Presentation to the Quality Council

Recommendations of the Perioperative Process Improvement Committee

Attached Documents:

1. Summation of recommendations regarding selection of tracheostomy tube length
2. “Time out” supplement for the performance of tracheostomies
3. Tracheostomy Downsizing Skills Checklist
4. Draft Post trach order set
5. Draft educational document for prevention of tracheostomy dislodgment
Report of working group of Perioperative Quality Improvement Committee

I. Members: (Leader) Addison May, Teresa Dail, Mike Daly, Gaelyn Garrett, Jay Morrison, Susan Moseley, Stephanie Randa, (Lee Parmley – conflict)

II. Perioperative quality issue being addressed:
The specific issue to be addressed is the prevention of tracheostomy dislodgement in the peri-procedural period. The issue has been identified as a “never event” by risk management.

The working group met, reviewed available documents, and reviewed input from feedback from physicians queried that perform tracheotomies. Seventeen of 37 faculty members that have entered CPT codes for tracheostomies were queried for feedback.

III. Issues requiring attention:
Prevention of tracheostomy dislodgements
a. Selection of appropriate length of tracheostomy tube
b. Method of securing tracheostomy and prevention of traction
c. Process of changing existing tracheostomy tubes in peri-tracheostomy period

Identification of patients with impending complication and subsequent actions:
d. Warning signs of potential impending airway mishap and communication algorithm
e. Emergent procedure and personnel for tracheostomy dislodgement

IV. Synopsis of discussion and deliberation:
Prevention of tracheostomy dislodgements:
The committee discussed the complexity of issues surrounding tracheostomy dislodgement and recognized the multiple contributing factors. However, two issues were felt to be most important after review – length of tracheostomy tube selected and appropriate securing the tracheostomy tube to minimize risk of airway dislodgement and injury. Patients most at risk are those that are critically ill requiring mechanical ventilation due to issues of airway and soft tissue edema, the need for positive pressure ventilation, and the issue of traction or pulling placed upon the tracheostomy tube by the ventilator tubing. The committee believes that to address these issues successfully in a broad and complex population will require 1) educational initiatives for physicians, nursing, and respiratory care, 2) implementation of “time out” procedures (see attachment) that consider tracheostomy tube length, standard tracheostomy tubes available, and BMI, 3) availability of appropriate tubes in all locations, and 4) implementation of “post-trach” order sets that indicate appropriate “tightness” of securing devises, warning signs of impending airway mishap, and emergency contacts.

The group also acknowledged the risk of airway loss during exchange or downsizing of tracheostomies. This issue has been addressed by the Institutional Critical Care Committee with the development of a check list (see attachment). However, the current draft does not address patients in whom tract may not be adequately developed.

Identification of patients with impending complication and subsequent actions:
The committee also discussed the signs and clinical findings that suggest that the airway may be at risk of dislodgement or injury to the trachea. These include but are not limited to: 1) hyperinflation or repeated inflation of the tracheostomy cuff to prevent a cuff leak, 2) significant rocking, twisting, or turning at the skin, 3) mal-position on x-ray, 4) resistance when passing catheters, 5) resistance with bagging. These signs or findings require immediate evaluation by a skilled and knowledgeable provider. There is a general lack of adequate knowledge of these signs across care providers. Multiple tools should be employed to address this knowledge deficit in the high risk environment.
The committee also acknowledged the complexity of communication and identification of appropriately skilled individuals in the event of impending or complete airway loss. This could be addressed by implementation of an “in-house” airway responder with a single phone number.

V. Recommendations:

Prevention of tracheostomy dislodgements:

- Adoption of recommendation that patients with BMI > 35 or who have undergone massive resuscitation or have significant soft tissue edema should be considered for extra-long tracheostomy tubes.
- Educational initiatives utilizing “webinservice” type tool should be employed to provide knowledge regarding this recommendation.
- Recommendation to service lines to implement a peri-procedural “time out” that includes BMI and tracheostomy length selection. A form can be provided via Star Panel to assist in this and could include tracheostomy tube lengths.
- Creation of a “post-tracheostomy” order set that would include instructions for appropriate “tightness” of tracheostomy tape or securing devise and warning signs of possible impending airway loss or injury to trachea.
- Revision and incorporation of tracheostomy exchange/downsizing check list. Must address patients without adequate tract developed.

Identification of patients with impending complication and subsequent actions:

- Signs that indicate impending airway loss or injury to trachea should be included in educational programs and incorporated into competencies for various healthcare providers managing fresh tracheostomies or patients mechanically ventilated via a tracheostomy.
- An “in-house” airway responder should be designated with a single emergency contact number.
- Order sets and signage developed that indicate appropriate contact personnel and indications for contacting.
- Draft VUMC policy “Tracheostomies: Management of Care” put forth to the Clinical Practice Committee by the Critical Care Committee should be reviewed consistency for inclusion of appropriate information within these recommendations before adoption.

Drafted by Addison May
SICU Check off sheet for Percutaneous Tracheostomies

Consent signed

Attending present

BMI

>35 or significant soft tissue edema
Recommend – Shiley 6 or 8 XLT

Medications in Room

Fentanyl 500 mcg
Vecuronium 20 mg
Versed 10 mg
Diprovan 50 cc vial
Lidocaine 2% with epi

Ventilator on Volume Control mode, rate of 12 and O2 at 100%

Ambu bag in room, connected to O2, and O2 turned on

Intubation tray in room or just outside door

CO2 detector, scissors, 10cc syringe, accordion trach extender, and suction set up at head of bed with airway nurse
### TRACHEOSTOMY DOWNSIZING SKILLS CHECKLIST

<table>
<thead>
<tr>
<th><strong>OVERVIEW: RESOURCES/EQUIPMENT/SUPPLIES</strong></th>
<th>Complete</th>
<th>Not Complete or N/A</th>
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<tbody>
<tr>
<td><strong>Initial Tracheostomy Exchange or Downsize should have 2 licensed healthcare providers who have documented competency with this procedure.</strong></td>
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<tr>
<td><strong>Tracheostomy Downsizing supplies:</strong></td>
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<tr>
<td>1. new tracheostomy tube with obturator (usually tracheostomy tube downsized from size #8 to #5 – cuffed or uncuffed depending on primary team’s preference)</td>
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<tr>
<td>2. intubation kit and Resuscitation bag (Ambu®) at bedside</td>
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<tr>
<td>3. suction source</td>
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<tr>
<td>4. sterile suction catheter kit</td>
<td></td>
<td></td>
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<tr>
<td>5. rigid pharyngeal suction tip (Yankauer®)</td>
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<td></td>
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<tr>
<td>6. pulse oximetry</td>
<td></td>
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<tr>
<td>7. personal protective equipment</td>
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</tbody>
</table>

### SKILLS

- don personal protective equipment (mask, gloves)
- place patient on pulse oximetry and assure emergency airway equipment is at bedside
- hyperoxygenate and suction tracheostomy tube to remove secretions
- remove trach ties from tracheostomy tube neck plate
- insert syringe into pilot balloon
- instruct patient to take deep breath
- at peak of deep inspiration: deflate the cuff, remove the old tracheostomy tube in one motion on inspiration, and insert new tracheostomy tube with obturator into tracheostomy stoma, remove obturator, insert tracheostomy tube inner cannula and lock into place, insert air into cuff if cuffed
- encourage the patient to deep breathe and cough
- suction new tracheostomy if needed
- observe patient for signs/symptoms of respiratory difficulty or distress
- write procedure note in patient’s chart documenting: type and size of old tracheostomy tube removed and type and size of new tracheostomy tube inserted, patient’s pulse oximetry values before and after procedure, any complications encountered, and patient tolerance of procedure
- make sure obturator is placed in a plastic bag and kept at the bedside if needed for emergent tracheostomy tube reinsertion if the patient is accidentally decannulated
Licensed Providers must perform 5 successful tracheotomy downsizes under the direct supervision of a resident/fellow/attending before performing independently. As well, licensed providers must perform at least 10 tracheostomy downsizes every two years in order to maintain competency.

References:


Resident/Fellow/Attending:

________________________________________  ______________________________________  _____________
printed name             signature             date
Post-procedure orderset:

1. AP chest xray now:
   - Indication: s/p tracheostomy

2. Nursing order: Maintain tracheostomy tape/strap so that no more than 1 – 2 fingers can be inserted freely between securing devise and neck

3. Nursing order and respiratory order: Notify MD (or mid-level practitioner, if appropriate) if:
   - Hyperinflation or repeated inflation of the tracheostomy cuff is required to prevent a cuff leak
   - Resistance encountered when passing catheters
   - Resistance encountered with oxygen delivery via resuscitation bag or ventilator
Prevention of Tracheostomy Dislodgment

Findings and Recommendations of the Perioperative Process Improvement Committee
Prevention of tracheostomy dislodgment in the peri-procedural period

• Perioperative Quality Improvement Committee charged with reviewing 4 cases of peri-procedural tracheostomy dislodgment

• Identified issues in review of these 4 cases:
  – Selection of appropriate length of tracheostomy tube
  – Method of securing tracheostomy and prevention of traction on the tube
  – Recognition of impending tracheostomy dislodgement
4 cases of tracheostomy tube dislodgement

• all related to length of tracheostomy tube

1. BMI 60 6 Shiley
2. BMI 31 + critically ill 8 Shiley
3. BMI 40 8 Shiley
4. BMI 28 + 90% burn 8 Shiley
Example Patient 1:

- 63 y.o. female underwent resection of head and neck SCCA with myocutaneous flap
- 409 pounds (BMI 60)
- 6 Shiley inserted in the OR
- POD #2 arrested and died secondary to migration of tracheostomy into subcutaneous tissue
Example Patient 2:

- 75 y.o. male underwent complicated Whipple procedure
- Underwent surgical (open) tracheostomy for prolonged ventilation
- BMI – pre-op 31
- POD #1 noted to have large “cuff-leak” and tracheostomy out of position on CXR
- Arrested during attempts to re-establish airway
Effect of tracheostomy tube length

Trach rocked forward due to weight of circuit. Distal tip not seated in tracheal lumen and balloon, likely in SubQ.
No published data or guidelines to direct selection of tracheostomy length in obese patients
Recommendations for selection of tracheostomy tube length

- All patients with a BMI $\geq 35$ should have a Shiley X-long 6, 8 or Shiley 9 tube
- All patients with massive resuscitation and/or severe soft tissue edema should have a Shiley tube longer than a regular length 8 Shiley
Length of tracheostomy tubes

- Shiley 6 X-long 95 mm
- Shiley 8 79 mm
- Shiley 8 long 89 mm
- Shiley 9 99 mm
- Shiley 8 X-long 105 mm
- Shiley 10 109 mm
Effect of tracheostomy tube length

XLT tracheostomy correctly seated
4 cases of tracheostomy tube dislodgment

• Additional issues identified:
  – Method of securing tracheostomy
  – Recognition of mal-position of tracheostomy and impending loss
Additional findings and recommendations

- All fresh tracheostomies and those connected to ventilator circuit should be secured with tape maintained so that only 1-2 fingers can be passed easily between tape and neck.

- Hyperinflation or repeated inflation of the tracheostomy cuff to prevent an airleak suggests mal-position of the tube with the cuff in the ostomy or subcutaneous space.

- “Rocking forward” of the tracheostomy or mal-position of the balloon position on CXR are significant warning signs for risk of dislodgment.

- Utilize tracheostomy order set post-procedure.
Summary of recommendations for prevention of tracheostomy dislodgment

• All patients with a BMI > 35 should have a Shiley extra-long (XLT) 6, 8 or Shiley 9 tube

• All patients with massive resuscitation and/or severe soft tissue edema should have a Shiley tube longer than a regular length 8 Shiley

• Maintain tracheostomy tape/strap so that only 1-2 fingers may be passed between skin and devise

• Hyperinflation of the cuff to prevent leak and mal-position on CXR are significant danger signs