A SILENT PAIN IN THE NECK

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Case: 85 yo M, ASA 3
Left Carotid Stenosis → Elective L CEA

PMHx/PSHx:

- HTN
- HLD
- CAD s/p 3vCABG (2008) & PCI to RCA (2009) w/ NSTEMI (Feb 2018)
  - LHC done, no intervention at that time.
- CHF – LVEF 55%.
  - Grade 2 LV diastolic dysfunction & LVH
- Bilateral carotid artery stenosis s/p R CEA (2006)
- PAD s/p left ilio-femoral bypass (1971) & bilateral aorto-femoral bypass (2001)
Case: 85 yo M, ASA 3  
Left Carotid Stenosis → Elective L CEA

**Meds:** ASA, clopidogrel, metoprolol, losartan, amlodipine, furosemide, rosuvastatin

**Social Hx:** former tobacco use: 36 pack-years

**All:** metoclopramide, morphine, nicacin, oxycodone-apap, ranitidine, statins, temazepam

**Labs:**

<table>
<thead>
<tr>
<th></th>
<th>13.1</th>
<th>128 (baseline)</th>
<th>145</th>
<th>110</th>
<th>18</th>
<th>135</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.2</td>
<td></td>
<td>3.8</td>
<td>27</td>
<td>1.09</td>
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**Studies:**

- **CTA Neck:** >90% stenosis proximal LICA (Jan 2018)
Case: 85 yo M, ASA 3
Left Carotid Stenosis → Elective L CEA

- GA + ETT, A-line
- Uncomplicated intra-op course:
  - Bovine pericardial patch angioplasty
  - Heparinized & reversed w/ protamine
  - Blake drain placed
  - Extubated awake
- Moderate care for postoperative monitoring
Post-op Day #1

- Developed mild neck swelling overnight—status closely monitored
- Complained of trouble eating breakfast in the AM and some hoarseness
- Surgeon requested urgent return to OR → neck exploration
History:
- For L CEA: Grade 2 mask, Grade 2b view
  2 attempts; success w/ cricoid + bougie

Symptoms:
- Endorsed dysphagia & hoarseness
- Denied dyspnea or orthopnea
### Airway Changes

#### Physical Exam

<table>
<thead>
<tr>
<th>L CEA:</th>
<th>Neck exploration:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dentition: implanted maxillary and mandibular incisors and canines(b) Implant Tooth/Teeth(b)</td>
<td>Dentition: implanted maxillary and mandibular incisors and canines(a) Implant Tooth/Teeth(a)</td>
</tr>
<tr>
<td>Beard: No(b)</td>
<td>Beard: No(a)</td>
</tr>
<tr>
<td>Mouth Opening: &gt;= 3 cm mouth opening(b)</td>
<td>Mouth Opening: &gt;= 3 cm mouth opening(a)</td>
</tr>
<tr>
<td>Mallampati Sitting Looking Forward: II(b)</td>
<td>Mallampati Sitting Looking Forward: III(a)</td>
</tr>
<tr>
<td>Thyroid to Mentum: T to M &gt;= 6 cm(b)</td>
<td>Thyroid to Mentum:</td>
</tr>
<tr>
<td>C-Spine: Normal(b)</td>
<td>C-Spine: Normal(a)</td>
</tr>
<tr>
<td>Existing Airway: None(b)</td>
<td></td>
</tr>
<tr>
<td>Neck Anatomy: (Normal)(b)</td>
<td>Neck Anatomy:</td>
</tr>
<tr>
<td>Jaw Protrusion: B: Limited, lower incisors can only be advanced to meet the upper incisors(b)</td>
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</tr>
<tr>
<td>Airway Comments:</td>
<td>Airway Comments:</td>
</tr>
<tr>
<td></td>
<td>B: Limited, lower incisors can only be advanced to meet the upper incisors(a)</td>
</tr>
</tbody>
</table>
OR Take-back: Neck Exploration

Initial Airway Plan: RSI with Glidescope

- OR arrival → moved to OR table (flat) → orthopnea & obstructive breathing

- RSI aborted & began prepping for awake endoscopic intubation:
  - Glycopyrrolate 0.8 mg, esmolol 30 mg
  - Lidocaine via nebulizer & atomized spray

- 17 minutes later → awake endoscopic intubation attempt by anesthesia attending
Endoscopic Intubation
OR Take-back: Neck Exploration

- ENT & Anesthesia Airway Consult Team paged STAT to OR.
  - Discussion between Vascular Surgeon/Anes/ENT re: opening left neck
  - Dexamethasone 10 mg given
  - 4th awake intubation attempt by ENT, SpO2 decreased to <85%
  - Neck prepped w/ betadine by ENT

- Respiratory arrest during neck prep requiring emergent trach by ENT.
  - 15-blade vertical & horizontal incision.
  - ETT placed into trachea.

- <15 seconds from arrest to ETCO2 confirmation.
  - Bilateral breath sounds confirmed.
  - SpO2 nadir 30s immediately improving to 90s.
OR Take-back: Neck Exploration

- Induction of GA after trach
- Formalization of trach – ETT exchanged for 6-0 cuffed shiley
- Left neck re-opened by vascular surgery
  - 50 cc of old clot evacuated within the deep layer from omohyoid muscle and from a previously clipped vein
- New JP drain placed
- Admitted to ICU
Hematomas After Neck Surgery

**Carotid Endarterectomy**
- Incidence: 1.4% - 5.5%

**Anterior Cervical Discectomy**
- Incidence: 1% - 11%

**Cervical Nerve Blocks**
- Stellate ganglion block

**Internal Jugular Vein Cannulation**
Hematomas After Neck Surgery

- Risk factors:
  - Non-reversal of heparin
  - Intraop hypotension
  - Hypertensive swings & coughing at extubation
  - Temporary intraluminal carotid shunt
Neck Surgery & Post-op Monitoring

- Close observation, early detection, & preparation for emergent airway management

- Signs and symptoms:
  - Early indicators may be non-specific:
    - Neck tightness, pain/pressure, swelling, sweating, agitation, anxiety, change in voice quality, dysphagia
  - Respiratory-specific:
    - stridor, hypoxia, dyspnea, tachypnea, tracheal deviation

- Repeated neck circumference measurements

- Surgeon to assess post-op bleeding risk
  - Continued observation vs. surgical intervention
Post-surgical Neck Hematomas: Mechanisms of Airway Obstruction

- Arterial vs. Venous
- Superficial vs. Deep

**Contributing Mechanisms:**

- Physical pressure effect
- Development of perilaryngeal edema
- Blood dissection along tissue planes
Contributing Mechanisms

Physical Pressure Effect

- Displacement of laryngeal inlet away from midline position
- Physical compression of laryngeal & tracheal lumen
Contributing Mechanisms

Development of Perilaryngeal Edema

- Often out of proportion to degree of externally visible neck swelling/discholoration
- Hematoma interference with venous/lymphatic drainage
- Release of tissue inflammatory mediators
- Swollen supraglottic mucosal folds may obscure glottic opening
Contributing Mechanisms

Blood can spread remotely from initial location.

RP collections of blood often manifest as neck pain & dysphagia in addition to hoarseness and dyspnea.

Compression of arytenoid cartilages → adduct vocal cords.

Shift laryngeal inlet anteriorly.
Neck Hematomas & Airway Management

**Emergent Intubation:**

- Difficult bag mask ventilation
- Difficult intubation
- Consider previous airway history
- Identify neck landmarks for possible surgical airway
Neck Hematomas & Airway Management

- Inhalational induction
- Intravenous induction
- Awake oral or nasal intubation
- Awake open cricothyrotomy or tracheotomy under local
Airway Management in Patients with Neck Hematomas After CEA

Shakespeare, William; Lanier, William; Perkins, William; Pasternak, Jeffrey
Failed Awake Endoscopic Intubations

- Natural progression of disease process
- Systemically administered sedative agents
- Laryngospasm
- Insufficient airway topicalization
- Patient panic
Michigan OxyTain Algorithm

1. Can’t Intubate
   Can’t Oxygenate
   - Call Airway Team Stat with ENT
   - Locate and open the Emergency Airway Oxygenation Pack
     - Continue attempts to provide oxygenation via BMV +/- LMA
   - Initial Cannula Rescue Oxygenation

2. Success
   - Oxygenate + Stabilize
     - Wake + return of spont ventilation
     - Percutaneous Melker technique
   - ENT Surgical Access
   - Scalpel Bougie Technique

3. Failure
   - Enters resuscitation triage
Take Home Points

**Neck Hematomas**

**Arterial Bleed**
- Acute presentation
- Obvious neck swelling
- Rapid surgical decompression prior to securing airway

**Venous Bleed**
- Subacute presentation
- Non-specific signs & symptoms
- May not have obvious neck swelling
- Secure airway promptly as it may become more difficult from over time
- Surgical decompression may not be helpful
Back To Our Patient...

- Flex laryngoscopy on POD #4 from emergent trach and neck hematoma evacuation.
  - Continued but improved edema.

- Decannulated on POD #6.

- Discharged home on POD #7.

- Doing well since!
References

- Airway Management of the Patient with a Neck Hematoma, Hung OR, Murphy MF. Hung's Difficult and Failed Airway Management, 3e; 2017
- Kua, et al. Airway obstruction following internal jugular vein cannulation. Anaesthesia. 1997. 52(8);776-80
Questions?

THANK YOU!