



433 Teams
ENT

Nose III & IV

Color index:

Doctor's lecture – **Important** – Details and explanation

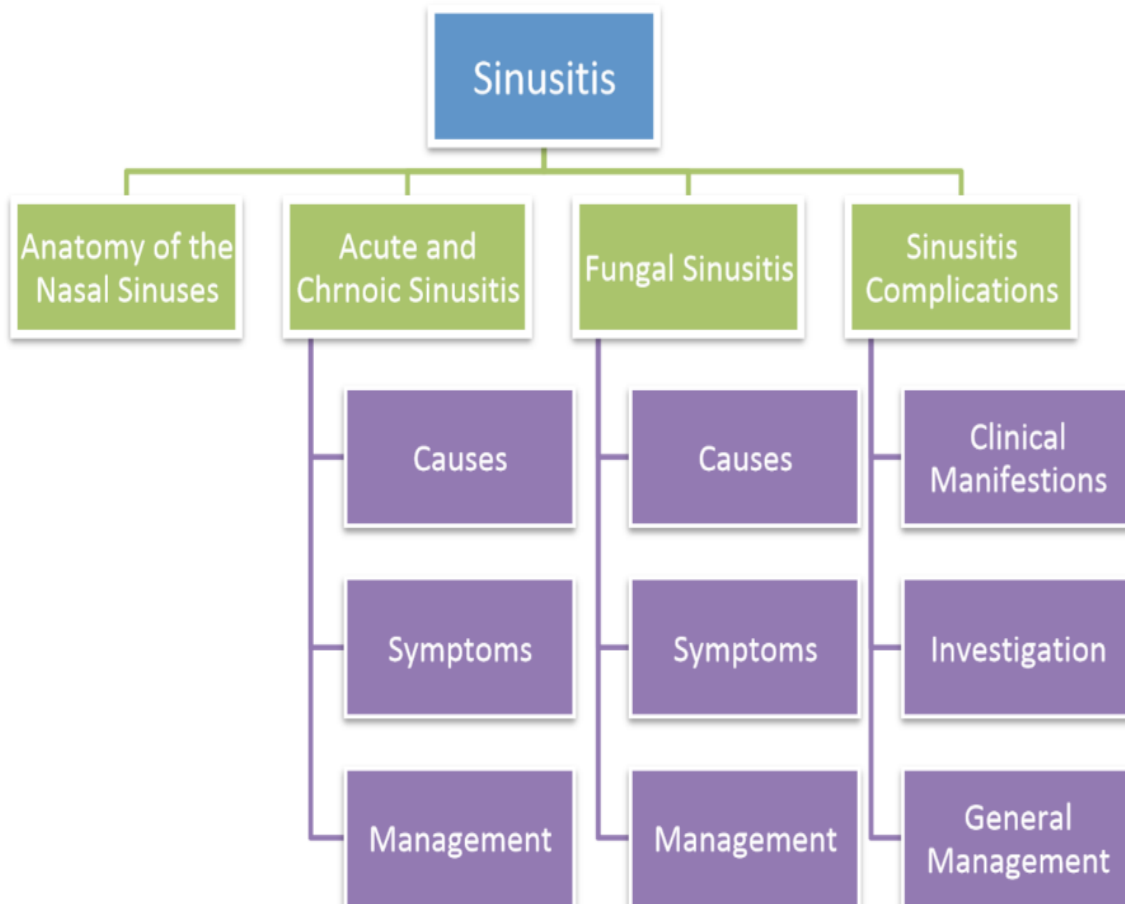


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Objectives

- 1- Acute & chronic sinusitis(causes, clinical & management).
- 2- Fungal sinusitis (in brief).
- 3- Complications of sinusitis (classification, management & with special attention to orbital complications, investigations & general treatment), radiology illustration.
- 4- diseases of nasal septum(DNS etc.).
- 5- Epistaxis(causes, clinical & management).
- 6- Turbinate hypertrophy.
- 7- Nasal operations(FESS, septoplasty, turbinate surgery) in short.



Introduction

Nasal infections are common cold, acute sinusitis (10 days-3 months) and chronic sinusitis (more than 3 months).

- All are an infection within the nasal cavity, difference is in the **duration** and some minor symptoms.

- Generally they all present with same symptoms:

PODS (Pain or facial pressure - Obstruction - Discharge "which is thick, purulent and sticky" - Smell).

- Discharge can be either anterior rhinorrhea, from anterior nostril or postnasal drip, expelled by the mouth or swallowed.

- These symptoms are different from Allergic rhinitis symptoms which are absent in common cold and sinusitis.

(Sneezing, Itchiness and Runny nose "a term used to describe thin watery and frequent nasal discharge")

Common Cold

- Very common, almost affects any person in life.

- **Lasts for less than 7 days.**

- **Usually the cause is viral** (Rhinovirus, Influenza A/B virus, parainfluenza virus, RSV).

- It gets better with time (worse in first day and much better in last day), if it becomes better but then drop again

(**double peak** or "worsening after initial improvement"), it is considered as acute sinusitis even if less than 10 days.

Why is this important?

Because management will differ.

Common cold is not managed by Antibiotics, rather you only advise the patient to rest, drink large amount of fluids and use analgesics and decongestant if needed).

Acute Sinusitis

- Inflammation of the mucosal lining of the nasal cavity and paranasal sinuses **lasts more than 10 days and less than 3 months**.
- It infects huge number of people worldwide and has an impact on their life.
- Women are affected more than men (Some studies accounted that women deal with children more than men and thus they are more exposed to microorganisms).

- **Acute** – the persistence of upper respiratory symptoms for greater than a 7-day course but lasts less than 4 weeks.
- **Subacute** - nasal symptoms lasting 4 weeks to 12 weeks.
- **Chronic**– persistence mucosal inflammation for > 12 consecutive weeks despite medical therapy or occurrence of more than 4 episodes a year. (A2)

Predisposing factors

Any thing that disturb normal physiology (obstruction , abnormal ciliary function , change in the quality of the nasal mucus , ETC) (F2)

1. Nasal obstruction by nasal polyps, tumor, mucous plug, edema, septal deviation or head trauma causing blockage of sinonasal pathway, **Ostiomeatal complex obstruction**.
2. Ciliary dysfunction (Primary ciliary dyskinesia) like in Kartagener's syndrome. Both will result on stagnation of nasal secretions, creating a good environment for the bacteria to grow.
3. Altered quantity or quality of the nasal mucous (That's why patients with sinusitis are advised to drink large amounts of fluids to increase the quantity and to correct the quality of the mucous to be thin and eradicable).

This is commonly caused by **dehydration** (common in elderly) and **cystic fibrosis** (in which, mucous is thick and poorly discharged, almost 99% of

Note: The **ostiomeatal complex** (or unit), sometimes less correctly spelled as osteomeatal complex, is a common channel that links the frontal sinus, anterior and middle ethmoid sinuses and the maxillary sinus to the middle meatus that allows air flow and mucociliary drainage (F2)

cystic fibrosis patient will encounter an episode of sinusitis in their life).

Etiology

- Viral (More in common cold).
- Bacterial

(*Streptococcus pneumonia*, *H. Influenza*, *Moraxella cattharalis*).

The most common cause of acute sinusitis is a viral infection associated with the common cold. Bacterial sinusitis occurs much less commonly, in only 0.5 to 2 percent of cases, usually as a complication of viral sinusitis. (Uptodate)

History

- Symptoms: (PODS)

1/Pain: Ask about the site to know which sinuses is affected and to exclude

The location of the pain can help to differentiate what is the sinus that is effected , Usually the pain increase when the patient lean forward (دوجسا) (F2)

other causes of upper facial pain and pressure e.g. Migraine)

2/Obstruction: Ask whether unilateral or bilateral (Each have a list of differentials).

3/Discharge: Ask about thickness, consistency, color, amount, frequency and if anterior or comes as post nasal discharge (Posterior).

4/Decreased in smell sensation (Anosmia "Complete" or Hyposmia "Partial").

- Systemic symptoms: fever, fatigue muscle pain.
- Ear symptoms: patients with acute sinusitis may present with otitis media due to Eustachian tube dysfunction secondary to sinusitis.
- Dental issues (Especially if unilateral symptoms) (e.g. a patient present with symptoms of acute sinusitis due to tooth extraction and spread of organisms "Usually anaerobes" from the tooth origin to maxillary sinus all the way to the other paranasal sinuses causing acute sinusitis). (In this case the Treatment is: **Metronidazole or Clindamycin**)
- Visual and neurological symptoms: symptoms of sinusitis complications (Will be discussed later).
- Duration.
- Immune status (**Be more aggressive in treatment in these patients**).

Examination

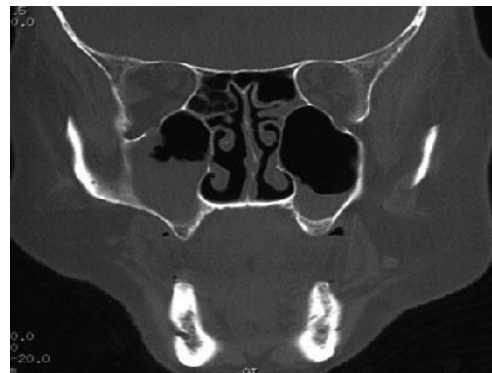
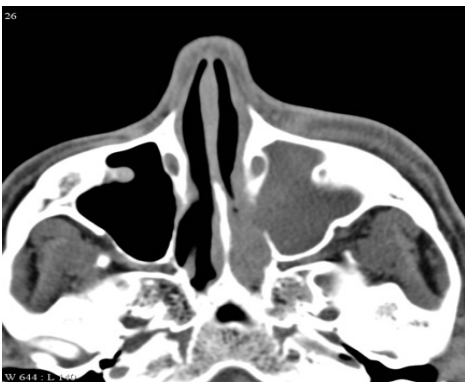
- Fever, facial edema, erythema and tenderness around the nose.
- Using a speculum to inspect the nose from inside or by a nasoscope: signs of inflammation (redness, swelling and discharge).
- Look at any cause of obstruction or deviated nasal septum.
- Sometimes, brief look at the oral cavity to see the teeth is important if you suspect the origin of infection is dental.

Investigations

- **It depends how bad the disease is**, sometimes no investigations are done at all.
- If the patient really sick, do:
 - CBC, ESR.
 - Culture: **only done if the patient had been given antibiotics and didn't improve, or if you suspect uncommon microorganism.**
- CT scan, when you suspect something serious (e.g. Meningitis, like when the patient reported photophobia). CT shows: Mucosal thickening, fluid filled sinuses and soft tissue density

(إذا عطيت المريض مضاد ولا أشوى، تسوي مزرعة عشان تكشف نوع البكتيريا)

Better anatomical delineation and assessment of inflammation extension, causes and complications. Peripheral mucosal thickening, air/fluid level, air bubbles within the fluid and obstruction of the ostiomeatal complexes are recognised findings.



Treatment

1) Antibiotics

1st line: Amoxicillin, if the patient is penicillin allergic give Macrolides (Clarithromycin or Azithromycin).

2nd line (if the patient Amoxicillin + Clavulanic acid), if the patient is penicillin allergic give Fluoroquinolones (Ciprofloxacin or Levofloxacin).

2) Analgesics, Decongestant, High fluid intake and Sinus wash.

3) Intranasal Corticosteroids

(Help to avoid the progression to chronic sinusitis).

Because antibiotics are effective only against bacterial, and not viral, infections, most people with acute sinusitis **do not need antibiotics** and would be putting themselves at risk for medication side effects and for developing antibiotic resistance by taking them for nonbacterial sinusitis. UPTODATE

The initial treatment aims to relieve the symptoms, since almost everyone will improve within 7--10 days. At this stage, antibiotics can only be used if there is clear evidence of severe bacterial infection. So as an initial treatment, we can give acetaminophen or ibuprofen for the pain, flushing the nose and sinuses with a saline solution to decrease pain associated with nasal congestion, and nasal decongestants to temporarily treat congestion. A2

Chronic Sinusitis

Inflammation of the mucosal lining of the nasal cavity and paranasal sinuses **lasts more than 3 months**.

- Those patients suffer a lot while nobody can feel or understand their problem.
- It's one of the diseases that severely affect the quality of life.

Predisposing factors

1. Long standing nasal obstruction. (Choanal atresia , Deviated septum, Polyps/foreign bodies, Turbinate/adenoid hypertrophy)
2. Transnasal tube or NG tube that is left for a long time (e.g. in ICU).
3. Atopic (Allergic) rhinitis.
4. Primary ciliary dyskinesia. “due to dynein arm defects, : primary ciliary dyskinesia lead to reduced mucociliary clearance of the respiratory tract “therefore chronic URTIs and LRTIs” and male infertility. It is also associated with dextrocardia, sinusitis, rhinitis, pneumonia, and otitis media “
5. Cystic Fibrosis. “characterized by decreased chloride secretion due to protein transmembrane conductance regulator (CFTR) mutation, results in thicker/sticker mucus adherent to bacteria”
6. Poor quality of the mucous.
7. Hormonal factors (a common disease in puberty and pregnancy due to hormonal changes).
8. Acid reflex (GERD).
9. Immunodeficiency.
10. Patients with hyper inflammatory status such as Wegner's disease (also called Granulomatosis polyangitis).
10. Dental procedures.
11. Churg-Strauss syndrome.

Etiology

Almost always a bacterial cause (*Staphylococcus aureus*, coagulase negative staphylococci and *Pseudomonas* species and less commonly Bacteroids and other anaerobes).

"Staph Aureus and some other bacteria are able to release what is called **Superantigen**; in which the immune system is activated aggressively in a non-functional way, this is done in order to distract the immune system from the site of infection and deviate it to other sites in the body. When this occur, immune cells start proliferating to release huge amount of useless antibodies, those patients have Eosinophilia, Hyper IgE".

History

- Symptoms: **Just like acute sinusitis (PODS)**.
- **No fever** (very important hint for chronic sinusitis). However they may encounter other systemic symptoms (fatigue, tiredness and muscle pain).
- Ear symptoms
- Halitosis
- Dental issues
- Visual and neurological symptoms
- Immune status
- Duration: **more than 3 months**.
- **It's important to ask about cough and exaggeration of asthma** (They are commonly associated with chronic sinusitis)

- It was noticed that when you deal with chronic sinusitis, asthma symptoms improves a lot and the need of asthma medications is reduced dramatically.

There are four cardinal signs/symptoms of CRS in adults:

- Anterior and/or posterior nasal mucopurulent drainage
- Nasal obstruction/nasal blockage/congestion - Facial pain, pressure, and/or fullness
- Reduction or loss of sense of smell (A2)

Examination

- Facial edema, erythema and tenderness around the nose
- Swelling and redness of nasal cavity using a Rhinoscope, you may also see nasal polyps as a predisposing factor to develop chronic sinusitis or as a complication of long standing chronic sinusitis.
- Brief dental exam.

Investigations

- CBC (Eosinophilia, since many patients have chronic sinusitis due to allergic rhinitis).
- Culture (If the patient wasn't responsive with the treatment), The culture must be directly from the sinus cavity because nasal culture have no diagnostic value (normal flora) (F2)
- CT (standard to be done in chronic sinusitis, to confirm the diagnosis and to assess the severity of the disease, also should be done pre-surgically).
- MRI (look for complications).
- Others: IgE, ESR, Serology (in case of autoimmune diseases).

Treatment

- 1) Mainstay treatment is local intranasal corticosteroids.
- 2) Systemic steroids orally (Only given in chronic sinusitis).
- 3) Antibiotics (same): given for 14 days.
 - 1st line: Amoxicillin, if the patient is penicillin allergic give Macrolides (Clarithromycin or Azithromycin).
 - 2nd line (if the patient Amoxicillin + Clavulanic acid), if the patient is penicillin allergic give Fluoroquinolones (Ciprofloxacin or Levofloxacin).
- 4) Next step is surgical treatment + Steroid is given after the surgery to reduce the inflammatory changes (e.g. scarring) during the process of healing.

Post Operative Care :

- Oral Antibiotics for a minimum of 2 weeks
- Aggressive nasal hygiene to prevent adhesions (saline irrigations)
- Nasal steroids
- Nasal debridement at 1, 3, and 6 weeks (F2)

Complications of sinusitis

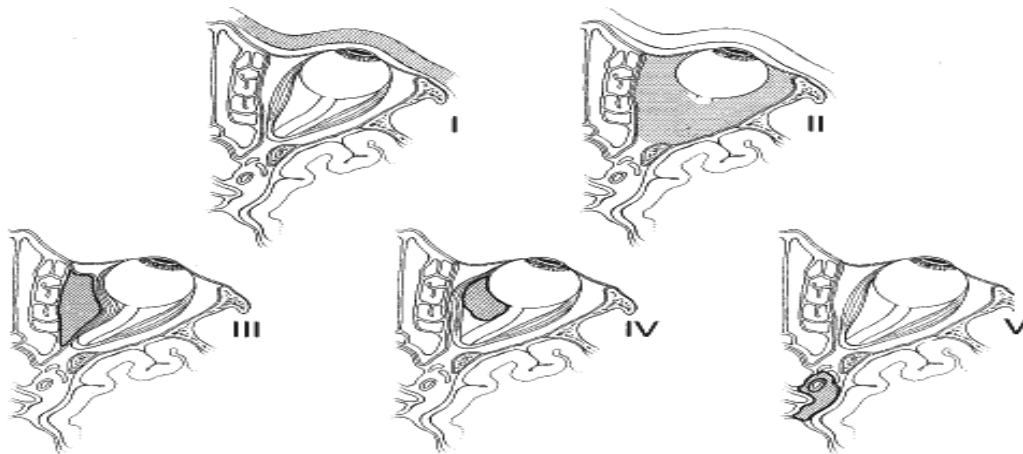
Classified by **Chandler**, all can occur in acute or chronic (more in chronic).

Group	Condition	Description
Group 1	Preseptal cellulitis	Inflammatory edema primarily limited to eyelid due to restricted venous drainage
Group 2	Orbital/postseptal cellulitis	Progressive inflammatory edema involving globe marked by chemosis
Group 3	Subperiosteal abscess	Collection of purulence between bone and periosteum with development of proptosis
Group 4	Orbital abscess	Collection of pus in orbital contents with onset of ophthalmoplegia
Group 5	Cavernous sinus thrombosis	Progression of inflammation intracranially with onset of fever, headache, and cranial nerve palsy

Treatment Of Complications (F2)

- History and physical examination
- Ophthalmology consultation
- IV antibiotics (ceftriaxone plus metronidazole and oxacillin)
- CT scan
- Surgery -- abscess, worsening vision, progression, persistent after 24 hours
- external, FESS, frontal sinus trephine

Cavernous sinus thrombosis is very dangerous to the extent of full blindness and death, give IV antibiotics, steroids and anticoagulants.



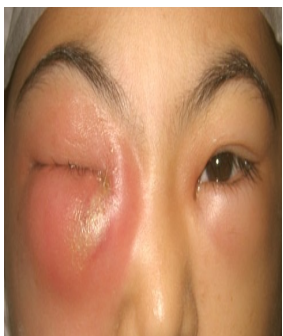
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III

IV

V



Mucoceles : F2

Mucoceles are **chronic, cystic lesions** of the sinuses lined by pseudostratified epithelium

Expand **slowly**, often requiring many years

Etiology is debated. Either due to obstruction of ostia or to simple obstruction of minor salivary gland

30% are idiopathic

Others Complications: F2

Osteitis , Pot's Puffy Tumor , Superior Orbital Fissure Syndrome , Orbital Apex Syndrome Sinocutaneous Fistula

Fungal Sinusitis

A fungal infection of the paranasal sinuses.

Fungal colonization of the upper and lower airways is a common condition, since fungal spores are constantly inhaled into the sinuses and lungs.

Types :

1/Noninvasive fungal sinusitis: Absence of fungal hyphae within the mucosa and other structures of the paranasal sinuses

A-Allergic fungal sinusitis it's a hypersensitivity reaction against normal fungal flora which the patient is allergic to. Treated by steroids only.

B-Fungus Ball (fungus Mycetoma)

- Patients with AFS are **atopic**
- Unresponsive to antihistamines, Intranasal Corticosteroids, and prior immunotherapy
- Patients with AFS always are **immunocompetent**
- Two thirds of patients report a history of allergic rhinitis
- 90% of patients demonstrate elevated specific IgE to one or more fungal antigens.
- CT Scan is heterogeneous and shows calcification F2

2/ Invasive fungal sinusitis: Presence of fungal hyphae within the mucosa, submucosa, bone, or blood vessels of the paranasal sinuses

Can be **acute** or **chronic**..:

A- Acute invasive fungal sinusitis is usually seen in immunocompromised patients (**Very common in cancer patients who're receiving chemotherapy**) and has a time course of days to few weeks. It is very dangerous and should be detected and treated early, otherwise the patient may die.

Those patients are usually hospitalized and are very sick with fever, cough, nasal discharge, headache, facial pain, decrease sensation of face, and mental status changes.

B- Chronic fungal sinusitis is usually seen in patients who are less immunocompromised with a time course greater than 3 months.

C-Chronic Granulomatous Invasive Fungal Sinusitis

Patients with fungal sinusitis in general are immunocompromised, usually due to uncontrolled diabetes, cancer, HIV, organ transplantation or using systemic or intranasal glucocorticoids.

Signs and symptoms: PODS, fever, dark ulcers within the septum, turbinates, or palate due to ischemia. In the late stages, signs and symptoms of cavernous sinus thrombosis are present.

Diagnosis

- Early nasal endoscopy and **biopsy** of affected tissues once you suspect fungal sinusitis (Very important), culture of the specimen is usually positive.
- CT or MRI: Assessing the extent of infection.

Treatment

1/Aggressive **endoscopic debridement** including the orbit if involved (The orbit may be removed completely, that's why you need to diagnose the patient correctly by a biopsy and differentiate it from bacterial sinusitis).

2/IV antifungal medications (**Amphotericin B**).

3/Leukocytes transfusion.

4/Granulocyte-macrophage colony-stimulating factor (GM-CSF): Given to stimulate WBCs release from bone marrow.

Always remember: Sinonasal symptoms in an immunocompromised patients is fungal sinusitis until proven otherwise.

Epistaxis

Bleeding from the nose.

- Very common, ranges from mild one to very severe.

Anatomical importance

Little's area (Kiesselbach's plexus), a round area located at the tip of the nose specifically the most anteroinferior part of nasal septum, formed of anastomosis between four arteries

1/Anterior ethmoidal artery and posterior ethmoidal artery (both from the ophthalmic artery)

2/Sphenopalatine artery (terminal branch of the maxillary artery)

3/Greater palatine artery (from the maxillary artery)

4/Septal branch of the superior labial artery (from the facial artery)

Little's area is the source of bleeding in most of the cases.

Woodruff's plexus: F2

Sphenopalatine A (IMAX)

Posterior epistaxis occur primarily in old adult

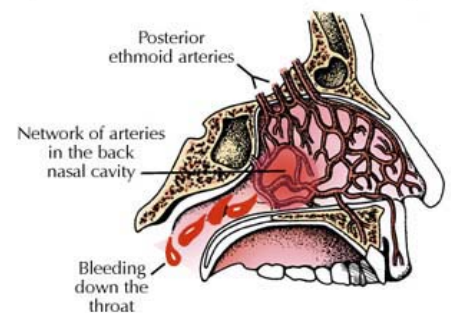
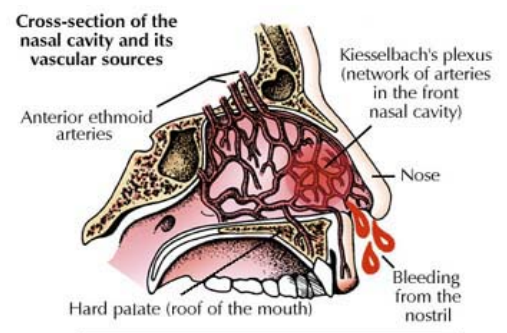
Causes

1/Local causes:

- Trauma (common in children who play with their nose frequently).
- Drying of the nasal mucosa from low humidity
- Tumors of the nasopharynx especially Nasopharyngeal Angiofibroma

2/Systemic causes:

- Coagulopathy.
- Vasculopathy (e.g. **hereditary hemorrhagic telangiectasia**, in which blood vessels are wide and prone to bleeding).
- Anti-coagulant use (Medications like Aspirin/Warfarin or food like garlic).
- Aging (In which arteries are very fragile).



History

- How much, How long and How frequent.
- Previous bleeding episodes
- Nasal trauma
- Family history of bleeding
- Hypertension - current medications and how tightly controlled
- Hepatic diseases
- Use of anticoagulants
- Other medical conditions - DM, CAD, etc.
- Unilateral or Bilateral
- Symptoms: **Dizziness, Loss of consciousness.**

Examination

- Look for signs of anemia.
- Rhinoscope (To detect the site of bleeding)

ANTERIOR

- Most common in younger population
- Usually due to nasal mucosal dryness
- Usually controlled with conservative measures

POSTERIOR

- Usually occurs in older population
- HTN and SYS diseases are common contributing factors
- Significant bleeding in posterior pharynx

Investigations

- CBC (Look for anemia and platelet count).
- Coagulation profile (PT/PTT and Coagulation factors).
- Cross matching (If the patient present to ER with active bleeding, to save time when the patient needs blood transfusion).
- CT scan (Helps in detecting the etiology, e.g. nasal tumor as a source of bleeding and pre-surgical assessment).
- Angiography (**Diagnostic and Therapeutic** "Embolization to block the bleeding source").

Treatment

1) Initial treatment:

- Blood loss Estimate
 - Vital sign (tachycardia , low blood pressure)
 - Blood workup (Hematocrit)
- In case of serious trauma, start managing the patient by ATLS protocol + prepare 2 large bore IV lines (for blood, packed RBCs or Cryoprecipitate).
- For stable patients, packing "By a gauze".

2) Prevention:

- Try to avoid any trauma even minor ones.
- Keep allergic rhinitis under control. Use saline nasal spray frequently to cleanse and moisturize the nose.
- Humidification and lubrication: Consider using a humidifier in the bedroom
- Self-management: Teach the patient to compress the tip of the nose immediately when bleeding starts and wait for 5 minutes, then leave it without washing to prevent rebleeding and bend the head down.

3) Mainstay treatment:

- Packing (Can be **absorbable** (for patient with bleeding tendency) and **non-absorbable**).

Most patients may be treated as outpatients but hospital admission and observation should be strongly considered when a posterior pack is used.

- Chemical cauterization (By silver nitrate).

"Be very cautious not to cauterize both sides otherwise patient will end up with nasal septal necrosis and perforation due to ischemia"

Instead, do one side and wait for healing then the other side can be done as well.

- Electrical cauterization (Very painful, try to avoid it as much as possible).
- Ligation (Under Rhinoscope, safe procedure, most commonly to the sphenopalatine artery).
- Embolization (Under Angiogram, it has risk of blindness).

4) Treat the cause: correct coagulopathy or vasculopathy if so.

Treatment of Posterior Epistaxis: F2

- IV pain medication and antiemetics may be helpful
- Use topical anesthetic and vasoconstrictive spray for improved visualization and patient comfort
- Balloon-type epistaxis devices often easiest
- Foley catheter or other traditional posterior packs may be necessary

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