IPPB via the Servo I
Guidelines for use in UCH Critical Care.

Version 1.3 August 2007

Document Control Summary

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| Implications of the Race Equality duties for this policy/strategy | This must be implemented fairly and without prejudice whether on the grounds of race, gender, sexual orientation or religion. |

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Summary Sheet

The aim of Intermittent Positive Pressure Breathing (IPPB) is to assist the patient in taking a deep breath to facilitate secretion clearance. IPPB is the maintenance of a positive pressure throughout inspiration, returning to atmospheric pressure during expiration. The patient triggers inspiration through spontaneous effort and expiration is passive.

At UCL Hospitals IPPB can be delivered either via The BIRD (Pressure Cycled) or via the Servo I ventilator (Flow cycled). These guidelines refer to the delivery of IPPB via the Servo I within the Critical Care setting.

These guidelines are to be used only by Critical Care staff who have been trained to use the Servo I to provide IPPB.

The Content of the policy is summarised briefly below:

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1. **Introduction**

This guideline is designed to standardise the use of IPPB via the Servo I Ventilators in the Critical Care setting by:

- Identifying the appropriate patients for IPPB
- Ensuring safe and correct application of IPPB
- Assessing the effectiveness of IPPB

2. **Guideline Statement**

The aim of this guideline is to provide instruction regarding the application and monitoring of IPPB via the servo I ventilators in the Critical Care setting.

3. **Guideline Objectives**

The objectives of this guideline are to ensure that:

- Appropriate patients are selected for the use of IPPB
- That the technique is applied safely and correctly

4. **Evidence base for guidelines**

There is little evidence suggesting that IPPB has unequivocal clinical effectiveness in terms of morbidity, mortality, or lung function, when used either alone or in combination with other modalities. There is no evidence that IPPB offers any advantage over simpler therapies in the prevention or treating postoperative atelectasis or secretion retention. However, IPPB may be useful in the management of atelectasis and or secretion retention that has not improved with simpler therapy (e.g. Nebulisers, ACBT and mobilisation) (AARC, 1993)

5. **Indications for IPPB**

Self ventilating patients in Critical Care, including those with tracheostomies who have the following:

- Atelectasis
- Sputum retention

**Where mobilising, DBE and encouragement to cough have failed**

6. **Aims of IPPB**:

- Increase tidal volume (Vt) (Welch et al, 1980 and Pfenninger and Roth, 1977)
- Mobilise Secretions (Pavia, Webber and Agnew, 1988)
7. Points to consider

- **PAIN?** Pain control issues should be addressed prior to administration of IPPB
- **IS IT A GAS EXCHANGE PROBLEM?** Is the problem that they can’t get the oxygen across the alveoli bed i.e fibrosing alveolitis or consolidation, rather than that they can’t get it to the alveoli bed?
- **IS IT TYPE I RESPIRATORY FAILURE/HYPOXIA?** Would CPAP be more appropriate to increase functional residual capacity?

8. Non-indications, Contraindications and Potential adverse effects

8.1. Non Indications

- Consolidation
- Agitated/uncooperative patient (Denehy and Berney, 2001)
- High respiratory rate
- Pleural effusion
- Distended abdomen
- Pulmonary emboli
- Prophylactic use (Denehy and Berney, 2001)

8.2. Contraindications:

- Undrained pneumothorax (AARC, 1993)
- Oesophagectomy or Gastro-oesophagectomy (Without discussion with the patients surgical team)
- Clamped chest drain
- Emphysematous bullae
- Surgical emphysema
- Wheeze (Relative contraindication)
- Bronchial Ca (air trapping)
- Raised intra cranial pressure
- Acute/open TB
- Haemoptysis
- Recent lung surgery without surgeons approval
- Unstable cardiovascular status

8.3. Potential adverse effects

- Hypotension
- Anxiety
- Pneumothorax
- Gastric distension

9. The Equipment

IPPB can be delivered via a full facemask, nasal facemask, mouthpiece or through a tracheostomy. If administration is through a tracheostomy, ensure that the cuff is inflated and extra care should be taken as there is an increased risk of baratrauma.
10. Procedure

10.1. Start Servo I in NIV mode
Set PEEP to 2
Set PS 0
FiO₂ to patient’s current oxygen requirements

10.2. Allow the patient to take 2 – 3 breaths to establish normal Vt. This is established by looking at the Vti. number on the screen.

10.3. Calculate target Vt. (1.5 x greater than the patients resting Vt.).

<table>
<thead>
<tr>
<th>Resting Vt. (PS 0)</th>
<th>Target Vt during IPPB</th>
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<tr>
<td>200</td>
<td>300</td>
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<tr>
<td>250</td>
<td>375</td>
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<td>300</td>
<td>450</td>
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<td>400</td>
<td>600</td>
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<td>450</td>
<td>675</td>
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If the patient is already taking a tidal volume of 500ml with PS 0 it is unlikely that IPPB will be of any additional benefit.

10.4. Keeping the Peak Inspiratory Pressure below 25, increase PS to achieve target Vt whilst encouraging the patient to take a Deep Breath. This may take several cycles of five breaths to achieve the target Vt.

10.5. Once the target Vt has been achieved deliver four cycles of five breaths or until the patient has cleared retained secretions.

11. Documentation

The following should be clearly documented in CIMS
- Patients baseline Vt on PS 0
- Target Vt
- Whether target Vt achieved
- Number of breaths delivered
- Whether IPPB successful i.e. secretion clearance, auscultation, if target Vt achieved.
12. Other considerations (F & G Grade Nursing staff & Physiotherapists only)

12.1. Inspiratory ramp time may need to be increased if the patient's inspiratory flow rate is slow, or decreased if patient's inspiratory flow is raised i.e. Increase 'T insp rise' time to get a slower longer breath, decrease to get a faster shorter breath.

12.2. If trying to facilitate a cough the “Inspiratory cycle off” trigger may need to be more sensitive e.g. increase from 50% to 70%.

12.3. If the indication for NIV was atelectasis, consider increasing the PEEP to 5.

12.4. If the indication for NIV was sputum retention the PEEP should remain at 2
References


Bott J. et al ‘Intermittent positive pressure breathing – a dying art?’ Physiotherapy 1992 Vol 78 (9) 656 - 660


Gold .MI. ‘Is intermittent Positive Pressure Breathing Necessary in the surgical patient?’ Chest editorial Vol 184


