Granulation tissue and tracheal stenosis in tracheostomy

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Tracheostomy
Tracheostomy

- Rise in tracheostomy in USA
  - 8.3 of 100,000 to 24.2 of 100,000 (1993 vs 2002)\(^1\)
- Early complications
  - Bleeding, infection, loss of airway, dislocation of tracheostomy, aspiration
- Late complications
  - Stenosis, tracheomalacia, tracheoesophageal fistula, erosion with bleeding

Clinical manifestations

- Failure to wean
- “Unexplained” dyspnea
- Cough and unable to clear secretions
- Stridor
- Airway obstruction!
Tracheal stenosis caused by a tracheal web (blue arrow).
Tracheal stenosis

- Different locations: suprastomal, stomal, at the cuff, at the tip of the tube
- Asymptomatic vs symptomatic
  - 3-12% → intervention\(^1\)
  - 62 of 344 patients had severe stenosis (>50%)\(^2\)
  - 31% stenosis >10%; 6% symptoms\(^3\)
- Percutaneous: Craglia vs Griggs\(^4,5\)
- Guidewire
- Invagination cartilage rings

Risk factors

- sepsis, stomal infection, hypotension, advanced age, male sex, steroids, tight-fitting or oversized cannula, excessive tube motion (ie, mechanical irritation), prolonged placement\(^1\)

- Cuff → tenfold reduction (high pressure/low volume vs low pressure/high volume)\(^2,3\)

Prevention

- Reduce size of tracheal defect
- Reduce movement tracheostomy
- Good stomal care (antibiotics)
- Pressure of cuff
Table 2. Treatment Strategies for Granulation Tissue

<table>
<thead>
<tr>
<th>Topical Strategies</th>
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<tbody>
<tr>
<td>Antibiotic cream</td>
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<td>Steroid cream</td>
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<tr>
<td>Silver nitrate</td>
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<td>Inhaled steroids</td>
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<td>Combination of antibiotics, antifungals, and steroid powder</td>
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<td>Polyurethane form dressings</td>
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Other options

- Fluorouracil (FU-5)
- Transforming growth factor Beta-3
- Mitomycine-C
Treatment (Epstein 2005)

Postintubation tracheal stenosis with symptoms

- Rigid bronchoscopy

  - Web-like stenosis
    - Nd-YAG laser photodissection and dilatation (repeated twice in cases of recurrence)
      - Cured
      - Third recurrence
        - Patient operable
        - Patient inoperable
          - Tracheal stent implantation
            - 6 months later
              - Patient operable
              - Patient inoperable
                - Stent removal
                - Recurrence
                  - Cured
                - Follow-up
                  - Tracheal sleeve resection
                    - Follow-up

  - Complex stenosis
    - Cured
    - Third recurrence
      - Patient operable
      - Patient inoperable
        - Stent removal
          - Recurrence
            - Cured
          - Follow-up (stent kept in place)

Fig. 3. Multidisciplinary algorithm for managing patients with post-tracheostomy tracheal stenosis. Nd-YAG = neodymium-yttrium-aluminum-garnet. (From Reference 24, with permission.)
Take home messages

- Treacheal stenosis is common during and after tracheostomy
- Failure to wean? Consider tracheal stenosis
- Topical treatment is unsure