THE ASSOCIATION BETWEEN UNILATERAL VOCAL FOLD IMMOBILITY & SWALLOWING FUNCTION

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UNILATERAL VOCAL FOLD IMMOBILITY (UVFI)

VOCAL FOLD IMMOBILITY
MECHANICAL FIXATION
NEUROPATHY

ETIOLOGIES ASSOCIATED WITH UVFI

- Iatrogenic
- Tumor
- Idiopathic
- Other

UVFI INCREASES RISK OF ASPIRATION

Chen, 2007

Heitmiller et al, 2000
38% aspirated
Leder et al, 2011
40% aspirated
Jang et al, 2011
33% aspirated
CAUSES FOR ASPIRATION IN PATIENTS WITH UVFI

VOCAL FOLD IMMOBILITY

POOR AIRWAY PROTECTION

OTHER FUNCTIONS AFFECTED BY THE VAGUS NERVE

UPPER ESOPHAGEAL SPHINCTER (UES) OPENING

PHARYNGEAL CONSTRICITION

PURPOSE

TO CHARACTERIZE SWALLOWING FUNCTION

IN PATIENTS WITH UVFI

METHODS
Retrospective Review

**Inclusion Criteria:**
- UVFI (197)
- Swallow Study

**Exclusion Criteria:**
- CVA, Neuromuscular Disease, Tumor
- Head or Neck Cancer
- Anterior Cervical Spine Surgery
- 26 Subjects
- Iatrogenic Idiopathic

**CONTROL GROUP**

Compared to:
- Age and gender matched controls
- No history of dysphagia

**OBJECTIVE MEASURES**

- Upper Esophageal Sphincter (UES) Opening
- Maximum opening of the UES
- Pharyngeal Constriction Ratio (PCR)
  - Area of pharyngeal space during swallow / pharyngeal space at rest
- Hyoid-Laryngeal Excursion (HL)
- Total Pharyngeal Transit Time (TPT)

**ANALYSIS**

One way ANOVA to compare:
- Differences between control and UVFI group
- Differences between 2 UVFI groups
RESULTS

UES OPENING

<table>
<thead>
<tr>
<th>Opening (cm)</th>
<th>CONTROL</th>
<th>EXPERIMENTAL</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0.25</td>
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<tr>
<td>0.25</td>
<td>0.75</td>
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p = 0.073

PHARYNGEAL CONSTRICTION

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<th>PCR</th>
<th>CONTROL</th>
<th>EXPERIMENTAL</th>
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<tr>
<td>0.07</td>
<td>0.14</td>
<td>0.11</td>
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p = 0.049

PHARYNGEAL TRANSIT TIME

<table>
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<th>Seconds</th>
<th>CONTROL</th>
<th>EXPERIMENTAL</th>
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<tbody>
<tr>
<td>0.9</td>
<td>1.8</td>
<td>1.4</td>
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p = 0.003
Were there differences between the two etiology groups?

**HYOLARYNGEAL EXCURSION**

- Control: 2.4 cm
- Experimental: 1.2 cm

*p < .0001*

**ASPIRATION**

- Iatrogenic: 35%
- Idiopathic: 26.25%

**GROUP DIFFERENCES**

- Controls
- Idiopathic
- Iatrogenic

PCR UES: Controls, Idiopathic, Iatrogenic
GROUP DIFFERENCES

SUMMARY

Patients with UVFI of iatrogenic and idiopathic etiologies have evidence of:
- decreased pharyngeal constriction
- increased pharyngeal transit time
- decreased hyolaryngeal excursion

CONCLUSION

Aspiration in patients with UVFI may not be secondary to impaired airway protection alone.

FUTURE DIRECTIONS

- Differences between the two experimental groups
- UES opening in lateral vs. A-P view to determine symmetry of involvement

Isolate hyoid displacement from larynx displacement
- Greater number of subjects

FURTHER INVESTIGATE...

- Differences between the two experimental groups
- All individuals with and without dysphagia complaints
- UES opening in lateral vs. A-P view to determine symmetry of involvement
- EMG to determine neuropathy vs. mechanical fixation
SPECIAL THANKS

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Dr. Julie Barkmeier-Kraemer
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Jan Pryor
Marissa McRay
Dr. Emily Plowman

DSS OBJECTIVE MEASURES
UES OPENING

DSS OBJECTIVE MEASURES
PHARYNGEAL CONSTRICTION RATIO

INNERVATION

- Pharyngeal constrictor muscle
- Superior laryngeal nerve
- Internal branch
- External branch
- Thyrohyoid membrane
- Inferior pharyngeal constrictor muscle
- Cricopharyngeus muscle
- Cricothyroid muscle
- Right recurrent laryngeal nerve