SECTION 7: CARE OF THE CHILD WITH A RESPIRATORY CONDITION

7.4 Care of the Child with a Tracheostomy

7.4.10 Management of a Cuffed Tracheostomy Tube

Aims

1. To maintain a patent airway while caring for a child with a cuffed tracheostomy tube.
2. To minimise the risk of damage to the tracheal mucosa while caring for the child with a cuffed tracheostomy tube.

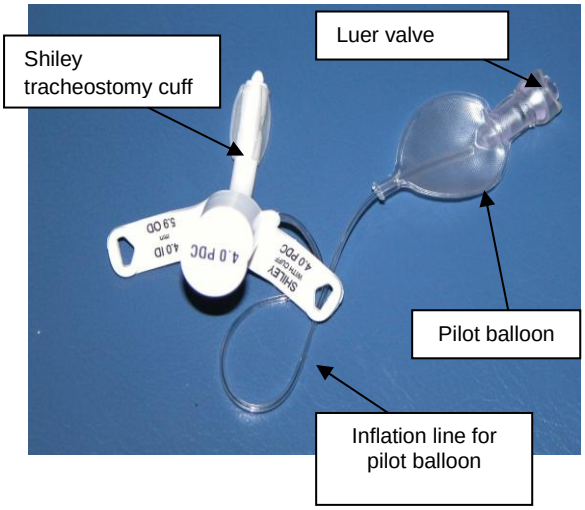
Key Points

- Cuffed tracheostomy tubes are used infrequently in younger children (<8yrs). A cuffed tracheostomy tube may be used in a child to prevent aspiration and/or improve mechanical ventilation by providing a seal within the trachea.[1]
- Cuffed tracheostomy tubes come in a variety of styles - air cuff, water cuff and foam cuff.[1] Each cuff requires a specific management method.
- Excessive pressure in a tracheostomy cuff can result in damage to the tracheal mucosa resulting in tracheal ischaemia and necrosis.[2-4] Appropriate management of a cuffed tube can prevent damage to the tracheal mucosa.[2]
- Tracheal capillary perfusion pressure is normally 27 to 47cmH_2O.[2-4] Recommended cuff pressure or volume should be sufficient to ONLY reduce leak to an adequate level - should always be less than **25cm H_2O**.[1, 5, 6]
- If the child no longer needs a cuffed tracheostomy tube, it should be replaced with an uncuffed tube as soon as possible.
- Routine cuff deflation is not required to protect the tracheal mucosa with the use of new low pressure tracheostomy cuffs.[1,3-5] Cuff deflation may be required to remove secretions from above the tracheostomy cuff and to assess the cuff pressure.[1, 2]
- **Speaking valves.** All patients with a tracheostomy tube require a leak around the tube or use a fenestrated tracheostomy tube to be able to talk. Use of a speaking valve with **the cuff completely deflated** may not be tolerated and require a reassessment of the leak.

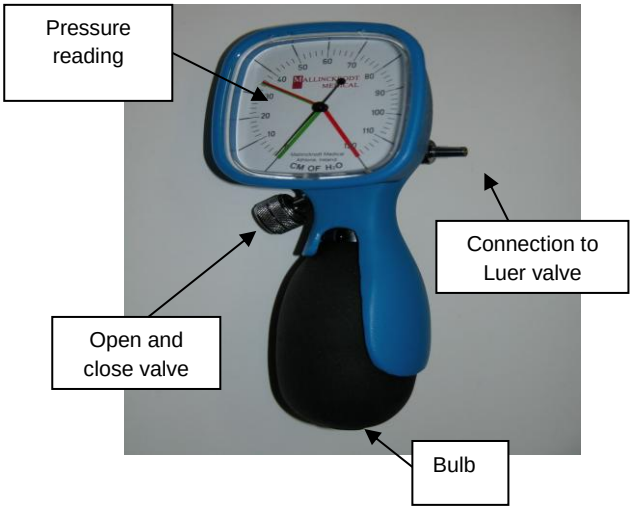
CHECKING CUFF PRESSURE USING A MANOMETER METHOD

- Unless indicated otherwise by medical staff, cuff pressure should be checked **once per shift**, when the tracheostomy tube is changed and if there is evidence of an increased air leak.
- Manometers to measure cuff pressure should be readily available for a patient with a cuffed tube and nursing staff need to be competent in their use.

Cuffed tracheostomy tube



Cuff Pressure Manometer



Equipment

Oxygen, self-inflating resuscitation bag, face mask and suction equipment

Cuff pressure manometer

5mL syringe

Additional equipment which may be required

Sterile water for injection

Procedure	Additional Information
Checking the Manometer:	
Close the open and close valve by turning clockwise.	To ensure manometer is functioning.
Check the pressure rises by occluding the valve that connects to the tracheostomy with your finger while pumping the bulb.[7]	If the valve is in the open position no reading will be obtained.

Procedure	Additional Information
Position the patient on their back, flat if possible.	The supine position may prevent some secretions draining into the patient's lungs.
Suction the patient's oropharyngeal/ nasopharyngeal area as tolerated. Suction the tracheostomy tube.	Oropharyngeal and tracheal secretions must be removed to reduce secretions that fall from above the cuff entering the lower airways. Oro/nasopharyngeal suctioning may not be possible in an alert child if this causes distress.
Check Cuff Pressure: Attach cuff pressure manometer to tracheostomy cuff luer valve. Determine the current pressure as indicated by black needle.	Over time, some cuffs become damaged and the pressure in the cuff may reduce. **If the cuff does not maintain pressure, change the tracheostomy tube.**
During expiration deflate the cuff with a syringe. Suction the tracheostomy tube to remove secretions that fall from above the cuff.	Secretions that sit on top of the cuff will fall into the lower airways. Deflating cuff during expiration will minimise this occurring. Note: Some patients in PICU may not tolerate suctioning during deflation - reinflation prior to suctioning may be required.
Using the black bulb inflate the cuff - not to exceed **25cm H_2O**.[8]	The cuff pressure required to provide an adequate seal in the patient's trachea will vary, but should always be less than **25cm H_2O - except in an emergency**.
Connecting and disconnecting from manometer will cause a small amount of air to escape (approx. 2 - 5 cmH_2O). Allow for this when choosing the cuff pressure.	This is why the pressure will have dropped slightly when the cuff pressure is checked again.

Procedure	Additional Information
Manometer method continued: Release air slowly by manual regulation of the open/close valve until pressure is <25cm H_2O.[1,4]	Use the lowest pressure that will maintain a seal.
Document the cuff pressure on the patient's observation chart.	

USING THE MINIMAL OCCLUSION VOLUME METHOD

Procedure	Additional Information
Only use this method when the cuff pressure manometer is not immediately available for example: • after unplanned tracheostomy tube change • to remove leak for ventilation purposes ie. during bagging • to protect from aspiration ie. during vomiting or regurgitation.	
Attach 5mL syringe to tracheostomy cuff valve and inflate the cuff until a seal is achieved.	
As soon as the patient's leak is no longer audible, stop inflating the cuff.	Use the smallest volume of air possible to minimise the potential damage to the tracheal mucosa.
Document volume of air put in cuff on patient's observation chart.	
Check the cuff pressure when: • the patient is clinically stable and • it is safe to deflate the cuff, suction the tube and use the cuff pressure manometer.	Aspiration and loss of ventilation can occur when cuff is deflated.

Checking Bivona™ Tight to Shaft Cuff Pressure

Procedure	Additional Information
Pre-fill a 5mL syringe with 4mL sterile water. Attach an empty 5mL syringe to the tracheostomy luer valve. During expiration aspirate water from cuff.	**Note:** Except in an emergency situation Bivona's cannot be checked using a cuff pressure manometer, as air leaks from the material used in the Bivona tracheostomy cuffs.
Suction the tracheostomy tube to remove secretions that fall from above the cuff. Deflate the cuff during expiration	Secretions that sit on top of the cuff will fall into the lower airways. Deflating cuff during expiration will minimize this occurring.
Attach 5mL syringe filled with sterile water. Inflate cuff with water until a seal is achieved. As soon as the patient's leak is no longer audible, stop inflating cuff.	The cuff should be inflated with the smallest volume of water possible to minimise the potential damage to the tracheal mucosa.
The volume of water used to inflate the cuff should be comparable to the amount aspirated from the cuff.	It is possible that there may be slightly less water (0.1 to 0.3mL) aspirated from the cuff than the volume previously inserted into cuff.
Document volume of water instilled into the cuff on patient's observation chart.	

Related Documents
PNPM Section 7.4, Care of the Child with a Tracheostomy

References:

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7. Mallinckrodt Inc. Hi-Lo hand pressure gauge user manual. Hazlewood Montana: Mallinckrodt 1998.
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NHS Greater Glasgow and Clyde. Care of the Patient with a Tracheostomy Tube / Management of the tracheostomy cuff. 2013. Available from: http://www.nhsggc.org.uk/content/default.asp?page=s1214_9_3 Accessed 12 June 2013

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