SINUSITIS
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SINUSITIS
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Sinusitis is the fifth common diagnosis for which an antibiotic is prescribed and about $2 billion is spent annually on medications to treat nasal and sinus problems. Diagnosing and treating sinusitis is therefore being very important. Acute bacterial sinusitis usually occurs following an upper respiratory infection that result in the obstruction of the osteomeatal complex, impaired mucociliary clearance and production of secretions. (L J Fagnan et al., 1998)

Acute sinusitis is a common illness in primary care. Studies have demonstrated the difficulty of making the differential diagnosis of acute purulent sinusitis based on clinical evaluations alone. This leads to a significant overuse of antibiotics, which in turn may contribute to increase bacterial resistance. (Morten Lindback et al., 2002)

Sinus disease is inherently associated with viral upper respiratory tract infections and occurs in 90% of individuals with common cold. Although the acute sinusitis frequently follows upper respiratory tract infections. Sinusitis or an inflammation of one or more of the para nasal sinuses, affects approximately 16% of US adults, resulting in nearly $5.8 billion in annual healthcare costs. (Lauria Barclay et al., 2005)

Chronic para nasal sinusitis is generally a mild disease. However it is important to realize that it afflicts a significant percentage of the population and causes considerable long term morbidity. (Patrick W. Doyle et al., 1991)

Acute sinusitis in children is often associated with two main predisposing factors: viral colds and allergies. (Mary. E. Temple et al., 2000)

Acute rhinosinusitis is one of the most common reasons for the prescribing antibiotics in primary care. However it is not clear whether antibiotics improve the outcome for patients with clinically diagnosed acute rhinosinusitis. (Heiner. C. Bucher et al., 2003)
INTRODUCTION

Sinusitis or inflammation of the mucosal surface of the paranasal sinuses is a common illness, affecting approximately 14% of the U.S. population. A recent report indicated that the rate at which patient visit physicians for treatment for sinusitis increased from 1980 – 2005 and all the recent reports still suggests that the frequency of sinusitis is increasing.

Sinusitis is a prevalent and important cause of morbidity in adults. In the U.S alone people with sinus disorders spend more than $ 2 billion annually on medications and 16 million physician visits each year in pursuit of symptomatic relief.

Acute sinusitis is estimated to occur in 0.5 to 2 percent of adults with common could and in 5 to 10 percent of children with such infections.

Acute sinusitis is one of the most common infections seen in general clinical practices.

ANATOMY OF PARA NASAL SINUSES

Para nasal sinuses are air containing cavities in certain bones of skull. They are four in each side.

Clinically paranasal sinuses have been divided into two groups.

ANTERIOR GROUP:
This includes maxillary, frontal and anterior ethmoidal. They all open in the middle meatus.

POSTERIOR GROUP:
This includes posterior ethmoidal sinuses which open in the superior meatus, and the sphenoid sinus which open in spheno-ethmoidal recess.

MAXILLARY SINUS (ANTRUM OF HICHMORE)
It is the largest of paranasal sinuses and occupies the body of maxilla.

It is pyramidal in shape with base towards lateral wall of nose and apex directed laterally into the zygomatic process. On an average, maxillary sinus has a capacity of 15 ml in an adult.

FRONTAL SINUS

Each frontal sinus is situated between the inner and outer tables of frontal bone above and deep to the supra orbital margin. It varies in shape and size and is often loculated. The two frontal sinuses are often asymmetric and the intervening bony septum is thin and often obliquely placed or may even be deficient. Frontal sinus may be absent on one or both sides or it may be very large extending into orbital plate in the roof of the orbit.

ETHMOIDAL SINUSES (ETHMUID AIR CELLS)

Ethmoidal sinuses are thin walled air cavities in the lateral masses of ethmoid bone. Their number varies from 3 to 18. They occupy the space between upper third of lateral nasal wall and the medial wall of orbit. Clinically ethmoidal cells are divided into anterior ethmoidal cells which opens into anterior ethmoidal group which opens into the middle meatus and posterior ethmoid group which opens into the superior meatus.

SPHENOID SINUS

It occupies the body of sphenoid. The two, right and lift sinuses, are rarely symmetrical and are separated by a thin bony septum which is often obliquely placed and may even be deficient (compare frontal sinus). Ostium of the sphenoid sinus is situated in the upper part of its anterior wall and drains into sphenoethmoidal recess.

MUCOUS MEMBRANE OF PARA NASAL SINUSES

Paranasal sinuses are lined by mucous membrane which is continuous with that of the nasal cavity through the ostia of sinuses. It is thinner and less vascular compared to that of the nasal cavity. Histologically it is ciliated columnar epithelium with goblet cells which secrete mucus. Cilia are more marked near the ostia of sinuses and help in drainage of mucus into the nasal cavity.
DEVELOPMENT OF PARANASAL SINUSES

Paranasal sinuses develop as outpouchings from the mucous membrane of lateral wall of nose. At birth only the maxillary and ethmoidal sinuses are present and are large enough to be clinically significant.

Growth of sinuses continues during childhood and early adult life. Radiologically maxillary sinuses can be identified at 4-5 months, ethmoid at 1 year, frontals at 6 years and sphenoids at 4 years.

LYMPHATIC DRAINAGE

The lymphatics of maxillary, ethmoid, frontal and sphenoid sinuses form a capillary network in their lining mucosa and collect with lymphatics of nasal cavity. Then they drain into lateral retropharyngeal and/or jugulodigastric nodes.

PHYSIOLOGY OF PARANASAL SINUSES

VENTILATION OF SINUSES

Ventillation of paranasal sinuses takes place through their ostia. During inspiration air current causes negative pressure in the nose. This varies from -6mm to -200 mm of H2O depending on the force of inspiration. During expiration, positive pressure is created in the nose and this sets up eddies which ventilate the sinuses. Thus ventilation of sinuses is paradoxical: they are emptied of air during inspiration and filled with air during expiration.

MUCUS DRAINAGE OF SINUSES

Mucus secreted in the paranasal sinuses travels to the ostium in a spiral manner. Here the cilia are very active and propel it into the meatus from where it is carried to the pharynx. The mucus from anterior groups of sinuses travels along the respective lateral pharyngeal gutter situated behind the posterior pillar and that from posterior group is spread over the pharyngeal wall to be finally swallowed. In infections of the anterior group of sinuses, lateral lymphoid bands, situated behind the posterior pillars, get hypertrophied.

FUNCTIONS OF PARANASAL SINUSES

It is not clear why nature provided paranasal sinuses. Probable functions of paranasal sinuses are:

- Air–conditioning of the inspired air by providing large surface area over which the air is humidified and warmed.
- To provide resonance to voice.
- To act as thermal insulators to protect the delicate structures in the orbit and the cranium from variations of intranasal temperature.
- To lighten the skull bones.

SINUSITIS

Sinusitis is the inflammatory condition of the mucous membrane lining of the sinuses. It may be of two types.

- ACUTE SINUSITIS
- CHRONIC SINUSITIS

Acute sinusitis is the acute inflammation of the sinus mucosa. This is having a rapid onset with severe symptoms and a sharp course. The treatment may be either medical or surgical but usually pharmacotherapy is the choice of treatment.

Chronic sinusitis is a disorder, i.e. inflammation of the sinus mucosa for a long time lasting for months or years. Most important cause of chronic sinusitis is failure of acute infection to resolve. Initial treatment of chronic sinusitis is conservative including different drugs. Most often some form of surgery is required either to provide free drainage and ventilation.

ACUTE SINUSITIS

Acute inflammation of sinus mucosa is called acute sinusitis. The sinus most commonly involved is the maxillary followed in turn by ethmoid, frontal and sphenoid. Very often more than one sinus is infected (multi sinusitis). Some times all the sinuses of one or both sides are involved simultaneously (pansinusitis unilateral or bilateral).

A sinusitis may be opened or closed type depending on whether the inflammatory products of sinus cavity can drain freely into the nasal cavity through the
natural ostia or not. A closed sinusitis causes more severe symptoms and is also likely to cause complications.

**AETIOLOGY OF SINUSITIS IN GENERAL**

**A. EXCITING CAUSES**

1. **NASAL INFECTIONS**
   Sinus mucosa is a continuation of nasal mucosa and infections from nose can travel directly by continuity or by way of submucosal lymphatics. Most common cause of acute sinusitis is viral rhinitis followed by bacterial invasion.

2. **SWIMMING AND DIVING**
   Infected water can enter the sinuses through their ostia. High content of chlorine gas in swimming pools can also set up chemical inflammation.

3. **TRAUMA**
   Compound fractures or penetrating injuries of sinuses-frontal, maxillary and ethmoid may permit direct infections of sinus mucosa. Similarly barotrauma may be followed by infection.

4. **DENTAL INFECTIONS**
   This applies to maxillary sinus. Infection from the molar to premolar teeth or their extraction may be followed by acute sinusitis.

**B. PREDISPOSING CAUSES**

**LOCAL**

1. **OBSTRUCTION TO SINUS VENTILATION AND DRAINAGE**
   Normally sinuses are well ventilated. They also secrete small amount of mucus, which by ciliary movement, is directed to the sinus ostia from where it drains into the nasal cavity. Any factor(s) which interfere with this function can cause sinusitis due to stasis of secretions in the sinus. They are
   
   a. Nasal packing
   b. Deviated septum
   c. Hypertrophic turbinates
   d. Oedema of sinus ostia due to allergy
   e. Nasal polyps
   f. Structural abnormality of ethmoidal air cells.
   g. Benign or malignant neoplasm.

2. **STASIS OF SECRETIONS IN THE NASAL CAVITY**
   Normal secretions of nose may not drain into the nasopharynx because of their viscosity (cystic fibrosis) or obstruction (enlarged adenoids, choanal atresia) and get infected.

3. **PREVIOUS ATTACKS OF SINUSITIS**
   Local defenses of sinus mucosa are already damaged.

**GENERAL**

**ENVIRONMENT**

Sinusitis is common in cold and wet climate. Atmospheric pollution, smoke, dust and over crowding also predispose to sinus infection.

**POOR GENERAL HEALTH**

Recent attack of exanthematous fever (measles, chicken pox, whooping cough), nutritional deficiencies, systemic disorders (diabetes, immune deficiency syndromes).

**BACTERIOLOGY**

Most cases of acute sinusitis start as viral infections followed soon by bacterial invasion. The aerobic bacteria most often responsible for acute suppurative sinusitis are

- Streptococcus pneumoniae
- Haemophilus influenzae
- Streptococcus group A
- Staphylococcus aureus
- Neisseria species
- Gram- negative bacilli
- Klebsiella species
- Branhamella catarrhalis (Moraxella catarrhalis)
- Pseudomonas species

**ANAEROBIC BACTERIA**

Fusobacteria, Anaerobic streptococci, Bacteroides species

**VIRUSES**

Rhinovirus, Influenza virus, Parainfluenza virus
PATHOLOGY OF SINUSITIS

Acute inflammation of sinus mucosa causes hyperaemia, exudation of fluid, outpouring of polymorphonuclear cells and increased activity of serous and mucous glands. Depending on the virulence of organisms, defenses of the host and capability of the sinus ostium to drain exudates, the disease may be mild (non-suppurative) or severe (suppurative). Initially the exudates is serous; later it may become mucopurulent or purulent. Severe infections cause destruction of mucosal lining. Failure of the ostium to drain results in empyema of the sinus and destruction of its bony walls leading to complications. Dental infections are very fulminating and soon result in suppurative sinusitis.

ACUTE MAXILLARY SINUSITIS

AETIOLOGY

1. Most commonly it is viral rhinitis which spreads to involve the sinus mucosa. This is followed by bacterial invasion.
2. Diving and swimming in contaminated water
3. Dental infections They are important source of maxillary sinusitis. Roots of premolar and molar teeth are related to the floor of sinus and may be separated only by a thin layer of mucosal covering. peri-apical dental abscess may burst into the sinus or the root of a tooth during extraction may be pushed into the sinus. In case of oroantral fistula following tooth extraction, bacteria from oral cavity enters the maxillary sinus.

4. Trauma Of The Sinus Compound fractures, penetrating injuries or gun shot wounds may be followed by sinusitis.

PRE-DISPOSING FACTORS

One or more of the predisposing factors enumerated for sinusitis in general may be responsible for acute or recurrent infection.

CLINICAL FEATURES

Clinical features depend on (a) severity of inflammatory process and (b) efficiency of ostium to drain the exudates. Closed ostium sinusitis is of greater severity and leads more often to complications.

1. CONSTITUTIONAL SYMPTOMS Consist of fever, general malaise and body aches. They are the result of toxaemia.

2. HEAD ACHE Usually this is confined to forehead and may be confused with frontal sinusitis.

3. PAIN Typically it is situated over the upper jaw, but may be referred to the gums or teeth. For this reason patient may primarily consult a dentist. Pain is aggravated by stooping; coughing or chewing. Occasionally pain is referred to the ipsilateral supraorbital region and thus may stimulate frontal sinus infection.

4. TENDERNESS Pressure or tapping over the anterior wall of antrum produces pain.

5. REDNESS AND OEDEMA OF CHEEK Commonly seen in children. The lower eye lid may become puffy.

6. NASAL DISCHARGE Anterior rhinoscopy shows pus or mucopus of the middle meatus. Mucosa of the middle meatus and turbinate may appear red and swollen.

Postural test- If no pus is seen in the middle meatus, it is decongested with a pledget of cotton soaked with a vasoconstrictor and patient made to sit with the affected sinus turned up. Examination after 10-15 minutes may show discharge in the middle meatus.
7. **POST NASAL DISCHARGE**

Pus may be seen on the upper soft palate on posterior rhinoscopy.

**PATHOLOGY**

1. **Catarrhal stage:** Initially there is congestion and oedema of the mucosa of the sinus and the ostium. There is hyper trophy of the mucous glands.
2. **Exudation:** Due to increased glandular activity, secretions collect in the sinuses, which are mucoid initially.
3. **Purulent stage:** The infection may progress to purulent stage and there is thick mucopurulent discharge which drains out through the ostium. At this stage the cilia may be come paralysed or destroyed some times the ostium becomes blocked due to mucosal oedema and the secretions become point up in a sinus producing acute empyema of the sinus.
4. **Stage of Complication:** If left untreated it can lead to complications further.
5. **Stage of Resolution:** The infection may be resolve at any stage depending upon the virulence of the organisms, resistance offered by the body and antibiotics administered.

**DIAGNOSIS**

**TRANSILLUMINATION TEST**

Affected sinus will be found opaque.

**X-Ray**

Waters’ view will show either opacity or a fluid level in the involved sinus.

**TREATMENT**

**MEDICAL**

1. **ANTIMICROBIAL DRUGS**

Ampicillin and amoxicillin are quite effective and cover a wide range of organisms. Erythromycin or doxycycline or co-trimoxazole are equally effective and can be given to those sensitive to pencillin. β-lactamase producing strains of H.influenzæ and M.catarrhalis may necessitate the use of amoxicillin / clavulanic acid or cefuroxime axetil. Sparfloxacin is also effective and has the advantage of single daily dose.

2. **NASAL DECONGESTANT DROPS:**

1% ephedrine or 0.1% xylometazoline or oxymetazoline were used as nasal drops or sprays to decongest sinus ostium and encourage drainage.

3. **STEAM INHALATION**

Steam alone or medicated with menthol or tincture of benzoin compounds provides symptomatic relief and encourages sinus drainage. Inhalation should be given 15 to 20 minutes after nasal decongestion for better penetration.

4. **ANALGESICS**

Paracetamol or any other suitable analgesics should be given for relief of pain and headache.

5. **HOT FOMENTATION**

Local heat to the affected sinus is often soothing and helps in the resolution of inflammation.

**SURGICAL**

**ANTRAL LAVAGE**

Most cases of acute maxillary sinusitis respond to medical treatment. Lavage is rarely necessary. It is done only when medical treatment has failed and that too only under cover of antibiotics.

**COMPLICATIONS**

1. Acute maxillary sinusitis may change to subacute or chronic sinusitis.
2. Frontal sinusitis- Frontal nasal duct which opens in middle meatus is obstructed due to inflammatory oedema.
3. Osteitis or osteomyclitis of the maxilla.
4. Orbital cellulites or abscess.

Infections spreads directly from the roof of maxillary sinus or indirectly after involvement of ethomid sinus to the orbit.

**ACUTE FRONTAL SINUSITIS**
**AETIOLOGY**

1. Usually follows viral infections of upper respiratory tract followed by later bacterial invasion.
2. Entry of water into the sinus during dividing or swimming.
3. External trauma to the sinus. eg. Fractures or penetrating injuries.
4. Oedema of middle meatus, secondary to associated ipsilateral maxillary or ethmoid sinus infection.

Predisposing factors, pathology and bacteriology are the same as in acute maxillary sinusitis in general.

**CLINICAL FEATURES**

1. **FRONTAL HEAD ACHE:**
   Usually severe and localized over the affected sinus. It shows characteristic periodicity i.e. comes upon waking gradually increases, reaches its peak by about midday and then starts subsiding. It is also called “office headache” because of its presence only during the office hours.

2. **TENDERNESS:**
   Pressure upwards on the floor of frontal sinus just above the medical canthus causes exquisite pain. It can also be elicited by tapping over the anterior wall of frontal sinus in the medial part of supra orbital region.

3. **OEDEMA OF UPPER EYE LID:**
   With suffused conjunctiva and photophobia.

4. **NASAL DISCHARGE:**
   A vertical streak of mucopus is seen high up in the anterior part of middle meatus. This may be absent if the ostium is closed with no drainage. Nasal mucosa is inflamed in the middle meatus.

**DIAGNOSIS**

**X-RAYS**- Opacity of the affected sinus or fluid level can be seen. Both waters’ and lateral views should be taken.

**TREATMENT**

**MEDICAL**

This is same as for acute maxillary sinusitis i.e. antimicrobials decongestion of the sinus ostium for drainage and analgesics. A combination of antihistamine with an oral nasal decongestant (pseudoephedrine or phenylephrine hydrochloride) is useful. Placing a pledget of cotton soaked in vasoconstrictor in the middle meatus once or twice daily helps to relieve ostial oedema and promotes sinus drainage and ventilation. If patient shows response to medical treatment and pain is relieved, treatment is continued for full 10 days or two weeks.

**SURGICAL**

1. **TREPHINATION OF FRONTAL SINUS**
   If there is persistence or exacerbation of pain or pyrexia inspite of medical treatment for 48 hours, or if the lid swelling is increasing and threatening orbital cellulites frontal sinus is drained externally. A 2 cm long horizontal incision is made in the superomedial aspect of the orbit below the eye brow. Floor of frontal sinus is exposed and a hole drilled with a burr. Pus is taken from culture and sensitivity and a plastic tube inserted and fixed. Sinus can now be irrigated with normal saline two or three times daily until frontonasal duct becomes patent. This can be determined by adding a few drops of methylene blue to the irrigating fluid and it exit seen through the nose. Drainage tube is removed when frontonasal duct becomes patent.

2. **ANTRAL LAVAGE**
   Coexistent maxillary sinusitis may require antral lavage. This will encourage frontal sinus drainage by relieving oedema of the middle meatus.

**COMPLICATIONS**

1. orbital cellulitis
2. Osteomyelitis of frontal bone and fistula formation
3. Meningitis, extradural abscess or frontal lobe abscess if infection breaks through the posterior wall of the sinus.
4. Chronic frontal sinusitis if the acute infection is neglected or improperly treated.

**ACUTE ETHMOID SINUSITIS**
AETIOLOGY

Acute ethmoid sinusitis is often associated with infection of ethmoid sinuses. Ethmoid sinusitis are more often involved in infants and young children.

CLINICAL FEATURES

1. PAIN:-
   It is localised over the bridge of the nose, medial and deep to the eye. It is aggravated by movements of the eye ball.

2. OEDEMA OF LIDS: -
   Both eyelids become puffy and swollen. There is increased lacrimation. Orbital cellulitis is an early complication in such cases.

3. NASAL DISCHARGE:-
   On anterior rhinoscopy pus may be seen in middle or superior meatus depending on involvement of anterior or posterior group of ethmoid sinuses.

4. SWELLING OF THE MIDDLE TURBINATE

TREATMENT

Medical treatment is the same as for acute maxillary sinusitis. Visual deterioration and exophthalmos indicate abscess in the posterior orbit and may require drainage of the ethmoid sinuses into the nose through an external ethmoidectomy incision.

Complications

1. Orbital cellulitis and abscess.
2. Visual deterioration and blindness due to involvement of optic nerve
3. Cavernous sinus thrombosis.
4. Extradural abscess, meningitis or brain abscess.

ACUTE SPHENOID SINUSITIS

AETIOLOGY

Isolated involvement of sphenoid sinus is rare. It is often a part of pansinusitis or is associated with infection of posterior ethmoid sinuses.

CLINICAL FEATURES

1. HEAD ACHE
   Usually localized to the occiput or vertex. Pain may also be referred to the mastoid region.

2. POST NASAL DISCHARGE
   It can only be seen on posterior rhinoscopy. A streak of pus may be seen on the roof and posterior wall of nasopharynx or above the posterior end of middle turbinate.

DIAGNOSIS

X-RAYS

Opacity or fluid level may be seen in the sphenoid sinus. Lateral view of the sphenoid sinus is taken in supine or prone position and is helpful to demonstrate the fluid level.

DIFFERENTIAL DIAGNOSIS

Mucocele of the sphenoid sinus or its neoplasms may clinically stimulate the features of acute infection of sphenoid sinus and should always be excluded in any case of isolated sphenoid sinus involvement.

TREATMENT

Treatment is same as for acute infection of other sinuses.

CHRONIC SINUSITIS

CHRONIC SINUSITIS IN GENERAL

Sinus infection lasting for months to years is called chronic sinusitis most important cause of chronic sinusitis is failure of acute infection to resolve.

PATHOPHYSIOLOGY

Acute infection destroys normal ciliated epithelium impairing drainage from the sinus. Pooling and stagnation of secretions in the sinus invites infection. Persistence of infection causes mucosal changes,
such as loss of cilia, oedema and polyp formation, thus continuing the vicious cycle.

PATHOLOGY

In chronic infections, process of destruction and attempts at healing proceed simultaneously. Sinus mucosa becomes thick and polyoidal (hypertrophic sinusitis) or undergoes atrophy (atrophic sinusitis). Surface epithelium may show desquamation, regeneration or metaplasia. Submucosa is infiltrated with lymphocytes and plasma cells and may show micro abscesses granulations, fibrosis and polyp formation.

BACTERIOLOGY

Mixed aerobic and anaerobic organisms are often present.

CLINICAL FEATURES

They are often vague and similar to those of acute sinusitis but of lesser severity. Purulent nasal discharge is the commonest compliant. Foul-smelling discharge suggests anaerobic infection. Local pain and headache are often not marked except in acute exacerbations. Some patients complain of nasal stuffiness and anosmia.

DIAGNOSIS

1. X-ray of involved sinus. It may show mucosal thickening or opacity.
2. X-rays after injection of contrast material may show soft tissue charges in sinus mucosa.
3. CT scan is particularly useful in ethmoid and sphenoid sinus infection and has replaced studies with contrast materials.
4. Aspiration and irrigation Finding of pus in the sinus is confirmatory.

TREATMENT

It is essential to search for underlying aetiological factors which obstruct drainage and ventilation. A work up for nasal allergy may be required. Culture and sensitivity of sinus discharge helps in the proper selection of an antibiotic.

Initial treatment of chronic sinusitis is conservative including antibiotics, decongestants, antihistaminics and sinus irrigations. More often some form of surgery is required either to provide free drainage and ventilation or radical surgery to remove all irreversible diseases so as to provide wide drainage or to obliterate the sinus. Recently endoscopic sinus surgery is replacing radical operations on the sinuses and provides good drainage and ventilation.

SURGERY FOR CHRONIC SINUSITIS

CHRONIC MAXILLARY SINUSITIS

- ANTRAL PUNCTURE AND IRRIGATION
- INTRANASAL ANTROSTOMY
- CALDWELL-LUC OPERATION

CHRONIC FRONTAL SINUSITIS

- INTRA NASAL DRAINAGE OPERATIONS
- TREPHEINATION FRONTAL SINUS
- EXTERNAL FRONTOETHMOIDECTOMY
  (HOWARTH’S OR LYNCH OPERATIONS)
- OSTEOPLASTIC FLAP OPERATION

CHRONIC ETHMOID SINUSITIS

- INTRANASAL ETHMOIDECTOMY
- EXTERNAL ETHMOIDECTOMY

CHRONIC SPHENOID SINUSITIS

- SPHENOIDOTOMY

COMPLICATIONS OF SINUSITIS

So long as infection is confined only to the sinus mucosa, it is called sinusitis. Complications are said to arise when infection spreads into or beyond the walls of the sinus. They are grouped as under

1. ORBITAL COMPLICATIONS
2. OSTEOMYELITIS
3. INTRA CRANIAL
4. DESCENDING INFECTIONS
5. FOCAL INFECTIONS

ORBITAL COMPLICATIONS

Orbit and its contents are closely related to the ethmoid, frontal and maxillary sinuses, but most of the complications, however, follow infections of
ethmoids as they are separated from the orbit only by thin lamina of bone-lamina papyracea. Infections travel from these sinuses either by osteitis or as a thrombophlebitic process of ethmoidal veins.

**Orbital complications include**

1. Inflammatory oedema of lids
2. Subperiosteal abscess
3. Orbital cellulites
4. Orbital abscess
5. Superior orbital fissure syndrome
6. Orbital apex syndrome

**OSTEOMYELITIS**

Osteomyelitis is infection of bone marrow and should be differentiated from osteitis which is infection of the compact bone. Osteomyelitis following sinus infection involves either of the following

1. Osteomyelitis of the maxilla
2. Osteomyelitis of frontal bone

**INTRACRANIAL COMPLICATIONS**

Frontal, ethmoid and sphenoid sinuses are closely related to anterior cranial fossa and infection from these can cause:

1. Meningitis and encephalitis
2. Extradural abscess
3. Subdural abscess
4. Brain abscess
5. Carvenous sinus thrombosis

**DESCENDING INFECTIONS**

In suppurative sinusitis discharge constantly flows into the pharynx and can cause or aggravate:

1. OTITIS MEDIA (ACUTE OR CHRONIC)
2. PHARYNGITIS AND TONSILLITIS
3. PERSISTENT LARYNGITIS AND TRACHEOBRONCHITIS

**FOCAL INFECTIONS**

The role of sinus infections to act as focus of infection is doubtful. A few conditions such as polyarthritis, tenossynovitis, fibrosis and certain skin diseases may respond to elimination of infection in the sinuses.

**MUCOCELE OF PARANASAL SINUSES**

The sinuses commonly affected by mucocele in the order of frequency are the frontal, ethmoidal, maxillary and sphenoidal. There are two views in the genesis of a mucocele.

1. Chronic obstruction to sinus ostium resulting in accumulation of secretions which slowly expand the sinus and destroys its bony walls.
2. Cystic dilatation of mucous gland of the sinus mucosa due to obstruction of its duct. In this case, wall of mucocele is surrounded by normal sinus mucosa. The contents of mucocele are sterile.

**PATIENT EDUCATION GIVEN DURING COUNSELLING**

- Get plenty of rest.
- Sip hot liquids and drink plenty of fluids.
- Avoid cold items like ice creams and other refrigerated food items. Avoid cold climatic exposures.
- Avoid cold climatic exposures which can aggravate sinusitis.
- Apply moist heat by holding a warm, wet towel against your face or breathing in steam through a cloth or towel.
- Don’t use a nasal drop for more than 5 days as it leads to rebound congestion.
### COMMONLY USED DRUGS FOR THE MANAGEMENT OF ACUTE SINUSITIS

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<td>NASIVION NASAL DROPS</td>
<td>0.5%w/v</td>
<td>3 drops</td>
</tr>
<tr>
<td></td>
<td>(OXYMETAZOLINE)</td>
<td></td>
<td>t.i.d</td>
</tr>
</tbody>
</table>

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### ROLE OF PHARMACIST IN EDUCATING PATIENTS WITH ACUTE SINUSITIS

Pharmacist can play a major role in the management of the disease. Pharmacist can educate the patients about the use of monitoring devices, medications, screening for unfavorable interactions, identification of the complications of sinusitis, about the side effects and minimization of it and use of different approaches for the adherence of the treatment plan. Physicians and pharmacists must join their hands and share their individual knowledge and experience to act synergistically for providing an effective treatment regimen and improve the quality of life in patients.
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