery to submucus (using radio frequency to cauterize).
     - Long needle to cauterize only limited anterior part of inferior turbinate.
     - Local anesthesia → outpatient procedure.
  4. **Partial Turbinectomy:**
     - Have to preserve the major component of turbinate to do the function.
     - Removal of mucosal erectile and bony part.
     - Can't differentiate which part of turbinate is enlarged; bony or eractile.
     - Apply cotton with epinephrine for 10 minutes, and then take it out.
     - If the turbinate shrinks → erectile enlargement.
     - If not → bony.

**Goals of any turbinate reduction:**

1. Mucosal preservation
2. Control reduction not to cause submucosal scarring → reduce recti major of the mucosa
3. Bony reduction: if necessary.
4. Minimal complications.

   (Sometimes patients would complain of obstruction afterwards because of roomy nose "they lose the feeling of air hitting on the turbinate" → feeling it's obstructed despite the fact that there isn't anything really obstructing)