

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

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Document Control Summary

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1.1	10/05/2006	Draft	Distributed for comments and suggestions
1.2	12/06/2006	Draft	Distributed for further comments and suggestions
1.3	8/08/2007	Final	Section 8.2

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UCL Hospitals is an NHS Trust incorporating the Eastman Dental Hospital, Elizabeth Garrett Anderson & Obstetric Hospital, The Heart Hospital, Hospital for Tropical Diseases, The Middlesex Hospital, National Hospital for Neurology & Neurosurgery, The Royal London Homoeopathic Hospital and University College Hospital.

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.

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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 (V_t) (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
- Barotrauma (Gonzalez and Burke, 1984, Fouts and Brashear, 1976, Inverson et al, 1978, Dohi and Gold, 1978)

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 barotrauma.

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 V_t. This is established by looking at the V_ti. number on the screen.
- 10.3. Calculate target V_t. (1.5 x greater than the patients resting V_t).

Resting V _t . (PS 0)	Target V _t .during IPPB
200	300
250	375
300	450
350	525
400	600
450	675

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 V_t whilst encouraging the patient to take a Deep Breath. This may take several cycles of five breaths to achieve the target V_t.
- 10.5. Once the target V_t has been achieved deliver four cycles of five breaths or until the patient has cleared retained secretions.

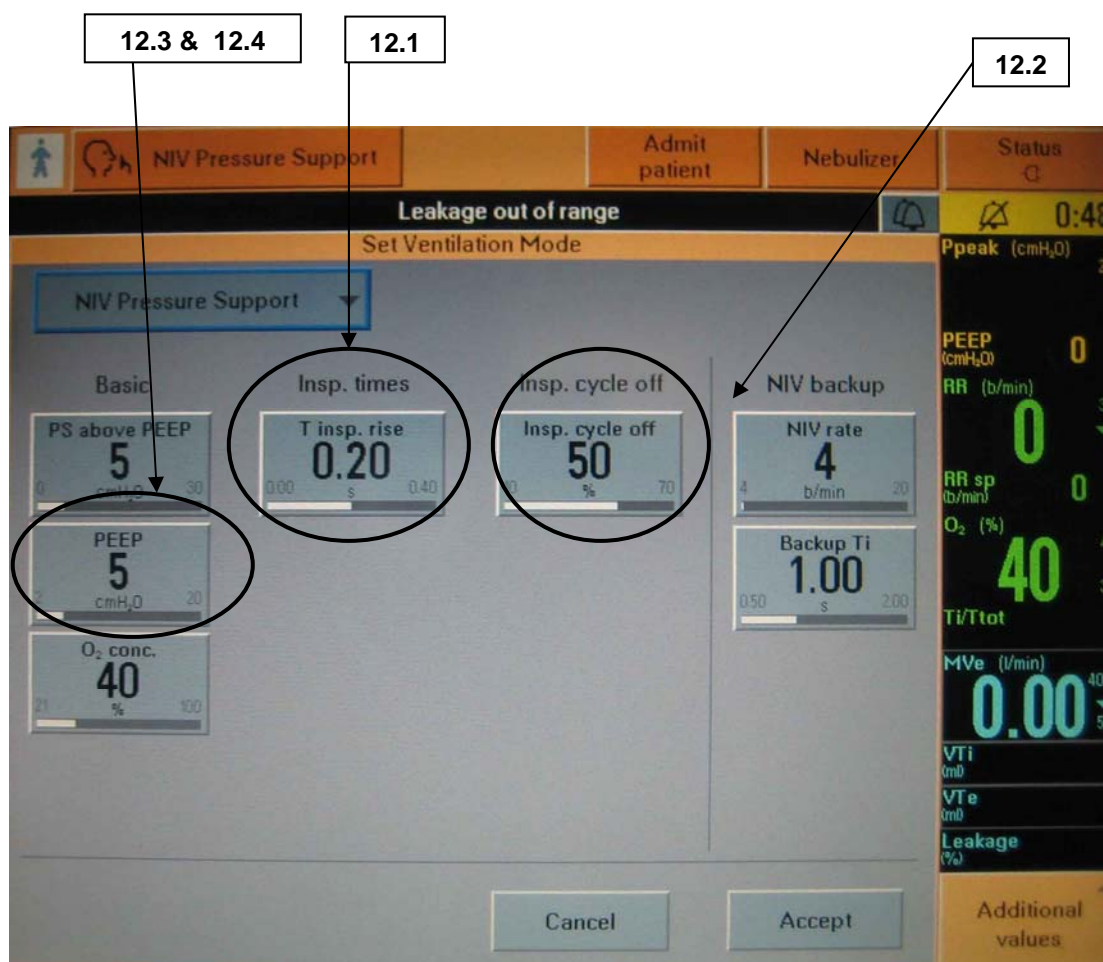
11. Documentation

The following should be clearly documented in CIMS

- Patients baseline V_t on PS 0
- Target V_t
- Whether target V_t achieved
- Number of breaths delivered
- Whether IPPB successful i.e. secretion clearance, auscultation, if target V_t achieved.

12. Other considerations (F & G Grade Nursing staff & Physiotherapists only)

- 12.1. Inspiratory ramp time may need to be increased if the patients 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



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