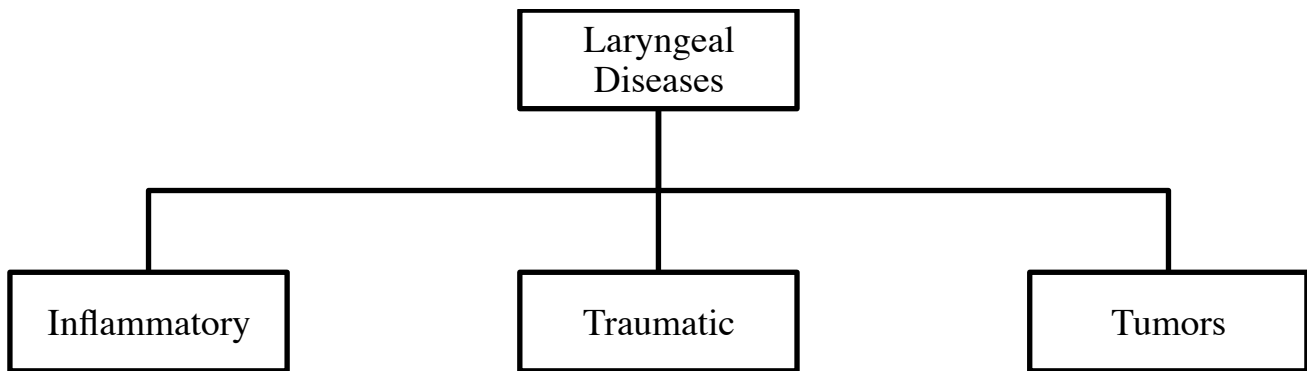


**Introduction:**

- The larynx is considered as a part of the upper respiratory tract.
- An infection to the larynx is considered as an URTI.
- It is lined by a ciliated columnar epithelium with goblet cells (respiratory epithelium)
  - Except over the vocal folds, which are covered with squamous epithelium.
- Its main functions are:
  - a) Voice production.
  - b) Airways protection.
  - c) Swallowing
  - d) Breathing
- All laryngeal muscles are supplied by recurrent laryngeal nerve, except the cricothyroid muscle, which is supplied by the superior laryngeal nerve (a branch from the vagus nerve).
- **Hoarseness:** Change in voice quality, ranging from voice harshness to voice Weakness Reflects abnormalities anywhere along Vocal Tract from oral cavity to Lungs.
- **Dysphonia:** a general Alteration in Voice Quality
- **Aphonia:** no Sound emanates from Vocal Cords
- Patients with laryngeal diseases commonly present with:
  - a) Voice problems:
    - This can vary from simple dysphonia (hoarseness) to aphonia with total voice loss.
  - b) Aspiration:
    - The larynx plays a major role in protecting the respiratory tract from the entrance of foreign bodies. This is mainly mediated by both the epiglottis and vocal folds. A problem in any of them could lead to a failure of the laryngeal inlet to close during swallowing, and hence food aspiration.
  - c) Stridor:
    - This is the most common sign seen in laryngeal pathology. 3 types have been established:
      - Inspirational stridor → at, or above the vocal folds
      - Biphasic stridor → subglottis or trachea
      - Expirational stridor → small airways.



## LARYNGITIS

- **ACUTE VIRAL LARYNGITIS**

- Pathogens: rhinovirus (most common)
- SSx: Mainly change in voice (cough, sputum, malaise, rigor, fever).
- Rx: conservative management

- **ADULT SUPRAGLOTTITIS**

- Common Pathogens: H. influenza (most common) S.pneumoniae. S.aureus, B-hemolytic Streptococcus.
- Inflammatory Process.
- SSx: Stridor → Change in voice → airway collapse.
- Rx:
  - Evaluate airway
  - Humidification
  - Parenteral antibiotics

- **REFLUX-INDUCED LARYNGITIS**

- Pathophysiology: leads to a chronic inflammation.
- SSx: Dysphonia, Cough
- Laryngeal Findings: increase in saliva in an attempt to overcome the acid
- Management:
  - Avoidance of aggravating factors (smoking, chocolate).
  - Elevation of the head during sleep.
- If the patient doesn't improve, try to suppress the acidity by giving H-1 blockers or protein pump inhibitors.

- **CROUP (Acute laryngotracheobronchitis, LTB)**

- Most common cause of stridor in children.
- Subglottic region
- Pathogen: parainfluenza 1 (most common cause)
- Risks: 1-5 years old during fall and winter seasons
- SSx: Inspiratory or Biphasec strider, gradual onset (over days), low-grade fever, cough. Occurs at night
- Dx: plain neck films ("Steeple")
- Complications.
- Management:
  - Assess Airway
  - Medical Management
  - Endoscopy.

- **EPIGLOTTITIS**

- Pathogen: Bacterial, H.influenzae Type b, uncommon due to HiB Vaccine.
- Risks; may cause death within min, because it will form a mass that will obstruct the airway.
- SSx : drooling saliva, high fever, sniff position, patient avoid laying.
- Dx: plain neck films ("thumbprint sign")
- Complications.
- Note: a Patient with epiglottitis takes a specific position called “sniff position”.
- Management:
  - Establish Emergent Airway
    - Endotracheal intubation → if failed → tracheostomy
  - Postoperative Care: parenteral antibiotics and corticosteroids (helps improve the Airway obstruction).

Viral infection is the most common cause for acute laryngitis.

Acute epiglottitis in children is a highly emergent situation.

Once a child is suspected to have acute epiglottitis, don't dare to examine his throat (don't even think about it!). This can induce a spasm, and you will be in a big, big trouble.

High dose of steroids is give to children with acute epiglottitis with signs or symptom of respiratory distress. It's useful to reduce the inflamed airways.

Fortunately, the incidence of acute epiglottitis in children has been decreased due to introduction of H.Influenzae B vaccin.

	<b>Acute LTB</b>	<b>Acute Epiglottitis</b>
<b>Pathogen</b>	Parainfluenzae virus1	Haemophilis influenzae-B
<b>Age</b>	<5 years old	2.-6 years old
<b>location</b>	Subglottic	Supraglottic
<b>Onset</b>	Gradual (over days)	Sudden onset (hours)
<b>Cough</b>	Barky	Normal
<b>Posture</b>	Supine	Upright
<b>Drooling</b>	No	Yes
<b>Fever</b>	Low grade	High fevers
<b>Radiographs</b>	Steeple sign	Thumb printing
<b>Treatment</b>	Supportive	Airway management

#### • CHRONIC LARYNGITIS:

- Common etiologies: smoking, irritant material, reflux and posterior nasal drip.
- Long Standing Inflammatory Changes in Laryngeal Mucosa
- SSx: hoarseness ( chronic Dysphagia ) , pain, chronic cough,
- Dx: roll out internal causes and Malignancies
- Rx: Remove offending Irritants, Treat related disorders, Voice Rest, Speech Therapy.
- **Laryngoscopy** : Cords erythematous, Thickened with ulceration and Granuloma Formation and Normal Mobility

- **EXAMPLES OF SPECIFIC CHRONIC LARYNGITIS**
  - TB Laryngitis
  - Syphilitic Laryngitis
  - Scleroma of the Larynx/ Rhinoscleroma
  - Leprosy (Hansen's Disease)
  - Perichondritis of the Larynx/Polychondritis
  - Fungal Laryngitis : affect mucosa and submucosa.

## **COMMON BENIGN LARYNGEAL NEOPLASMS**

- **RECURRENT RESPIRATORY PAPILLOMATOSIS**
  - Second most common cause of hoarseness in children.
  - **Etiology:** Human Papilloma Virus types (6, 11), Possible hormonal Influence , Acquired during delivery.
  - **Pathophysiology:** viral infection which affect the transit zone of the larynx; which is the part where the respiratory epithelium changes to stratified squamous epithelium (in the epiglottis} and simple squamous epithelium (in the vocal cords}.
  - Lesion: wart-like ( in supraglottic larynx and trachea ) , irregular exophytic
  - Types:
    - Juvenile. ( May resolves spontaneously at puberty)
    - Senile . ( may undergo malignant Transformation )
  - SSx: hoarseness ( Frog Voice) and stridor.
  - Dx.
  - Complications: Airway problem.
  - Management
    - Microlaryngoscopy with Laser excision
    - Avoid tracheotomy: it ,ay create a new transit zone.
    - Adjunctive Therapy.
- **SYSTEMIC DISEASES AFFECTING THE LARYNX**
  - Sarcoidosis
  - Wegener's Granulomatosis: affects the blood vessels in (nose, airway, kidney}.
  - Amyloidosis
  - Arthritis of Cricoarytenoid Joint

- **OTHER COMMON LARYNGEAL LESIONS**

- Acquired Stenosis
    - Laryngeal
    - Subglottic
  - Edema
    - Angioedema
    - Reink's edema
  - Cysts
    - Laryngeal cyst
    - Laryngocele
  - Ulcer
    - Contact ulcer: with reflux diseases.
  - Granuloma
    - Intubation granuloma
  - Nodule
    - Singer's: in the mid zone, which is the most movable part of the vocal cord. Occur due to voice abuse (not sudden). Start unilateral but presents late with hoarseness when it becomes bilateral. Treated by speech therapy.
    - Vocal Cords callus, red soft noduls, Bilateral !
  - Polyp
    - Muroid
    - Structural manifestation of vocal cords irritants
    - Angiomatoma: due to sudden voice abuse, treated by observation.
    - Most common benign tumor of vocal cords
- ❖ Note: Ring polyp affects smokers. The vocal cord is affected except the bony part. It's treated by making an incision down the vocal cord to suck the fluid.

### Vocal Cords: Polyps Vs. Nodules

<b>Polyps</b>	<b>Nodules</b>
Unilateral, Asymmetric	Bilateral
Acute onset, may resolve spontaneously	Gradual Onset, Often follow a chronic course
Subepithelial Capillary Breakage	<b>Acute:</b> SubMucosal Hemorrhage or Edema <b>Chronic:</b> Hyalinization within submucos lesion
Soft, Smooth, fusiform, Pedunculated mass	<b>Acute:</b> Small, discrete Nodules <b>Chronic:</b> Hard, White Thickened Fibrosed Nodule
Surgical Excision if persistent or there is a risk factor for it	Surgical excision if Refractory

#### • **HEMANGIOMA**

- Most common head and neck neoplasm in children
- Typically presents by 6 months old then involutes by 2 years of age
- Most common laryngeal site is the subglottis
- 50% of subglottic hemangiomas are associated with cutaneous involvement
- Pathophysiology: abnormal blood vessel growth
- Types:
  - Compact or Capillary (more common in infantile type, typically resolves),
  - Cavernous (may enlarge rapidly, less chance of regression)
- Symptom:
  - Polypoid or sessile lesions,
  - Biphasec stridor,
  - Worse with crying (hemangiomas become engorged with blood),
  - Dysphonia,
  - Dysphagia,
  - Seldom causes bleeding in the larynx
- Diagnosis: endoscopy (avoid biopsy)

**Management**

- May observe if asymptomatic and non progressive
- Embolization
- Corticosteroids or interferon.
- Endoscopic CO2 or argon laser excision (YAG lasers).
- Radiation therapy may be considered although increases risk of malignant degeneration.

**NEUROGENIC VOCAL PATHOLOGIES**

- Anterior 2/3 of the vocal cord → movable.
- Posterior 1/3 of the vocal cord → bony (not movable).

**VOCAL FOLD PARALYSIS**

- Evaluation of Vocal Fold Paralysis
  - History and Physical
  - Ancillary test.
  - Vocal Fold Positioning.
    - RLN paralysis paramedian vocal folds.
    - SLN paralysis: bowing deformity.
    - RLN and SLN paralysis: "cadaveric", intermediate vocal folds.
    - Bilateral vocal fold paralysis: typically near midline.



	Adults	Pediatrics
<b>Causes of vocal folds paralysis</b>	<ul style="list-style-type: none"> <li>○ Neoplastic</li> <li>○ Iatrogenic Injury</li> <li>○ Idiopathic</li> <li>○ Trauma</li> <li>○ Neurological</li> <li>○ Infectious</li> <li>○ Systemic Diseases</li> <li>○ Toxins</li> </ul>	<ul style="list-style-type: none"> <li>○ Arnold Chiari Malformation.</li> <li>○ Idiopathic: commonest.</li> <li>○ Birth Trauma</li> <li>○ Iatrogenic Injury: second.</li> <li>○ Infection</li> <li>○ Vascular Abnormalities</li> </ul>

- Unilateral Vocal Paralysis Management
  - Must determine if self limiting or permanent paralysis
  - May not require surgical management
  - Goal of unilateral surgical procedures is to **medialize** vocal fold.
- Surgical Management of Unilateral Vocal Fold Paralysis
  - **Fold Injections**
  - **Thyroplasty**
  - Arytenoid Adduction
  - Reinnervation procedure.
  - Tracheotomy.
- Bilateral Vocal Fold Paralysis Management
  - Goal is **lateralize** vocal fold
    - Tracheotomy: gold standard treatment
    - Cordotomy (Laser)
    - Arytenoidectomy
    - Reinnervation procedure

Done !