

Humidifier Circuit Tubing

D/4 Change the circuit when it is visibly soiled.

D. TRACHEOSTOMY TUBE CARE

Cuff Tubes

Cuff Pressure

D/4 Check the cuff pressure using a hand pressure gauge every shift or a minimum of eight-hourly. Maintain the cuff pressure between 15-25 cm H₂O, unless medically indicated.

Cuff Inflation

D/4 Inflate cuff of tracheostomy tube only if medically indicated (e.g. on positive ventilation or high risk for aspiration).

Inner Cannula Care

D/4 Inspect the inner cannula at least six-hourly to ensure patency.

D/4 Clean the inner cannula using sterile water or as according to manufacturer's instruction prior to reinsertion.

E. STOMA CARE

Frequency of Dressing Change

D/4 Keep the dressing dry, change stoma dressing and tapes daily and/or whenever soiled.

Stoma Infection

D/4 Observe for the following signs and symptoms of stoma infection:

- excessive leakage of secretion
- foul smell
- erythema around the stoma site
- erosion of stoma site

F. WEANING

D/4 Weaning must be planned, clearly documented and regularly evaluated by the members of the multi-disciplinary team.

Wean the patient under the following criteria:

- Reversal of the medical condition that originally necessitate intubations
- Adequate ventilatory reserve
- Patent upper airway
- Adequate nutritional state
- Ability to cough and clear airway secretions
- Absence of respiratory infection
- Presence of psychosocial support

D/4 Carry out weaning gradually according to manufacturers' instruction and institutions' protocol.

D/4 Observe for any signs of increased respiratory distress such as noisy breathing, excessive gurgling sounds and hypoxia during the weaning procedure.

G. SWALLOWING / FEEDING

Swallowing Assessment

D/4 Refer tracheostomised patient with swallowing difficulty to speech therapist for assessment before commencing oral feeding.

H. TRACHEOSTOMY EMERGENCY

Tube Dislodgement

D/4 Tube dislodgement is displacement of tracheostomy tube by unintentional and unplanned tube removal. The displacement or dislodgement can be a partial or complete tube come out of the stoma or out of the trachea into the soft tissue of the neck.

- Establish presence of spontaneous breathing when tube dislodgement is confirmed.
- If breathing is present, ensure cuffed tube is deflated and provide patent with supplement oxygen via facemask.
- Emergency oral intubation may be indicated if reinsertion of a new tracheostomy tube fails.

Tube Obstruction

D/4 Acute dyspnoea is commonly caused by partial blockage or complete blockage of the tracheostomy tube by a mucous plug.

D/4 Ask the patient to cough.

D/4 Remove inner cannula.

D/4 Apply suctioning to remove the secretions.

D/4 Ventilate the patient (and secure airway patency).

- Deflate the cuff tube (if this is in-situ), bag and mask patient.
- Call for medical help.
- Prepare for change of tracheostomy tube or oral intubation.

Levels of Evidence and Grades of Recommendation

Level	Type of Evidence
1 ⁺⁺	High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias.
1 ⁺	Well conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias.
1 ⁻	Meta analyses, systematic reviews, or RCTs with a high risk of bias.
2 ⁺⁺	High quality systematic reviews of case-control or cohort or studies; High quality case-control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal.
2 ⁺	Well conducted case-control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal.
2 ⁻	Case-control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal.
2-	Case-control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal.
3	Non-analytic studies e.g. case reports, case series.
4	Expert opinion.

Grade	Recommendation
A	At least one meta-analysis, systematic review, or RCT rated as 1 ⁺⁺ , and directly applicable to the target population; or A body of evidence, consisting principally of studies rated as 1 ⁺ , directly applicable to the target population, and demonstrating overall consistency of results.
B	A body of evidence, including studies rated as 2 ⁺⁺ , directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1 ⁺⁺ or 1 ⁺ .
C	A body of evidence including studies rated as 2 ⁺ , directly applicable to the target population and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 2 ⁺⁺ .
D	Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2 ⁺ .

Key References

American Association for Respiratory Care. (1992). AARC clinical practice guideline. Humidification during mechanical ventilation. *Respiratory Care*, 37(8), 887-890. [AARC, 1992]

Centers for Disease Control and Prevention (CDC). (2004). Guidelines for preventing health-care associated pneumonia 2003: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. *MMWR* 2004, 53(RR03), 1-36. [CDC, 2004]

Thompson, L. (2000). Suctioning adults with an artificial airway: A systematic review. *The Joanna Briggs for Evidence Based Nursing and Midwifery*, Number 9. [JBI, 2000]

Acknowledgments

Singapore Ministry of Health Nursing Clinical Practice Guidelines Workgroup on Nursing Management of Adult Patients with Tracheostomy.



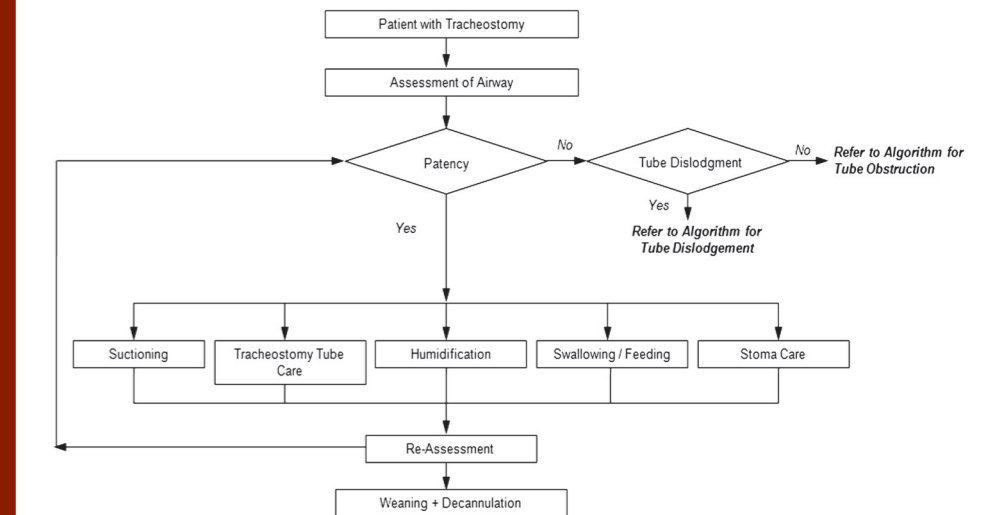
MINISTRY OF HEALTH
SINGAPORE

MOH Nursing Clinical Practice Guidelines 2/2010 NURSING MANAGEMENT OF ADULT PATIENTS WITH TRACHEOSTOMY

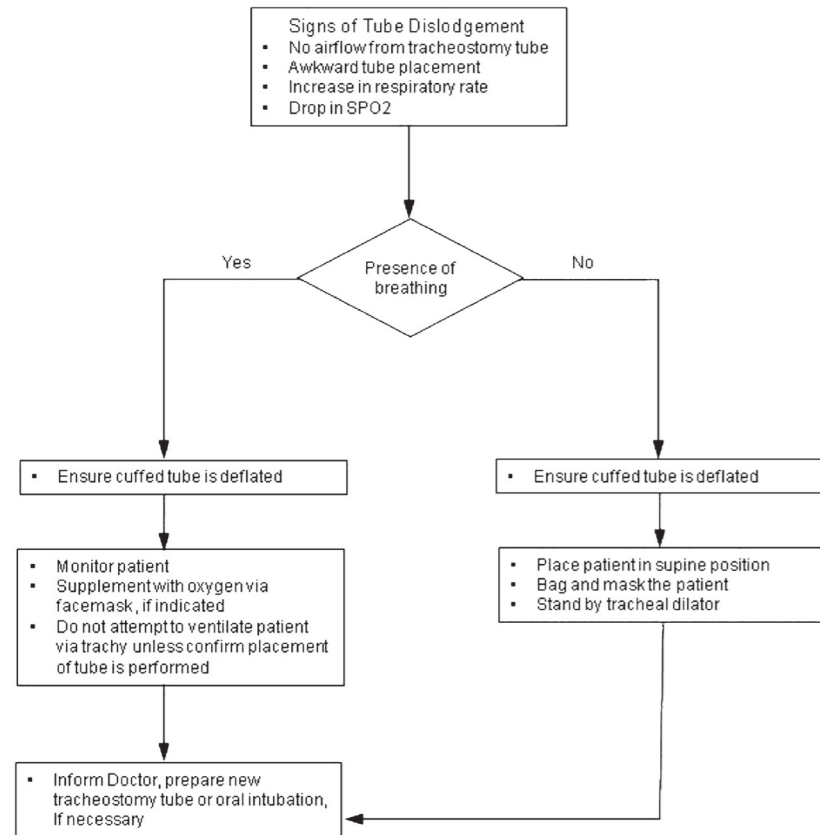
Scope of the Guidelines

This set of guidelines aims to guide healthcare workers who are involved in caring for adult patients with tracheostomy. The recommendations are based on best available evidence and existing evidence-based guidelines. There are, however, many aspects of tracheostomy care in which evidence-based research is lacking. In such circumstances, we rely on a consensus of expert opinions in this field. Every healthcare worker must exercise clinical judgement in the care of adult patients with tracheostomy. Whilst these guidelines allude to best practices, due consideration must be given to individual patient circumstances, overall treatment goals, resource availability, institutional policies and other care options available.

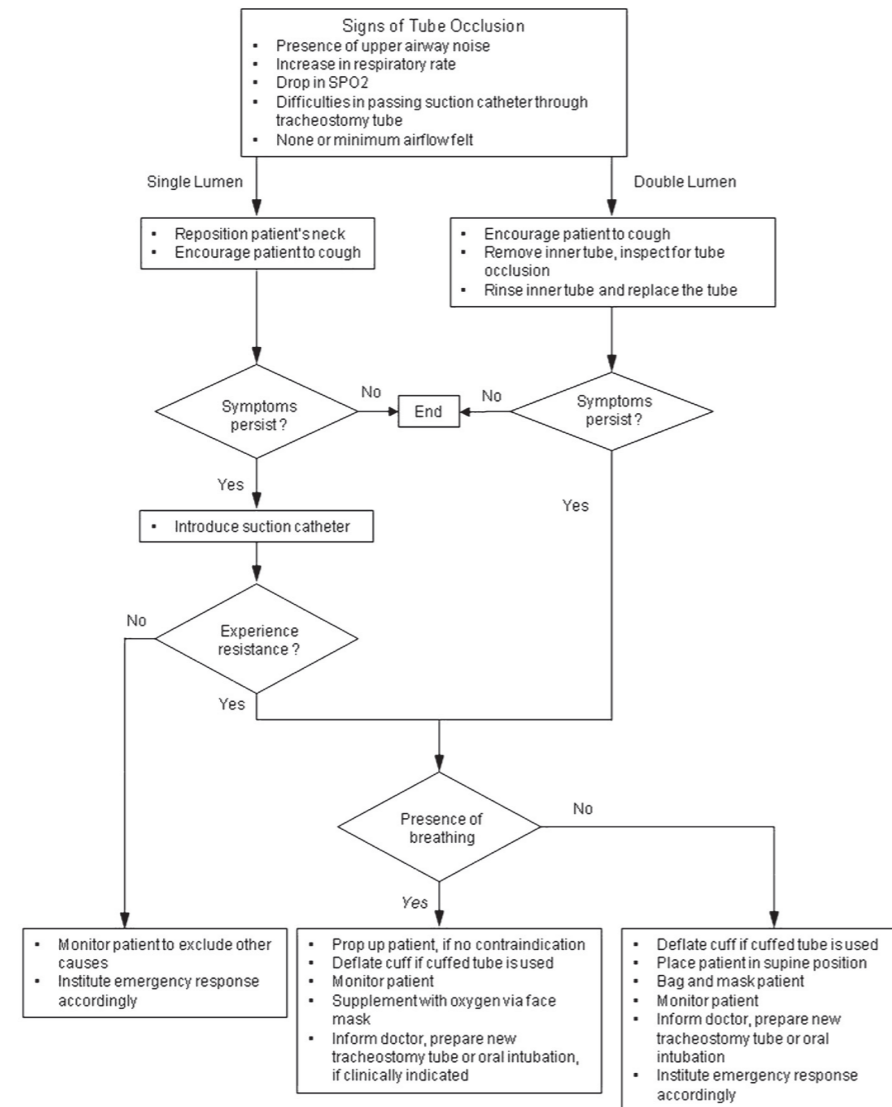
Algorithm for Nursing Management of Adult Patient with Tracheostomy



Algorithm for Management of Emergency – Tube Dislodgment



Algorithm for Management of Emergency – Tube Obstruction



Summary of Recommendations

A. ASSESSMENT

Clinical Assessment of Airway

D/4 Assess all patients with tracheostomy for airway patency which include the absence of the following:

- abnormal breath sounds such as 'whistling', crepitus or diminished sounds
- irregular breathing patterns
- increase in coughing / inability to cough
- cyanosis / deterioration in oxygen saturation

B. SUCTIONING

Frequency of Suctioning

D/4 Perform tracheostomy suctioning at predetermined time points is to be avoided.

Asepsis

D/4 Apply aseptic technique when performing tracheostomy suctioning.

Suction Catheters

Choice of Catheter

D/4 Use multiple-eyed catheters.

D/4 Use closed system suction catheter for patients on ventilators.

Size of Catheters

D/4 Determine catheter size using the following formula:

- Divide the tracheostomy tube inner diameter by two (2) which gives the external diameter of the suction catheter. Multiply this result by three (3) to obtain the French gauge (FG).

$$\frac{\text{Tracheostomy size (inner diameter)}}{2} \times 3 = \text{FG of suction catheter}$$

Suctioning Pressure

D/4 Regulate the suction pressure for adults between 100 mmHg and 120 mmHg.

Suctioning Duration

D/4 Perform suctioning for not more than 15 seconds.

Preoxygenation

D/4 Preoxygenate patient prior to performing suctioning if necessary.

Normal Saline Installation

D/4 Do not instill Normal Saline routinely to liquefy secretion.

C. HUMIDIFICATION

Devices

D/4 Humidify the inspired gas using one of the following devices:

- Humidifier system – heated or non-heated
- Heat Moisture Exchanger (HME) Filter

Methods of Humidification

D/4 Use the following criteria to determine the methods of humidification:

- Heated Humidifiers – recommended for patients with:
 - New tracheostomy tubes
 - Dehydration
 - Immobility
 - Tenacious secretions
 - Prolonged mechanical ventilation (>7 days)
 - Hypothermia
- Heat Moisture Exchanger (HME) – recommended for patients with:
 - Adequate hydration
 - Mobility
 - Less copious secretions
 - Anticipation for discharge
- Contraindications for HME – Not suitable for patients with:
 - Thick, copious or bloody secretions.
 - An expired tidal volume less than 70% of delivered tidal volume and patients with COPD condition.
 - Weak respiratory muscles, who will be difficult to wean off the ventilator.

Heat Moisture Exchanger

D/4 Change HME daily, and whenever visibly soiled or according to manufacturer's recommendation.

Heated Humidification

D/4 Check, empty and discard condensate along the tubing of the heated humidification system. Do not drain condensate into the humidifier reservoir.

Humidifier Water

D/4 Use only sterile water to fill reservoir of humidifier or use single reservoir unit with closed water feed system.