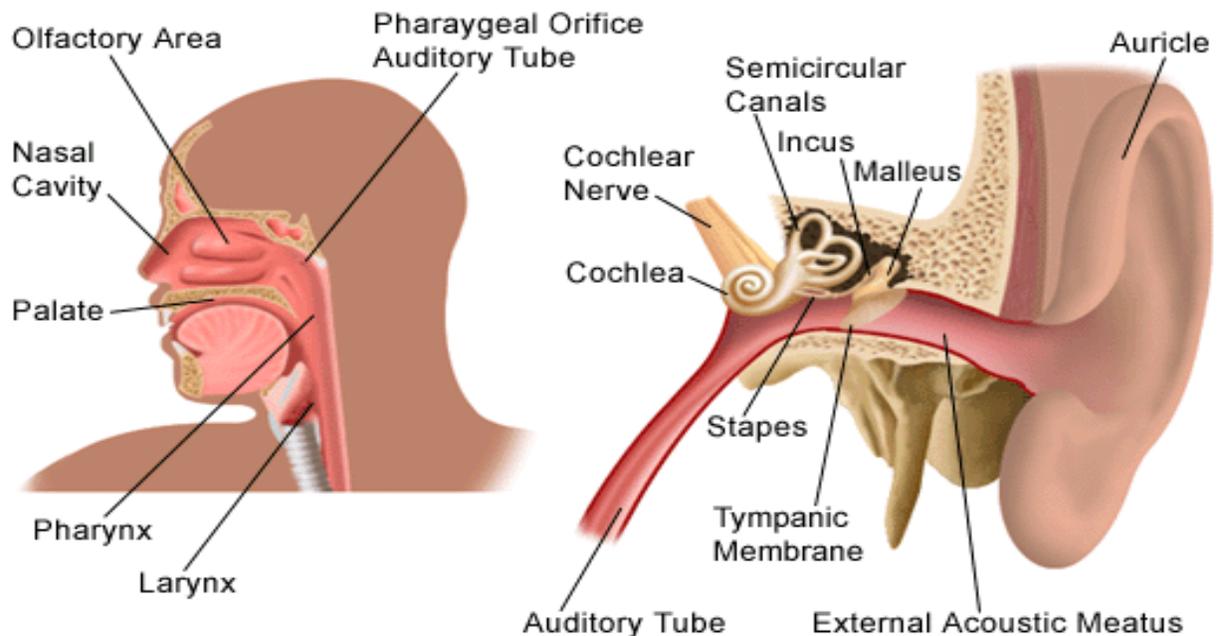


FIRST PART: E.N.T (EAR, NOSE AND THROAT)

CHAP. I. Nose & Sinus Disease/Disorders

Otorhinolaryngology (ORL) or ENT (ear, nose and throat) is the branch of medicine that is specialized in the diagnosis and treatment of ear, nose, throat, head and neck disorders.

I.0. ANATOMIC VIEW



1. RHINITIS

1.1. Definition:

Rhinitis is an inflammation of the mucous membranes of the nose.

1.2. Physiopathology

- The pathophysiology of rhinitis is complex. There is a strong genetic component to the allergic response, which is driven through mucosal infiltration and action on plasma cells, mast cells and eosinophils.
- The allergic response occurs in two phases, which are considered the "early" and "late" phase responses.
- Early phase response occurs within minutes of exposure to the allergen and tends to produce sneezing, itching, and clear rhinorrhea.

- Late phase response occurs 4 to 8 hours after allergen exposure and is characterized by congestion, fatigue, malaise, and irritability.
- The inflammation results in the generating of excessive amounts of mucus, commonly producing runny nose, nasal congestion and post-nasal drip.
- It has been associated with sleeping problems and ear conditions.
- Rhinitis is caused by an increase in histamine. This increase is most often caused by airborne allergens.

1.3. Signs and symptoms.

- Repeated sneezing (seen mainly in allergic rhinitis)
- Itching of the eyes, nose, ears, and throat (seen mainly in allergic rhinitis)
- Watery, runny nose
- Nasal congestion

1.4. Types

Rhinitis is mainly categorized into two types:

1. Nonallergic or vasomotor rhinitis
2. Allergic rhinitis

1.4.1. Vasomotor rhinitis

Vasomotor rhinitis is better known as nonallergic rhinitis. The distinguishing characteristic leading to a diagnosis of nonallergic rhinitis is the absence of allergic response. It appears to be significantly more common in women than men, leading some researchers to believe hormones to play a role.

In general, age of onset occurs after 20 years of age, in contrast to allergic rhinitis which generally appears before age 20. Individuals suffering from vasomotor rhinitis typically experience symptoms year-round, though symptoms may be exacerbated by weather changes.

Causes

- Environmental or occupational irritants. Dust, smoke or strong odors, such as perfumes, can trigger nonallergic rhinitis.
- Weather changes. Temperature or humidity changes can trigger the membranes inside the nose to swell and cause a runny nose.

- Infections. A common cause of nonallergic rhinitis is a viral infection, a cold or the flu.
- This type of nonallergic rhinitis usually clears up after a few weeks but can cause postnasal drip.
- Sometimes, this type of rhinitis can become chronic causing sinusitis.
- Foods and beverages. Nonallergic rhinitis may occur after eating hot foods.
- Drinking alcoholic beverages also may cause the membranes inside the nose to swell, leading to nasal congestion.
- Stress. Emotional or physical stress can trigger nonallergic rhinitis.
- Certain medications. Some medications can cause nonallergic rhinitis. These include NSAIDs such as aspirin and ibuprofen.
- Hormone changes. Changes in hormones due to pregnancy, menstruation, oral contraceptive use or a hormonal condition such as hypothyroidism can cause nonallergic rhinitis.

1.4.2. Allergic rhinitis

Allergic rhinitis often called allergies occurs when the immune system overreacts to particles breathed in the air. The immune system attacks the particles in the body, causing symptoms such as sneezing and a runny nose. The particles are called allergens which simply mean they can cause an allergic reaction. Heredity and environmental exposures may contribute to a predisposition to allergies. Over time, allergens may begin to have less affects and symptoms.

a. Pathophysiology

When an allergen such as pollen or dust is inhaled by an individual with a sensitized immune system, it triggers antibody production. These antibodies mostly bind to mast cells, which contain histamine. When the mast cells are stimulated by pollen and dust, histamine (and other chemicals) is released. This causes itching, swelling, and mucus production. Very sensitive individuals can experience rashes. Cross-reactivity may occur in these individuals.

b. Signs and symptoms

- Repeated sneezing especially in the morning.
- Runny nose and postnasal drip. The drainage from a runny nose caused by allergies is usually clear and thin. But it may become thicker and cloudy or yellowish if a nasal or sinus infection has occurred.
- Eyes are watery and itchy.
- Ears, nose, and throat are itchy.

c. Diagnosis

- Viral rhinitis is diagnosed based on symptoms.
- Symptoms that last longer than a week may require further testing to rule out a secondary bacterial infection, or an allergy.
- Allergies can be evaluated by blood tests, skin testing for specific substances, or nasal smears.
- IgE antibody tests to detect specific allergens are the standard method used.
- In addition diagnosis must be confirmed with a positive history and demonstration that the symptoms are the result of IgE-mediated inflammation.

d. Complications

- **Nasal polyps.** These are soft, noncancerous (benign) growths that develop on the lining of the nose or sinuses due to chronic inflammation.
- **Chronic sinusitis.** Prolonged nasal congestion due to rhinitis may increase the chances of developing sinusitis an infection or inflammation of the membrane that lines the sinuses.
- **Middle ear infections.** Increased fluid and nasal congestion may lead to middle ear infections.

1.4.3 Treatment of rhinitis

- The goal of rhinitis treatment is to reduce the symptoms caused by the inflammation of affected tissues.
- In cases of allergic rhinitis, the most effective way to decrease allergic symptoms is to completely avoid the allergen.
- Vasomotor rhinitis can be brought under a measure of control through avoidance of irritants, though many irritants, such as weather changes, are uncontrollable.
- Systemic glucocorticoids such as Prednisone are effective at reducing nasal inflammation, but their use is limited by their short duration of effect and the side effects of prolonged steroid therapy.

a. Allergic rhinitis treatment

- Allergic rhinitis can typically be treated much like any other allergic condition.
- Eliminating exposure to allergens is the most effective preventive measure.
- Several antagonistic drugs are used to block the action of allergic mediators like antihistamines (e.g. poloramine), dexamethasone and hydrocortisone.

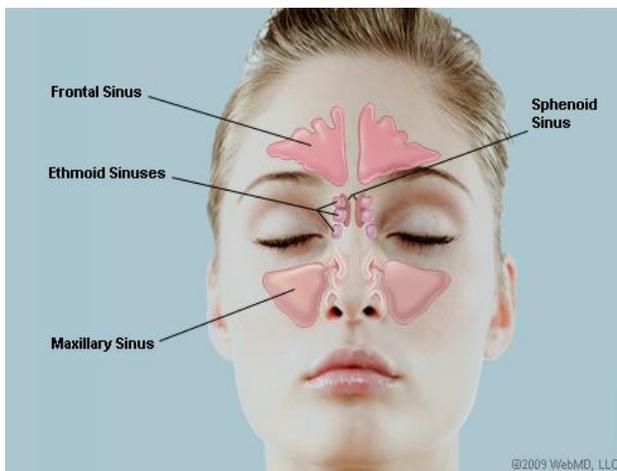
- An antihistamine, Azelastine (Astelin), is available as a nasal spray.
- More severe cases of allergic rhinitis require immunotherapy (allergy shots) or removal of tissue in the nose (e.g., nasal polyps) or sinuses.

b. Nasal treatments

- Steroid nasal sprays: are effective and safe, and may be effective without oral antihistamines. E.g. beclomethasone (Beconase) and fluticasone (Flonase, Flixonase).
- They take several days to act and so need to be taken continually for several weeks as their therapeutic effect builds up with time.
- Topical decongestants: may also be helpful in reducing symptoms such as nasal congestion, but should not be used for long periods as stopping them after protracted use can lead to a rebound nasal congestion (Rhinitis medicamentosa).

2. SINUSITIS

2.1. Anatomic view



2.2. Definition

- Paranasal sinuses, open areas within the skull, are named for the bones within which they lie.
- The sinuses are air spaces within bone. There are several groups of sinuses.
- *Sinuses help warm, moisten and filter the air in the nasal cavity and also add resonance to certain sounds.*

2.3. Pathophysiology

The sinuses are protected against infection by mucociliary action. Mucus is removed from sinuses through **ostia** in the nose. When ciliary action is impaired or the ostia obstructed, mucus can accumulate in sinus & become infected.

Sinusitis is a common infection that may occur in any of the paranasal sinuses. It may be acute or chronic. Blockage of the ostia may be due to deviated nasal septum, bony or congenital abnormalities, infections or allergies.

Under normal conditions air and mucus can easily move through sinus openings. When inflamed these openings close, causing changes in pressure within the effected sinus and result in the associated sinus pain.

Conditions that can cause sinus blockage include the common cold, allergic rhinitis (swelling of the lining of the nose), nasal polyps (small growths in the lining of the nose), or a deviated septum (a shift in the nasal cavity).

CLASSIFICATION

By location, there are several paired paranasal sinuses, including the frontal, ethmoid, maxillary and sphenoid sinuses. Sinusitis can be classified by the sinus cavity which it affects:

- **Maxillary sinusitis:** can cause pain or pressure in the maxillary area.
- **Frontal sinusitis:** can cause pain or pressure in the frontal sinus cavity (above eyes), headache.
- **Ethmoid sinusitis:** can cause pain or pressure pain between/behind eyes, headache.
- **Sphenoid sinusitis:** can cause pain or pressure behind the eyes, but often refers to the vertex of the head.

By duration, sinusitis can be **acute** (less than four weeks), **subacute** (4–8 weeks) or **chronic** (8 weeks or more). All three types of sinusitis have similar symptoms, and are thus often difficult to distinguish. Acute sinusitis is very common. Roughly 90% of adults have had sinusitis at some point in life.

✓ **Acute sinusitis**

A sudden onset of cold-like symptoms such as runny, stuffy nose and facial pain that does not go away after 7-10 days. Acute sinusitis typically lasts 4 weeks or less.

Signs and Symptoms of Acute Sinusitis

The primary symptoms of acute sinusitis include:

- Facial pain/pressure
- Nasal stuffiness
- Nasal discharge
- Loss of smell
- Cough/congestion

Additional symptoms may include:

- Fever
- Bad breath
- Fatigue
- Dental pain

Acute sinusitis may be diagnosed when a person has two or more symptoms and/or the presence of thick, green, or yellow nasal discharge.

Treatment for acute sinusitis

If there is have a simple sinus infection, the health care provider may recommend treatment with decongestants like Sudafed and steam inhalations alone. Use of nonprescription decongestant nasal drops or sprays may also be effective in controlling symptoms. However, these medicines should not be used beyond their recommended use, usually four to five days, or they may actually increase congestion. If antibiotics are given, they are usually given for 10 to 14 days. With treatment, the symptoms usually disappear and antibiotics are no longer required.

✓ **Chronic sinusitis**

A condition characterized by sinus inflammation symptoms lasting 8 weeks or longer.

The Signs and Symptoms of Chronic Sinusitis

People with chronic sinusitis may have the following symptoms for 8 weeks or more:

- Facial congestion/fullness
- A nasal obstruction/blockage
- Pus in the nasal cavity
- Fever
- Nasal discharge/discolored postnasal drainage

Additional symptoms of chronic sinusitis may include:

- Headaches
- Bad breath
- Fatigue
- Dental pain

Treatment of chronic sinusitis

Warm moist air may alleviate sinus congestion. A vaporizer or inhaling steam from a pan of boiling water (removed from heat) may also help. Warm compresses are useful

to relieve pain in the nose and sinuses. Saline nose drops are also safe for home use. Use of nonprescription decongestant nasal drops or sprays might be effective in controlling symptoms, however, they should not be used beyond their recommended use.

Antibiotics may also be prescribed.

- Nasal, as well as, oral steroids
- Antibiotics
- Antihistamines (if allergies)
- Sinus lavage

DIAGNOSIS OF SINUSITIS

- Diagnosis is basically by signs and symptoms
- Frontal X-ray shows opacity or a fluid in the antrum/sinusal cavity.
- **Intracranial Complications:** The frontal, ethmoid and sphenoid sinuses are separated from the intracranial cavity by a layer of bone. If the infection passes through this bone it may infect the tissue and fluid that lines the brain, causing "**meningitis**". In even more severe cases the infection may spread to the brain itself causing an "abscess".

COMPLICATIONS

- When sinusitis is managed properly, complications rarely occur.
- The following are the potential complications of sinusitis:
 1. **Orbital Complications:** The frontal, maxillary, ethmoid and sphenoid sinuses sit immediately above, below, between and behind the eyes, respectively. For this reason, infections of any of the sinuses may spread to the orbit, causing a wide spectrum of complications from mild inflammation of the eyelid to abscesses with possible blindness.
 2. **Vascular Complication:** The carotid artery and cavernous sinus are two large vascular structures that border the sphenoid sinus. Infections that involve either of these structures may lead to aneurysms or infected blood clots in the intracranial cavity, both of which are potentially fatal.
 3. **Asthma :** A number of patients suffer from both asthma and chronic sinusitis and, for these individuals, flare-ups of the sinusitis can lead to asthma attacks. Many studies have shown that resolving the sinus condition will result in dramatic improvement of the asthma.
 4. **Loss of Smell and Taste :** Sinusitis may diminish the senses of smell and taste, since the two are interconnected.

5. **Osteomyelitis** : Some recent studies suggest that bone becomes actively involved during a chronic sinus infection, making the infection more difficult to treat. This may even cause the destruction of bone that leads to the intracranial and intraorbital complications.

Surgery treatment for sinusitis

- Surgery: (FESS) Functional Endoscopic Sinus Surgery to reestablish sinus ventilation and drainage.
- Fiberoptic endoscope is passed into sinuses through nasal cavities to allow visualization of sinuses, removal of diseased tissue, & enlarge ostia.
- External Sphenoethmoidectomy: to remove diseased tissue from sphenoidal or ethmoidal sinus.
- Small incision over ethmoidal sinus on lateral nasal bridge. Nasal and ethmoidal packing is inserted. An eye patch helps decrease periorbital edema.

Post Op Care:

- Observe for bleeding, respiratory distress, and ecchymosis, orbital and facial edema (24 hrs).
- Apply ice compresses to nose and cheek to minimize edema & control bleeding.
- Position in semi-Fowlers for 24-48 hours.
- Analgesics as required and before removing packing.
- Instruct client to avoid blowing nose for 7-10 days.
- Sneeze with mouth open
- Nasal saline sprays may be started 3-5 days after surgery to moisten mucosa.
- Minimal straining, lifting for two weeks.

3. NOSE TRAUMATISMS

The nose may be injured in various forms of sport, in personal assaults and in traffic accidents.

It is defined as an injury to the nose or other related structure and this result in bleeding, external deformity.

Injury to the nose may result in one or a combination of several of the following:

- Epistaxis
- Fractures of the nose bones
- Fracture or dislocation of the septum
- Septal haematoma.

The fracture is often simple but comminuted. It may be compound, with an open wound in the skin over the nasal bones.

3.1. SIGNS AND SYMPTOMS

- Swelling and discoloration of the skin and subcutaneous tissues covering the nasal bones and the surrounding area
- Tenderness
- Mobility of the nose
- Deformity. This may or may not be present and is of importance in deciding upon treatment

3.2. TREATMENT

- Fractured noses usually bleed and the epistaxis should be controlled first.
- Lacerations should be cleaned meticulously to avoid tattooing with dirt and sutured carefully with very fine suture material if necessary.
- X-rays are of doubtful value in nasal fractures and are difficult to interpret. If a previously straight nose is now bent, it must be broken. If it is not bent after an injury, no treatment is necessary. The key to whether treatment is necessary is the presence of deformity, which is more readily appreciated by standing behind the patient and looking down on the nose.
- If no deformity is present, no manipulation or splinting is required. If deformity is present decide whether it is bony or cartilaginous. If the nasal bones are displaced, reduction will be necessary.

WHEN TO REDUCE THE FRACTURE

Nasal fractures can be reduced immediately after the injury with the little additional discomfort by simple manipulation, but the appropriate medical attendant is rarely present. More often, the patient presents himself to the casualty officer some time later, by which time oedema may obscure the extent of any deformity and preclude manipulation. The oedema will settle over 5-7 days and the patient should be referred to the ENT surgeon within a week of injury. He can then choose the most convenient time to carry out reduction. After 2 weeks, the bone may be so fixed as to render manipulation impossible, and deformity may be permanent. The optimum timing is usually 7-10 days after the injury.

REDUCTION OF FRACTURED NASAL BONES

The nose should be painted with cocaine paste or sprayed thoroughly with a mixture of lidocaine and phenylephrine to reduce bleeding. Reduction is carried out under general anaesthetic with an endotracheal tube and pharyngeal pack. Anything less than this may be dangerous, because blood can be inhaled. Simple lateral angulation of the nasal bones can often be reduced, with an audible click, by digital pressure on the nose. Depressed nasal fractures will require elevation with Walsham's forceps. If the nasal bones are excessively mobile, splinting with plaster of Paris is necessary.

Nasal fractures are now often reduced in outpatients under local anesthetic. The nose is cocaineized and the external nasal nerve at its exit below the nasal bone is blocked with lignocaine. Nasal bone manipulation can then be carried out with minimal discomfort.

LATE TREATMENT OF NASAL FRACTURES

If a patient with a fractured nose presents months or years after injury, manipulation is clearly not possible, and formal rhinoplasty is necessary. This involves elevation of the skin from the nasal skeleton, mobilization of the nasal bones by lateral saw cuts and realignment of nasal fractures all the more important.

SEPTAL DISLOCATION WITH FRACTURE

Nasal injury may result in deviation of the nasal septum, causing airway obstruction. If no external deformity exists, treatment is by septoplasty or submucous resection (SMR) after a period of weeks or months. Sometimes the septal displacement is accompanied by external nasal deformity that is maintained by the misplaced septum. In such a case, reduction of the nasal bones may be achieved only if the septum is corrected surgically at the same time. Such surgery must be done before the nasal bones have set.

SEPTAL HAEMATOMA

Sometimes, soon after a punch on the nose, the victim complains of very severe or complete nasal obstruction. This may be caused by a septal haematoma the result of haemorrhage between the two sheets of mucoperichondrium covering the septum. It is often (but not always) associated with a fracture of the septum.

The appearance is quite distinctive. Both nasal passages are obliterated by a boggy, pink or dull red swelling replacing the septum.

TREATMENT

Treatment may be expectant in the case of a very small haematoma, but a large one requires incision along the base of the septum, evacuation of the clot, the insertion of a drain, and a nasal packing to approximate the septal coverings of muco-perichondrium. Antibiotic cover should be given in an attempt to avert the development of a septal abscess. The patient should be warned that deformity of the nose may ultimately occur (the outcome of necrosis of the cartilage).

4. EPISTAXIS /NOSE BLEED

1. Definition

- Epistaxis is the relatively common occurrence of hemorrhage from the nose, usually noticed when the blood drains out through the nostrils.
- There are two types: anterior (the most common), and posterior (less common, more likely to require medical attention).
- Sometimes in more severe cases, the blood can come up the nasolacrimal duct and out from the eye.
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2. Causes/ etiology of Epistaxis

The cause of nosebleeds can generally be divided into two categories, local and systemic factors, although it should be remembered that a significant number of nosebleeds occur spontaneously.

Local causes	General causes
Spontaneous	CVS conditions; hypertension
Trauma	Coagulation or vascular defects; Hemophilia, leukemia, anticoagulant therapy, thrombocytopenia.
Post-operative	Fevers; typhoid fever and influenza.
Tumors	Blood dyscrasias

The most common causes are irritation, trauma, infection, foreign bodies, tumor, systemic diseases, systemic treatment, etc.

3. Types of Epistaxis:

3.1. Anterior:

Most common. 90% of all occurs children/young adults

Bleeding is **VENOUS**.

3.2. Posterior:

10% of all nosebleeds occurring in older adults

Bleeding is **ARTERIAL** and it is the most dangerous

4. Pathophysiology

- Nosebleeds are due to the rupture of a blood vessel within the richly perfused nasal mucosa. This rupture may be spontaneous or initiated by trauma. An increase in blood pressure (e.g. due to general hypertension) tends to increase the duration of spontaneous epistaxis.
- The vast majority of nose bleeds occur in the anterior part of the nose from the nasal septum because this area is richly endowed with blood vessels (Kiesselbach's plexus). This region is also known as Little's area.
- Bleeding further back in the nose is known as a posterior bleed and is usually due to rupture of the sphenopalatine artery.

- Posterior bleeds are often prolonged and difficult to control. They can be associated with bleeding from both nostrils and with a greater flow of blood into the mouth.

5. Signs and symptoms

Nasal bleeding

Headache most of the time this signs may be absent

6. Laboratory Tests

Laboratory tests to evaluate the patient's condition and underlying medical problems may be ordered depending on the clinical picture at the time of presentation. If the bleeding is minor and not recurrent, then a laboratory evaluation may not be needed.

- **Hematocrit count** and blood type and cross-match if a history of persistent heavy bleeding is present,
- Complete blood count (CBC) with differential is needed if a history of recurrent epistaxis, a platelet disorder, or neoplasia is present.
- The bleeding time is an excellent screening test if suspicion of a bleeding disorder is present.
- The international normalized ratio (INR)/prothrombin time (PT) if the patient is taking warfarin or if liver disease is suspected.
- The activated partial thromboplastin time (aPTT) as necessary.

Other Studies.

- Direct visualization with a good directed light source, a nasal speculum, and nasal suction should be sufficient in most patients. However, computed tomography (CT) scanning, magnetic resonance imaging (MRI) or both may be indicated to evaluate the surgical anatomy and to determine the presence and extent of rhinosinusitis, foreign bodies, and neoplasms. Nasopharyngoscopy may also be performed if a tumor is the suspected cause of bleeding.
- Sinus films are rarely indicated for a nosebleed. Angiography is rarely indicated.

7. Treatment

In most patients with epistaxis, the bleeding responds to cauterization, nasal packing, or both. For those who have recurrent or severe bleeding for which medical therapy has failed, various surgical options are available. After surgery or embolization, patients should be closely observed for any complications or signs of rebleeding.

a. Manual Hemostasis

Initial treatment begins with direct pressure. The nostrils are squeezed together for 5-30 minutes straight, without frequent peeking to see if the bleeding is controlled. Usually, 5-10 minutes is sufficient.

Patients should keep their heads elevated but not hyperextended because hyperextension may cause bleeding into the pharynx and possible aspiration. This maneuver works more than 90% of the time.

If direct pressure is not sufficient, gauze moistened with epinephrine at a ratio of 1:10,000 or phenylephrine (Neo-Synephrine) may be placed in the affected nostril to help vasoconstrict and achieve hemostasis.

b. Humidification and Moisturization

If bleeding is caused by excessive dryness in the home (eg, from radiator heating), patients may benefit from humidifying the air with a cool mist vaporizer in the bedroom or, as a simpler alternative, placing a metal basin of water on top of a radiator to humidify the ambient air.

Nasal saline sprays are useful. Oxymetazoline may also be used, with fewer cardiac adverse effects. To minimize the risk of rhinitis medicamentosa and tachyphylaxis, these agents should be used for no more than 3-5 days at a time.

The physician may consider local application of bacitracin or petrolatum ointment directly to the Kiesselbach area with a cotton applicator to prevent further drying (studies recommend 2 wk).

c. Cauterization

Bleeding from the Kiesselbach plexus (Little's area) is frequently treated with silver nitrate cauterization. Manage the vessels leading to the site before managing the actual bleeding site. Avoid random and aggressive cauterization and cautery on opposing surfaces of the septum.

Electrocauterization with an insulated suction cautery unit can also be used. This method is usually reserved for more severe bleeding and for bleeding in more posteriorly located sites, and it often requires local anesthesia. The effectiveness of both cauterization methods can be enhanced by using rigid endoscopy, especially in the case of more posteriorly located bleeding sites.

After the bleeding has been controlled, instruct the patient to use nasal saline spray and antibiotic ointment and to avoid strenuous activities for 7-10 days. NSAIDs are to be avoided if at all possible. Digital manipulation of the nose is to be avoided. A topical vasoconstrictor may be used if minor bleeding recurs with the dislodging of the eschar. Cauterizing agents coagulate cellular proteins, which can in turn reduce bleeding.

Silver nitrate coagulates cellular protein and removes granulation tissue. It also has antibacterial effects.

d. Nasal Packing

Nasal packing can be used to treat epistaxis that is not responsive to cauterization. Two types of packing, anterior and posterior, can be placed. In both cases, adequate anesthesia and vasoconstriction are necessary.

e. Anterior

For anterior packing, various packing materials are available. Petroleum jelly gauze (0.5 in x 72 in) filled with an antibiotic ointment is traditionally used. Layer it tightly and far enough posteriorly to provide adequate pressure. Blind packing with loose gauze is to be avoided.

All packings should be removed in 3-4 days. Absorbable materials (eg, Gelfoam, Surgicel, Avitene) may be used in patients with coagulopathy to prevent trauma upon packing removal. Administer prophylactic antibiotics to all patients with packing, and instruct them to avoid physical strain for 1 week.

f. Posterior

Epistaxis that cannot be controlled by anterior packing can be managed with posterior packing. Classically, rolled gauzes are used, but medium tonsil sponges can be substituted.

8. Complications

Complications of epistaxis may include the following:

- Sinusitis
- Septal hematoma/perforation
- External nasal deformity
- Mucosal pressure necrosis
- Vasovagal episode
- Balloon migration
- Aspiration

9. Prevention of Epistaxis

To the extent possible, patients should avoid the following:

- **Strenuous activities** - Protection from direct trauma from some sports activities is afforded by the use of helmets or face pieces.
- **Hot and dry environments** – The effects of such environments can be mitigated by using humidifiers, better thermostatic control, saline spray, and antibiotic ointment on the Kiesselbach area.
- **Hot and spicy foods**

- **Digital trauma** – In children, nose picking is difficult to deter and should probably be considered inevitable. Keeping the child’s nails well trimmed may be helpful.
- **Nose blowing and excessive sneezing** - Instruct patients to sneeze gently with the mouth open.
- **Inappropriate or careless use of drugs** - Consider drug education relating to use or accidental ingestion of aspirin, warfarin (eg, rat poison in toddlers), or drug abuse in adolescents.

1. Nasal tumors

a. Definition

Nasal and sinus tumors are benign or cancerous tumors that occur in the nose or sinuses. Cancerous nasal cavity or sinus tumors are rare. Most of these types of tumors (60 to 70%) occur in the maxillary sinus, while 20 to 30 % are in the nasal cavity and 10 to 15 percent are in the ethmoid sinuses. Cancer in the sphenoid or frontal sinuses is extremely rare, accounting for only 5% of such cancers.

b. Etiology

Men are more likely to get sinus cancer than women. The most common age for diagnosis of the condition is fifties and sixties. Smoking and tobacco smoke is a major risk factor for nose and sinus cancer, as well as other cancers of the respiratory track. Exposure to dusts from wood, leather or textiles, as well as inhaling vapors from glue, formaldehyde, solvents, nickel, chromium, rubbing alcohol and radium appear to increase the risk of such cancers. Avoiding exposure to these risk factors can reduce the risk of sinus or nasal cancer, especially avoiding tobacco smoke.

Although the cause of sinus and nasal cavities tumors is unknown, they occur when the genes that control cell growth become defective.

c. Physiopathology

The path physiology is the same as other tumors.

What are the stages of paranasal sinus and nasal cavity cancer?

Sinus cancers are categorized into Stages I, II, III, and IV. In general, as the tumor grows larger and involves more areas of the sinuses, the stage is considered more advanced.

The following are the stages for maxillary sinus cancer, which is the most common kind of sinus cancer:

Stage 0: Cancer is found in the superficial lining of the maxillary sinus only. Stage 0 is also called carcinoma in situ.

Stage I: Cancer is found in the mucous membranes of the maxillary sinus.

Stage II: Cancer has spread to bone around the maxillary sinus, including the roof of the mouth and the nose.

Stage III: In stage III, cancer is found in any of the following places:

- Bones around the maxillary sinus
- Tissues under the skin
- Eye socket
- Base of the skull
- Ethmoid sinuses
- Lymph nodes

Stage IV: This stage involves the spread of cancer to areas including:

- Skin of the cheek
- Behind the jaw
- Bone between the eyes
- Sphenoid or frontal sinuses
- Lymph nodes
- Brain
- Other parts of the body

The following stages are used for nasal cavity and ethmoid sinus cancer:

Stage 0: Cancer is found in the innermost lining of the nasal cavity or ethmoid sinus only.

Stage I: Cancer is found in only one area of either the nasal cavity or the ethmoid sinuses.

Stage II: Cancer may have spread to nearby sinuses and possibly into bone.

Stage III: In stage III, cancer is found in any of the following places:

- Eye socket
- Maxillary sinus
- Roof of the mouth.

Stage IV: During this stage, cancer can be found in:

- Eye socket
- Skin of the nose or cheek
- Base of the skull
- Sphenoid or frontal sinuses
- Brain
- Other parts of the body

d. Symptoms of Nasal and Sinus Tumors

Although many sinus or nasal cancers exhibit no symptoms, certain prolonged symptoms may indicate cancer, including:

- Persistent nasal congestion, especially on one side
- Pain in the forehead, cheek, nose or around the eyes or ear
- Post-nasal drip at the back of the throat
- Frequent and persistent nosebleeds
- Double or blurred vision
- Loss of sense of smell or taste
- Pain or numbness in the face or teeth
- A growth in the face, nose, palate or neck
- Runny eyes, diplopia
- Difficulty opening the mouth
- Recurrent ear infections
- Difficulty hearing

Tests that examine the sinuses and nasal cavity are used to detect (find) and diagnose paranasal sinus and nasal cavity cancer.

The following tests and procedures may be used:

- **Physical exam and history:** An exam of the body to check general signs of health, including checking for signs of disease, such as lumps or anything else that seems unusual. A history of the patient's health habits and past illnesses and treatments will also be taken.
- **Physical exam of the nose, face, and neck:** An exam in which the health care provider looks into the nose with a small, long-handled mirror to check for abnormal areas and checks the face and neck for lumps or swollen lymph nodes.
- **X-rays** of the head, neck, and chest: An x-ray is a type of energy beam that can go through the body and onto film, making a picture of areas inside the body.
- **Nasoscopy:** A procedure to look inside the nose for abnormal areas. A nasoscope is inserted into the nose. A nasoscope is a thin, tube-like instrument with a light and a lens for viewing. It may also have a tool to remove tissue samples, which are checked under a microscope for signs of cancer.
- **Biopsy:** The removal of cells or tissues so they can be viewed under a microscope by a pathologist to check for signs of cancer.

e. Treatment

The following treatments are used for cancer of the paranasal sinuses and nasal cavity:

• **Surgery:** Traditionally, tumors of the sinuses have been removed by open craniofacial resection. This involves making incisions on the face and a craniotomy (removal of forehead bone flap) by a neurosurgeon to achieve tumor resection. With the advances in sinus endoscopy, many of these tumors can now be removed directly through the nose. Minimally invasive endoscopic resection can avoid the need for facial incisions or

a craniotomy. The complications are decreased and the recovery is faster. Tumors with extensive brain involvement may still require a craniotomy. All cases are presented at the Multidisciplinary Skull Base Conference to devise the best treatment plan for each patient.

- **Radiation therapy:** The use of high-dose x-rays or other high-energy rays to kill cancer cells. Typically, radiation is used after surgery to minimize the risk of cancer recurrence.

- **Chemotherapy:** The use of drugs to kill cancer cells. Chemotherapy is used in selected cases of aggressive sinus cancers before or after surgery. In selected cases, it may also be used to treat recurrent cancer.

Can cancer of the paranasal sinus and nasal cavity be prevented?

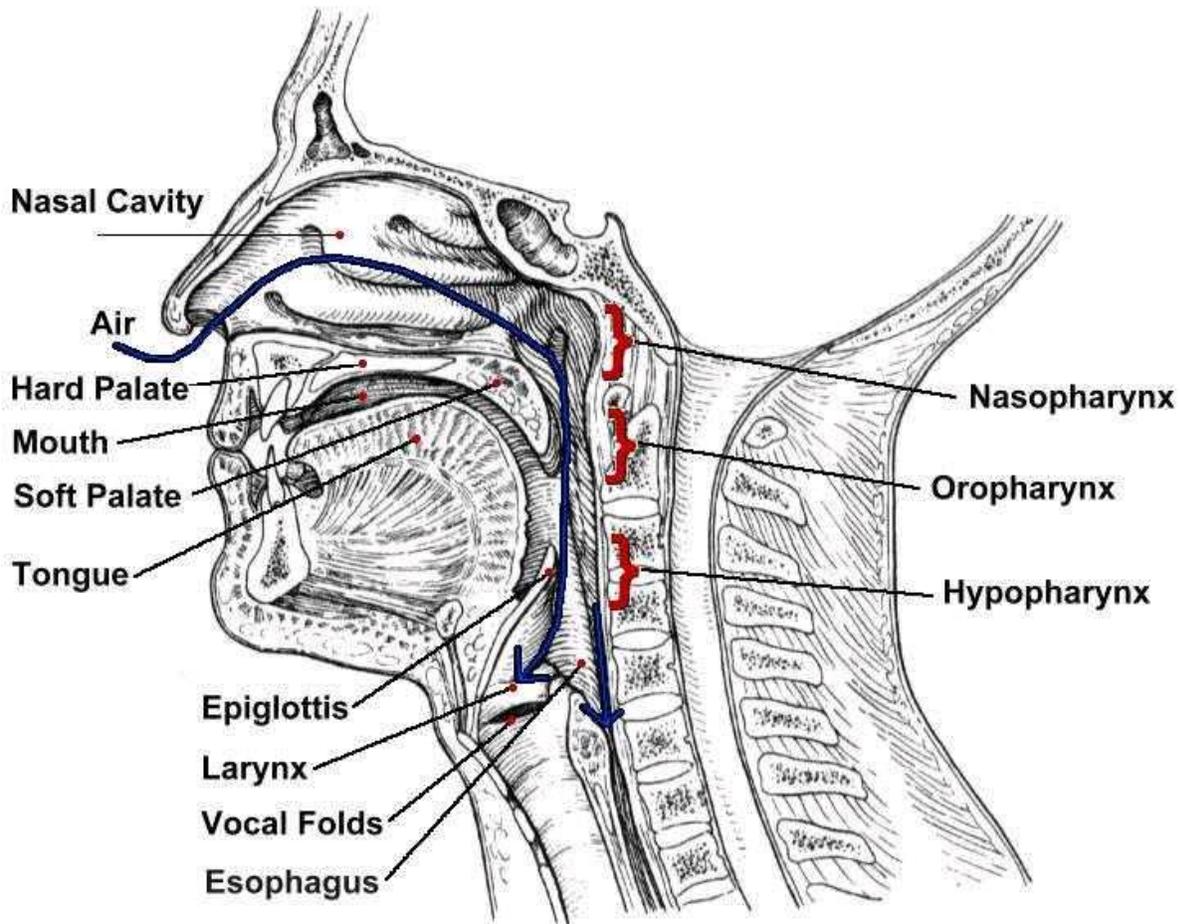
Many people with cancer of the nasal cavity and paranasal sinuses have no known risk factors, so there is no way to prevent these cancers. People who smoke can potentially reduce their risk by no longer using tobacco products. People who work with potentially harmful substances, especially industrial chemicals, should find out if they are being protected from harmful exposure to these substances.

What is the prognosis (chance of recovery) for someone with paranasal sinus and nasal cavity cancer?

The prognosis depends on the location and type of the cancer, the stage of the cancer, and the patient's general state of health. Five-year survival rates for people with nasal cavity and sinus cancer range from 80-90% for small cancers that have not spread to 10 to 20% for people with advanced cancers.

CHAP.II. Pharynx Diseases/Disorders

0. Anatomic view



1. Pharyngitis

Pharyngitis is an inflammation of the throat or pharynx. In most cases it is painful and is often referred to as a sore throat. Like many types of inflammation, pharyngitis can be acute characterized by a rapid onset and typically a relatively short course or chronic. Pharyngitis can be accompanied by a cough or fever, for example, if caused by an upper respiratory tract infection.

Causes

- The pharynx is a common site of infection.
- Most acute cases are caused by viral infections (40%–60%), with the remainder caused by bacterial infections, fungal infections, or irritants such as pollutants or chemical substances.

Viral pharyngitis

- Adenovirus : the most common of the viral causes. Typically the degree of neck lymph node enlargement is modest and the throat often does not appear red but painful.
- Orthomyxoviridae which cause influenza present with rapid onset high temperature, headache and generalised ache.
- Infectious mononucleosis ("glandular fever") caused by the Epstein-Barr virus.
- This may cause significant lymph gland swelling and an exudative tonsillitis with marked redness and swelling of the throat.
- Herpes simplex virus can cause multiple mouth ulcers.
- Common cold: rhinovirus, respiratory syncytial virus, parainfluenza virus can cause infection of the throat, ear, and lungs causing standard cold-like symptoms and often extreme pain.
- Primary HIV

Bacterial pharyngitis

- A number of different bacteria can infect the human throat.
- The most common bacterial agent is streptococcus. It causes about 15-30% of cases of pharyngitis.
- Others include *Corynebacterium diphtheriae*, *Neisseria gonorrhoeae*, *Chlamyphila pneumoniae*, and *Mycoplasma pneumoniae*.
- Unlike adenovirus, there tends to be greater generalized symptoms.
- Viral causes: Some cases of pharyngitis are caused by fungal infection such as *Candida albicans* causing oral thrush.

Signs and symptoms

- Headache,
- sore throat,
- dysphagia and dysphonia,
- myalgia and
- Fever.

Diagnosis.

- It is generally clinically diagnosed characterized by; enlarged and tender lymph nodes, bright red and inflamed with white or yellow spots on the throat.
- Rapid test or throat culture to test for strep throat.

Treatment

- Treatment can be divided into symptomatic and remedial.
- Symptomatic treatments attempt to reduce pain and discomfort.
- Remedial treatments attempt to cure pharyngitis or prevent long term complications such as rheumatic fever.
- Remedial treatments are effective for bacterial infections and fungal infection.
- No specific treatment for viral infections has been found to be effective and most cases will settle within a few days and may only require symptomatic treatment.

Symptomatic treatment

- Analgesics such as NSAIDs can help reduce the pain associated with a sore throat.
- Viscous lidocaine relieves pain by numbing the mucus membranes of the throat.

Remedial treatment

- Antibiotics penicillin V, amoxicillin are useful if a bacterial infection is the cause of the sore throat.
- Antifungal drugs are useful in fungal pharyngitis (nystatin and fluconazole)

Complications

- Some immune-system mediated complications may occur:
- Scarlet fever with its vivid rash.
- Generalized inflammatory disorder of rheumatic fever which could later result in Rheumatic heart disease affecting the valves of the heart.
- Post-streptococcal glomerulonephritis.
- Very rarely septicemia (Lemierre's syndrome).

II.2. Vegetations

Most of vegetations found in the oropharyngeal cavity are called **adenoids**.

2.1. ADENOIDS

Enlarged adenoid is swelling of the lymph tissue found in the airway between the nose and the back of the throat. The tissue is similar to the tonsils.

Adenoids (or pharyngeal tonsil, or nasopharyngeal tonsil) are a mass of lymphoid tissue situated posterior to the nasal cavity, in the roof of the nasopharynx, where the nose blends into the throat.

Normally, in children, they make a soft mound in the roof and posterior wall of the nasopharynx, just above and behind the uvula.

Causes

Enlarged adenoids may be a natural occurrence, beginning when the baby grows in the womb.

Long-term inflammation can also lead to enlarged adenoids.

The adenoids normally shrink as a child grows older.

Pathology

Enlarged adenoids, or adenoid hypertrophy, can become nearly the size of a ping pong ball and completely block airflow through the nasal passages.

Even if enlarged adenoids are not substantial enough to physically block the back of the nose, they can obstruct airflow enough so that breathing through the nose requires an uncomfortable amount of work, and inhalation occurs instead through an open mouth.

Adenoids can also obstruct the nasal airway enough to affect the voice without actually stopping nasal airflow altogether.

Symptoms

- Bad breath
- Cracked lips
- Dry mouth
- Mouth breathing (mostly at night)
- Mouth open during day (more severe obstruction)
- Persistent runny nose or nasal congestion
- Restlessness while sleeping
- Snoring

Exams and Tests

The adenoids cannot be seen by looking in the mouth directly, but can be seen with a special mirror or using a flexible endoscope through the nose.

Tests may include:

- X-ray (side view of the throat)
- Sleep apnea studies (severe cases only)

Treatment

- Antibiotics may be used to treat tonsil, adenoid, and sinus infections when they occur.
- Surgery to remove the adenoids (adenoidectomy) may relieve symptoms or prevent complications in those with frequent ear or sinus infections or fluid behind the ears. It may also be done when ear tubes have not successfully reduced infections.

Removal of the adenoids

Surgical removal of the adenoids is a procedure called adenoidectomy.

Adenoids may be removed if they become infected, causing **symptoms** such as **excessive mucus production**. Studies have shown that adenoid regrowth occurs in as many as 20% of the cases in which they are removed.

Carried out through the mouth under a general anesthetic (or less commonly a topical), adenoidectomy involves the adenoids being curetted, cauterized, lasered, or otherwise ablated.

Like other organs of the lymphatic system, some believe them to be involved in helping fight off pharyngeal and upper respiratory tract infections, but there is no conclusive evidence to that effect.

Possible Complications

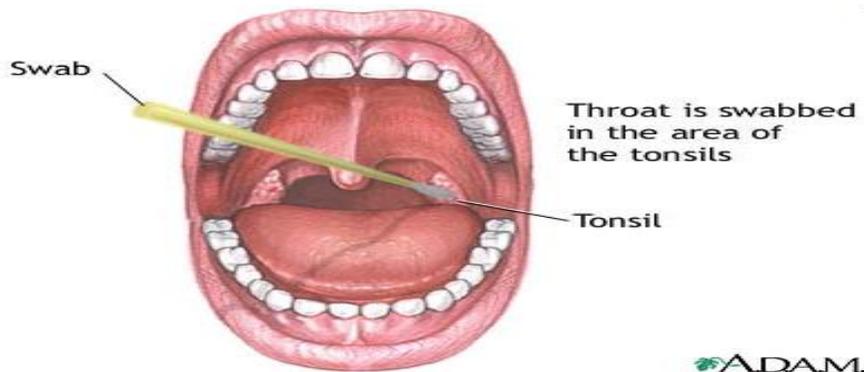
- Frequent ear infections
- Intermittent sleep apnea

Prevention

- Treating throat infections early may prevent the adenoids from becoming enlarged from long-term infection and inflammation. Removing the adenoids prevents long-term airway blockage.

2. Tonsillitis

Tonsils that are two masses of tissue which act as filters, trapping germs that could otherwise enter the airways and cause infection. They also produce antibodies to fight infection. But sometimes the tonsils themselves become infected. Overwhelmed by bacteria or viruses, they swell and become inflamed, a condition known as **tonsillitis**.



TYPES

- There are 3 main types of tonsillitis: acute, subacute and chronic.
- Acute tonsillitis can either be bacterial or viral in origin.
- Subacute tonsillitis is caused by the bacterium Actinomyces.
- Chronic tonsillitis, which can last for long periods if not treated, is mostly caused by bacterial infection.

ETIOLOGY

Bacterial and viral infections can cause tonsillitis. A common cause is Streptococcus (strep) bacteria. Other common causes include:

- Adenoviruses
- Influenza virus
- Epstein-Barr virus
- Parainfluenza viruses
- Enteroviruses
- Herpes simplex virus

SIGNS AND SYMPTOMS

- Tonsillitis usually occurs as part of pharyngitis (throat infection).
- Tonsillitis usually begins with sudden sore throat and dysphagia.

The main symptoms of tonsillitis are inflammation and swelling of the tonsils, sometimes severe enough to block the airways. Other symptoms include:

- Throat pain or tenderness
- Redness of the tonsils
- A white or yellow coating on the tonsils
- Painful blisters or ulcers on the throat
- Hoarseness or loss of voice
- Headache
- Loss of appetite
- Ear pain
- Difficulty swallowing or breathing through the mouth
- Swollen glands in the neck or jaw area
- Fever, chills
- Bad breath

In children, symptoms may also include:

- Nausea
- Vomiting
- Abdominal pain

DIAGNOSIS

- The diagnosis is basically clinical.
- However, throat swab and culture to determine whether tonsillitis is caused by bacteria or virus.

DIAGNOSTIC TESTS.

- The diagnosis is basically clinical.
- However, throat swab and culture to determine whether tonsillitis is caused by bacteria or virus.

TREATMENT

Treatment for tonsillitis will depend in part on the cause.

- Treatments of tonsillitis consist of pain management with NSAIDs.
- If the tonsillitis is caused by bacteria, then antibiotics are prescribed, with penicillin being most commonly used. Erythromycin and Clarithromycin are used for patients allergic to penicillin.
- When tonsillitis is caused by a virus, the length of illness depends on which virus is involved. Usually, a complete recovery is made within one week; however, some rare infections may last for up to two weeks.

- Chronic cases or if tonsillitis is recurrent, or if enlarged tonsils cause upper airway obstruction or difficulty eating, surgical removal of the tonsils, called tonsillectomy may be a treatment of choice.
- Additionally, gargling with a solution of warm water and salt may reduce pain and swelling.

INDICATIONS OF TONSILLECTOMY

- In chronic/recurrent cases (generally defined as seven episodes of tonsillitis in the preceding year, five episodes in each of the preceding two years or three episodes in each of the preceding three years).
- In acute cases where the palatine tonsils become so swollen that swallowing is impaired.
- Hypertrophy of the tonsils that result in snoring, mouth breathing, disturbed sleep, and obstructive sleep apnea.

POST OPERATIVE CARE

- Tonsillectomy is an outpatient procedure performed under general anesthesia and typically lasting between 30 minutes and 45 minutes. It is most commonly performed in children.
- Analgesics to relieve pain.
- During the recovery period, it's important to get enough rest.
- It's also important to make sure you get plenty of fluids; however, you should avoid milk products for the first 24 hours after surgery.

COMPLICATIONS

- Peritonsillar abscess; an abscess that develops lateral to the tonsil during an infection, typically several days after the onset of tonsillitis.
- Rarely, the infection may spread beyond the tonsil resulting in inflammation and infection of the internal jugular vein giving rise to a spreading septicaemia infection (Lemierre's syndrome).
- In very rare cases, diseases like rheumatic fever or glomerulonephritis can occur.

CHAP.III. Larynx Diseases/ Disorders

Introduction

The larynx is an organ at the front of the neck. It is also called the *voice box*. It is above the windpipe (trachea). Below and behind the larynx is the esophagus.

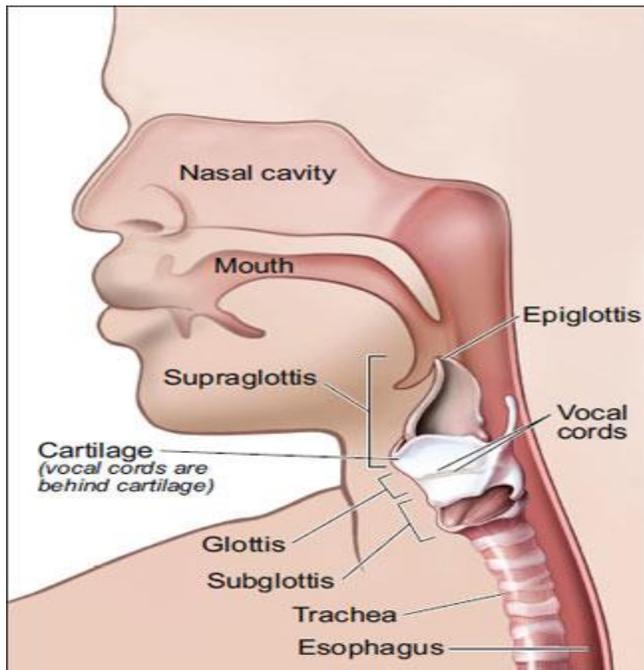
The larynx has two bands of muscle that form the vocal cords. The cartilage at the front of the larynx is sometimes called the Adam's apple.

The larynx has three main parts:

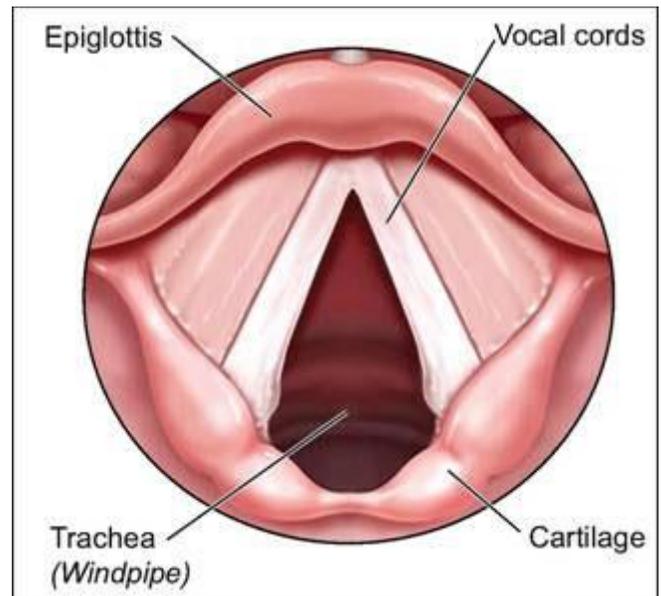
- The top part of the larynx is the supraglottis.
- The glottis is in the middle. The vocal cords (the vibrating elastic bands inside the larynx that produce the voice) are in the glottis.
- The subglottis is at the bottom. The subglottis connects to the windpipe.

The larynx plays a role in **breathing, swallowing, and talking**. The larynx acts like a valve over the windpipe. The valve opens and closes to allow breathing, swallowing, and speaking:

- **Breathing:** When you breathe, the vocal cords relax and open. When you hold the breath, the vocal cords shut tightly.
- **Swallowing:** The larynx protects the windpipe. When you swallow, a flap called the epiglottis covers the opening of the larynx to keep food out of the lungs. The food passes through the esophagus on its way from the mouth to the stomach.
- **Talking:** The larynx produces the sound of voice. When you talk, the vocal cords tighten and move closer together. Air from the lungs is forced between them and makes them vibrate. This makes the sound of the voice. The tongue, lips, and teeth form this sound into words.



This picture shows the main parts of the larynx: the supraglottis, glottis, and subglottis.



This picture shows how the larynx looks from above.

Hoarseness and other problems of the larynx and surrounding tissues are very common. Increased voice use in both the work and play environments has put strain on structures that were not meant to be used/abused in the way they are. Telecommunications operators, coaches, pop singers (in bars especially), and people who have to talk in noisy environments are all prone to hoarseness from improper use

of their voices as well as people with diseases such as nodules, cancer, vocal polyps, and weakness or paralysis of one or both vocal cords.

1. Laryngitis

- Laryngitis is an inflammation of the larynx. It causes hoarse voice or the complete loss of the voice because of irritation to the vocal folds (vocal cords). Dysphonia is the medical term for laryngitis and other vocal disorders.
- Laryngitis is categorized as acute if it lasts less than a few days. Otherwise it is categorized as chronic, and may last over 3 weeks.

CAUSES

Laryngitis can be caused by:

- Upper respiratory tract infections are the most common cause (viral infection)
- Acid reflux, also known as gastroesophageal reflux disease (GERD). This type of laryngitis is also called reflux laryngitis.
- bacterial or fungal infection
- excessive coughing, or alcohol consumption
- Overuse of the voice, such as cheering at a sports event.
- Irritation, such as from allergies or smoke.

Acid reflux is the most common cause of chronic laryngitis. But chronic laryngitis may be caused by more severe problems such as nerve damage, sores, polyps, or hard and thick lumps (nodules) on the vocal cords.

SYMPTOMS

- Symptoms of laryngitis can vary, depending on the severity and also the cause.
- The most common, and obvious, symptom is impaired speech, ranging from hoarseness to the total loss of speech.
- Other symptoms can include:
 - Dry, sore throat
 - Coughing, which can be a symptom of, or a factor in causing laryngitis
 - Difficulty swallowing
 - Sensation of swelling in the area of the larynx
 - Cold or flu-like symptoms
 - Swollen lymph glands in the throat, chest, or face
 - Fever
 - Difficulty breathing (mostly in children).

Diagnostic test.

- Physical exam that will probably include feeling the neck for sensitive areas or lumps and looking at the nose, mouth, and throat for inflammation.
- A specialist (otolaryngologist) may examine the vocal cords with a small mirror or a special scope.

TREATMENT

- Treatment for laryngitis depends on the underlying cause. Acute laryngitis caused by a virus often gets better on its own within a week.
- Home treatment can help with symptoms:
- Resting voice as much as possible.
 - Drink plenty of fluids to prevent dehydration (avoid alcohol and caffeine).
 - Treat the underlying cause of laryngitis, such as heartburn, smoking or alcoholism.

MEDICATIONS USED INCLUDE:

- **Antibiotics.** Antibiotic are rarely indicated because the cause is frequently viral. But if bacterial infection is suspected are indicated.
- **Corticosteroids.** Corticosteroids help reduce vocal cord inflammation. However, this treatment is only used when there's an urgent need to treat laryngitis
- **Acid reflux medications.** If gastroesophageal reflux disease (GERD) is the cause of laryngitis. Example Zantac.

2. Larynx cancers

Cancer definition.

Cancer begins in cells. Normally, cells grow and divide to form new cells as the body needs them. When cells grow old, they die, and new cells take their place.

Sometimes this process goes wrong. New cells form when the body does not need them, and old cells do not die when they should. These extra cells can form a mass of tissue called a growth or **tumor**. Growths on the larynx also may be called nodules or polyps. Not all growths are cancer. Growths can be benign or malignant:

Benign growths are not cancer:

- They are rarely life-threatening.

- Usually, benign tumors can be removed, and they rarely grow back.
- Cells from benign tumors do not spread to tissues around them or to other parts of the body.

Malignant growths are cancer:

- They are generally more serious and may be life-threatening.
- Malignant tumors usually can be removed, but they can grow back.
- Cells from malignant tumors invade and damage nearby tissues and organs. Also, cancer cells can break away from a malignant tumor and enter the bloodstream or lymphatic system. That is how cancer cells spread from the original cancer (the primary tumor) to form new tumors in other organs. The spread of cancer is called metastasis. Different types of cancer tend to spread to different parts of the body.

Cancer of the larynx also may be called *laryngeal* cancer. It can develop in any part of the larynx. Most cancers of the larynx begin in the glottis. The inner walls of the larynx are lined with cells called squamous cells. Almost all laryngeal cancers begin in these cells and they are called squamous cell carcinomas.

If cancer of the larynx spreads (metastasizes), the cancer cells often spread to nearby lymph nodes in the neck. The cancer cells can also spread to the back of the tongue, other parts of the throat and neck, the lungs, and other parts of the body. When this happens, the new tumor has the same kind of abnormal cells as the primary tumor in the larynx. For example, if cancer of the larynx spreads to the lungs, the cancer cells in the lungs are actually laryngeal cancer cells. The disease is called metastatic cancer of the larynx, not lung cancer. It is treated as cancer of the larynx, not lung cancer.

Risk Factors.

A risk factor is something that may increase the chance of getting a disease.

- Smoking tobacco causes most laryngeal cancers. Heavy smokers who have smoked tobacco for a long time are most at risk for laryngeal cancer.
- Heavy drinkers are more likely to develop laryngeal cancer than people who don't drink alcohol. The risk increases with the amount of alcohol that a person drinks.
- Many other possible risk factors are under study. For example, researchers are studying whether an HPV infection in the throat may increase the risk of laryngeal cancer. HPV is a group of viruses that can infect the body. Another area of research is whether reflux (the backward flow of liquid from the stomach to the throat) may increase the risk of laryngeal cancer.

SIGNS AND SYMPTOMS

Possible signs of laryngeal cancer include a **sore throat** and **ear pain**.

The symptoms of laryngeal cancer depend mainly on the size and location of the tumor. Common symptoms of laryngeal cancer include:

- A hoarse voice or other voice changes for more than 3 weeks
- A sore throat or trouble swallowing for more than 6 weeks
- A lump in the neck

Other symptoms may include:

- Trouble breathing
- A cough that doesn't go away
- An earache that doesn't go away

These symptoms may be caused by laryngeal cancer or by other health problems. People with these symptoms should consult their health care provider so that any problem can be diagnosed and treated as early as possible.

DIAGNOSIS

Tests that examine the throat and neck are used to help detect (find), diagnose, and stage laryngeal cancer.

The following tests and procedures may be used:

- **Physical exam of the throat and neck**: An examination in which the health care provider feels for swollen lymph nodes in the neck and looks down the throat with a small, long-handled mirror to check for abnormal areas.
- **Laryngoscopy**: A procedure in which the health care provider examines the larynx (voice box) with a mirror or with a laryngoscope (a thin, lighted tube).
- **Endoscopy**: A procedure to look at organs and tissues inside the body to check for abnormal areas. An endoscope (a thin, lighted tube) is inserted through an incision (cut) in the skin or opening in the body, such as the mouth. Tissue samples and lymph nodes may be taken for biopsy.
- **CT scan (CAT scan)**: A procedure that makes a series of detailed pictures of areas inside the body, taken from different angles. The pictures are made by a computer linked to an x-ray machine. A dye may be injected into a vein or swallowed to help the organs or tissues show up more clearly. This procedure is also called computed tomography, computerized tomography, or computerized axial tomography.
- **MRI (magnetic resonance imaging)**: A procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of areas inside the body. This procedure is also called nuclear magnetic resonance imaging (NMRI).
- **Biopsy**: The removal of cells or tissues so they can be viewed under a microscope to check for signs of cancer.
- **Barium swallow**: A series of x-rays of the esophagus and stomach. The patient drinks a liquid that contains barium (a silver-white metallic compound). The liquid

covers the esophagus and stomach, and x-rays are taken. This procedure is also called an upper GI series.

Prognosis (chance of recovery) depends on the following:

- The stage of the disease.
- The location and size of the tumor.
- The grade of the tumor.
- The patient's age, gender, and general health, including whether the patient is anemic.

Staging

To learn whether laryngeal cancer has invaded nearby tissues or spread, the health care provider may order one or more tests seen above.

When cancer spreads from its original place to another part of the body, the new tumor has the same kind of abnormal cells and the same name as the primary (original) tumor.

Health care providers describe the stage of laryngeal cancer based on the size of the tumor, whether the vocal cords move normally, whether the cancer has invaded nearby tissues, and whether the cancer has spread to other parts of the body:

- **Early cancer:** Stage 0, I, or II laryngeal cancer is usually a small tumor, and cancer cells are rarely found in lymph nodes.
- **Advanced cancer:** Stage III or IV laryngeal cancer is a tumor that has invaded nearby tissues or spread to lymph nodes or other parts of the body. Or the cancer is only in the larynx, but the tumor prevents the vocal cords from moving normally.

TREATMENT

Treatment options depend on the following:

- The stage of the disease.
- The location and size of the tumor.
- Keeping the patient's ability to talk, eat, and breathe as normal as possible.
- Whether the cancer has come back (recurred).

Cancer of the larynx is usually treated with **surgery or radiation therapy**, also called radiotherapy. Some patients may receive **chemotherapy** at the time of radiation therapy.

Smoking tobacco and drinking alcohol decrease the effectiveness of treatment for laryngeal cancer. Patients with laryngeal cancer who continue to smoke and drink are

less likely to be cured and more likely to develop a second tumor. After treatment for laryngeal cancer, frequent and careful follow-up is important.

Nutrition

The diet is an important part of the medical care for laryngeal cancer. You need the right amount of calories, protein, vitamins, and minerals to maintain the strength and to heal.

Rehabilitation

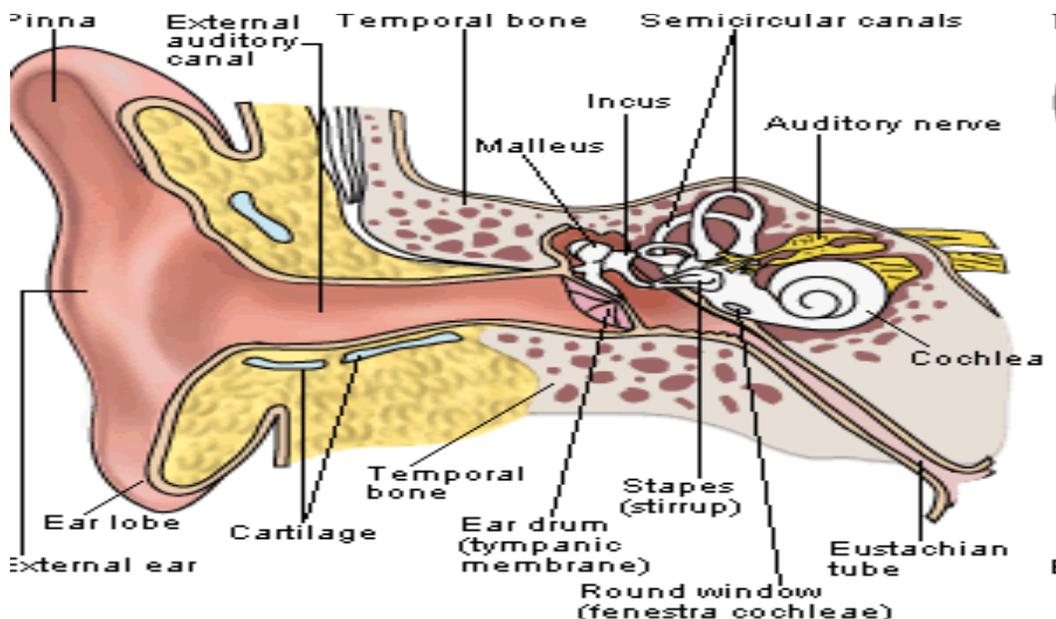
Laryngeal cancer and its treatment can make it hard to swallow, talk, and breathe. The health care team will help patient to return to normal activities as soon as possible. The goals of rehabilitation depend on the extent of the disease and type of treatment.

After surgery or radiation therapy, the neck and shoulders may become stiff or weak. Health care team can teach patient exercises that help loosen the neck and shoulder muscles.

CHAP.IV EAR DISEASES/ DISORDER

Ear disease causes significant discomfort and hearing loss. It also creates work loss and decreased productivity this increases as the persons communicative skills decrease when associated hearing loss increases. In children, developmental delays and academic failure may result. Complications such as deafness, meningitis, brain abscesses, and facial nerve paralysis may also occur. Proper management of ear disease is critical.

0. Anatomic view of the ear



The ear has external, middle, and inner portions. The outer ear is called the pinna and is made of ridged cartilage covered by skin. Sound funnels through the pinna into the external auditory canal, a short tube that ends at the eardrum (tympanic membrane).

Sound causes the eardrum and its tiny attached bones in the middle portion of the ear to vibrate, and the vibrations are conducted to the nearby cochlea. The spiral-shaped cochlea is part of the inner ear; it transforms sound into nerve impulses that travel to the brain.

The fluid-filled semicircular canals (labyrinth) attach to the cochlea and nerves in the inner ear. They send information on balance and head position to the brain. The eustachian (auditory) tube drains fluid from the middle ear into the throat (pharynx) behind the nose.

1. OTITIS MEDIA

- Otitis media is inflammation of the middle ear, however, many health care providers consider otitis media to be either inflammation or infection of the middle ear. "Otitis" means inflammation of the ear, and "media" means middle.
- Otitis media occurs in the area between the ear drum (the end of the outer ear) and the inner ear, including a duct known as the eustachian tube.
- Infections can be caused by viruses or bacteria and may be acute or chronic.

1.1. PATHOPHYSIOLOGY

- Typically, this inflammation often begins with infections that cause sore throats, colds or other respiratory problems, and spreads to the middle ear after a few days of a stuffy nose and can cause severe pain that will usually settle within a day or two, but can last over a week.
- Sometimes the ear drum ruptures, discharging pus from the ear, but the ruptured drum will usually heal rapidly.
- At an anatomic level, the typical progression of acute otitis media occurs as follows: the tissues surrounding the Eustachian tube swell due to an URTI, allergies, or dysfunction of the tubes.
- The Eustachian tube remains blocked most of the time. The air present in the middle ear is slowly absorbed into the surrounding tissues.
- A strong negative pressure creates a vacuum in the middle ear, and eventually the vacuum reaches a point where fluid from the surrounding tissues accumulates in the middle ear and this fluid may become infected.
- It has been found that dormant bacteria behind the tympanic membrane multiply when the conditions are ideal, infecting the middle ear fluid.

- The individual with bacterial acute otitis media has the classic "earache", pain that is more severe and continuous and is often accompanied by fever (39 °C) or more.
- Bacterial cases may result in perforation of the ear drum, infection of the mastoid space (mastoiditis) and in very rare cases further spread to cause meningitis.

1.2. SIGNS AND SYMPTOMS

- **First phase** - exudative inflammation lasting 1-2 days, fever, rigors, meningism (occasionally in children), severe pain (worse at night), muffled noise in ear, deafness, sensitive mastoid process.
- **Second phase** - lasting 3-8 days. Pus and middle ear exudate discharge spontaneously and afterwards pain and fever begin to decrease. This phase can be shortened with topical therapy.
- **Third phase** - healing phase lasting 2-4 weeks. Aural discharge dries up and hearing becomes normal.

1. Acute otitis media

Definition

Acute otitis media is usually of rapid onset and short duration. Acute otitis media is typically associated with fluid accumulation in the middle ear together with signs or symptoms of ear infection; a bulging eardrum usually accompanied by pain, or a perforated eardrum, often with drainage of purulent material (pus, also termed suppurative otitis media).

Pathophysiology

Obstruction of the eustachian tube appears to be the most important antecedent event associated with AOM. The vast majority of AOM episodes are triggered by an upper respiratory tract infection (URTI) involving the nasopharynx.

Symptoms and signs

Pain and fever are rarely present if there is a hole (perforation) in the eardrum before the infection starts. The standard **treatment** of acute otitis media is **oral antibiotics**. Ear drops are added if the eardrum perforates. IV antibiotics are indicated for severe infections, if the mastoid bone is also infected, or if the **facial nerve** becomes **paralyzed** as a "**complication**" of the acute infections. Hearing loss is present but usually goes away when the infection clears.

Risk factors

The following are proven risk factors for otitis media:

- Prematurity and low birth weight, Young age, Early onset, Family history
- Race - Native American, Inuit, Australian aborigine
- Altered immunity, Craniofacial abnormalities, Neuromuscular disease, Allergy
- Crowded living conditions, Low socioeconomic status, Tobacco and pollutant exposure
- Use of pacifier, Prone sleeping position, Fall or winter season
- Absence of breastfeeding, prolonged bottle use

Causes

- **Bacterial infections.** Bacteria cause most ear infections. The most common types are *Streptococcus pneumoniae* (also called pneumococcus), *Haemophilus influenzae*, and *Moraxella catarrhalis*.
- **Viral infections.** Viruses can also lead to ear infections. The respiratory syncytial virus (RSV) and flu (influenza) virus are the most frequent types found.

Exams and Tests

The health care provider will look inside the ears using an instrument called an otoscope. This may show:

- Areas of dullness or redness
- Air bubbles or fluid behind the eardrum
- Bloody fluid or pus inside the middle ear
- A hole (perforation) in the eardrum

A hearing test may be recommended if the person has a history of ear infections. In nearly all cases, a careful history and physical examination makes the diagnosis. Also, a culture of the fluid is necessary to check for infection. This is usually only considered in cases of recurrent ear infections or severe disease.

Treatment of middle ear infection or inflammation.

The treatment for acute otitis media varies depending upon the age and symptoms of the child.

If antibiotics are initiated, amoxicillin is usually recommended as the first line treatment. This is usually prescribed for 10 days. Ceftriaxone (50mg/kg/d) injection is recommended for children that cannot take oral antibiotics; three days of this antibiotic is usually more effective than a single injection.

- **Tympanostomy tube** to permit fluid to drain from the middle ear may be done.
- A procedure to lance the eardrum (myringotomy) may be recommended to release the pus when severe pain is experienced.

Prognosis

- Death from AOM is rare in the era of modern medicine. With effective antibiotic therapy, the systemic signs of fever and lethargy should begin to dissipate, along with the localized pain, within 48 hours. Children with fewer than 3 episodes are 3 times more likely to resolve with a single course of antibiotics, as are children who develop AOM in nonwinter months. Typically, patients eventually recover the conductive hearing loss associated with AOM. Middle ear effusion and conductive hearing loss can be expected to persist well beyond the duration of therapy.

Complications

The complications of AOM are classified by location as the disease spreads beyond the mucosal structures of the middle ear cleft. They may be categorized as follows:

- **Intratemporal** : Perforation of the tympanic membrane, acute coalescent mastoiditis, facial nerve palsy, acute labyrinthitis, petrositis, acute necrotic otitis, or development of chronic otitis media
- **Intracranial** : Meningitis, encephalitis, brain abscess, otitis hydrocephalus, subarachnoid abscess, subdural abscess, or sigmoid sinus thrombosis
- **Systemic** : Bacteremia, septic arthritis, or bacterial endocarditis

2. Chronic otitis media

Chronic Otitis Media (COM) also known as chronic suppurative otitis media (CSOM) is a perforated tympanic membrane with persistent drainage from the middle ear.

CSOM is defined as chronic otorrhea (ie, lasting >6-12 wk) through a perforated tympanic membrane. Chronic suppuration can occur with or without cholesteatoma, and the clinical history of both conditions can be very similar.

Pathophysiology of COM

The Eustachian tube normally prevents the accumulation of fluid by allowing fluid to drain through the tube. Chronic otitis media develops over time, and often starts with a chronic middle ear effusion (fluid) that does not resolve. This persistent fluid will often become contaminated with bacteria, and the bacteria found in chronic otitis media are often different from those found in acute otitis media. *Therefore, anything that disturbs the function of the Eustachian tube can lead to chronic otitis media.* A chronic middle ear infection causes changes in the eardrum that weaken it, and often lead to a hole in the eardrum (tympanic membrane perforation). Eventually, the eardrum loses its strength and begins to collapse into the middle ear space, then it can attach to the other middle ear structures. It is frequently seen draped around the middle ear bones

(ossicles) or the inner wall of the middle ear (promontory). This disrupts the conduction of sound through the middle ear, and may diminish hearing.

Signs and symptoms

Warning signs of chronic otitis media include:

- Persistent blockage of fullness of the ear
- Hearing loss
- Chronic ear drainage
- Development of balance problems
- Facial weakness
- Persistent deep ear pain or headache
- Fever
- confusion or sleepiness
- Drainage or swelling behind the ear.

Treatment.

It is important to realize that antibiotics alone usually cannot remove infection from the bone; **surgical removal** of the infected bone is usually necessary to accomplish this. Even IV antibiotics do not often eradicate a true bone infection, especially in the mastoid, which has its connection to the bacteria-filled nose through the eustacian tube.

Complications

Extracranial complications

Characteristics of extracranial complications include the following:

- Chronic suppurative otitis media : A form of chronic otomastoiditis, often with drainage due to *Pseudomonas aeruginosa*
- Facial nerve paralysis: May be associated with acute or subacute/chronic infection
- Labyrinthitis : May be serous or suppurative
- Mastoiditis with subperiosteal abscess : May present as Bezold abscess, which represents extension of the abscess from the mastoid tip into the digastric groove; a temporal root abscess can also form by direct extension via bone erosion through the epitympanic temporal root cells
- Petrositis : May present as a classic triad of retro-orbital pain, otorrhea, and abducens paralysis; this condition also is known as **Gradenigo syndrome**

Intracranial complications

- A brain abscess may occur in the temporal lobe or cerebellum, typically from chronic otitis media. An epidural abscess may occur as a result of bony destruction and extension from coalescent mastoiditis or cholesteatoma.
- Meningitis may be associated with acute or subacute/chronic infection. Acute otitis media is the most common cause of meningitis.
- A sigmoid sinus thrombosis or subdural abscess/empyema may be associated with otitis media. Otitic hydrocephalus may occur as a result of increased intracranial pressure secondary to middle ear infection and complicated by sigmoid sinus thrombosis with total occlusion.

Serious middle ear infection or inflammation

Serous otitis media is inflammation in the middle ear without infection. Typically, the Eustachian tube is not functioning and cannot ventilate the ear normally. As a result, fluid accumulates in the middle-ear. This can lead to a dullness or fullness within the ear along with diminished hearing.

3. CHOLESTEATOMAS

a. Definition.

A **cholesteatoma** is a common additional finding along with chronic otitis and mastoiditis. A cholesteatoma is a skin sac that grows back into the middle ear or mastoid from the eardrum, creating a mass of skin and debris that keeps getting larger and larger over time, destroying anything in its path. The ear bones, the inner ear, the **facial nerve** (the nerve that makes all the muscles of one side of the face to work), and the brain next to the ear can all be damaged or destroyed by either spreading infection or cholesteatoma.

Causes of Cholesteatomas.

- ✧ A cholesteatoma can form in a few ways.
- ✧ Some people are born with a small remnant of skin that is trapped in the middle ear, but this is rare.
- ✧ Also, a perforation of the eardrum (from infection or trauma) can provide an opening for the skin of the outer surface of the eardrum to grow through.
- ✧ In many cases, repeated ear infections can aggravate the Eustachian tube, causing negative pressure to build in the middle ear.
- ✧ Additionally, an improperly functioning Eustachian tube can cause repeated ear infections.

These diseases must be removed for the safety of the ear, the head, and the brain. Infection or cholesteatoma involving the inner ear, facial nerve, or the brain requires immediate attention by an ear surgeon and often required immediate surgery.

Chronic suppuration can occur with or without cholesteatoma, and the clinical history of both conditions can be very similar. The treatment plan for cholesteatoma always includes tympanomastoid surgery with medical treatment as an adjunct.

Symptoms and signs

Upon physical examination, the most common sign of a cholesteatoma is drainage and granulation tissue in the ear canal and middle ear unresponsive to antimicrobial therapy. Hearing loss usually accompanies chronic otitis and cholesteatoma.

The symptoms that a cholesteatoma is present include:

- hearing loss
- dizziness
- ear pressure
- drainage

Diagnosis of Cholesteatoma

An ear exam may show a pocket or perforation (opening) in the eardrum, often with drainage. The deposit of old skin cells may be visible with an otoscope, a special instrument to view the ear.

The following tests may be performed to rule out other causes of dizziness.

- Caloric stimulation
- CT scan
- Electronystagmography

CHOLESTEATOMA TREATMENT

Cholesteatoma treatment, at a minimum requires surgery to remove the growth. Antibiotics can decrease associated infections, but there is no medication that will cure cholesteatomas. Surgery results in a safe, healthy ear, free of disease, and can also give a secondary benefit of restoring the hearing lost due to the cholesteatoma. The procedure most commonly used to remove a cholesteatoma growth is called a **tympanomastoidectomy**.

Complications of Cholesteatoma

- Brain abscess.
- Deafness in one ear.
- Dizziness (vertigo).
- Erosion into the facial nerve (causing facial paralysis).
- Labyrinthitis.
- Meningitis.

- Persistent ear drainage.
- Spread of the cyst into the brain.

Outcome and Prognosis.

Eliminating a cholesteatoma is almost always possible; however, multiple operations may be required. Because surgery is generally successful, complications from uncontrolled cholesteatoma growth are now relatively uncommon.

Prevention of Cholesteatoma

Prompt and complete treatment of chronic ear infection may help to prevent some cases of cholesteatoma.

4. DEAFNESS

There are more than 24 million Americans of all ages who suffer some type of hearing problem. **Deafness** is the complete inability to hear sound.

Hearing loss is the reduced ability to hear sound. It may be **sensorineural (nerve loss)**, **conductive (blocked sound transmission)**, **central (a problem in the brain)**, or **a mixture of these**.

Risk Factors in Deafness

Various factors which are likely to increase the risk of developing deafness are:

- Aging: people ageing 75 years and above become more prone to deafness
- Heredity: The genetic makeup may make the person more susceptible to ear damage.
- Occupational noises: Jobs or work places where loud noise is a regular part of the working environment, such as farming, construction or factory work, can lead to damage inside the ear.
- Exposure to explosive noises, such as from firearms and fireworks, can cause immediate, permanent hearing loss.
- Listening to music at high volume
- Drugs, such as the antibiotic gentamicin and certain chemotherapy drugs, can damage the inner ear.
- Temporary effects on the hearing can occur by taking very high doses of aspirin, other pain relievers, anti malarial drugs or loop diuretics.
- Diseases or illnesses that result in high fever, such as meningitis, may damage the cochlea.

Causes

Conditions affecting the cochlea, eighth cranial nerve, spinal cord, or brain cause **sensorineural hearing loss**. Examples include:

- Meniere's disease,
- hearing loss of aging (presbycusis),
- nerve injury from syphilis,
- hearing loss of unknown cause (idiopathic hearing loss),
- nerve tumors and;
- Drug toxicity (such as aspirin and aminoglycosides).

Conditions that affect the ear canal, eardrum (tympanic membrane), and middle ear lead to **conductive hearing loss**. Examples of conductive hearing loss include:

- ear wax blocking the ear canal,
- otitis media and;
- Otosclerosis.

Hearing loss, or deafness, can be **present at birth** (congenital), or become evident **later in life** (acquired). The distinction between acquired and congenital deafness specifies only the time that the deafness appears. It does not specify whether the cause of the deafness is genetic (inherited).

Acquired deafness may or may not be genetic. For example, it may be a manifestation of a delayed-onset form of genetic deafness. Alternatively, acquired deafness may be due to damage to the ear from noise.

Congenital deafness similarly may or may not be genetic. For example, it may be associated with a white forelock, and be caused by a genetic disease called Waardenburg syndrome. In fact, more than half of congenital hearing loss is inherited. Alternatively, congenital deafness may be due to a condition or infection to which the mother was exposed during pregnancy, such as the rubella virus.

Deafness as the inability to hear properly; the types are classified according to the part of the hearing process that is not functioning normally:

Conduction deafness: impairment of one of the structures that transmits vibrations. Examples of this type are a punctured eardrum, arthritis of the auditory bones, or a middle ear infection in which fluid fills the middle ear cavity.

Nerve deafness: impairment of the 8th cranial nerve or the receptors for hearing in the cochlea. The 8th cranial nerve may be damaged by some antibiotics used to treat bacterial infections. Nerve deafness is a rare complication of some viral infections such as mumps or congenital rubella (German measles). Deterioration of the hair cells in the cochlea is a natural consequence of aging, and the acuity of hearing diminishes as we get older. For example, it may be more difficult for an elderly person to distinguish conversation from background noise. Chronic exposure to loud noise accelerates degeneration of the hair cells and onset of this type of deafness. Listening to music by way of earphones is also believed to increase the risk of this type of damage.

Central deafness: damage to the auditory areas in the temporal lobes. This type of deafness is rare but may be caused by a brain tumor, meningitis, or a cerebrovascular accident in the temporal lobe.

Other classifications of hearing loss.

Hearing loss can also be classified based on which portions of the hearing system (auditory system) are affected:

- **Sensorineural hearing loss:** when the nervous system is affected.
- **Conductive hearing loss:** when the portions of the ear that are responsible for transmitting the sound to the nerves are affected.

Diagnosis for Deafness

The health care provider may diagnose the hearing disability by examining the year thoroughly. He may ask you to cover one ear at a time to see how well you hear words spoken at various volumes and how you respond to other sounds.

The health care provider may ask about the family history of health conditions and the patient's medical history. The diagnosis is done to determine the cause to decide the best suitable treatment.

Treatment for hearing loss and deafness

The treatment of hearing loss depends on its cause. For example:

- Ear wax can be removed,
- Ear infection can be treated with medications, such as antibiotics
- Medications that are toxic to the ear can be avoided and;
- Occasionally surgical procedures are necessary.

Complications in Deafness

Deafness can cause various problems and can adversely affect the quality of life. Its common complications include:

- Depression
- Anxiety
- An often false sense that others are angry with you.

Prevention of Deafness

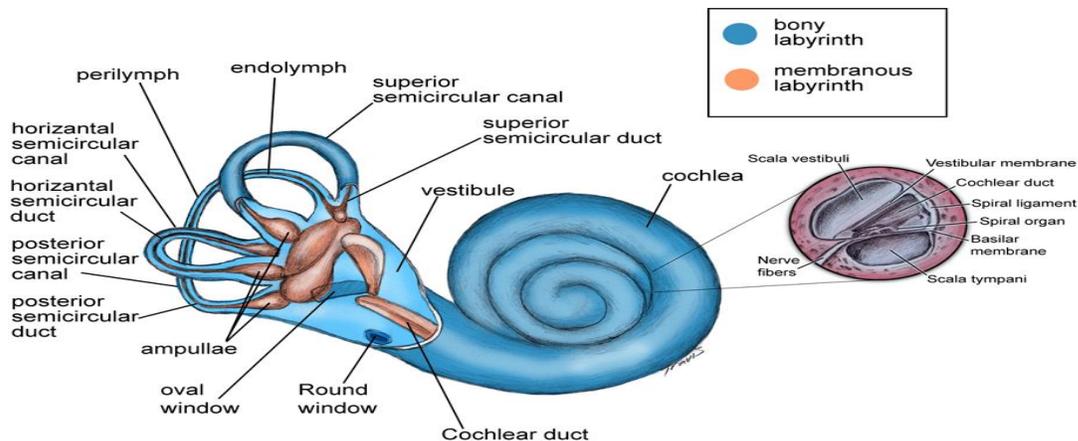
Various preventive measures which are helpful in reducing the risk of developing hearing disability are:

- Protect the ears in the workplace
- Wear earmuffs wherever required
- Have the hearing tested frequently
- Avoid recreational risks
- Avoid listening to loud music

5. LABYRINTHINE SYNDROME.

5.0. Anatomic view.

The anatomic relationships of the labyrinth, middle ear, mastoid, and subarachnoid space are essential to understanding the pathophysiology of labyrinthitis. The labyrinth is composed of an outer osseous framework surrounding a delicate membranous network that contains the peripheral sensory organs for balance and hearing. See the image below.



Anatomy of the labyrinth.

These sensory organs include the utricle, saccule, semicircular canals, and cochlea. Symptoms of labyrinthitis occur when infectious microorganisms or inflammatory mediators invade the membranous labyrinth and damage the vestibular and auditory end organs.

The labyrinth lies within the petrous portion of the temporal bone adjacent to the mastoid cavity and connects with the middle ear at the oval and round windows. The labyrinth maintains connections with the central nervous system and subarachnoid space by way of the internal auditory canal and cochlear aqueduct. Bacteria may gain access to the membranous labyrinth by these pathways or through congenital or acquired defects of the bony labyrinth. Viruses may spread to labyrinthine structures hematogenously or by way of the aforementioned preformed pathways.

5.1. Pathology

Labyrinthine syndrome refers to any pathologic condition that can affect the labyrinth.

Interference with or infection of the labyrinth can result in a syndrome of ailments called **labyrinthitis**. Labyrinthitis is the most common inflammatory disorder of the *inner* ear or labyrinth.

Causes of labyrinthitis.

Many times, you cannot determine the cause of labyrinthitis. Often, the condition follows a viral illness such as a cold or the flu. Viruses, or the body's immune response to them, may cause inflammation that result in labyrinthitis.

Other potential causes are these:

- Trauma or injury to the head or ear
- Bacterial infections: If found in nearby structures such as the middle ear, such infections may cause the following: Fluid to collect in the labyrinth (serous labyrinthitis) and fluid to directly invade the labyrinth, causing pus-producing (suppurative) labyrinthitis
- Allergies, Alcohol abuse, A benign tumor of the middle ear
- Certain medications taken in high doses (Furosemide (Lasix), Aspirin, Some IV antibiotics, Phenytoin (Dilantin) at toxic levels)
- **Benign paroxysmal positional vertigo**: With this condition, small stones, or calcified particles, break off within the vestibule and bounce around. The particles trigger nerve impulses that the brain interprets as movement.
- More serious causes of vertigo can mimic labyrinthitis, but these occur rarely. Those may be tumors at the base of the brain and strokes or insufficient blood supply to the brainstem or the nerves surrounding the labyrinth

5.2. Pathophysiology

The anatomic relationships of the labyrinth, middle ear, mastoid, and subarachnoid space are essential to understanding the pathophysiology of labyrinthitis. The labyrinth is composed of an outer osseous framework surrounding a delicate membranous network that contains the peripheral sensory organs for balance and hearing.

5.3. Symptoms

Clinically, this condition produces disturbances of balance and hearing to varying degrees and may affect one or both ears.

- Vertigo (timing and duration, association with movement, head position, and other characteristics)
- Hearing loss (unilateral or bilateral, mild or profound, duration, and other characteristics)
- Aural fullness
- Tinnitus, Otorrhea, Otagia
- Nausea or vomiting, Fever

- Facial weakness or asymmetry
- Neck pain/stiffness
- Upper respiratory tract infection symptoms (preceding or concurrent)
- Visual changes

5.4. Labyrinthitis Treatment

Self-Care at Home

- ✓ Lie still in a comfortable position, often flat on the side.
- ✓ Reduce salt and sugar intake.
- ✓ Avoid chocolate, coffee, and alcohol.
- ✓ Stop smoking.
- ✓ Try to create a low-noise, low-stress environment.

Medications

- Aminoglycosides and other ototoxic medications
- Beta-blockers and other antihypertensives
- Tranquilizers, including benzodiazepines
- Antiepileptics
- Alcohol
- Illicit drugs

Examples of drugs: Meclizine (Antivert), Diazepam (Valium), Promethazine (Phenergan), Dimenhydrinate (Dramamine), An antibiotic (rarely), An antihistamine such as diphenhydramine (Benadryl).

5.5. Prevention

The only causes of labyrinthitis that you can try to avoid are accidents or trauma to the ear.

MOTION SICKNESS OR KINETOSIS, also known as **travel sickness**, is a condition in which a disagreement exists between visually perceived movement and the vestibular system's sense of movement. Depending on the cause, it can also be referred to as seasickness, car sickness, simulation sickness or airsickness.

Dizziness, fatigue, and nausea are the most common symptoms of motion sickness. Sopite syndrome in which a person feels fatigue or tiredness is also associated with motion sickness. *Nausea* in Greek means seasickness (*naus* means ship). If the motion causing nausea is not resolved, the sufferer will usually vomit.

Vomiting won't relieve the feeling of weakness and nausea, which means the person could vomit until the cause of nausea is found.

Cause

The most common hypothesis for the cause of motion sickness is that it functions as a psychological defense mechanism against neurotoxins.^[5] The area postrema in the brain is responsible for inducing vomiting when poisons are detected, and for resolving conflicts between vision and balance. When feeling motion but not seeing it (for example, in a ship with no windows), the inner ear transmits to the brain that it senses motion, but the eyes tell the brain that everything is still. As a result of the discordance, the brain will come to the conclusion that one of them is hallucinating and further conclude that the hallucination is due to poison ingestion. The brain responds by inducing vomiting, to clear the supposed toxin

Signs& symptoms :vertigo ,malaise, nausea ,vomiting, excessive sweating

6. EAR TRAUMATISM

Definition

Ear trauma is a term that covers any sort of physical damage to any part of the ear caused by an external force or event.

1.1. Outer ear trauma

1.1.1. Auricle

The auricle can be easily damaged. Because it is skin-covered cartilage, with only a thin padding of connective tissue, rough handling of the ear can cause enough swelling to jeopardize the blood-supply to its framework, the auricular cartilage.

That entire cartilage framework is fed by a thin covering membrane called the perichondrium (meaning literally: around the cartilage). Any fluid from swelling or blood from injury that collects between the perichondrium and the underlying cartilage puts the cartilage in danger of being separated from its supply of nutrients. If portions of the cartilage starve and die, the ear never heals back into its normal shape. Instead, the cartilage becomes lumpy and distorted. *Wrestler's Ear* is one term used to describe the result, because wrestling is one of the most common ways such an injury occurs. Cauliflower ear is another name for the same condition, because the thickened auricle can resemble that vegetable.

The lobule of the ear (ear lobe) is the one part of the human auricle that normally contains no cartilage. Instead, it is a wedge of adipose tissue (fat) covered by skin. There are many normal variations to the shape of the ear lobe, which may be small or

large. Tears of the earlobe can be generally repaired with good results. Since there is no cartilage, there is not the risk of deformity from a blood clot or pressure injury to the ear lobe.

Other injuries to the external ear occur fairly frequently, and can leave a major deformity. Some of the more common ones include, laceration from glass, knives, and bite injuries, avulsion injuries, cancer, frostbite, and burns.

1.1.2. Ear canal

Ear canal injuries can come from firecrackers and other explosives, and mechanical trauma from placement of foreign bodies into the ear. The ear canal is most often self-traumatized from efforts at ear cleaning. The outer part of the ear canal rests on the flesh of the head; the inner part rests in the opening of the bony skull (called the external auditory meatus). The skin is very different on each part. The outer skin is thick, and contains glands as well as hair follicles. The glands make cerumen (also called ear wax). The skin of the outer part moves a bit if the pinna is pulled; it is only loosely applied to the underlying tissues. The skin of the bony canal, on the other hand, is not only among the most delicate skin in the human body, it is tightly applied to the underlying bone. A slender object used to blindly clean cerumen out of the ear often results instead with the wax being pushed in, and contact with the thin skin of the bony canal is likely to lead to laceration and bleeding.

1.2. Middle ear trauma

Like outer ear trauma, middle ear trauma most often comes from blast injuries and insertion of foreign objects into the ear. Skull fractures that go through the part of the skull containing the ear structures (the temporal bone) can also cause damage to the middle ear. Small perforations of the tympanic membrane usually heal on their own, but large perforations may require grafting. Displacement of the ossicles will cause a conductive hearing loss that can only be corrected with surgery. Forcible displacement of the stapes into the inner ear can cause a sensory neural hearing loss that cannot be corrected even if the ossicles are put back into proper position. Because human skin has a top waterproof layer of dead skin cells that are constantly shedding, displacement of portions of the tympanic membrane or ear canal into the middle ear or deeper areas by trauma can be particularly traumatic. If the displaced skin lives within a closed area, the shed surface builds up over months and years and forms a cholesteatoma. The -oma ending of that word indicates a tumour in medical terminology, and although cholesteatoma is not a neoplasm (but a skin cyst), it can expand and erode the ear structures. The treatment for cholesteatoma is surgical.

1.3. Inner ear trauma

There are two principal damage mechanisms to the inner ear in industrialized society, and both injure hair cells. The first is exposure to elevated sound levels (noise trauma), and the second is exposure to drugs and other substances (ototoxicity).

In 1972 the U.S. EPA told Congress that at least 34 million people were exposed to sound levels on a daily basis that are likely to lead to significant hearing loss. The worldwide implication for industrialized countries would place this exposed population in the hundreds of millions. The National Institute for Occupational Safety and Health has recently published research on the estimated numbers of persons with hearing difficulty (11%) and the percentage that can be attributed to occupational noise exposure (24%). Furthermore, according to the National Health and Nutrition Examination Survey (NHANES), approximately twenty-two million (17%) US workers reported exposure to hazardous workplace noise. Workers exposed to hazardous noise further exacerbate the potential for developing noise induced hearing loss when they do not wear (hearing protection).