Vocal Fold Immobility in Children: A Primer

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Vocal cord Immobility

- Second most common congenital laryngeal anomaly
- Unilateral or bilateral
- Can result from infection, birth trauma, neurologic problem (Arnold-Chiarri malformation), surgical sequela, or a mass
- Up to 20% may be idiopathic
- Need to trace course of recurrent nerve from brain to chest
Vocal cord Immobility

**Symptoms:**
- vary according to if unilateral or bilateral VCP
  - unilateral VCP may be asymptomatic and manifest only as weak cry
  - Most common symptom for both UVFI and BVFI is stridor!
  - bilateral VCP can be severe

**Diagnosis:**
- flexible fiberoptic laryngoscopy
- CXR
- MRI Head
Vocal cord Immobility

- Second most common congenital laryngeal anomaly
- Unilateral or bilateral
- For each, we can ask a series of questions (as we did for laryngomalacia):

What it looks like:

What it sounds like:
- Inspiratory stridor

What it isn’t:
- Tracheomalacia
  - Expiratory stridor
- Hemangioma
- Anything else
So important to scope, record, and review!!!
Clinical Pearls

- Take a careful history
- Listen Closely
- Look Closely
  - Video and review
  - It can be hard to see!
    - Is it really VF paralysis?
    - Is there too much hooding to see?
    - Is the CA joint mobile? SGS?
    - Is it really Vocal Fold Immobility or is it paralysis?
# UVFI vs BVFI

## Type of VFP

<table>
<thead>
<tr>
<th>Type of VFP</th>
<th>MEEI (n=40 cases)</th>
<th>Daya (n=102 cases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral</td>
<td>(5/9) 55%</td>
<td>48%</td>
</tr>
<tr>
<td>Bilateral</td>
<td>(4/9) 45%</td>
<td>52%</td>
</tr>
<tr>
<td>Acquired</td>
<td>(6/9) 66%</td>
<td>56%</td>
</tr>
<tr>
<td>Congenital</td>
<td>(3/9) 33%</td>
<td>44%</td>
</tr>
</tbody>
</table>

## Etiology

<table>
<thead>
<tr>
<th>Etiology</th>
<th>MEEI (n=9 cases)</th>
<th>Daya (n=102 cases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurological</td>
<td>(0/9) 0%</td>
<td>16%</td>
</tr>
<tr>
<td>Idiopathic</td>
<td>(3/9) 33%</td>
<td>35%</td>
</tr>
<tr>
<td>Iatrogenic</td>
<td>(6/9) 66%</td>
<td>43%</td>
</tr>
<tr>
<td>Birth trauma</td>
<td>(0/9) 0%</td>
<td>5%</td>
</tr>
</tbody>
</table>

## Recovery

<table>
<thead>
<tr>
<th>Recovery</th>
<th>MEEI (n=13 VFs)</th>
<th>Daya (n=65 cases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurological</td>
<td>-</td>
<td>71%</td>
</tr>
<tr>
<td>Idiopathic</td>
<td>(3/5) 60%</td>
<td>64%</td>
</tr>
<tr>
<td>Iatrogenic</td>
<td>(2/8) 25%</td>
<td>46%</td>
</tr>
<tr>
<td>Birth trauma</td>
<td>-</td>
<td>33%</td>
</tr>
</tbody>
</table>
Vocal cord paralysis

- **Treatment:**
  - Remember the triad: airway, voice, and swallowing
  - Remember that many cases (especially the idiopathic cases recover spontaneously)
  - Be as conservative as possible
    - Assess for aspiration
      - Consider early Speech Pathology evaluation and VFSS
    - Assess for airway distress
      - May or may not need airway intervention/ tracheostomy
Common Treatment Options: UVFI

- Observation alone
- VF Injection
- Thyroplasty
- Ansa-Recurrent Nerve Anastomosis
Options

- **VF Injection**

  - **Advantages:** Easy to do, in older teenagers (can do in office)
  - **Disadvantages:** Have to re-inject every 6-12 months
Options

- Thyroplasty
- Advantages: Permanent
- Disadvantages: Done in non-intubated patient who is sedated but vocalizing for "tuning" purposes (hard to do in most kids!)
Ansa RLN Nerve Anastomosis
Vocal Fold Medialization in Children

Injection Laryngoplasty, Thyroplasty, or Nerve Reinnervation?

J. Andrew Sipp, MD; Joseph E. Kerschner, MD; Nicole Braune, RN; Christopher J. Hartnich, MD

Additional Readings UVFI
There is an emerging role for Laryngeal EMG in children with VFI

Respiration-Related Laryngeal Electromyography in Children With Bilateral Vocal Fold Paralysis

Robert G. Berkowitz, MD, FRACS; Monique M. Ryan, FRACP; Paul M. Pilowsky, MBBS, PhD

Intraoperative Laryngeal Electromyography in Children With Vocal Fold Immobility

Results of a Multicenter Longitudinal Study

Stephen C. Maturo, MD; Nicole Braun, BSN, RN, CPN; David J. Brown, MD; Peter Siao Tick Chong, MD; Joseph E. Kerschner, MD; Christopher J. Hartnick, MD

On the horizon

Vocal Fold Pacing

Laryngeal pacing for bilateral vocal fold immobility
Andreas H. Mueller

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Common treatment options: BVFI

- Observation
  - similar to UVFI, there is a significant chance of one if not both vocal folds regaining function usually in the first year of life then by the time the children are 5-10
  - Parental pressure may make it hard to wait this long

- VF cordotomy
- VF pexy lateralization
- Posterior Cricoid graft augmentation
- Tracheostomy
Additional Reading

Surgery for pediatric vocal cord paralysis: A meta-analysis
MATTHEW T. BRIGGER, MD, and CHRISTOPHER J. HARTNICK, MD, Bethesda, Maryland, and Boston, Massachusetts

Endoscopic Posterior Cricoid Split and Rib Grafting in 10 Children
Andrew F. Inglis, Jr., MD; Jonathan A. Perkins, DO; Scott C. Manning, MD; Jason Mousakes, MD
Common treatment options: BVFI

- Once again, be as conservative as you safely can be...
- Botox has been proposed as a possible adjuvant strategy
- Try to avoid “destructive” or ablative procedures at least until 1-2 years after diagnosis to allow time for spontaneous recovery
On the horizon: BVFI

- Vocal Fold Re-Inervation

Laryngeal reinnervation for bilateral vocal fold paralysis
Mat B. Marina\textsuperscript{a,b,d}, Jean-Paul Marie\textsuperscript{c} and Martin A. Birchall\textsuperscript{a,b}

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