Cardiff Critical Care Standard Operating Procedure

Procedure for use of Passy-Muir Speaking Valve in Mechanically Ventilated Patients in ICU

Introduction and Objectives:

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Version: 1.0 **Issue Date:** Feb 2019 **Review Date:** Feb 2022

This SOP outlines the process for use of Passy-Muir Speaking Valve for patients requiring mechanical ventilation via a tracheostomy within Critical Care.

- To outline standard operations for use of Passy-Muir Speaking Valves.
- To outline criteria for success of use.
- To reduce the risk of attempting to use a PMV with the cuff up which risks severe respiratory compromise.

1. Introduction:

A Passy-Muir Valve (PMV) is a one-way positive closure-speaking valve that attaches to 15 mm tracheostomy tubing. The valve has a closed bias position which means as the patient inhales, the PMV opens allowing air to enter the tracheostomy tube and lungs. At the end of inspiration, the PMV closes and remains closed throughout expiration allowing all air to be directed through the vocal cords/upper airway to produce voice

2. Considerations for use of PMV:

Indications:

- Able to maintain adequate levels of alertness for a minimum of 30 minutes
- Minimal secretions – suitable for cuff deflation
- Patient mouthing words or attempting to communicate
- Haemodynamically stable (within normal parameters for that patient)
- Good gaseous exchange on ventilator assisted breathing:
  - Pressure support <15**
  - PEEP ≤ 8
  - FiO_2 ≤50%
- **If ASB > 15/8 and patient meets all other criteria above, assessment may be made on individual basis following discussion with Consultant

Contradictions:

- Inability to tolerate full cuff deflation
- Airway obstruction
- Unstable medical/pulmonary status
- Laryngectomy
- Severe anxiety/cognitive dysfunction
- Anarthria
- Severe tracheal/laryngeal stenosis
- End stage pulmonary disease

3. Equipment Required for use of PMV:

- 10ml syringe
- Additional 10ml syringe if sub-glottic suction available on tracheostomy tube
- Suction equipment
- Passy-Muir Speaking Valve
- Inter-surgical '1962' connector

4. Procedure for use of PMV:

Action	Rationale
Obtain medical agreement prior to commencing procedure	Patient needs to be medically stable and weaning from mechanical ventilation, in order to ensure that patient is safe to tolerate cuff deflation and ventilator adjustments
Where possible the patient must fully understand the procedure and its mechanism, explanation is therefore essential	To reduce the anxiety of the patient which can influence the success of the voice production
Ensure no evidence of reduced airway patency – Patient history, bronchoscopy results, ABGs	
Ideally the patient should be on a pressure support of ≤ 15 cmH_2O and ≤ 8cmH_2O of PEEP, with FiO_2 < 0.50	To ensure minimum ventilator support is required

Check RR/HR/SpO_2	To ensure within normal limits for the patient
Determine potential changes to ventilation modes and O_2 therapy	To allow for air leak within the ventilator system
Make the following changes to the ventilator (as expiratory flow monitoring cannot be recorded with PMV in situ): Turn off flow sensors Turn off apnoea ventilation alarm Change vitals to monitor RR (via Plethysmography) rather than CO_2	To reduce impact of ventilator alarms on patient/assessment/environment
Suction orally and via tracheostomy tube prior to cuff deflation and complete sub-glottic suction (if present)	To ensure minimum residual secretions during procedure
Slowly deflate cuff while carrying out synchronous suction. Check for airflow at mouth	Know your ventilator
If signs of intolerance are observed, please remove valve, re-inflate cuff and do not proceed any further without further reassessment	Signs of intolerance: • Increased coughing • Increased respiratory rate • Respiratory effort • Need for suction increases SpO_2 levels decrease
Once the patient is tolerating cuff deflation insert the Passy-Muir valve into the ventilator circuit as close to the tracheostomy as possible.	To increase likelihood of success when using valve

Assess patient's ability to phonate	To ensure supra-glottic airflow. Remove the speaking valve if: • Respiratory rate / effort increases • Heart rate rises • SpO_2 levels decrease • Patient experiences distress / discomfort • No supra-glottic airflow • Weak / breathy / hoarse voice • Inspiratory / expiratory stridor • The patient requests it
If the patient's voice sounds "wet" or "gurgly" ask them to cough and clear secretions	Any secretions present may adversely affect voice clarity
Monitor respiratory rate / oxygen saturations / work of breathing carefully and liaise with the other team members regarding the weaning plan	Remove the speaking valve if: • Respiratory difficulty occurs • SpO_2 levels decrease • The patient becomes fatigued • The patient requests it
If indicated, remove the speaking valve at the end of the use period, re-inflate the tracheostomy tube cuff if indicated using the MOV technique, checking the cuff pressure with a manometer	
Clean and dry the speaking valve according to manufacturer's guidelines and store in the box provided by manufacturer with the patient's name on it	Reduce risk of cross-infection
Place ventilator and monitoring back to pre-assessment state i.e. Turn on flow sensors Turn on apnoea ventilation alarm Change vitals back to monitor Co2	Ensure correct alarm parameters in place

Document all actions on the weaning plan	To ensure effective communication amongst the multidisciplinary team

NB: All patients placed on PMV regime will have a *'How to use'* Guide placed in notes with all information above detailed in step by step process outlined with pictures

5. Criteria for successful use of PMV:

- If respiratory/cardiovascular systems are stable – no detectable change pre/post valve placement
- Patient able to produce voice
- Absence of persistent coughing
- Spontaneous swallows are noted and evidence of swallowing oral secretions

Do not continue with PMV trial if any of the following occur, and remove the valve and re-inflate the cuff:

- Respiratory rate / effort increases
- Heart rate rises
- SpO_2 levels decrease
- Constant coughing that doesn't settle post cuff deflation
- Patient experiences distress / discomfort
- No supra-glottic airflow
- Weak / breathy / hoarse voice
- Inspiratory / expiratory stridor
- Patient request

6. Documentation:

It is essential that all Passy Muir Valve trials are appropriate documented including outcome of the trial, ongoing tracheostomy weaning plan or reason for discontinuation of Passy-Muir valve trials. This will ensure MDT awareness of plan and ensure overall success of the weaning plan.