Voice Outcomes Following Gray Mini-Thyrotomy

Pavan S. Mallur, MD
Jackie L. Gartner-Schmidt, PhD
Clark A. Rosen, MD

1Department of Otology and Laryngology
Beth Israel Deaconess Medical Center
Harvard Medical School
Boston, MA

2Department of Otolaryngology-Head and Neck Surgery
University of Pittsburgh Voice Center
University of Pittsburgh School of Medicine
Pittsburgh, PA

Gray Mini-Thyrotomy

• Surgical approach to sub-epithelial space
• MSL combined with external approach
• External incision
• Anterior-based thyrotomy
• Access to former lamina propria

Rosen CA and Simpson CB, Operative Techniques in Laryngology, 2008

Gray Mini-Thyrotomy

• No epithelial disruption
• Separate tethered scar or suclus vocalis
• Longitudinal dissection
• Dissection along free edge (not superior surface)
• Optimal control of instruments

Rosen CA and Simpson CB, Operative Techniques in Laryngology, 2008

Gray Mini-Thyrotomy

• Access for lamina propria replacement
• Fat or fascia implant
• Improve VF pliability
• Re-establish height of free edge
• Medial augmentation
• Limit superior migration of implant

Rosen CA and Simpson CB, Operative Techniques in Laryngology, 2008
Gray Mini-Thyrotomy: Epithelial Elevation

Gray Mini-Thyrotomy: Fat Implantation

Study Design and Outcomes
- Retrospective review
- Previous Procedures
- Quantitative Outcomes
- Qualitative Outcomes
- Safety
- VHI-10
- Self-reported voice
- Stroboscopic parameters
- Complications

Indications for Gray Mini-Thyrotomy
- 13 Gray Mini-Thyrotomy procedures
- 9 unilateral
- 4 bilateral
- 9 scar – post-surgical
- 1 scar – XRT
- 2 scar – phonotrauma
- 1 sulcus vocalis
Previous Procedures

- 8 of 13 - 2+ Failed Previous Procedures
- Global Augmentation
  - 3 CaHA or RVG
  - 3 deep collagen
  - 2 lipoinjection
  - 2 medialization laryngoplasty
- Treatment of LP
  - 6 superficial collagen
  - 5 superficial steroid

Self-Reported Voice Outcome

<table>
<thead>
<tr>
<th>Voice Outcome</th>
<th>Number of Patients</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved</td>
<td>7</td>
<td>54</td>
</tr>
<tr>
<td>Worsened</td>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td>No change</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>100</td>
</tr>
</tbody>
</table>

*mean f/u 64.7 days (23-268)*

Quantified Voice Outcome: VHI-10

- Mean Pre-op VHI-10: **30.6**
  - Range 20-40
  - 7/13 >30
- Mean Post-op VHI-10: **30.2**
- 6 of 13 improvement: 7.5 or 24%
- 4 of 13 worse: 9.8 or 40%
- 3 of 13 no change

Quantified Voice Outcome: VHI-10

6 of 13 procedures: IMPROVED VHI-10

<table>
<thead>
<tr>
<th>Mean Pre-op VHI-10</th>
<th>31.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Post-op VHI-10</td>
<td>23.7</td>
</tr>
<tr>
<td>Delta VHI-10</td>
<td>7.5</td>
</tr>
<tr>
<td>Percent Decrease</td>
<td>24.1%</td>
</tr>
</tbody>
</table>
Quantified Voice Outcome: VHI-10

4 of 13 procedures: **WORSE VHI-10**

2 of 4: **SELF-REPORTED WORSE VOICE**

<table>
<thead>
<tr>
<th></th>
<th>Mean Pre-op VHI-10</th>
<th>Mean Post-op VHI-10</th>
<th>Delta VHI-10</th>
<th>Percent Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24.5</td>
<td>34.3</td>
<td>9.8</td>
<td>40%</td>
</tr>
</tbody>
</table>

Videostroboscopy Outcomes

**NO CORRELATION WITH VHI-10**

- Mucosal Wave (17 vocal folds)
  - Improved – 7 (41.3%)
  - Worse – 3 (17.6%)
  - No change – 23.5%
  - Could not visualize – 3 (17.6%)

- Closure (13 procedures)
  - Improved – 7 (53.8%)
  - No change – 6 (46.2%)

Complications

- Subcutaneous emphysema → seroma → abscess
- Wound dehiscence
- Temporary tongue numbness / taste changes
- Post-op aspiration → PEG placement

Limitations

- Loss of fat viability and / or volume
  - Over-augmentation required
  - Unpredictable retained volume
  - Sub-optimal pliability
- Unrealistic expectations
- Patient wound healing factors
Future Directions

• Material development – lamina propria replacements
• Controlled outcomes studies comparing Gray Mini-Thyrotomy with more traditional surgical treatments

Conclusions

• The Gray Mini-Thyrotomy is a safe and viable treatment option for severe scar and sulcus vocalis
• Patient population marked by:
  – Severe voice limitations (mean VHI-10 ~30)
  – Failed attempts at treatment (2+)
• Improvement in subset of patients (~50%)
• Realistic surgeon and patient expectations are warranted