Recurrent Laryngeal Nerve Injury at Thyroid and Parathyroid Surgery

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Management of RLN Injury

• Prevention
  – Decision to operate
  – Operative planning
  – Operative technique

• Management of nerve injuries
  – Temporary
  – Permanent
Prevention of Nerve Injury

General Principles

• Deliberate consideration and documentation of the indication for operation, and especially, for re-operation
• For re-operations, careful preoperative imaging and planning to limit the amount of “exploration” necessary
• Identify recurrent laryngeal nerve early and low – keep in view
• Dissect from un-operated to operated areas in re-operations
• Intraoperative nerve monitoring for re-operations (?)
Completion Thyroidectomy for Cancer

• Careful consideration of the rationale for completion thyroidectomy; may not be necessary in everyone
• Timing of secondary operation controversial
• Careful management of RLNs and especially parathyroid glands critical
Timing of Completion
Thyroidectomy for Cancer

- Operations between 10 and 90 days after initial resection is no different from early or delayed operation

<table>
<thead>
<tr>
<th>Condition</th>
<th>Total thyroidectomy</th>
<th>Completion thyroidectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Group 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(&lt; 10 or &gt;90 days)</td>
</tr>
<tr>
<td>Nil</td>
<td>172 (84)</td>
<td>60 (95)</td>
</tr>
<tr>
<td>Temporary hypocalcaemia</td>
<td>20 (10)</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Vocal cord dysfunction</td>
<td>2 (1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Recurrent laryngeal nerve injury</td>
<td>2 (1)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Haematoma</td>
<td>1 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Reoperation for bleeding</td>
<td>3 (1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Tracheostomy</td>
<td>2 (1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Other</td>
<td>2 (1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Death</td>
<td>1 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Total</td>
<td>205 (100)</td>
<td>63 (100)</td>
</tr>
</tbody>
</table>

Values in parentheses are percentages
Re-operative central neck procedure for cancer

- 102 re-operative central neck procedure for malignancy
- 6 patients with pre-existing vocal cord palsy
- 5 patients had RLN sacrificed deliberately
- Remainder: 12 had transient vocal cord dysfunction

Moley JF et al., Surgery 1999.
Recurrent or persistent hyperparathyroidism

- Confirm the diagnosis
- Review indications for operation
- Review previous procedures and operative reports
- Localize parathyroid abnormality
- Re-operate with intraoperative parathyroid hormone measurements
Results of operation

- Operation generally safe and successful with complication rates below 10% and success rates above 90%

<table>
<thead>
<tr>
<th>Source, y</th>
<th>No. of Patients</th>
<th>Cure Rate, %</th>
<th>Vocal Cord Paralysis, %</th>
<th>Hypocalcemia, %</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Transient</td>
<td>Permanent</td>
</tr>
<tr>
<td>Martin et al,² 1980</td>
<td>25</td>
<td>88</td>
<td>...</td>
<td>...</td>
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<td>McGarity and Goldman,³ 1981</td>
<td>28</td>
<td>82</td>
<td>0</td>
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<tr>
<td>Brennan et al,⁴ 1981</td>
<td>106</td>
<td>96</td>
<td>6</td>
<td>1</td>
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<tr>
<td>Brennan and Norton,⁵ 1984</td>
<td>175</td>
<td>&gt;90</td>
<td>...</td>
<td>6</td>
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<td>Grant et al,⁶ 1986</td>
<td>157</td>
<td>89</td>
<td>8</td>
<td>4</td>
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<tr>
<td>Cheung et al,⁷ 1989</td>
<td>83</td>
<td>86</td>
<td>2.4</td>
<td>1.2</td>
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<tr>
<td>Levin and Clark,⁸ 1989</td>
<td>81</td>
<td>91</td>
<td>...</td>
<td>...</td>
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<tr>
<td>Carty and Norton,⁹ 1991</td>
<td>206</td>
<td>95</td>
<td>6.6</td>
<td>0.7</td>
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<tr>
<td>Jarhult et al,¹⁰ 1993</td>
<td>93</td>
<td>82</td>
<td>...</td>
<td>10</td>
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<tr>
<td>Weber et al,¹² 1994</td>
<td>51</td>
<td>92</td>
<td>2</td>
<td>0</td>
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<tr>
<td>Rodriguez et al,¹³ 1994</td>
<td>152</td>
<td>93</td>
<td>1</td>
<td>0</td>
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<tr>
<td>Present study, 1996</td>
<td>102</td>
<td>95</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Total                      1259  91%  4.3%  2.7%  8.8%

Prevention of Nerve Injury
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Management of Nerve Injuries

- Temporary/Permanent
- Unilateral/Bilateral
- Complete/Incomplete
- Recurrent
- Laryngeal/Vagus
- External Branch of Superior Laryngeal
Superior Laryngeal Nerve

- Injury leads to impairment of upper vocal range
- Management is voice therapy
RLN Injury Effects

- Paralysis of the ipsilateral vocal fold and cord
- Dysphagia
- Aspiration – especially of liquids
Injury with intact nerve

- Temporary neuropraxia occurs due to manipulation or stretching of nerves
- Resolution over weeks to months
- Expectant management except for bilateral paralysis compromising airway or aspiration
- Most recover or compensate over time; laryngoscopy can distinguish
Permanent Injury

- Flexible laryngoscopy to evaluate defects
- Voice therapy
- Medialization
  - Injection laryngoplasty
  - Laryngeal framework procedures
- Re-innervation
- Tracheostomy
- Feeding tube placement
Medialization

- Correct voice defects
- Limits full opening of airway
- Best current results with thyroplasty for isolated nerve injury
Type I Thyroplasty

- Medializes paralyzed cord with silastic placed through a window in thyroid cartilage
- Local anesthesia with larngoscopic and voice monitoring
Re-innervation Procedures

- Transfer of ansa cervicalis to transected RLN can restore bulk and tone to vocal fold muscles – but not motion
- Nerve repair or transfer procedures not yet effective for RLN
Permanent bilateral injury

- Tracheostomy
- Posterior cordotomy
- Arytenoidectomy
Management of RLN Injury

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