Bilateral Abductor paralysis

Dept OF ENT & Head and Neck Surgery

Dr P Harikishore, Asst Professor
Introduction

• It is a sign of disease and not a diagnosis.

• Potential morbidity and mortality

• Multiple etiologies, necessitating thorough evaluation

• Various treatment options.
# Functions of Larynx

<table>
<thead>
<tr>
<th>Abduction action</th>
<th>Adduction action</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Passage for Respiration</td>
<td>• Allows Phonation</td>
</tr>
<tr>
<td></td>
<td>• protection of airway</td>
</tr>
<tr>
<td></td>
<td>• Allows Stabilization of Thorax</td>
</tr>
</tbody>
</table>

![Abduction action](image1)

![Adduction action](image2)
Phonation- normal
Phonation-breathy voice
Bilateral Abductor paralysis
Positions of vocal cords
Anatomy of Larynx - Muscles

Adductors of Larynx

Abductor of Larynx:

Action of posterior cricoarytenoid muscles
Abduction of vocal ligaments
Anatomy of Larynx - Muscles

Superior view

Conus elasticus
Cricoarytenoid muscle
Cricoarytenoid muscle
Post arytenoid muscles
Cricothyroid muscle
Thyroarytenoid muscle
Vocalis muscle
Vocal ligament
Lamina of thyroid cartilage

Action of vocalis and thyroarytenoid muscles
Shortening (relaxation) of vocal ligaments
Vagus nerve
- branches
Aetiology

- Idiopathic 13% - Viral, Smokers
- Inflammatory 13% - Tuberculosis (95%)
- Non Surgical trauma 11% - # skull, penetrating injuries, neck, cardiomegaly, aneurysm.
- Neurological 7% - CVA, Parkinson’s, MS, Alcoholic and diabetic neuropathy.
- Miscellaneous 11% - Haemolytic anaemia, RA, Collagen disease
Etiology - Malignancy
Etiology: Surgical

1. Non-thyroid surgeries (67%)  
   [Image of medical illustration]

   Problem disc

   Carotid artery
   Plaque is removed.
   An incision is made to open the carotid artery.
   Then the repaired artery is closed.
   Carotid endarterectomy may prevent a stroke if you have a severely narrowed carotid artery.

   © Mayo Foundation for Medical Education and Research. All rights reserved.

Thyroid surgeries (33%)  
   [Image of neck]
Etiology: Idiopathic

- Not well understood
- Possible infectious cause
  - Lyme disease
  - Tertiary syphilis
  - Epstein-Barr virus
  - Herpes simplex virus Type I

- **Diagnosis of exclusion**
  - *Urquhart et al. showed that 26% of patients with a diagnosis of idiopathic VCP had a preexisting neurologic condition and 20% developed a subsequent CNS condition.*

Etiology: Traumatic

• Iatrogenic: Non-surgical
  – Endotracheal intubation
    • Arytenoid dislocation, subluxation
    • Tapia’s syndrome (combination of recurrent laryngeal and hypoglossal palsy – Post interscalene brachial plexus block)
  – Nasogastric tube placement

• Cardiomegaly, aneurysm

• Non-iatrogenic
  – Blunt or penetrating trauma to the neck
Etiology: Medications

• Vinca alkaloids
  – Vincristine and vinblastine
Pathology of vocal cord palsy

• Semon’s law
  – 1\textsuperscript{st} stage abductors damaged, cords midline, mobile
  – 2\textsuperscript{nd} stage add more damaged, cords midline, immobile
  – 3\textsuperscript{rd} stage add paralysed, cords cadaveric

• Wagner & grossman theory (1897)
  ▪ Most popular and widely accepted
  ▪ Complete palsy of RLN cord paramedian
  ▪ SLN also paralysed cord intermediate.
Recurrent Laryngeal Nerve Palsy

Abductor palsy
- Unilateral
- Bilateral

Adductor palsy
- Unilateral
- Bilateral
Bilateral Abductor Palsy

- VC in paramedian position
- Degree of stridor variable
- Good voice
Evaluation

Indirect laryngoscopy

- Normal vocal cords
- Contact ulcers
- Polyp
- Nodules
- One-sided paralysis
- Cancer

Fibre optic laryngoscopy
Evaluation - Videostroboscopy

- Demonstrates small mucosal motion abnormalities
- Video-documentation
- Parameters checked
Evaluation - Electromyography

- Normal
  - Joint Fixation
  - Post. Scar

- Fibrillation
  - Denervation

- Polyphasic
  - Synkinesis
  - Reinnervation
Evaluation - Imaging

- Chest X-ray
  - Screen for intrathoracic lesions
- MRI of Brain
  - Screen for CNS disorders
- CT Skull Base to Mediastinum
- Direct Laryngoscopy
  - Palpate arytenoids, especially when no L-EMG
Differential Diagnosis

• Cricoarytenoid fixation
  – Caused by
    • Joint subluxation/dislocation with ankylosis
    • Joint fixation by rheumatoid arthritis or gout
  – Normal EMG
  – Direct laryngoscopy

• Laryngeal malignancy
Bilateral Abductor Palsy

- Management
  - Emergency Tracheostomy
  - Others
    - Cordectomy
    - Laterofixation of cord
    - Arytenoidectomy and arytenoidopexy
    - Reinnervation
    - Laryngeal pacemakers
Treatment - goal

• Improve voice and prevent aspiration
• Patient factors affect treatment strategies.
  – Presence of aspiration
  – Nature of nerve injury
  – Vocal demands
  – Medical comorbidities
  – LEMG findings
Emergency tracheostomy
Vocal fold Lateralization

- Techniques –
  - Tracheostomy
  - Transcervical approach
    - Arytenoidectomy
    - Lateral fixation of the cord

Woodman’s operation – 1946
- Lateral open approach
- Arytenoidectomy
- Avoid laryngofissure

- Endoscopic approaches
  - Arytenoidectomy  Thornell 1948
  - LASER : Cordectomy / arytenoidectomy / Cordotomy
Vocal fold lateralisation
Arytenoidectomy
Laryngeal reinnervation procedures

• Goal: Increase bulk and tone
• Indications: Poor chance of spontaneous recovery
• Nerve characteristics
  – RLN
  – Ansa cervicalis
• Types
  – Neuromuscular pedicle
  – Nerve-nerve anastomosis
what’s new ?-laryngeal pace maker
Injection laryngoplasty
surgical options
Post operative Evaluation

• Assess swallow function and aspiration
  – Modified barium swallow
  – Functional endoscopic evaluation of swallowing (FEES)
• No additional work up required if clear cut etiology
Case discussion

- Our patient presented with stridor
- Emergency tracheostomy.
- Later evaluated.
- Options left over
- Continue tracheostomy tube with speaking valve or any of the above said procedures.
- Post op follow up – no stridor after removal of tube.
- Voice slightly breathy.
- No recovery of the other cord.
Lateralisation of vocal cords
Take home message

• Various diseases can present as Vocal cord paralysis.
• B/L Abductor Paralysis could be dangerous.
• Emergency tracheostomy in case of stridor.
• Nowadays, variety of laryngeal surgeries available, that can avoid tracheostomy.
Thank you