Professor Ramadan Hashem Sayed & Usama Mohammed Rashad

- VOCAL FOLD IMMOBILITY -

❖ Physiological positions of the vocal folds:

A. Median position: Both vocal folds are in the middle line. This occurs during phonation, swallowing, coughing or straining.

B. Resting position: The distance between the two vocal folds is about 8 mm. this occurs during quite respiration.

C. Full abduction position: The distance between the two vocal folds is about 16 mm. This occurs during deep inspiration.

❖ Types of VF paralysis:

A. Abductor paralysis: The vocal fold is in the midline or paramedian and cannot move laterally during inspiration.

B. Adductor paralysis: The vocal fold is in the lateral position and cannot move medially during phonation swallowing, coughing or straining.

❖ Incidence:

- **Side:**
  - Unilateral vocal fold paralysis is commoner than bilateral paralysis
  - Left VF paralysis is commoner than right VF paralysis because the left recurrent laryngeal nerve has a longer course than the right one.
- **Sex:** Commoner in ♂ than ♀
- **Age:** Maximum in old age
- **Cause:** Malignant disease is the commonest cause. Thyroidectomy is the commonest cause of bilateral paralysis.

❖ Etiology:

A. Upper motor neuron Lesion: Rare due to bilateral presentation of the larynx in the cerebral hemispheres.

B. Lower motor neuron lesion:

1. Intracranial causes:

- Nuclear (bulbar) paralysis:
  - Due to damage to the nucleus ambiguous in the medulla by:
    - Vascular: VBI
    - Inflammatory: encephalitis, bulbar poliomyelitis
    - Traumatic: cranial trauma
    - Neoplastic: intramedullary tumors e.g. glioma
    - Disseminated sclerosis
    - Degenerative: MND

- Often associated with paralysis of IX, XI, XII CNs

- Posterior cranial fossa lesion:
  - - Meningioma - Acoustic neuroma - Metastatic tumor
  - - Meningitis

2. **Cranial causes:**
   - Skull base lesion at jugular foramen due to:
     - Traumatic: fracture base involving jugular foramen
     - Inflammatory: jugular bulb thrombophlebitis
     - Neoplastic: glomus jugular, metastatic tumor in the jugular LN (Krause LN), nasopharyngeal carcinoma, neurogenic tumors
   - Associated with IX, XI CNs lesions
3. **Extra-cranial causes:**
   - In the neck:
     - Neoplastic: Thyroid carcinoma, hypopharyngeal carcinoma, esophageal carcinoma, carotid body tumor, metastatic carcinoma in Cx LNs, neurogenic tumors.
     - Traumatic:
       - Iatrogenic: Thyroidectomy (common cause), diverticulectomy, block dissection
       - Accidental: External trauma, pressure or stretching
     - Inflammatory: Cervical infections, radiation neuritis
   - In the thorax:
     - Neoplastic: Bronchogenic carcinoma (common cause), esophageal carcinoma, mediastinal tumors
     - Traumatic:
       - Iatrogenic: thoracic surgery
       - Accidental: pressure e.g. left atrial dilatation, aortic aneurysm
     - Inflammatory: TB (commonest), mediastinal infection
4. **Peripheral neuropathy:**
   - - Viral neuritis - Post-diphtheritic neuritis - Metallic poisoning
   - - Metabolic: DM, alcholism - Guillain-Barre syndrome - Collagen diseases
5. **Idiopathic:** in 13% of cases

- **Common causes of bilateral vocal fold paralysis:**
  - - Thyroid surgery (commonest caues) - Malignant goiter

❖ **Clinical picture:** According to the position of the paralyzed vocal fold (fig 31):

	Vocal fold position

	1- Abductor paralysis	2- Adductor paralysis
A. Unilateral paralysis		
○ **VF position** (f 31) ○ **Voice** ○ **Airway** ○ **Aspiration**	- Paralyzed VF in paramedian position - Minimal dysphonia or no - Mild exertional stridor - No	- In the intermediate position - Severe dysphonia (week, breathy) - No stridor - Aspiration
B. Bilateral paralysis		
▪ **VF position** (f 31) ▪ **Voice** ▪ **Airway** ▪ **Aspiration**	- Both VFs in the paramedian position - Good voice (no dysphonia) - Severe stridor - No aspiration	- Both VFs in intermediate position - Aphonia - No stridor - Life threatening aspiration, poor coughing

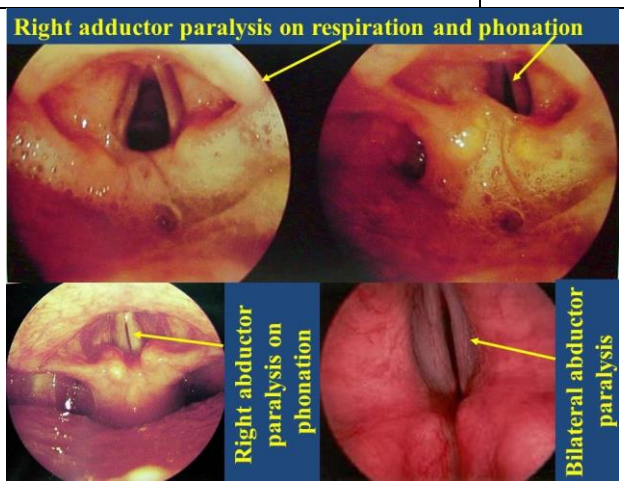

Fig (31) Position of the paralyzed vocal fold

❖ Investigations:

- **Endoscopic:** Panendoscopy and biopsy from any suspicious lesion
- **Radiologic:** CT scanning and MRI
- **Laboratory:** -ESR -Serological tests -Blood sugar -Paul-Bunnel test

❖ Treatment:

1. **Principles:**
   - Delay surgical treatment to 1.5-2 years to allow for spontaneous nerve recovery or compensation (the mobile cord cross the midline to meet the paralyzed fixed one)
   - Operations done to improve the airway will be at the expense of voice.
   - Treatment of the cause if possible
2. **Lines of treatment:**

   A. Unilateral abductor paralysis: → No treatment is needed

B. Unilateral adductor paralysis:

- Conservative treatment (wait for 1.5-2 years for spontaneous recovery)
- If no recovery → Surgical treatment to medialize the paralyzed fold:
  - - Reinnervation procedures - Vocal fold injection of Teflon
  - - Medialization thyroplasty

C. Bilateral abductor paralysis:

- Urgent tracheostomy to save the airway
- Immediate re-exploration of the neck in cases of post-thyroidectomy
- Wait for 1.5-2 years for spontaneous recovery
- If no recovery occurred → either permanent tracheostomy with expiratory valve or Surgical treatment to open the airway:
  - Reinnervation procedures
  - Endoscopic treatment (Cordotomy, cordectomy, arytenoidectomy)
  - Woodman's operation: External arytenoidectomy with cordopexy

D. Bilateral adductor paralysis:

- Conservative treatment waiting for recovery:
  - Cuffed tracheostomy tube to prevent aspiration
  - Treatment of pulmonary infection
  - Stop oral intake and provide an alternative route for feeding
- Surgical treatment: if conservative treatment failed to control aspiration. Narrow field laryngectomy is the best.