



RESPIRATORY SERVICES

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CLINICAL GUIDELINE

TITLE: CRITICAL CARE –
Cuff Pressure Management
(Respiratory Therapy)

NUMBER: B-00-12-12019

RELATED DOCUMENTS:

B-00-12-12024

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SITE APPLICABILITY:

ST. PAUL'S HOSPITAL
MOUNT SAINT JOSEPH HOSPITAL

GENERAL INFORMATION:

High pressure exerted upon the tracheal wall from the inflated cuff of an artificial airway may produce tracheal mucosal injury. However, if the pressure in the cuff is too low the risk of silent aspiration and ventilator-associated pneumonia (VAP) is significantly increased.

Although cuff pressure is not the sole determinant of aspiration or tracheal mucosal injury, evidence suggests the relative risk of these complications is reduced when cuff pressure is maintained between 20 – 30 cmH₂O (15 – 22 mmHg)*. Cuff pressure must be measured a minimum of once per shift (ideally every 4 hours) and whenever air is added or removed from the cuff.

***NOTE:** Refer to [SPECIAL CONSIDERATIONS – ENDOBRONCHIAL TUBES](#) for information specific to double-lumen tubes.

EXHIBITS:

- A. [Endobronchial Tube](#)

CAUTIONS:

If the cuff pressure cannot be maintained within the desired range without allowing a leak, slowly inflate the cuff until no leak is heard on auscultation over the trachea. Record the pressure and consider the following factors:

NOTE: excessively high cuff pressure may result in cuff rupture with an associated risk of airway obstruction.

a) Endotracheal tube position:

- Review the position via chest x-ray and the last documented position
- Reposition the endotracheal tube if required and reassess the cuff pressure

b) Size of the artificial airway:

- An artificial airway that is too small in relation to the patient's trachea may require higher cuff pressure to maintain a seal

- This type of elevated pressure is likely not transmitted to the trachea

c) Ventilating pressures:

- High ventilating pressure may dilate the trachea on inspiration

d) Integrity of the cuff:

- If the cuff is suspected to have ruptured, inform the physician immediately and prepare for replacement of the airway

e) Integrity of the pilot line:

- If the pilot line of the cuff appears to be leaking, the placement of a 1-way stopcock on the pilot line may help to maintain a seal

If the pilot line has been cut or damaged, it may **temporarily** be repaired using a Pilot Tube Repair Kit Assembly as per [B-00-12-12024](#).

NOTE: In all above circumstances, inform the physician of the problem and ensure proper documentation.

SPECIAL CONSIDERATIONS – ENDOBRONCHIAL TUBES:

An endobronchial tube is a dual-lumen tube extending into a bronchus. A bronchial cuff (**BLUE**) isolates the lung allowing for independent lung ventilation. A secondary lumen opens into the trachea, and when the tracheal cuff (**CLEAR/WHITE**) is inflated allows for independent ventilation of the second lung. Endobronchial tubes are available in either a Left or Right configuration.

Both the tracheal and bronchial cuff pressures should remain below 25 cmH₂O (18 mmHg). The bronchial cuff should be inflated via syringe with 3 mL of air.

It is very important to regularly check cuff pressures for endobronchial tubes. A significant change in pressure may indicate the tube is no longer in proper position. Refer to [CAUTIONS](#) for more information on troubleshooting abnormal cuff pressure.

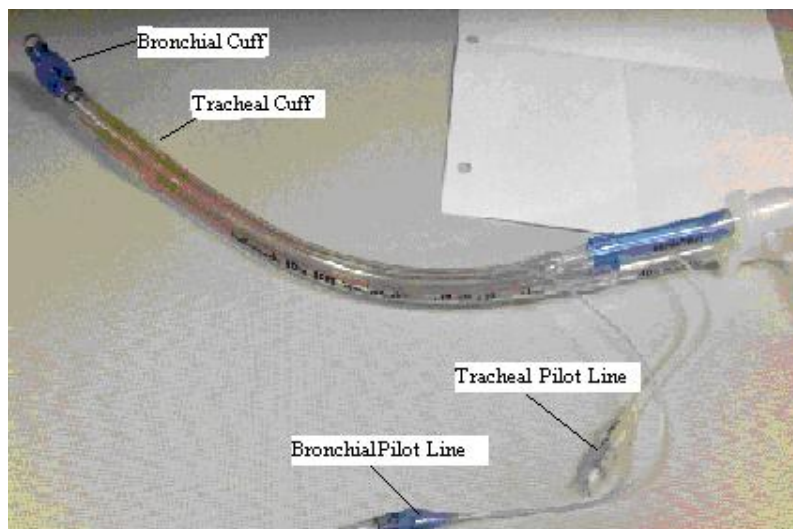


FIGURE A.

REQUIRED SUPPLIES & EQUIPMENT:

CUFFLATOR METHOD:

- Cufflator
- Oral and tracheal suction set-up
- Stethoscope

PYLANT MONITOR METHOD:

- Plyant monitor
- 10 mL syringe
- Oral and tracheal suction set-up

3-WAY STOPCOCK METHOD:

- 3-way stopcock with extension
- 10 mL syringe
- Manual blood pressure manometer
- Oral and tracheal suction set-up
- Stethoscope

PROCEDURE USING CUFFLATOR:

1. Gather equipment and supplies. Wash hands and don personal protective equipment. Explain the procedure to the patient.
2. Suction the patient's oropharynx. Perform tracheal suctioning if required.
3. Attach the Cufflator to the pilot line of the artificial airway and note the pressure.
4. Using the stethoscope, auscultate over the trachea and adjust the cuff pressure so that it is between 20 – 30 cmH₂O with NO leak being heard.
 - a) To **increase** the pressure, gently squeeze the bulb of the Cufflator
 - b) To **decrease** the pressure, slowly depress the red lever at the side of the Cufflator

NOTE: Refer to [CAUTIONS](#) for information on troubleshooting abnormal cuff pressure.

5. Remove personal protective equipment and surface-clean the Cufflator with anti-bacterial wipes. Wash hands. Document as appropriate.

PROCEDURE USING PYLANT MONITOR:

1. Gather equipment and supplies. Wash hands and don personal protective equipment. Explain the procedure to the patient.
2. Suction the patient's oropharynx. Perform tracheal suctioning if required.
3. Inspect the unit and check for leaks prior to use.
4. Using a finger, occlude and seal the narrow end of PYLANT monitor. This is the end that connects to the pilot balloon of the cuff.
5. Attach syringe to the one-way valve end of PYLANT monitor and add air until pressure gauge reads 20 – 30 cmH₂O. The measured pressure should remain constant for 3-5 seconds - if pressure drops replace with new monitor.
6. To assess and measure cuff pressure, remove syringe from PYLANT monitor. Connect narrow end of PYLANT monitor to pilot balloon and observe and record the cuff pressure measurement.
7. To adjust ETT cuff pressure to desired level, place syringe on the one-way valve end of PYLANT monitor and add or remove volume until the desired pressure is achieved.
8. Once desired ETT cuff pressure is achieved, remove monitor and place with the patient's emergency airway equipment.

NOTE: DO NOT DISCARD - the monitor is **REUSABLE**.

NOTE: Replace PYLANT monitor if the indicator needle does not move when inflating or deflating the cuff or if becomes unattached from the membrane. Never open PYLANT monitor body.

PROCEDURE USING 3-WAY STOPCOCK, SYRINGE AND MANUAL BLOOD PRESSURE MANOMETER:

1. Gather equipment and supplies. Wash hands and don personal protective equipment. Explain the procedure to the patient.
2. Suction the patient's oropharynx. Perform tracheal suctioning if required.
3. Close one port of the 3-way stopcock.
4. Attach the balloon of the artificial airway pilot line to the closed port of the 3-way stopcock.
5. Attach the syringe to the second port of the 3-way stopcock.
6. Attach the pressure line of the manual blood pressure manometer to the third port of the 3-way stopcock.
7. Using air in the syringe, pressurize the manometer to 15 – 22 mmHg to prevent loss of volume and pressure to the cuff once the stopcock is opened to the pilot line.
8. Open the stopcock to the pilot line and blood pressure manometer. If the cuff pressure drops slightly, close the stopcock to the pressure manometer and slowly inject 0.5 – 1 mL of air. Reopen the stopcock to the pilot line and pressure manometer.
9. Using the stethoscope, auscultate over the patient's trachea. If required adjust the cuff pressure so that it is between 15 – 22 mmHg with NO leak being heard.
 - a. To **increase** the pressure, open the stopcock to the syringe and pilot line and slowly **inject** air 0.5 – 1 mL at a time; recheck the pressure by opening the stopcock to the pilot line and pressure manometer
 - b. To **decrease** the pressure, open the stopcock to the syringe and pilot line, and slowly **withdraw** air 0.5 – 1 mL at a time; recheck the pressure by opening the stopcock to the pilot line and pressure manometer

NOTE: Refer to [CAUTIONS](#) for information on troubleshooting abnormal cuff pressure.

10. Remove personal protective equipment and wash hands. Document as appropriate.

DOCUMENTATION, COMMUNICATION, EDUCATION:

Document the cuff pressure on the Respiratory Critical Care Flowsheet under the initial shift assessment.

NOTE: Cuff inflation pressure must be measured and recorded a minimum of once per shift and whenever air is added or removed from the cuff.

REFERENCES:

1. Bahk, J. (2002). *Guidelines for determining the appropriateness of double-lumen endobronchial tube size*. *Anesthesia and Analgesia*, 95(2), 501.
2. Kim, H., Jun, J., Lee, H., Choi, Y., & Chung, M. (2010). *Left mainstem bronchial rupture during one-lung ventilation with Robert Shaw double lumen endobronchial tube - A case report -*. *Korean Journal of Anesthesiology*, 59 Suppl S21-S25. doi:10.4097/kjae.2010.59.S.S21
3. Rodsky, J., Adkins, M., & Gaba, D. (1989). *Bronchial cuff pressures of double-lumen tubes*. *Anesthesia and Analgesia*, 69(5), 608-610.
4. Roscoe, A., Kanellakos, G., McRae, K., & Slinger, P. (2007). *Pressures exerted by endobronchial devices*. *Anesthesia and Analgesia*, 104(3), 655-658.

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