Management of Patients after Total Laryngectomy

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Preoperative considerations

- Patients should meet with SLP prior to surgery
- Preoperative visit should include patient assessment and education
- Keep in mind patient readiness for information
Preoperative visit

- Confirm patient understanding of diagnosis and surgery
- Ask about patient/family fears and concerns
- Observe family dynamics and communication styles
Evaluation

• Preoperative communication – How does patient communicate now?
  ▫ Issues with preoperative speech
  ▫ Issues with literacy/writing

• Social and emotional status
  ▫ Support network?
  ▫ Drug or alcohol abuse?

• Economic issues
• Visual abilities
• Cognitive abilities
• Manual dexterity
Education

- Role of the SLP
- Communication options
- Changes in respiratory system
- Changes in swallowing
- Changes to taste/smell
Safety concerns

- **Protection of airway**
  - Covering stoma
  - Avoidance of submersion in water
  - Shower covers/guards

- **Lack of smell**
  - Test smoke detectors

- **CPR**
  - Inform local firehouse/police department
  - Medic alert bracelet
  - Consider ambu-bag for CPR
Preparation for hospital stay

- Communication options (non-verbal)
- Typical rehabilitation course
  - Communication
  - Swallowing
Preparation for return to community

- Send for samples of filters
- Send for free copy of Self Help for the Laryngectomee
- Connect with web whispers online
- Connect with local support groups
Total laryngectomy: Verbal communication options

- Electrolarynx
- Esophageal speech
- Tracheoesophageal voice prosthesis (TEP)
Examples

- Videos
- Visit from another patient
- Chance meetings in waiting room
Alaryngeal speech, the ideal

- When possible it is best to train the patient in at least two options in the event that one option fails
- Pairing an electrolarynx with one form of esophageal phonation is beneficial
Comparison of alaryngeal speech options - Electrolarynx

- **The pros:**
  - Training can begin as early as one day post-operatively
  - Can be used in patients who are unable to achieve vibration of the PE segment secondary to stricture, spasm, hyper tonicity, or surgical procedure

- **The cons:**
  - Mechanical voice quality and reduced intelligibility
  - Can be costly to purchase and maintain
Electrolaryngeal speech

- Voice created by application of mechanized vibration source
- Devices can be applied to neck, cheek, or intraorally
- Treatment focuses on articulation, timing, and device placement
Electrolaryngeal speech
Comparison of alaryngeal speech options
- Esophageal speech

• The pros:
  - Does not rely on any device

• The cons:
  - Very difficult to acquire
  - Often requires extensive speech therapy
  - May result in distracting secondary behaviors during air charging
Esophageal speech

- Voice is created by ejecting air into the esophagus either through positive or negative pressure
- Voice is elicited as vibration of the pharyngoesophageal segment
Esophageal speech
Tracheo-esophageal speech

- Voice is created by shunting air into the esophagus through a one-way valve, creating vibration of the pharyngo-esophageal segment
- Devices can be managed by the patient or by the speech-language pathologist
Comparison of alaryngeal speech options - TEP

• The pros:
  - Can usually be initiated ~2 weeks after surgery
  - Typically easy to acquire
  - Judged by many as more natural and easier to understand

• The cons:
  - May require high level of care and maintenance
  - Can be costly
  - Can be difficult if there are issues with the esophagus/PE segment
Tracheoesophageal speech

- Treatment involves training in stomal occlusion, maximizing functional communication, troubleshooting TEP failure, and increasing independence with prosthesis use and care
Tracheoesophageal speech
Timing of puncture

- Primary puncture – Fistula created during laryngectomy surgery
- Secondary puncture – Fistula created at some time after laryngectomy procedure
Timing of prosthesis placement

- Prosthesis can be placed by surgeon at the time of surgery or by SLP at a later date
  - For primary puncture, prosthesis typically placed 7-14 days post-operatively
  - For secondary puncture, prosthesis typically placed 3-5 days post-operatively
Where to begin:
Prosthesis selection

- **Indwelling prostheses**: Placed by qualified SLP or MD
  - Higher grade medical silicone
  - Meant to be left in place until leakage occurs
  - Can remain in place from 1-12+ months

- **Non-indwelling prostheses**: Placed by patient
  - Softer silicone construction
  - Removed regularly for cleaning
In-Health/Blom Singer

- Large distributor of tracheoesophageal prostheses
  - Indwelling/non-indwelling
  - 16/20F diameter
  - Duckbill
  - Increased resistance
  - Large esophageal retention collar
  - Dual Valve
  - Advantage
Blom Singer Indwelling TEP
Blom Singer Non-indwelling
Blom Singer duckbill
Blom Singer large esophageal flange
Blom Singer Advantage
Blom Singer Dual Valve
Atos/Provox

- Another main distributor of TEPs
  - Indwelling/non-indwelling
  - 17f/20f/22.5f diameter
  - Provox 1 for retrograde placement
  - Provox 2 for anterior placement
  - Provox Vega
  - Provox Activalve
Provox 2
Provox NID
Provox Vega
Provox Activalve
Caring for the tracheoesophageal voice prosthesis

- Prosthesis should be cleaned on average twice daily
- Ideally cleaning involves use of brush and flush
- Dried secretions around tracheal collar can be gently removed with tweezers or hemostat
- Mixture of saline and peroxide can be used to loosen dried mucous
Using the brush to clean the prosthesis

- Gently insert brush into center of prosthesis
- Rotate gently, do not piston
- Remove and repeat if needed
- If secretions are very dry, dip brush in saline and peroxide solution
Using the flush to clean the prosthesis

- Draw water or saline into bulb (like a turkey baster)
- Insert the end of the flush into the shaft of the prosthesis
- Keep firm pressure to maintain seal and prevent seepage into trachea
- Squeeze the bulb to squirt the fluid through the prosthesis into the esophagus
Voice prosthesis challenges

- **Leakage through the prosthesis**
  - Most common issue
  - Failure of the one-way flap to close
- **Leakage around the prosthesis**
  - Only noted in ~3-6% of TEP users
  - Difficulty with tract or tissue elasticity
- **Strained voice**
- **Weak voice**
Leakage through the prosthesis

- Food/mucous/debris
  - Simple solution: Clean the prosthesis!
Leakage through the prosthesis

- Candida; the evil yeast
  - Discuss dietary habits
  - Consider diabetes control
  - Consider yeast resistant prostheses (Blom Singer Advantage or ATOS Activalve)
  - Dual valve Blom Singer
  - Consider medical management
  - Encourage probiotics and/or buttermilk
  - Discuss cleaning procedures
Leakage through the prosthesis

- **Negative esophageal pressure**
  - Look for cause with fluoroscopy (may require dilation or Botox)
  - Try higher resistance valve (Blom Singer Increased Resistance indwelling valve, Atos Activalve, Duckbill non-indwelling)
  - In extreme cases, resistance can be increased by placing drop of silicone adhesive on back of valve for extra weight
  - Dual valve Blom Singer?
Leakage through the prosthesis

- Puncture migration/vertical positioning
  - May require closure of tract and re-puncture
  - Consider primary placement of prosthesis during re-puncture
Leakage through the prosthesis

- Leakage occurring immediately after placement
  - May be due to compression on shaft
  - Consider prosthesis with integrated ring such as Provox 2 or Blom Singer Advantage
  - May also be due to inadequate sizing
  - Defective prosthesis is possible but infrequent
Leakage around the prosthesis

• Consider the cause
  ▫ Sizing
  ▫ Poor tissue compliance after radiation
  ▫ Medical concerns including rapid weight loss, thyroid levels, and diabetes
  ▫ Consider recurrence/metathesis if no explanation
Leakage around the prosthesis

• Eliminate the problem before it happens (when possible)
  ▫ Start with smaller diameter prosthesis (Blom 2003)
  ▫ Avoid weighing down the tract with a red rubber catheter
  ▫ Ensure proper sizing of prosthesis
  ▫ Resist the temptation to increase diameter in response to leakage around
Leakage around the prosthesis

• **When leakage occurs:**
  - First evaluate length of prosthesis
  - Examine shape of tract; be wary of tear-drop tracts
  - Work with physician to assess any change in medical status (nutrition/albumin levels, thyroid function, uncontrolled diabetes, excessive alcohol intake, etc)
Leakage around the prosthesis

• When leakage occurs:
  ▫ Consider enlarged flange devices
  ▫ Consider tissue expanders
  ▫ Consider diet modifications
  ▫ Consider esophageal patency
  ▫ Consider “resting” the tract
# One option: Enlarged collars

<table>
<thead>
<tr>
<th>Commercially available</th>
<th>Custom made</th>
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<tbody>
<tr>
<td>Blom Singer large esophageal flange</td>
<td>Can be fashioned with any commercial prosthesis</td>
</tr>
<tr>
<td>Available for 20F standard prostheses only</td>
<td>Can add esophageal and/or tracheal collar</td>
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Blom Singer large esophageal flange prosthesis
Another option: Tissue expanders

- Injection of Cymetra or other injectibles around the prosthesis to fill the gap (Seshamani et al 2006, Lorincz et al 2005, Remacle & Declaye 1988)
  - Consider longevity/permanence when choosing injectible substance
Voicing issues

- Establish voicing abilities with open-tract assessment
  - If good open-tract and poor with prosthesis, problem is likely related to prosthesis
- Establish if problem is due to patient vs. clinician occlusion
Voicing issues

- Patient-related problems
  - Occlusion problems
  - Excessive effort/tension
  - Difficulty coordinating respiration/phonation
Voicing issues

- **Prosthesis-related problems**
  - Inappropriate length
  - Small diameter
  - Higher resistance prosthesis
Voicing issues

- Puncture-related problems
  - Angle of tract
  - Presence of granulation tissue
  - High tract
Voicing issues

- PE segment-related problems
  - Hypertonic segment
    - Trouble with voice and swallowing
    - Trouble persists with open-tract evaluation
    - Best evaluated with fluoroscopy
    - Treated with Botox, dilation, or myotomy
Voicing issues

- PE segment-related problems
  - CP spasm
    - Trouble with voice exceeds trouble with swallowing
    - Best evaluated with fluoroscopy during swallowing and voicing
    - Most commonly treated with Botox
      - 87% of patients regained TE voice after Botox (Lewin et al, 2001)
Voicing issues

- **PE segment-related problems**
  - **Hypotonic segment**
    - Voice is weak/breathy
    - Poor volume
    - Treated with head posture or pressure band
Stoma related challenges

- Microstomia
- Macrostomia
- Irregular shape
- Deep set
Microstomia

• Causes:
  ▫ Inflammatory response
  ▫ Granulation tissue
  ▫ Natural patient healing properties
  ▫ Recurrence/metathesis

Cause should dictate treatment
Microstomia

- Preferred size >2 cm
- Medical management may include antibiotics or steroids
- Can be a medical emergency
- May require surgical intervention
Microstomia

- Typically easily managed with commercial devices
- Ideal device will allow interfacing with Heat-moisture exchange units and/or “hands-free” speaking valves
Provox larytubes and larybuttons
Barton Mayo Buttons
Singer Laryngectomy Tubes
Large or irregularly shaped stomas

- Interferes with stomal occlusion for TE speech
- Communication with surgeons is key for prevention
- Consider adhesive base plate devices
- Customization of base plate devices (Lemon et al, 2003)
- Consider alternative ways of occluding (e.g. ping pong balls, prosthetic “thumbs”, rubber thumb tips)
Deeply recessed stoma

- May be fine for digital occlusion but difficult to access for interfacing HME or hands-free valves
- Typically do best with stoma buttons unless stoma is too large or irregular
- Consideration of customized device
Changing demographics

• Increasing numbers of patients are undergoing chemo radiotherapy prior to total larynectomy
  ▫ VA Larynx study (1991)
Changing demographics = Changing challenges

• After salvage surgery, higher incidence of leakage around the prosthesis
• After salvage surgery, higher incidence of multiple size changes
• After salvage surgery, higher incidence of spontaneous extrusion

Changing Demographics = Changing Challenges

- Chemo radiation increases the risk of esophageal stricture: 12-25% (Lawson et al, 2008; Rosales Solis et al, 2004; Lee et al, 2006)

- Factors increasing risk of stricture/stenosis (Lee et al, 2006)
  - Female
  - BID hyper fractionation
  - Hypo pharyngeal primary
Changing challenges = changing care patterns?

- Novel use of available instruments
- Modification of available devices
- Collaboration with new colleagues
Case 1:
Leakage around the prosthesis

- Patient presents with repeated issues with leakage around appropriately sized prosthesis
- Thyroid function, nutrition, and diabetes status assessed
- Problem suspected to be related to poor tissue compliance after radiation
- Commercially available prostheses do not resolve problem
Custom made enlarged flange prostheses

- Flange fashioned from silicone sheeting - affixed to prosthesis with silicone glue.
- Product must cure for a minimum of 24 hours prior to insertion.
**Important disclaimer**

- Modification of prostheses can be a medical-legal liability
- Discuss with medical legal team prior to implementing
- Ensure safety of patients as paramount
- IRB required for modifications in some institutions
- Both Eric Blom and Frans Hilgers are willing to help with customization
Final outcome

- Leakage controlled with customized prosthesis
- Patient trained in easy voice production using manometer for biofeedback
- Leakage around prosthesis eliminated
Comment on radiation effects

• Preliminary data suggest larger diameter prosthesis may be a problem when poor tissues
• Clinical intuition suggests primary placement may help to minimize tissue trauma
• Consider primary placement of smaller diameter prostheses in salvage laryngectomy
• Alternatively, consider secondary puncture
Case 2: Progressively strained voice

- Patient presents to clinic with complaints of voice loss
- Onset of complaint was gradual over several days
- Also noted difficulty with cleaning prosthesis and some bleeding
Solution

- Prosthesis removed anteriorly
- Gradually dilated tract back up with red rubber catheters
- Used flexible endoscope with ENT to ensure RRC in true tract
- Patient re-sized and fit with new prosthesis
- Placement confirmed with endoscope
- Patient treated for reflux
Granulation tissue

- Consider reflux as culprit (Pattani et al 2009)
- Darkening of posterior aspect of prosthesis may indicate reflux
- If you can see it in front, it may also be in back
- Can be due to irregular edge where strap is cut
- May require cauterization
- Consider Mometasone Furoate Cream USP 0.1% (BID X14 days)
Using a sinus scope to confirm placement

- Helpful tool to use when concerned about placement
- Can demonstrate placement in false tract (loose space between trachea and esophagus)
- Can visualize esophageal granulation
Using a sinus scope to confirm placement

- Scope can be gently guided through prosthesis shaft
- False tract will appear dark pink and tunnel-like (no evidence of secretions)
- Esophageal lumen will appear light pink and cave-like (glistening and bubbling of saliva during prompted swallow)
Another option for verification

- Plain film X-ray of neck
- Ask for frontal and lateral views
- Look for full circle on frontal view to confirm esophageal collar unfolded
- Most radiologists won’t know what to look for
- Best to view films personally
Radiographic confirmation
Case 3:  
Non-compliant patient

- Patient frequently failed to report for scheduled appointments
- When seen, pt’s spouse complained of patient refusal to use communication devices
- Patient not cleaning prosthesis as directed
- Patient not following through with HME suggestions (led to ER visit for mucous plug)
Mood disorders after treatment

- Can reduce compliance
- Can reduce motivation for rehabilitation
- Has the potential to impact
  - Appetite
  - Cognitive functioning
  - Self-worth
  - Mood
  - Sleep
  - Energy
  - Relationships with loved ones
Depression and anxiety

- 12.1% of head and neck cancer patients reported anxiety
- 6.3% of head and neck cancer patients reported depression
- 15% reported both anxiety and depression

Factors correlated with depression in H&N cancer

- Factors most predictive of depression
  - Male
  - Unmarried
  - Younger than 40
  - Lower physical functional status
  - History of or current smoking
  - Larger tumor at time of diagnosis

Psychosocial stress

• Trend for depression to decrease with time and to be less common among those attending a support group
Support groups

- Social and medical support are important factors in improving patients’ self-confidence and satisfaction
- In a study of total and partial laryngectomees: stoma and voice loss NOT the most important factors for QOL (greatest factors were loss of work identity and change in family relationships)
Solution

- Patient referred to psychiatric nurse for counseling
- Physician contacted to consider anti-depressant medications
- Patient provided with supportive care during speech visits
- Patient/spouse connected with other survivors
- Patient referred to Lost Cords Club and Web Whispers online
Conclusions

• A network of helpers is always better than a lone provider
• Today’s laryngectomy ≠ yesterday’s laryngectomy
• Changing population = changing challenges
• Changing challenges MUST = changing patterns of care
• Consider novel use of tools, instruments, and materials to meet the patient’s needs
Thank You!

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