Pediatric Airway Reconstruction

Principle, decision-making, and outcomes at the university of Iowa hospitals and clinics

Presenter: R1 陳俊男
Introduction

• Pediatric airway stenosis
  – Prolonged intubation?
  – Genetic factors?
• Tracheostomy rate vs symptomatic stenosis?
• Current technique
  – Staged airway expansion
  – Single-stage expansion grafting
  – Segmental airway resection procedures
Selection of procedure

• **Goal**
  – Attain an adequate airway to allow for normal activity without the need for a tracheostomy

• **Definition of Success**
  – Use of a single operative procedure with minimal postoperative morbidity
  – Minimized hospitalization
Comparison of Expansion grafting procedures with Segmental airway resections

- Perioperative complication rate
- Hospitalization times
- Single-procedure success rates
Materials and Methods

- Retrospective chart review
  - Children undergone an open airway reconstruction from 1990 to 2002
- Stenosis
  - Myer-Cotton grading system
  - Operative diagnostic laryngoscopy and bronchoscopy
  - CT or MRI
- Time
  - Op during spring and summer months
  - After GERD was treated at least 4 weeks
Data analysis

• 89 patients, 102 procedures

• For evaluation: 74 patient, 91 procedures

• Procedures (Total 91):
  – 80 expansion grafting procedures
  – 11 segmental resections

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### Overall Outcome

<table>
<thead>
<tr>
<th>Cotton-Myer Grade of stenosis</th>
<th>No. of patients</th>
<th>Single-Procedure Success</th>
<th>Ultimate Success #</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>5</td>
<td>5 (100%)</td>
<td>5 (100%)</td>
</tr>
<tr>
<td>II</td>
<td>24</td>
<td>20 (83%)</td>
<td>24 (95%)</td>
</tr>
<tr>
<td>III</td>
<td>26</td>
<td>20 (77%)</td>
<td>26 (100%)</td>
</tr>
<tr>
<td>IV</td>
<td>5</td>
<td>3 (60%)</td>
<td>4 (80%)</td>
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</tbody>
</table>

#Decannulation
## Procedure-specific Outcome

<table>
<thead>
<tr>
<th></th>
<th>Expansion grafting</th>
<th>Segmental resection</th>
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</thead>
<tbody>
<tr>
<td>No. of procedure</td>
<td>80</td>
<td>11</td>
</tr>
<tr>
<td>Overall complications (%)</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>Reintubation (%)</td>
<td>13</td>
<td>18</td>
</tr>
<tr>
<td>Return to operating room (%)</td>
<td>22</td>
<td>27</td>
</tr>
<tr>
<td>Single-procedure success (%)</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>Mean Hospital Stay (d)</td>
<td>17.2</td>
<td>18.2</td>
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</table>
Airway expansion grafting - 1

- **Advantage**
  - High level of success

- **Disadvantage**
  - Multiple procedures
  - Without preoperative tracheostomy
  - Perioperative morbidity

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Airway expansion grafting -2

• Multiple procedure:
  – 54% of grade III, 70% of grade IV

• Morbidity:
  – Infection (19%), Reintubation (29%),
  Tracheostomy replacement (15%)

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Cricotracheal resection

- Decrease the number of procedures
  - 1999 Monniedr et al
  - 2001 Triglia et al
  - 2001 Rutter et al
No statistically significant difference between procedures
## Discussion-4

<table>
<thead>
<tr>
<th></th>
<th>Intubation time</th>
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<tbody>
<tr>
<td></td>
<td>0-2 days</td>
<td>3-7 days</td>
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<tr>
<td>No. of procedures</td>
<td>14</td>
<td>50</td>
<td></td>
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<tr>
<td>Overall complication</td>
<td>10</td>
<td>12</td>
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<td>0.03</td>
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<tr>
<td>Return to operating room</td>
<td>8</td>
<td>8</td>
<td></td>
<td>0.02</td>
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<tr>
<td>Reintubation</td>
<td>2</td>
<td>4</td>
<td></td>
<td>&gt;0.05</td>
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Thanks for your attention!