Anatomical Study of Two Cricothyroid Approaches to the Larynx

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Introduction
- Transcervical vocal fold injection is a common office procedure
- Indications: Botox, Medialization
- Often used with flexible laryngoscopy to confirm placement
- Lack of precise anatomic data in literature
- Transthyroid cartilage approach
  - 5mm lateral to midline, 3mm above inferior border of thyroid cartilage
- Transthyroid
  - Insert at thyroid notch and place intraluminally, guide into place using laryngoscope for visual confirmation
- Transcricothyroid
  - 5-10mm lateral to midline, aim posterosuperiorly
  - 30-45 degrees upward angle
- Objective of study was to establish anatomic measurements for 2 cricothyroid approaches:
  - Inferior to thyroid cartilage
  - Superior to cricoid cartilage

Methods
- 23 cadavers (13 female, 10 male)
- Larynges bisected, skin and soft tissue removed
- 2 approaches: just inferior to inferior thyroid cartilage, and superior to cricoid
- 27G needle inserted at a 0 (zero) degree angle until just lateral to thyroarytenoid muscle at the mid-point of musculomembranous vocal fold
- Measured: depth of insertion, distance from midline, height of cricothyroid membrane, cricoid cartilage
- Calculated angle of insertion

Results

Table 1: Mean Distance from Midline

<table>
<thead>
<tr>
<th>Approach</th>
<th>Male (mm)</th>
<th>Female (mm)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrahyoid</td>
<td>5.7 +/- 0.7</td>
<td>4.8 +/- 0.8</td>
<td>0.012</td>
</tr>
</tbody>
</table>

Table 2: Angles of Insertion

<table>
<thead>
<tr>
<th>Approach</th>
<th>Male (degrees)</th>
<th>Female (degrees)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrahyoid</td>
<td>22.2 +/- 6.9</td>
<td>19.3 +/- 3.4</td>
<td>0.016</td>
</tr>
<tr>
<td>Suprahyoid</td>
<td>33.0 +/- 5.2</td>
<td>29.7 +/- 4.7</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 3: Depth of Insertion

<table>
<thead>
<tr>
<th>Approach</th>
<th>Male (mm)</th>
<th>Female (mm)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrahyoid</td>
<td>11.3 +/- 1.8</td>
<td>10.8 +/- 1.6</td>
<td>0.082</td>
</tr>
<tr>
<td>Suprahyoid</td>
<td>18.2 +/- 2.4</td>
<td>17.2 +/- 2.6</td>
<td>0.021</td>
</tr>
</tbody>
</table>

Discussion
- Increased depth of insertion via suprahyoid approach may lead to more potential for misplaced position. However, this approach may allow for greater freedom of movement of needle and be preferred for certain indications.
- Improved knowledge of anatomic landmarks can help clinicians perform safe and effective in-office transcervical injections with high rate of success.
- Individual patients have varying anatomy and measurements may be sensitive to amount of fat.

Acknowledgements
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References

- Damrose EJ. Percutaneous Injection Laryngoplasty in the Management of Acute Vocal Fold Paralysis 2010; 120: 1582-90.