433 Teams

ENT

10 & 11

Nose III & IV

Sinusitis, Epistaxis and Nasal septum diseases

Color index:

432 Team – **Important** – **433 Notes** – **Not important**

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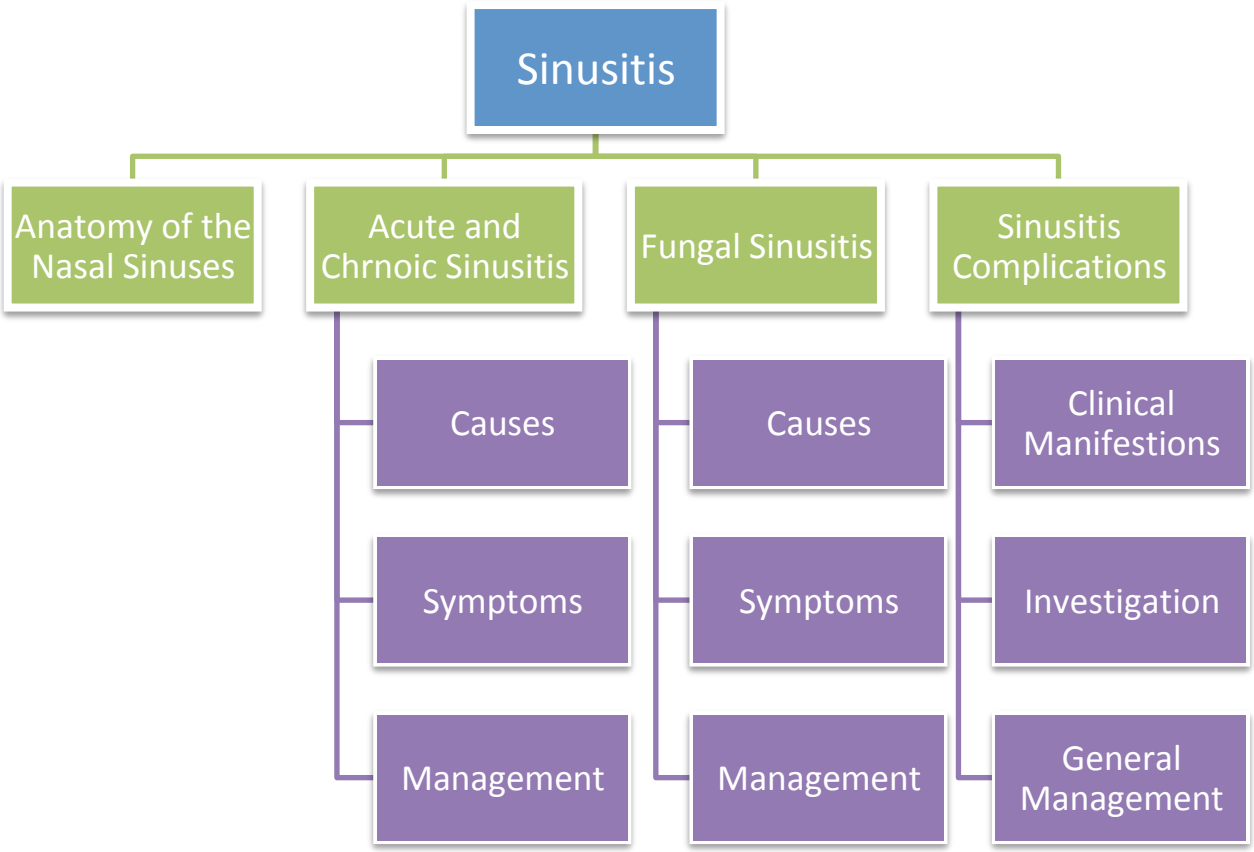
Objectives:

1. Know the causes, clinical manifestations and management of acute and chronic sinusitis.
2. Know about fungal sinusitis in brief.
3. Know the classification and management of sinusitis complications, in addition to the investigation and general management of orbital complications.
4. Be familiar with the role of radiology in sinusitis.



Acute and Chronic Sinusitis

- **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.

Causes of Acute Rhinosinusitis:

Streptococcus pneumonia, Haemophilus influenza, and Moraxella catarrhalis.
Infection lasting less than three months with more severe symptoms. 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.

Nasal sinuses become infected whenever there is a blocked drainage introduced by allergy, infection, immunosuppression, or ciliary dysfunction.

Clinical Manifestations of Acute Rhinosinusitis:

- Nasal congestion and obstruction
- Purulent nasal discharge
- Maxillary tooth discomfort
- Facial pain or pressure that is worse when bending forward.

REMEMBER THIS
PODS:
Pain, Obstruction, Discharge and Smell

- Other signs and symptoms include fever, fatigue, cough "day and night", hyposmia or anosmia, ear pressure or fullness, headache, and halitosis.

Causes of Chronic Rhinosinusitis:

Staphylococcus aureus, Anaerobes, Alpha-hemolytic Streptococcus, and Moraxella catarrhalis.
Infection for more than three months with milder symptoms. Additional symptoms are present like: **chronic cough, bronchitis, fatigue, malaise, and depression.**

Clinical Manifestations of Chronic Rhinosinusitis "CRS":

The first manifestation of CRS may be a relatively acute presentation with severe headaches or facial pain or visual changes (such as diplopia).
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

Pathophysiology:

Systemic:

- Viral infections
- Allergy
- Immotile cilia
- Cystic fibrosis
- Immune disorder

Chronic sinusitis may be noninfectious and related to allergy, cystic fibrosis, gastroesophageal reflux, or exposure to environmental pollutants.

Local:

- Trauma
- Swimming/diving
- Rhinitis medicamentosa

Swimming or diving could apply pressure over the sinuses or introduce foreign bodies.

Mechanical:

- Choanal atresia
- Deviated septum
- Polyps/foreign bodies
- Turbinate/adenoid hypertrophy

Mucociliary Clearance:

Ostia are small and located in locations not conducive to spontaneous drainage
Cilia work best at a temperature of 37℃ and humidity near 100%. Respiratory epithelium is **pseudostratified ciliated columnar epithelium with goblet cells.**
Reduced mucociliary clearance can be seen in cases of: **Kartagener's syndrome "primary ciliary dyskinesia", cystic fibrosis, radiotherapy, GRED, or rhinosinusitis.**

Kartagener's Syndrome:

It is an autosomal recessive disease characterized with the presence of immotile cilia and immotile spermatozoa due to dynein arm defects, resulting in **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.**

Cystic Fibrosis:

It is an autosomal recessive disease characterized by **decreased chloride secretion due to protein transmembrane conductance regulator (CFTR) mutation**, results in thicker/sticker mucus adherent to bacteria. The viscosity leads to multi-organ

systems dysfunction including GIT, pancreas, respiratory tract, sweat glands, and other exocrine glands.

Treatment of Acute Rhinosinusitis:

Antibiotics → Amoxicillin (If allergy, give them Macrolides or Fluoroquinolones)

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.

Nasal decongestants → (No nasal adverse effects with Systemic nasal decongestant, but local might cause Physiological addiction)

Second-line treatment includes **nasal steroids to reduce swelling inside the nose**, **amoxicillin** can be prescribed if bothersome symptoms of sinusitis persist for more than 10 days, or improve and worse again within the same period.

Treatment of Chronic Rhinosinusitis:

The symptoms of chronic rhinosinusitis may be relieved with **topical decongestants, topical steroids, antibiotics, nasal saline, topical cromolyn, or mucolytics.**
Steam inhalation and nasal saline irrigation may help by **moistening dry secretions, reducing mucosal edema and mucus viscosity.**
Steroids may help decreasing polyps size and improving olfaction.
Oral antibiotics regimens generally used to treat chronic rhinosinusitis. Initial choice of the appropriate antimicrobial(s) is usually empiric. Therapeutic regimens include **the combination of a penicillin (e.g., amoxicillin) plus a beta-lactamase inhibitor (e.g., clavulanic acid), a combination of metronidazole plus a macrolide or a second- or third-generation cephalosporin, and the newer quinolones (e.g., moxifloxacin).**

Surgical Treatment:

Conservative FESS "Functional endoscopic sinus surgery".

- We start with the medial management "steroids nasal sprays and nasal wash", then we go to the surgical.
- Go for surgical management if there are complications or no response to medical therapy.

Sinusitis Complications

Three main categories:

- ✓✓ **Orbital (60-75%)**
- ✓✓ **Intracranial (15-20%)**
- ✓✓ **Bony (5-10%)**

Radiography:

- Computed tomography (CT) best for orbit.
- Magnetic resonance imaging (MRI) best for intracranium.

Orbital Complications: "*Chandler Criteria*"

Five classifications:

- Preseptal cellulitis
- Orbital cellulitis
- Subperiosteal abscess
- Orbital abscess
- Cavernous sinus thrombosis

Table 2 – Chandler's classification of orbital infection deriving from sinusitis

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

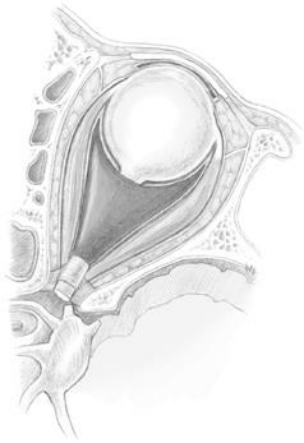
From Chandler JR, et al. *Laryngoscope*. 1970.[13]

1. Preseptal Cellulitis "managed by antibiotics"


2. Orbital Cellulitis

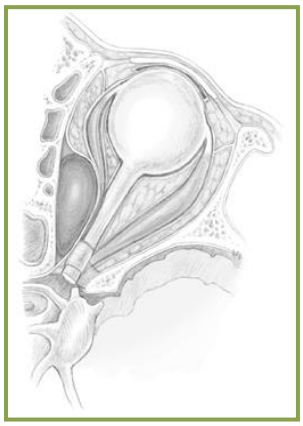
Patients may complain of pain and diplopia and a history of recent orbital trauma or dental surgery.

Diagnosis of sinusitis complications: based on the symptoms and the CT scan or MRI findings.



3. Subperiosteal Abscess

Surgical driange is indicated if there is worsening of visual acuity or extraocular movement, or in case of lack of improvement after 48 hours. "Antibiotics then drainage"

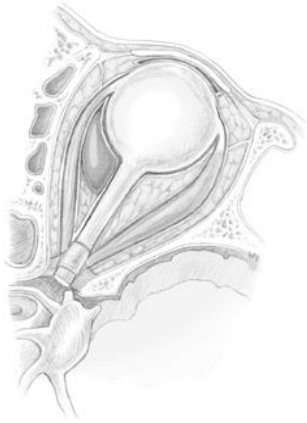


- **Approaches**
  - **External ethmoidectomy (Lynch incision) is most preferred.**
  - Endoscopic ideal for medial abscesses.
  - Transcaruncular approach

4. Orbital Abscess

Similar approaches as with subperiosteal abscess:

- Lynch incision
- Endoscopic



Transcaruncular approach allegedly does not utilize a facial incision.

5. Cavernous Sinus Thrombosis

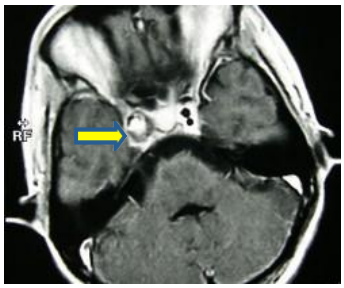
Symptomatology:

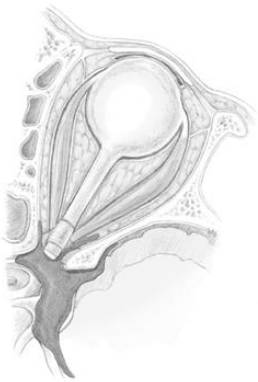
- **Orbital pain**
- **Proptosis and chemosis**
- **Ophthalmoplegia**
- **Symptoms in contralateral eye**
- **Associated with sepsis and meningitis**

Radiology:

- **Better visualized on MRI**

Mortality rate up to 30%. Needs surgical drainage and intravenous antibiotics.





- Contralateral involvement is distinguishing feature of cavernous sinus thrombosis
MRI findings of heterogeneity and increased size suggest the diagnosis.
- MRI better especially if suspecting intracranial involvement, too.

Intracranial Complications:

Five types:

✓✓ **Meningitis "the most common"**
✓✓ Epidural abscess
✓✓ Subdural abscess
✓✓ Intracerebral abscess
✓✓ Cavernous sinus, venous sinus thrombosis

Teenagers affected more because of developed frontal and sphenoid sinuses, and because they are more prone to URI's than adults.
Thrombophlebitis originating in the mucosal veins progressively involves the emissary veins of the skull, the dural venous sinuses, the subdural veins, and, finally, the cerebral veins. By this mode, the subdural space may be selectively infected without contamination of the intermediary structure; a subdural empyema can exist without evidence of extradural infection or osteomyelitis.

Bony Complications:

Pott's puffy tumor

- Frontal sinusitis with acute osteomyelitis.
- **Subperiosteal pus collection leads to "puffy" fluctuance.**
- Rare complication

Sir Percivall Pott described Pott's Puffy tumor in 1768 as a local subperiosteal abscess due to frontal bone suppuration resulting from trauma. Pott reported another case due to frontal sinusitis.

Fungal Sinusitis

Fungal rhinosinusitis is 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.
Allergic fungal rhinosinusitis involves a hypersensitivity response to colonizing fungi.
Invasive fungal sinusitis can be acute or chronic. Acute invasive fungal sinusitis is usually seen in immunocompromised patients and has a time course of days to few weeks, whereas chronic fungal sinusitis is usually seen in patients who are less immunocompromised with a time course greater than 12 weeks.
So the patients in general are immunocompromised, usually due to diabetes, cancer, HIV, organ transplantation or using systemic or intranasal glucocorticoids.

Patients with acute invasive fungal sinusitis are usually hospitalized and are very sick with fever, cough, nasal discharge, headache, and mental status changes. Signs and symptoms include **dark ulcers on the septum, turbinates, or palate**. In the late stages, signs and symptoms of cavernous sinus thrombosis are present.

Patients with chronic invasive fungal sinusitis present with symptoms of long-standing sinusitis. Symptoms are usually not acute, and fever and mental status changes are absent.
Orbital apex syndrome, which is characterized by a decrease in vision and ocular immobility due to a mass in the superior portion of the orbit, is usually associated with this condition.

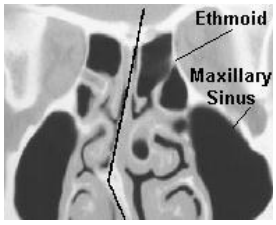
Diagnosis: early nasal endoscopy with biopsies of affected tissues. Cultures of the affected biopsy specimen are usually positive. Assessing the extant of infection should be done using CT scan or MRI.

Treatment of acute invasive fungal sinusitis: Initial systemic antifungal treatment after surgical debridement. High doses of **amphotericin B** (1-1.5 mg/kg/d) are recommended followed by oral itraconazole.

Treatment of chronic invasive fungal sinusitis: Surgical treatment is mandatory. Initiate medical treatment with systemic antifungals once invasion is diagnosed. **Amphotericin B** (2 g/d) is recommended; this can be replaced by **ketoconazole** or **itraconazole** once the disease is under control.

Diseases of the nasal septum

1- Deviated nasal septum



Etiology:
- Trauma.
- Maldevelopment. → Congenital

Symptoms:
- Nasal obstruction.
- External deformity.
- Crusting, epistaxis. Due to dryness

Diagnosis: The diagnosis is mostly clinical in deviated septum.
Radiology is unnecessary in most cases.

Treatment:
- No treatment. If the patient was Asymptomatic
- Septoplasty. (In Septoplasty they usually lift the mucosal flap from the nose then remove the deviated part and put internal splints.
Nowadays we go in with certain techniques "we crush the deviated part with a specific tool for that" to repair the cartilage and put it back in place and also put splint inside "removable after 5 days").

Complications of Septoplasty:
- Septal hematoma And abscess. → due to infection
- Septal perforation.
- Nasal deformity.
- Synechia (Adhesions). → will lead to obstruction

In septal hematoma, the cartilage of the septum receives its blood supply from the perichondrium, so if the hematoma was central it'll separate the perichondrium from the septum → Necrosis & deformity
And if you a central hematoma → emergency/direct drainage.

2-Hematoma of the septum

Etiology:
-Direct trauma.
-Operative trauma. "Septoplasty"
-Blood dyscrasias. "bleeding disorders"

Clinical features:

Obstruction, bleeding, lacerations, …

Complications:
- Cartilage necrosis.
-Septal abscess.
-Permanent thickening of the septum. At the site where the hematoma has developed → very common in patients who have gotten a Septoplasty due to trauma "it'll appear as a mass"

Treatment:
-Incision and drainage. Emergency
-Systemic Antibiotics. As a prophylactic

3- Perforation of the septum

Clinical features: "clinical features depend on the size and the site of the perforation"
-Asymptomatic.
-Crusting. Due to turbulence of air
-Epistaxis.
-Whistling. "the smaller the size of the perforation the more the whistling" "And the bigger the perforation → the more obstruction → due to air instead of going back to the nasopharynx there's going to be turbulence "

Treatment:
-No treatment. "in Asymptomatic patients"
-Nasal wash.
-Surgical closure.

Surgical reduction of the Inferior Turbinates

Turbinate is another name for concha.
- Turbinate resection, Total "not done anymore because it'll cause the loss of all the imp functions of the nose like ex: protection and conditioning" or partial.
- Out fracturing of the inferior turbinate. "to widen the airway, Dr said know the name of this procedure"
- Destructive procedures, including electro cautery, cryosurgery, laser surgery, and submucous resection.

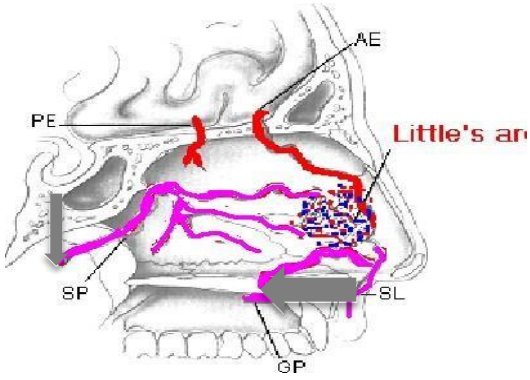
According to the doctor, nowadays we prefer going with the submucous resection due to less symptoms and less bleeding.
But still the electro cautery is one of the best options but the problem with it is that it doesn't provide permanent results (lasts for 3 years only) "temporary"

Causes of hypertrophy:
-Compensatory mechanism in septal deviation.
-Rhinitis with chronic use of vasoconstrictors → rebound.

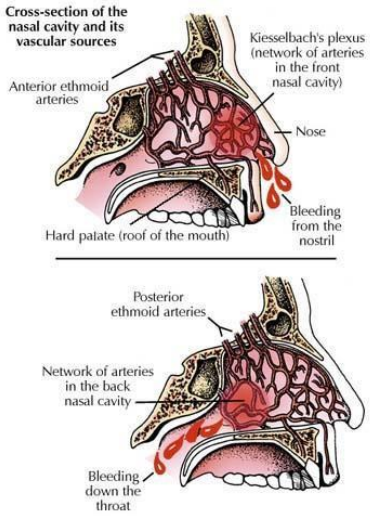
4-Epistaxis

Why bleeding from the nose?
-Vascular organ secondary to incredible heating/humidification requirements.
-Vasculature runs just under the mucosa. "Very rich in blood supply"
-Arterial to venous anastomoses.
-ICA and ECA blood flow.

Sites:
- Anterior (Little's area)
- Posterior (vicinity of sphenopalatine foramen)



Kesselbach's plexus/Little's area:
1. Anterior Ethmoid (Opth)
2. Superior Labial A (Facial)
3. Sphenopalatine A (IMAX)
4. Greater Palatine (IMAX)



Woodruff's plexus:
-Spenopalatine A (IMAX)

IMAX= Internal Maxillary Art.

Anterior ethmoid art → came from ophthalmic → from internal carotid Superior labial Art → From facial → from external carotid artery Sphenopalatine → IMAX → From external carotid artery
Greater palatine → Imax→ External carotid artery.

External carotid gives many branches in the neck, starting from: the superior thyroid, lingual, posterior oracular/occipital, internal maxillary, superficial temporal.
Internal carotid branches in the neck → None, it moves upward into the brain and form the circle of wills then give the ophthalmic branch.

<u>Local causes:</u>
- Acute trauma.
- Chronic trauma.
- Deviated septum.
-Inflammation of the nose and sinuses.
- Tumors.
- Idiopathic.

<u>Systemic causes:</u>
- Coagulation and bleeding diseases.
- Atherosclerosis.
- Familial hemorrhagic telangiectasia, "Autosomal dominant disease where they have no muscles around the blood vessels thus will present with burses and GI bleeding"

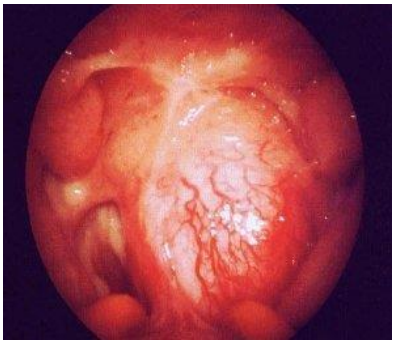
Management:
- General measures. "ABC"
- Stop the bleeding.
- Prevent further bleeding.

Control the bleeding
- Digital pressure. +Leaning forward
- Cautery. "With silver nitrate"
- Anterior nasal packing,
- Postnasal packing,
- Arterial ligation
  Maxillary, Ethmoids, External carotid
- Arterial embolization.

In anterior nasal packing, it can be used for as long as needed. But usually we have to remove it before 24 hours or in left more than you need to give prophylactic Antibiotics → to prevent against infection "toxic shock syndrome"

Angiofibroma

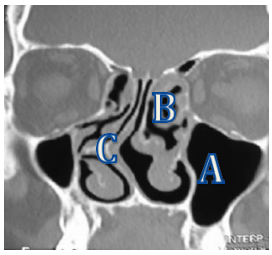
-Juvenile nasopharengeal
-Benign
-Adolcent Males "always males between 10-20 try to exclude angiofibroma first"
-Frequent chronic epistaxis
-Nasal obstruction
-Rhinorrhea
-Conductive hearing loss
-Diplopia
-Otitis Media
-Treatment: embolization & Surgery



Cases:

A 25 years old man post RTA with fever and nasal obstruction.
What is your diagnosis? Infected hematoma
What is your management? sgnnias es neisecn ssiioiaiign +

What is this radiological study? What is A, B and C?
A= Maxillary sinus "left"
B= Ethmoid sinus "left" C= Deviated septum



This is a CT scan of a new borne who presented with respiratory distress.
A- what is your diagnosis? Choanal atresia B- what is the management?
First we give an oral airway called "nipple" (intubation through the mouth). Then, the final management "after 2 weeks or 3" surgical opening.

MCQs:

1- A 30-year-old woman complaining of headache increases on leaning forward during praying and mucopurulent postnasal discharge. On examination there was nasal discharge in both nasal cavities.

What is the investigation required to reach the diagnosis?

A) CT sinuses
B) Plain x ray to the nasal bone
C) Skin allergy test

2- What is the best imaging modality for the orbit?

A) MRI
B) CT
C) US
D) X-ray

Answers:
1- A
2- B

Summary

Rhinosinusitis

Symptoms: PODS. (previously mentioned)
Acute: the persistence of upper respiratory symptoms for greater **than 10 days 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.

Causes of Acute Rhinosinusitis: Streptococcus pneumonia, Haemophilus influenza, and Moraxella catarrhalis. (Important)
Causes of Chronic Rhinosinusitis: Staphylococcus aureus, Anaerobes, Alpha-hemolytic Streptococcus, and Moraxella catarrhalis**.**

Treatment:
The initial treatment aims to relieve the symptoms. Antibiotics are only for bacterial clearance. Medications: NSAID and flushing the nose and sinuses you can give steroids nasal spray (second-line treatment). **Surgical (FESS) treatment if there are complications or medication doesn't work**.

Complications of Sinusitis

Orbital
- Preseptal cellulitis
- Orbital cellulitis
- Subperiosteal abscess
- Orbital abscess
- Cavernous sinus thrombosis

Intracranial Complications
- Meningitis
- Epidural abscess
- Subdural abscess
- Intracerebral abscess
- Cavernous sinus, venous sinus thrombosis

Bony
- Pott's puffy tumor

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