ENDOTRACHEAL TUBE SUCTIONING

THEORY
Endotracheal tube (ETT) suctioning is a component of bronchial hygiene during mechanical ventilation. Mechanical ventilation and its associated sedation often impairs the normal cough and pulmonary hygiene mechanisms, therefore an alternate means to aspirate secretions is necessary. ETT suctioning involves the mechanical aspiration of pulmonary secretions from an artificial airway via a suction catheter.

PATIENT SELECTION

Indications:
- Secretions present in endotracheal tube or lungs
- Secretions suspected because of increased work of breathing or decline in gas exchange
- Routine suctioning should be performed at least every 12 hours unless contraindicated to ensure tube patency, especially for patients with an endotracheal tube with a diameter less than 4.0 mm

Contraindications:
- Patients with severe lung disease may experience clinical decline when suctioning
- Multidisciplinary team decides when and how often to suction patients with pulmonary hypertension or severe lung disease

EQUIPMENT
- Suction catheter
- Monitoring equipment
- Manual ventilation bag and mask
- Oxygen source
- Clean gloves
- Personal protective equipment
- Mask with a shield

PROCEDURE
1. Perform hand hygiene.
2. Choose an adequately sized catheter. Use one that can comfortably fit down the endotracheal tube.
3. Determine the appropriate depth to insert suction catheter. To avoid causing injury to the tracheal or bronchial mucosa, you want to ensure that your suction catheter is not inserted too deep. Line up the markings on the ETT with the markings on the suction catheter (e.g. line up the 18 cm mark on the ETT with the 18 cm mark on the catheter). Then, advance the suction catheter 0.5 - 1 cm beyond the depth and note or mark the catheter where it reaches the end of the ETT (Figures 1 & 2). If you do not have markings on your suction catheter, you can line up your suction catheter next to an ETT that is the same size as the one in your patient and mark the catheter where it reaches the end of the ETT.
4. Consider sedation or analgesia. Patients will often require sedation or the administration of analgesia prior to suctioning to maintain intubation.
5. Explain what you will be doing. For older children, explain what you will be doing and, if possible, how they can cooperate. You will also need to explain the procedure to caregivers if present.
6. Monitor the patient’s baseline vital signs. Note the patient’s oxygen saturation and vital signs prior to starting the procedure.
7. Hyperoxygenate the patient. Have a colleague assist you by disconnecting the patient from the ventilator, cover or cap the ventilation system, and then provide 100% oxygen by giving breaths through the bag mask system for several minutes, to give patient a reserve of oxygen for the procedure.
8. **Maintain sterility.** Use one sterile hand to hold the suction catheter and insert it into the ETT, while the other hand is free to touch non-sterile items such as the suction source. Ideally, use a new sterile suction catheter each time. Do not use the same catheter on multiple patients.

9. **Insert the suction catheter to the appropriate depth.** Pass the suction catheter into the ETT, making careful note of the markings on the catheter as you do so, to ensure that your catheter advances to the proper depth.

*IMPORTANT: Do not apply any suction as you pass the catheter into the ETT!*

10. **Apply suction as you remove the catheter from the ETT.** Start to apply suction and, using a pill-rolling technique, remove the catheter from the ETT. Do not apply suction for more than 10 seconds at a time. The amount of suction to be used will vary by age of the patient. Infant: <80 mm Hg. Older patients: <120 mm Hg.

11. **Repeat the procedure if needed.** You may need to make more than one pass to clear the ETT from secretions.

12. **Hyperoxygenate the patient between passes.** Provide 100% oxygen to patient between suction passes.

13. **Monitor vital signs.** Ensure that the patient’s oxygen saturation reaches at least baseline between passes.

**Troubleshooting**

- If secretions are quite thick, consider the instillation saline down the tube to loosen secretions. Please note that this practice has not been supported by research findings, but is occasionally performed in some PICUs.

**COMPLICATIONS**

- Unplanned extubation
- De-recruitment of lung tissue
- Decreased oxygen saturation
- Infection
- Bradycardia
- Tissue trauma to bronchial/tracheal mucosa
- Acute pulmonary hypertensive crisis
- Increase in intracranial pressure
- Patient pain or discomfort

**ASSESSMENT AND MONITORING**

- Monitor vital signs (oxygen saturation, heart rate, and blood pressure)
- Assess lungs sounds and patient comfort

*Note: It is advised that you assess and monitor these clinical features before, during and after the procedure*

**DOCUMENTATION**

- Indication for procedure
- Date and time of procedure
- Characteristics of secretions (amount, color, consistency, odor)
- Vital signs before, during and after procedure
- Resolution or persistence of the indication for procedure
- Patient’s comfort during procedure
- Adverse outcomes

**REFERENCES**


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