



Tracheostomy Care in the ICU

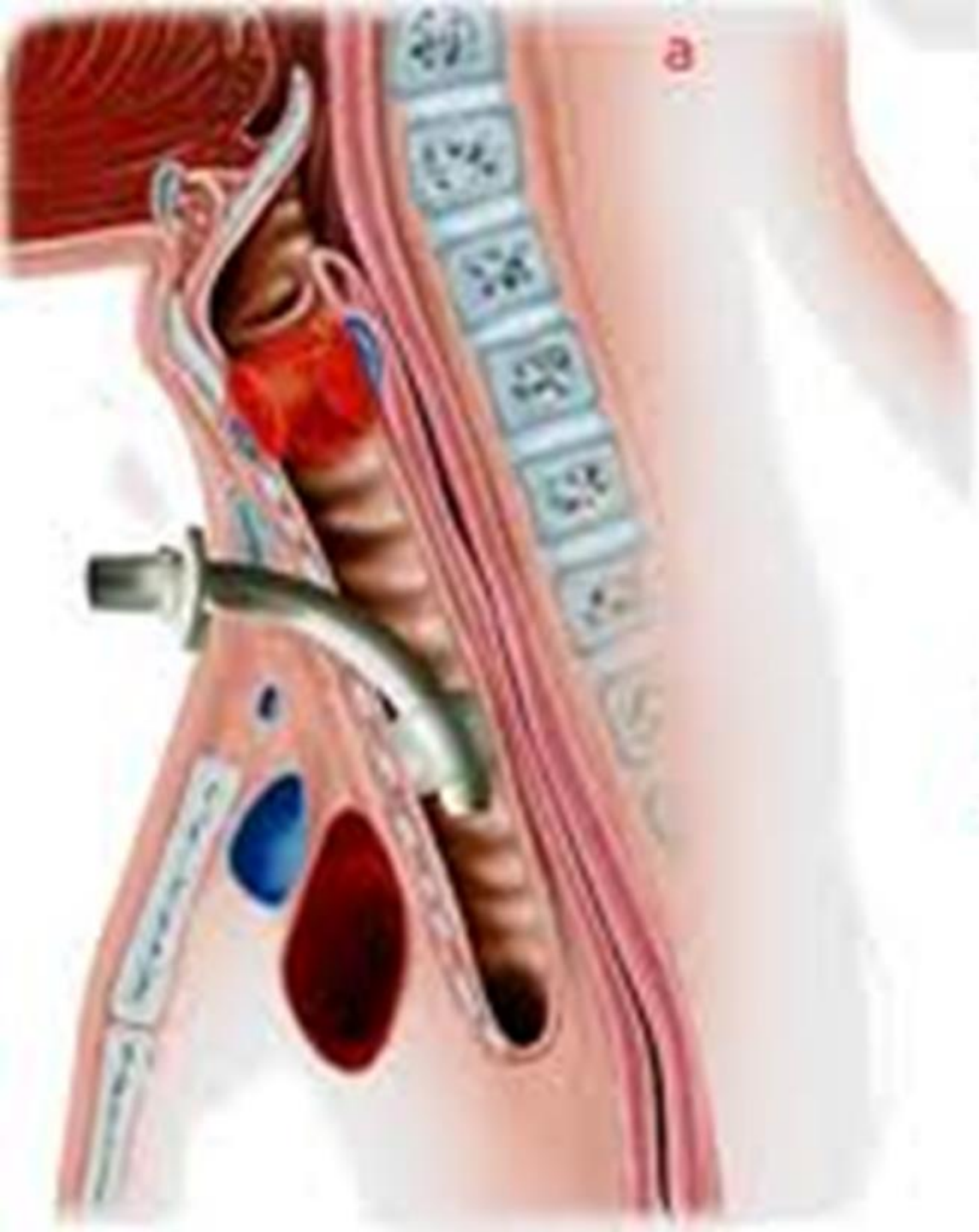
Kathryn Schie

February 2019

VTA Symposium

Trache Fast Facts

- Tracheostomy is one of the oldest recorded surgical procedures, depicted on Egyptian tablets dated from around 3 600 BC.
- The 1952 polio epidemic saw tracheostomies used in the first ICU in Copenhagen, Denmark. It allowed positive pressure ventilation to be delivered to patients and reduced mortality from bulbar polio from $\pm 85\%$ to $<15\%$.
- One of the most frequently done procedures on critically ill patients requiring prolonged mechanical ventilation in the ICU
 - 24% of all ICU patients



Reasons for Tracheostomy

- **Performed:**
 - **Airway obstruction** - Bypass airway obstruction at or above the trachea
 - **Secretions** - To clean & remove secretions from the airway (bronchopulmonary toileting)
 - **Ventilation** - To manage the airway for long-term ventilatory support
 - **Airway protection** – those patients who can't protect their airway or those with an inefficient swallow &/or cough mechanism
- **Temporary vs. long-term**
 - Temporary <6/12
 - Permanent >6/12

Indications for tracheostomy in the ICU

- **Usually performed in critically ill patients:**
 - Prolonged weaning from assisted ventilation
 - Acute or chronic neuromuscular conditions
 - Poor cardiorespiratory reserve
 - Bulbar dysfunction
 - Brain injury
 - Upper airway obstruction

Role of tracheostomy in the ICU

- Better tolerated by patients as compared to oral or nasal intubation
- **Less discomfort** = reduction in analgesic, sedative & muscle relaxant drugs
- Clearance of airway secretions; more effective suctioning of the secretions
- Mouth care; improved oral hygiene
- Airway resistance & anatomical dead space are reduced
- Allows a seamless transition between different modes of assisted ventilation and weaning modes without trials of extubation and reintubation
- Earlier d/c from the ICU
- Allows for mobilisation and rehabilitation

Timing of tracheostomy

- Controversial
- Tracheostomy vs translaryngeal intubation
- Commonly done 7 – 14 days
 - Unless rapid improvement is likely to make trache unnecessary
- **Evidence of better outcomes if trache done in first few days in ICU patients with:**
 - Severe respiratory failure
 - Severe traumatic brain injury
 - Older patients with chronic chest disease or neurological disease (e.g. GBS)

Tracheostomy procedure

- Open tracheostomy
- Percutaneous tracheostomy techniques (percutaneous dilatational tracheostomy (PDT))
 - Procedure is usually performed at the bedside in ICU

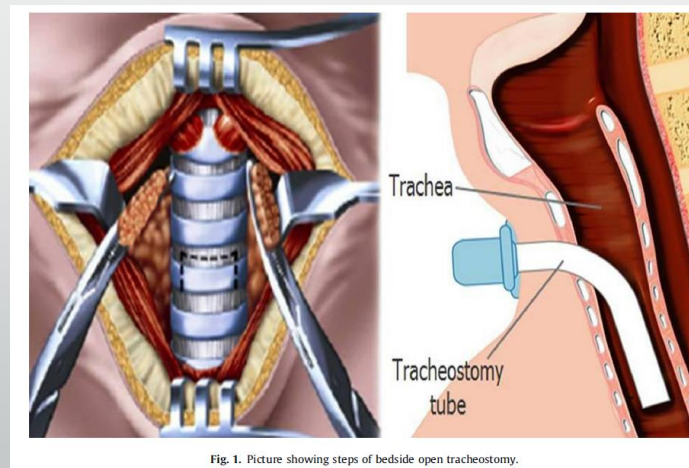


Fig. 1. Picture showing steps of bedside open tracheostomy.

Risk/ Complications of a tracheostomy

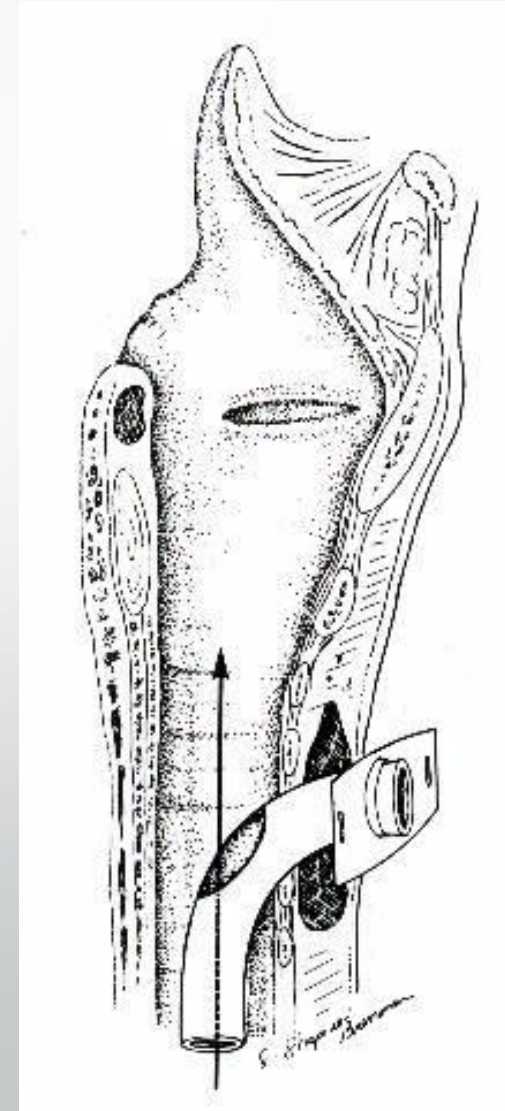
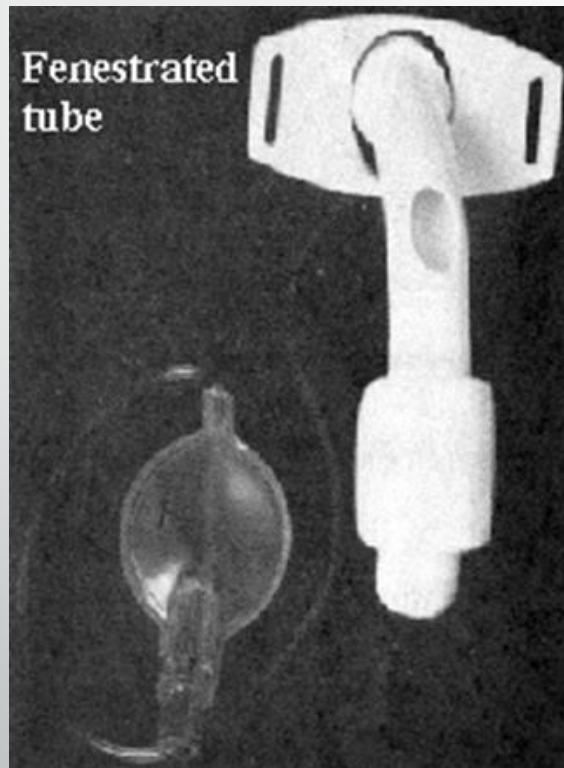
Early	Late
Haemorrhage	Stomal infection
Obstruction due to blood clot or mucus	Tracheal stenosis
Misplacement of the tube	Tracheo-oesophageal fistula
Dislodgement of the tube	Tracheo-innominate artery fistula
Subcutaneous emphysema	Tracheomalacia
Pneumothorax	Tube occlusion
Injury to adjacent structures	

Different Types of Trache Tubes



Different Types of Trache Tubes

- Cuffed vs. Uncuffed
- Fenestrated vs. Unfenestrated



Different Types of Trache Tubes

- Cuffed vs. Uncuffed
- Fenestrated vs. Unfenestrated
- Parts
 - Outer cannula
 - Inner cannula
 - Obturator



Aftercare of the tracheostomy

When a clinical incident occurs relating to a tracheostomy, the chance of some harm occurring is between 60 – 90% (Thomas, 2009; McGrath, 2010)

- Obstruction is a recurrent problem with all types of tracheostomy tube
- Appropriate equipment at the patient's bedside
- Appropriate care plans (humidification, suctioning etc.)
- In emergency replace trache

Changing & Cleaning

- **Cleaning around the stoma**
 - Potential for stoma problems
 - Considered as a full thickness, open wound
 - Complicated by the moisture & mucus associated with respiratory.
 - Added is a large foreign body which slides about every time the patient moves
- **Trache change (single lumen – paed)**
 - First change ± 9 days by the ENT
 - it is necessary to wait for this period of time in order for a mature tract to be established (Mitchell et al., 2012).
 - Advocate for daily changes

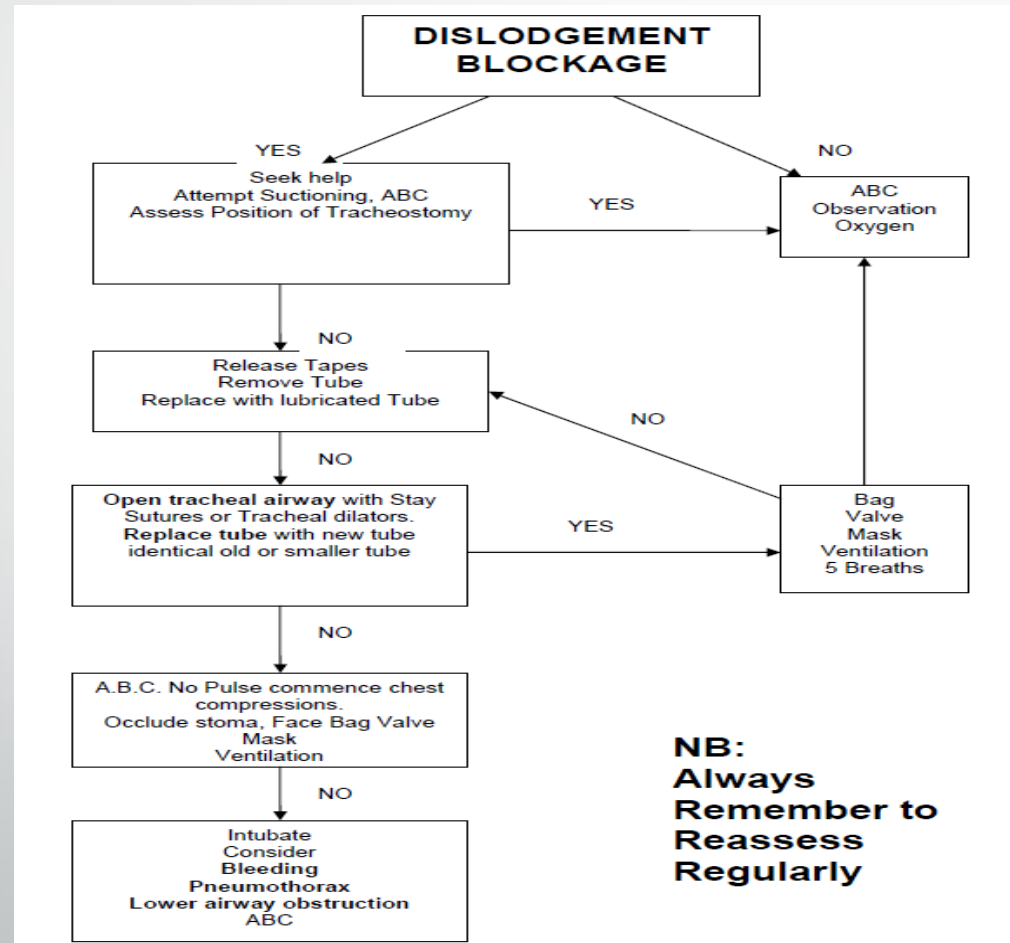
Suctioning

- Essential part of routine care of the tracheostomy patient
- Should not occur distal to the tube tip. Catheters should only be inserted so that the distal hole sits at the end of the tube
 - This allows collection of the secretions but not trauma to the distal tracheal mucosa

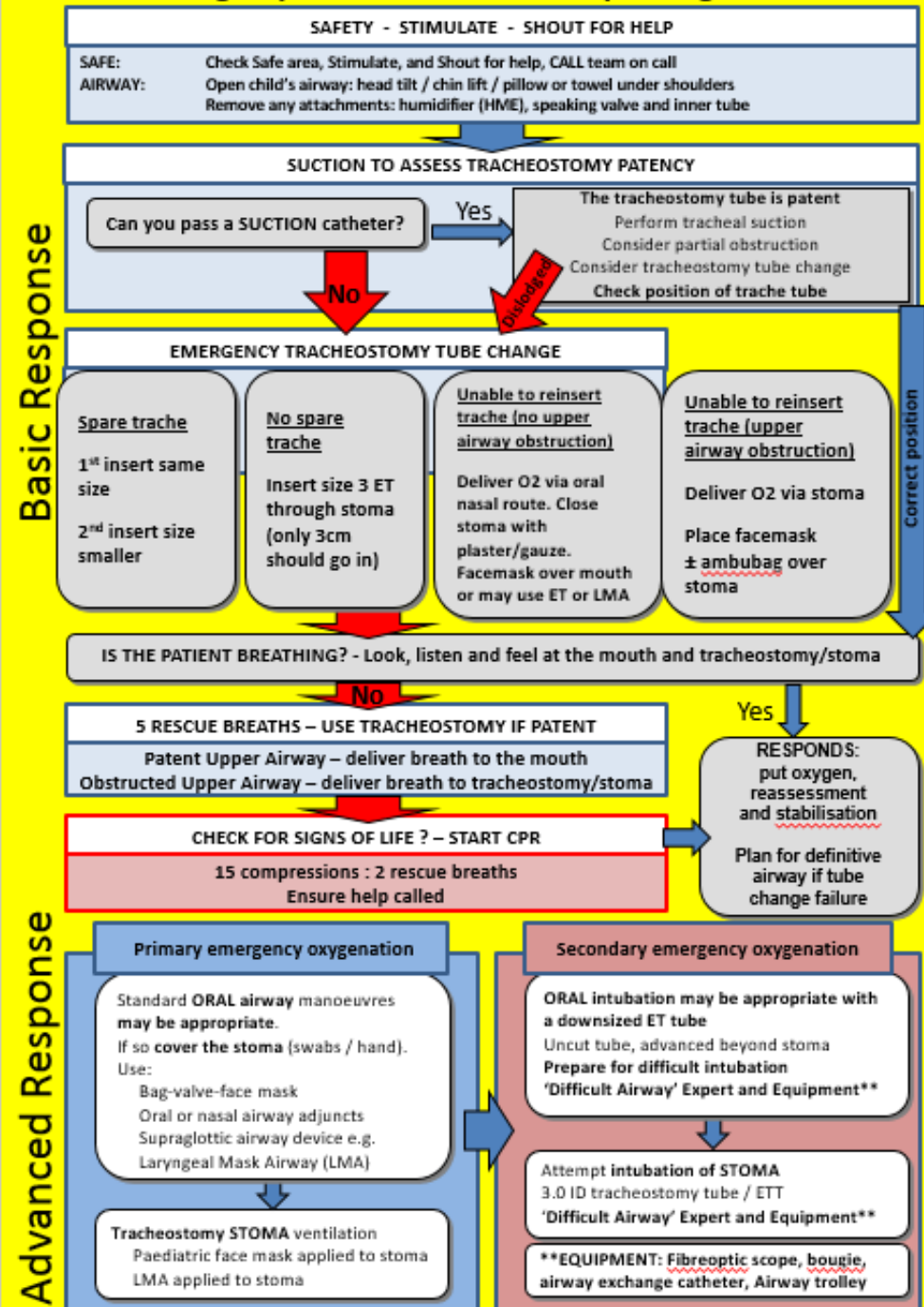
Humidification

- During normal breathing, inspired air is warmed, filtered and moistened by ciliated epithelial cells in the nose and upper airways
- Failure to adequately humidify could result in tube or stoma blockage as secretions become dry and viscous, forming a crust around the tracheostomy

Emergency management with a tracheostomy tube



Emergency Paediatric Tracheostomy Management



Emergency Paediatric Tracheostomy Management

SAFETY - STIMULATE - SHOUT FOR HELP

SAFE: Check Safe area, Stimulate, and Shout for help, CALL team on call
AIRWAY: Open child's airway: head tilt / chin lift / pillow or towel under shoulders
Remove any attachments: humidifier (HME), speaking valve and inner tube

SUCTION TO ASSESS TRACHEOSTOMY PATENCY

Can you pass a SUCTION catheter?

Yes

No

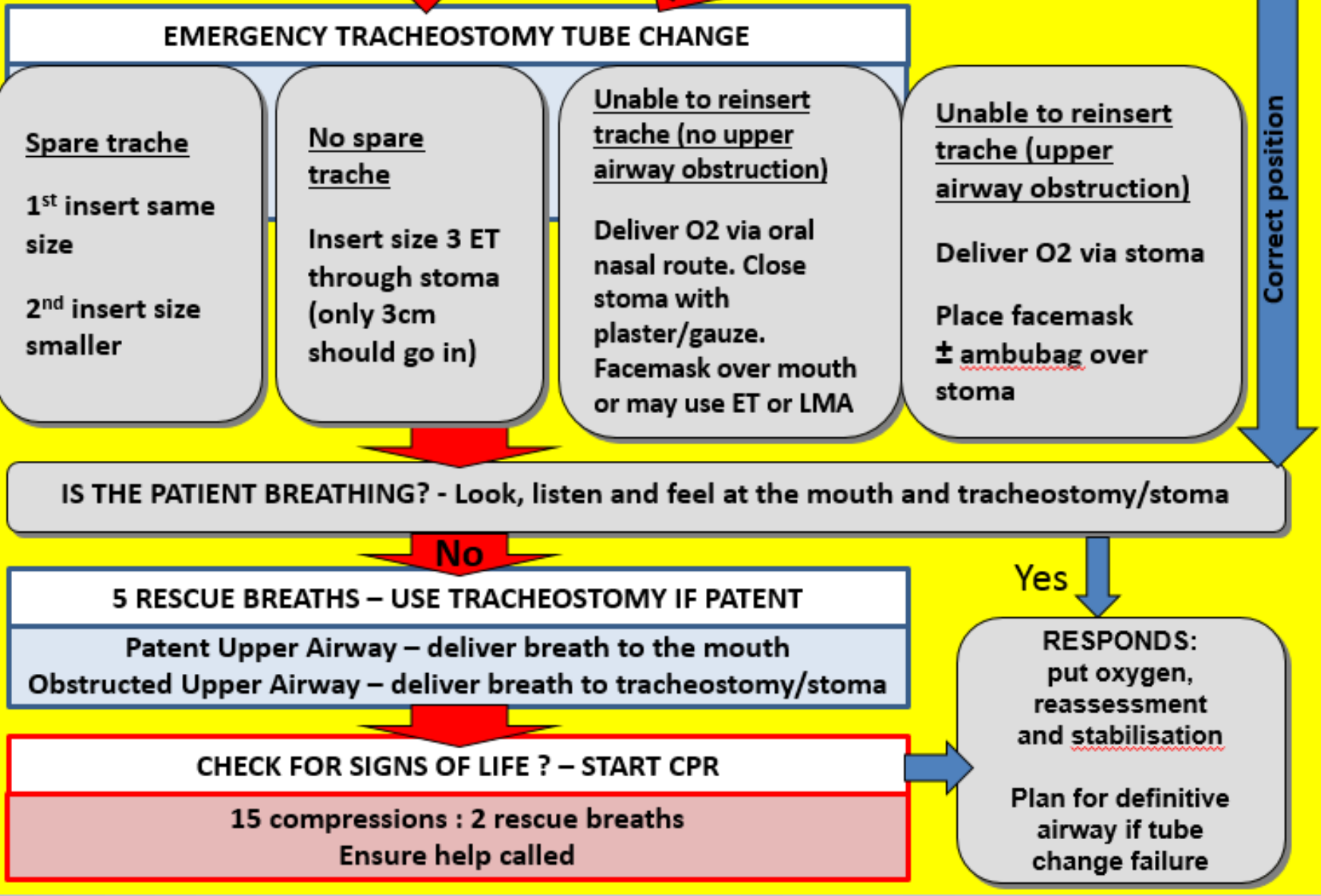
Dislodged

The tracheostomy tube is patent
Perform tracheal suction
Consider partial obstruction
Consider tracheostomy tube change
Check position of trache tube

EMERGENCY TRACHEOSTOMY TUBE CHANGE

response

Basic Resp



Advanced Response

Primary emergency oxygenation

Standard **ORAL** airway manoeuvres may be appropriate.
If so **cover the stoma** (swabs / hand).
Use:
Bag-valve-face mask
Oral or nasal airway adjuncts
Supraglottic airway device e.g. Laryngeal Mask Airway (LMA)

Tracheostomy STOMA ventilation
Paediatric face mask applied to stoma
LMA applied to stoma

Secondary emergency oxygenation

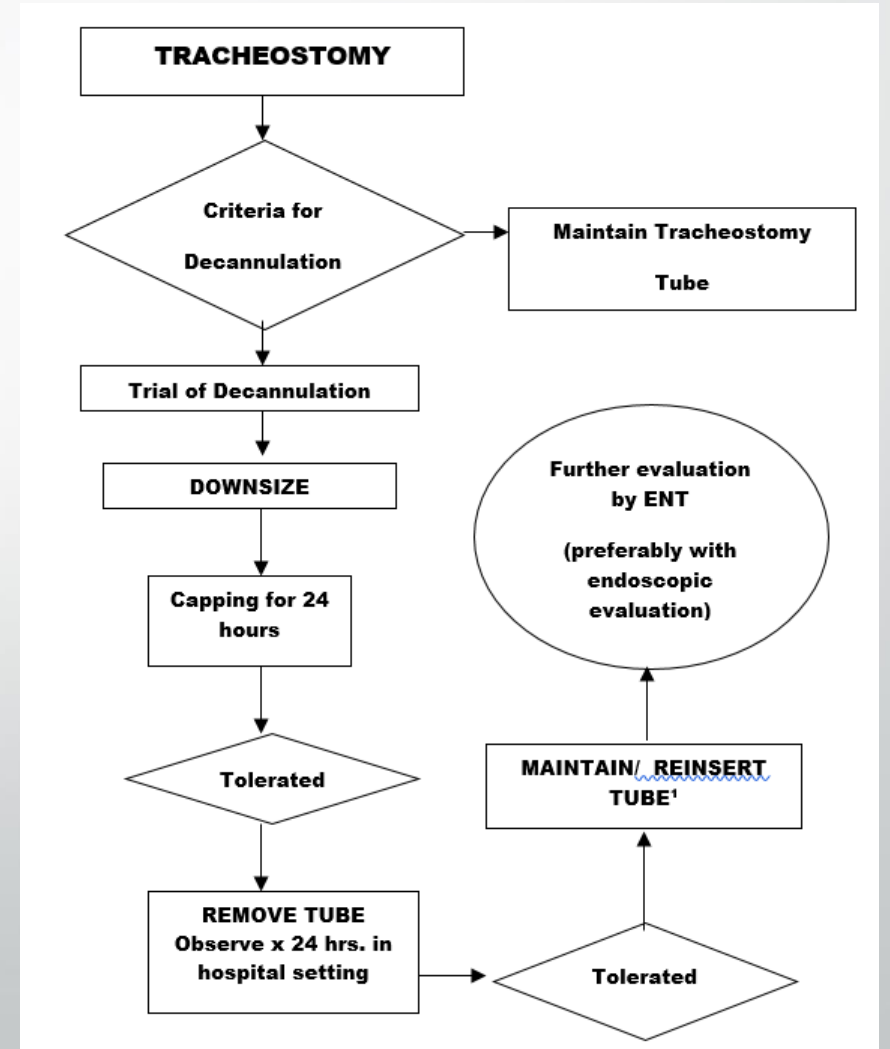
ORAL intubation may be appropriate with a downsized ET tube
Uncut tube, advanced beyond stoma
Prepare for difficult intubation
'Difficult Airway' Expert and Equipment**

Attempt **intubation of STOMA**
3.0 ID tracheostomy tube / ETT
'Difficult Airway' Expert and Equipment**

****EQUIPMENT:** Fibreoptic scope, bougie, airway exchange catheter, Airway trolley

Decannulation in the ICU

- Multidisciplinary approach to evaluation of readiness
- Monitor tolerance of trache & cuff deflation regime, capping regime & suitability for oral intake



Decannulation in the ICU

- Multidisciplinary approach to evaluation of readiness
- Monitor tolerance of trache & cuff deflation regime, capping regime & suitability for oral intake
- After successful decannulation, stomas are usually left to granulate and close spontaneously



Christopher Reeve (actor)



Luther Vandross (singer)



Elizabeth Taylor (actress)



Stephen Hawking (physicist) Amyotrophic Lateral Sclerosis (ALS)



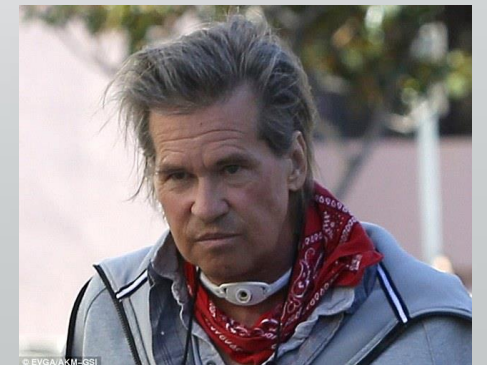
John Fitzgerald Kennedy (U.S. President)



John Paul II (Pope)



Catherine Zeta Jones (actress)



Val Kilmer (actor)



Questions?



References

- Barry, B.N. (2004). The role of tracheostomy in ICU. *Anaesthesia and Intensive Care Medicine*, 5(11), 375-378.
- Brighton and Sussex University Hospitals Tracheostomy Guidelines. 2010
- Chandrasheker, Y., Viswanatha, B., Srinivasan, S.B., Jayaram, R.T. & Vijayashree, M.S. (2016). Tracheostomy in Intensive Care Unit: Indications and outcomes at a teaching hospital. *Research in Otolaryngology*, 5(2), 28-31.
- El-Anwar, M.W., Nofal, A.A., El Shawadfy, M.A., Maaty, A. & Khazbak, A.O. (2017). Tracheostomy in the Intensive Care Unit: a University Hospital in a developing country study. *International Archives of Otorhinolaryngology*, 21, 33-37.
- Funamura, J.L., Durbin-Johnson, B., Tollefson, T.T., Harrison, J. & Senders, C.W. (2014). Pediatric Tracheotomy: Indications and Decannulation Outcomes. *Laryngoscope*, 124: 1952 – 1958.
- Global Tracheostomy Collaborative (2013). Bite size training.
- Hopkins, C., Whetstone, S., Foster, T., Blanet, S. & Morrison, G. (2009). The Impact of Paediatric Tracheostomy on both Patient and Parent. *International Journal of Pediatric Otorhinolaryngology*, 73: 15 – 20.
- Hosokawa, K., Nishimura, M., Egi, M. & Vincent, J. (2015). Timing of tracheostomy in ICU patients: a systematic review of randomized controlled trials. *Critical Care*, 19, 424.
- Mitchell, R.B., Hussey, H.M., Setzan, G., Jacobs, I.N., Nussenbaum, B., Dawson, C., Brown, C.A., Brandt, C., Deakins, K., Hartnick, C. & Merati, A. (2012). Clinical Consensus Statement: Tracheostomy Care. *Otolaryngology – Head and Neck Surgery*, 148 (1).
- Morris, L.L., Whitmer, A. & McIntosh, E. (2013). Tracheostomy care and complications in the intensive care unit. *Critical Care Nurse*, 33(5), 18 – 30.
- Muralidhar, K. (2008). Tracheostomy in ICU: An insight into the present concepts. *Indian Journal of Anaesthesia*, 52(1), 28-37.
- NHS Quality Improvement Scotland. Caring for the patient with a tracheostomy: best practice statement (2008).
- Prickett, K.K. & Sobol, S.E. (2015). Inpatient Observation for Elective Decannulation of Pediatric Patients with Tracheostomy. *JAMA Otolaryngology-Head & Neck Surgery*, 141 (2), 120 – 125.
- Swain, S.K., Behera, I.C., Sahu, M.C. (2017). Bedside open tracheostomy at intensive care unit – our experiences of 1000 cases at a tertiary care teaching hospital of eastern India. *Egyptian Journal of Ear, Nose, Throat and Allied Sciences*, 18, 49-53.
- Trouillet, J.L., Collange, O., Belafia, F., Blot, F., Capellier, G., Cesareo, E., et al. (2018). Tracheotomy in the intensive care unit: guidelines from a French expert panel. *Intensive Care*, 8 (37).
- Vargas, M., Sutherasan, Y., Antonelli, M., Brunetti, I., Corcione, A., Laffey, J.G. et al. (2015). Tracheostomy procedures in the intensive care unit: an international survey. *Critical Care*, 19, 291.
- Wirtz, N., Tibesar, R.J., Lander, T. & Sidman, J. (2016). A Pediatric Decannulation Protocol: Outcomes of a 10-Year Experience. *Otolaryngology – Head and Neck Surgery*, 154 (4).