Belfast Health and Social Care Trust

Physiotherapy use of Cough Assist Devices or Mechanical Insufflation-Exsufflation

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Version 1

1.0 INTRODUCTION / PURPOSE OF POLICY

1.1 Background

Mechanical Insufflation-Exsufflation (MIE) or a Cough Assist Device (CAD) is the use of positive airway pressure which rapidly changes to negative pressure to assist the patient's cough. Patients for a wide variety of reasons and conditions are unable to cough or clear airway secretions effectively due to reduced peak cough flow. These devices assist in the mobilisation and clearance of bronchial secretions by inflating the lungs. MIE is an alternative to suctioning providing decreased mucosal trauma and increased patient comfort.

1.2 Purpose

To provide guidance for physiotherapy/nursing staff using the devices.

Please ensure that the appropriate device manual is read in conjunction with this policy.

1.3 Objectives

This policy aims to meet the following objectives:

To provide information on the safe application and use of CAD.

To provide a training record and point of reference for CAD.

2.0 SCOPE OF THE POLICY

This policy applies to physiotherapy and nursing staff who have access to the cough assist device and have had the relevant training.

This policy will aid relevant physiotherapy staff in the training of multi-disciplinary teams and carers where appropriate.

3.0 ROLES/RESPONSIBILITIES

As a method of airway clearance the cough assist device is primarily the responsibility of the physiotherapy team. Senior clinicians are responsible for the organisation and dissemination of training and the implementation of the policy in line with the Trust's medical device policy. Adhering to the policy is the responsibility of each individual user.

4.0 KEY POLICY PRINCIPLES

Definitions

Key Policy Statement(s)

Policy Principles
4.1
Indications for use:

The cough assist device is to be used with patients who present with respiratory compromise and restricted lung patterns.
These patients present frequently with;

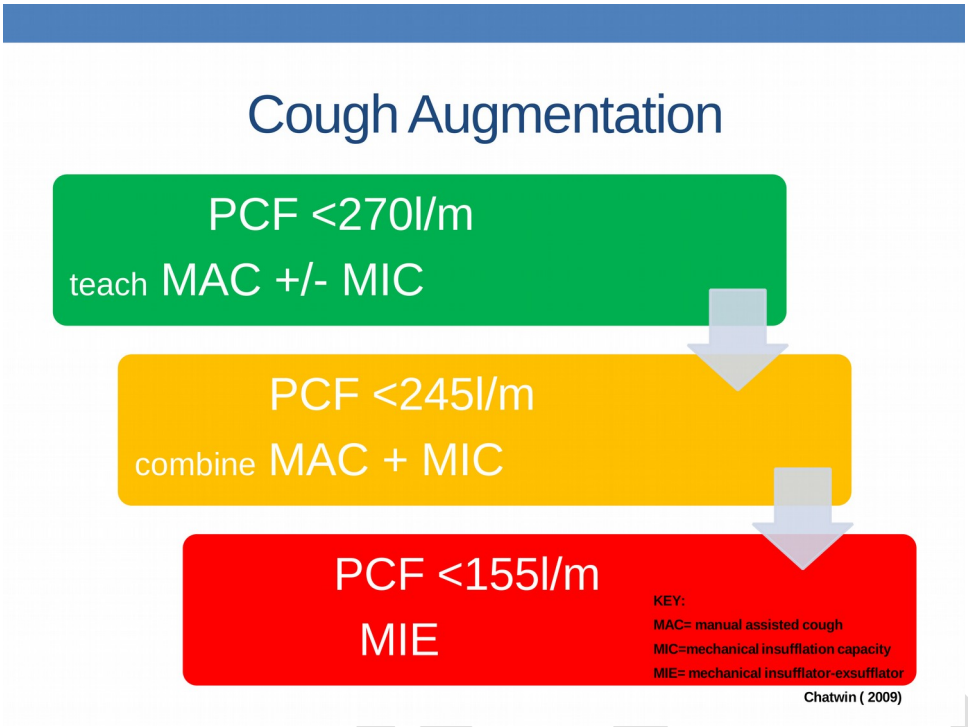
- Decreased lung volumes
- Retention of secretions
- Impaired or absent cough
- Increased work of breathing

The CAD can be used with a tracheostomy, via a facemask or mouthpiece with a nose clip.

Peak cough flow rate can be used as an indicator for the initiation of CAD since it highlights the ability or inability to cough and the associated risk of an impaired or absent cough.

Indeed below a level of 155l/m CAD should be used.

Cough Algorithm



Since respiratory compromise is prevalent in these patients the CAD can be used in the acute setting, throughout rehabilitation and in the community. The device can be used by appropriately trained staff caring for these patients and by family members.

Contraindications for use:

- Undrained pneumothorax
- History of bullous emphysema
- Known susceptibility to pneumothorax or pneumo-mediastinum
- Any recent barotraumas

CARE SHOULD BE TAKEN WITH;
Patients with known cardiac instability

Pulse and oxygen saturations should be monitored very closely

COMPLICATIONS
Fear, pain and poor technique will lead to poor synchrony with the machine

CLEANING

Tubing and mask are single patient use and should be replaced as per infection control policy.

Please refer to appropriate device manual for cleaning procedures.

The filter and tubing must be replaced between each patient to prevent cross contamination. Do not try to wash the filter. The filter may need to be replaced during individual use if it becomes blocked by sputum or trapped moisture.

The exterior of the machine is to be cleaned as per infection control policy.

TECHNIQUE

Discuss use and rationale of the CAD with Consultant.

Gain consent from the patient and document.

Explain procedure to patient and let them experience the feeling of the mask to their face with the machine switched off.

With a tracheostomy let the patient experience an insufflation and the feeling of pressure delivered.

Start with a low pressure insufflation or positive pressure until the patient has accommodated and gradually build up.

The cough assisted can be operated manually or set to automatic. Refer to device manual for further operational instructions.

SETTINGS

It is advisable to begin with lower pressures, such as 10-15cm H2O positive and negative, to familiarise the patient with the feel of the mechanical insufflation-exsufflation.

During subsequent treatments, pressures can be increased as necessary to achieve adequate secretion clearance.

If on NIV start at the level set on the ventilator, initially keeping inspiratory and expiratory pressure equal.

Maximum positive pressure is 60-70cm H2O depending on the device

Maximum negative pressure is 60-70cm H2O depending on the device

10 cmH2O = 1kPA = 7 mmHg

30 cmH20 = 3kPa = 21mmHg

40 cmH20 = 4kPa = 28 mmHg

50 cmH20 = 5kPa = 35 mmHg

60 cmH20 = 6kPa = 42 mmHg

70 cmH20 = 7kPa = 49 mmHg

As a guideline, as there is no CO2 outlet, with both the automatic and manual settings, cycles of 5-6 breaths should be delivered, followed by a short rest and time to recover their normal breathing pattern.

Clinical assessment will determine the appropriate treatment regime, number of insufflations cycles and use of exsufflation mode.

Good Practice Points

- **Consider MI-E as a treatment option in patients with bulbar muscle involvement who are unable to breathstack.**
- **Consider MI-E for any patient who remains unable to increase peak cough flow to effective levels with other strategies. Where cough effectiveness remains inadequate with MI-E alone, combine it with manually assisted coughing.**
- **MI-E pressures should be titrated to suit the individual to optimise the insufflation and exsufflation required to achieve an effective cough.**
- **If secretions require loosening to facilitate removal, other strategies must be employed prior to using MI-E**

(Bott et al., 2009)

5.0 IMPLEMENTATION OF POLICY

5.1 Dissemination

Physiotherapy, nursing and medical staff.

5.2 Resources

Training will be provided by a validated trainer from the supplier/manufacturer. Senior physiotherapists competent in the use of the equipment will also provide training. Regular awareness and refresher training will take place internally with appropriate support from the supplier. The relevant documentation should be completed as per the Belfast Trust Medical Device Policy.

The physiotherapy team have access to two CAD's;

- NIPPY Clearway Cough Assistor
- Phillips Respironics CoughAssistor E70

5.3 Exceptions

Staff must have attended appropriate training.

6.0 MONITORING

Monitoring of local induction policy and training records to ensure competency of all staff concerned.

7.0 EVIDENCE BASE / REFERENCES

- **BTS/ACPRC Guidelines 2009 Physiotherapy management of the adult, medical, spontaneously breathing patient**
- **SCIRE Respiratory Management 2010**
- **John Bach 2012 Non-invasive respiratory management of high level spinal cord injury**

  (The Journal of Spinal Cord Medicine Vol.35 No.2)
- Literature source specific to SCI see appendix 2.

Fidelma Paper

8.0 CONSULTATION PROCESS

Insert a list of those groupings consulted in the development of this policy e.g. Trade Unions, Specialist Committees, User groups, Section 75 groups.

9.0 APPENDICES / ATTACHMENTS

Appendix 1 – literature review

MIE in SCI – written as part of Masters module project available from Kim Gregg,

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Appendix 2- reference papers

- **Bott J et al (2009) Physiotherapy management of the adult, medical spontaneously breathing patient. Thorax 64: Supplement**
- **Chatwin, M (2009) Mechanical aids for secretion clearance. INTERNATIONAL JOURNAL OF RESPIRATORY CARE, Autumn/Winter, p50-53**
- **REPORT: Use of Mechanical Insufflation-Exsufflation as a cough augmentation technique for an ineffective cough. AUTHORS: Janine Mc McCaughey, BSc Hons**

Physiotherapy, MCSP, Belfast Trust; Fidelma Moran, PhD, MCSP, University of Ulster.
TO: Public Health Agency, NIV Community Users Group, January 2013

SCI References

1. Bach (1993). Inappropriate weaning and late onset ventilatory failure of individuals with traumatic spinal cord injury. Paraplegia, 31, 430 – 438.

2. Bach (1993). Mechanical insufflation-exsufflation. Comparison of peak expiratory flows with manually assisted and unassisted coughing techniques. Chest, 104, 1553 – 1562.

3. Bach (1993). A comparison of long-term ventilatory support alternatives from the perspective of the patient and care giver. Chest, 104, 1702 – 1706.

4. Bach, J.R., and Alba, A.S., 1990. Noninvasive options for ventilatory support of the traumatic high level quadriplegic patient. *Chest*; 98(3), pp. 613 – 619.

5. Bach, J.R., Goncalves, M.R., et al., 2010. Extubation of Patients with Neuromuscular Weakness. *Chest*; 135(5), pp. 1033 –1039.

6. Garstang et al (2000). Patient preference for in-exsufflation for secretion management with spinal cord injury. J S Cord Med, 23, 80 – 85.

7. Kirby, N.A., Barnerias, M.J.. et al., 1966. An Evaluation of Assisted Cough in Quadriparetic Patients. *Archives of Physical Medicine and Rehabilitation*; 47, pp. 705 – 710.

8. Liszner and Feinberg (2006). Cough assist strategy for pulmonary toileting in ventilator-dependent spinal cord injured patients. Rehabilitation Nursing, 31, 218 – 221.

9. Niranjan and Bach (1998) Noninvasive management of pediatric neuromuscular ventilatory failure. Crit Care Med, 26, 2061 – 2065.

10. Pillastrini et al (2006). Study of the effectiveness of bronchial clearance in subjects with upper spinal cord injury. S Cord, 44, 614 – 616.

11. Suri et al (2008). Pneumothorax associated with mechanical insufflation-exsufflation and related factors. Am J Phys Med Rehabil, 87, 951 – 955.

Appendix 3- instruction manuals

See manuals provided in equipment folders or with individual machines:

-NIPPY Clearway Cough Assistor Instruction Manual

-Phillips Respironics CoughAssist E70 Instruction Manual

Appendix 4- useful websites

- **www.nippyventilator.com**
- **coughassiste70.respironics.com**

10.0 EQUALITY STATEMENT

In line with duties under the equality legislation (Section 75 of the Northern Ireland Act 1998), Targeting Social Need Initiative, Disability discrimination and the Human Rights Act 1998, an initial screening exercise to ascertain if this policy should be subject to a full impact assessment has been carried out.

The outcome of the Equality screening for this policy is:

Major impact ☐

Minor impact ☐

No impact. ☐

SIGNATORIES

(Policy – Guidance should be signed off by the author of the policy and the identified responsible director).

_____ Date: _____

Name

Title

_____ Date: _____

Name

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