

Department of Respiratory Medicine

Non Invasive Ventilation

Document Name: Non Invasive Ventilation (NIV) SOP

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Attachments: **Embedded Clinician User Guide**

Non Invasive Ventilation (NIV) SOP

PURPOSE

Non Invasive Ventilation (NIV) is an effective treatment for acute hypercapneic respiratory failure, particularly in COPD. It is NOT a substitute for tracheal intubation and invasive ventilation if this is more appropriate

NIV is indicated in patients with respiratory acidosis ($\text{PaCO}_2 > 6.0 \text{ kPa}$, $\text{pH} < 7.35$) which persists despite maximal medical treatment and appropriate controlled O_2 .

Before initiation of NIV a formal decision about escalation e.g. intubation is required.

SCOPE

The addition of NIV to conventional therapy for severe exacerbation's of COPD with type II (hypoxic/hypercapnoeic) respiratory failure is superior to the addition of the respiratory stimulant Doxapram.

Treatment of type II respiratory failure with NIV has been shown to rapidly improve blood gases and reverse acidosis.

Reductions in mortality, hospital stay and readmission rates are further advantages.

RESPONSIBILITY

Patients must be able to cooperate to benefit. NIV is not able to ventilate a patient who is not breathing. NIV is not a substitute for intubation and ventilation in patients with type I (hypoxic) respiratory failure.

VALIDATION

Standard operating procedure has been validated by Dr P Stockton.

REFERENCES

RELATED DOCUMENTS

Clinical user ward guide, embedded within body of SOP.

PROCEDURE

Respiratory ward NIV patients

Patients will only be accepted onto the respiratory wards acutely for Bi Level positive airway pressure NIV (BiPAP) for those patients with Chronic obstructive Pulmonary Disease (COPD).

Patients will NOT be accepted for BiPAP for any other respiratory cause unless explicitly requested by a Respiratory Consultant who has formally accepted care.

Patients on domiciliary NIV, Continuous positive airway pressure (CPAP)/BiPAP will continue on their usual machine (unless contraindicated) whilst on the respiratory ward, in a general respiratory bed.

NIV should be used as much as possible in the first 24-48 hours after initiation.

Intermittent use makes NIV more tolerable and allows patient's time to clear secretions and eat/drink.

NIV can be used in conjunction with a humidifier for improved patient comfort.

Guidelines for exacerbation of COPD

1. Assess patient. Request CXR, ABG (always record the FiO₂), FBC, U&E, CRP and ECG.
2. Commence conventional therapy. Controlled Oxygen, nebulised bronchodilators, Corticosteroids, antibiotics as per policy, diuretics (if required) and Aminophylline.
3. Recheck ABG in 1 hour – if still acidotic and hypercapnoeic consider NIV.

The decision to commence NIV

This decision must be made by a senior member of the medical team, Specialist Registrar or above.

The availability of an NIV bed should now be the priority and should be undertaken as soon as the clinician thinks that a bed may be required. The earlier that discussion with the Medical team takes place the better.

The patient should be ideally transferred to ward 2C as soon as possible. If required, NIV can be initiated in the AED, prior to transfer to ward 2C, this is the only location that has the expertise to do this.

The nursing staff on ward 2C will commence NIV. There will be a senior NIV on duty for each shift.

The review and assessment of the patient, including ABGs and the prescription of O₂ at more than 2 Litres per minute is the responsibility of the medical team.

The Respiratory team will take formal handover of the patients at 0900hrs on the day after admission.

There will be the usual Consultant Respiratory Physician cover during the normal working day.

Criteria for the use of NIV

1. Patients with a pH \leq 7.35
2. Diagnosed with exacerbation of COPD
3. On optimal acute medication (see above).
4. ABG analysis meets the following criteria:

 pH \leq 7.35
 PaCO₂ > 6KPa on 24% O₂
 PaO₂ < 8KPa on 24% O₂
5. Patient will require a suitable review by a senior member of the Medical or Respiratory team.

Initial Ventilator Settings for NIV BIPAP

Mode	Spontaneous/Timed (S/T)
Start on	EPAP: 4cm H ₂ O IPAP: 8cm H ₂ O
Then	Increase IPAP only; by 2cm H ₂ O every 2 – 3 minutes until IPAP of 20cm H ₂ O is reached.
Or	until patient cannot tolerate any further increase.
Back up rate	12 breaths per minute

Contraindications to NIV

There are no absolute contraindications in patients with type II respiratory failure but the following must be considered:

- Facial trauma or burns
- Recent facial, upper airway or upper gastrointestinal tract surgery
- Fixed obstruction of the upper airway
- Inability to protect airway
- Life threatening hypoxaemia
- Haemodynamic instability
- Severe co-morbidity
- Impaired consciousness
- Confusion/agitation
- Vomiting
- Bowel obstruction
- Copious respiratory secretions
- Focal consolidation on chest radiograph
- Undrained pneumothorax

Before initiation of NIV

A decision must always be made with respect to resuscitation.

A decision re intubation must be made prior to initiation of NIV for the event of treatment failure. Therefore a discussion with the critical care team must be initiated.

In general, NIV should be the treatment ceiling for patients with long standing COPD and poor quality of life where intubation is usually inappropriate.

Intubation and Ventilation

Important to consider overall outlook before embarking on this.

In general, ventilatory support is appropriate in a previously active patient with a good quality of life over the previous 6 months, or where the history is unclear.

There is no point in embarking on mechanical ventilation when the patient has end-stage chronic respiratory failure with very poor quality of life as there is no cure for the underlying disease

Causes of NIV failure

- Use for non-type II respiratory failure
- Poor co-operation (confusion, anxiety)
- Poor mask fit/leak (adentulous/facial deformity)
- Unable to synchronise with ventilator
- High respiratory rate (this will impair exhausting of gases).
- Lobar pneumonia on CXR.

Mask Pressure Relief

Assess the patient after 20 minutes, then after every 2 hours. Allow 10 minutes off the mask every 2 hours. Check the skin around the mask site especially the bridge of the nose, for any signs redness. Contact a senior member of the team if there are any concerns.

Monitoring Guidance

Measure oxygen saturation frequently initially, then every 1-2 hours (record saturation and inspired oxygen i.e. 93% at 2 Litres/min).

ABG 1 hour and 4 hours after starting NIV (again record inspired oxygen). If saturations are poor, check more often. Thereafter, if stable, a daily ABG should be checked.

Record total time on NIV each day.

Once stable 4 hourly TPR saturation and Respiratory rate.

Adjustment of BIPAP settings/Problem Solving

PaO₂ remains low on BIPAP

Ensure optimum ventilation.

Increase FiO₂ were appropriate.

Increasing EPAP in 2cm H₂O increments to 'aid alveolar recruitment'

If EPAP is increased, increase IPAP by the same increment to maintain tidal volume.

PaCO₂ remains high on BIPAP

Ensure optimum ventilation.

Increase FiO₂ were appropriate.

Increasing EPAP in 2cm H₂O increments to 'aid alveolar recruitment'

If EPAP is increased, increase IPAP by the same increment to maintain tidal volume.

Asynchrony between patient and ventilator

Usually due to inappropriate ventilator settings.

Consider:

- Persistent hypercapnia and hypoxia
- Mechanical leaks with the system
- Anxiety
- Mouth breathing
- Confusion

Gastric Distention

It is not advisable to use BIPAP in those patients with ileus.

NG tubes can be useful.

Weaning patient from NIV

There is no correct way to wean. Reduction in time on NIV or reduction in IPAP are both appropriate. A weaning plan should be made by the medical team at the beginning of each day. A good time to take the patient off is at meal times.

Once a patient no longer requires NIV support for >24 hours or the patient is deemed inappropriate for further NIV, the patient will be moved immediately to a non NIV respiratory bed.

Policy for use/protection of NIV beds on ward 2C

The Trust has agreed that the 3 NIV beds on ward 2C will only be used for NIV patients unless the Trust is on heightened operational escalation, in which case 1 bed will be used for non NIV respiratory patients, as long as there are no patients awaiting NIV in the Trust.

It has been agreed that a minimum 2 beds will be kept available for NIV at all times.

In the event of the Trust being on high escalation status, all NIV may potentially be used for non NIV patients. This can only occur with the approval of the General Manager on call after consultation with a Consultant Respiratory Physician, including out of hours.

Once a general Respiratory bed is available on ward 2C, any patient not requiring NIV will be moved to free an NIV bed as soon as possible.

In the event of an NIV bed being unavailable for a potential NIV patient, NIV can be initiated in the AED using the protocol above. Critical Care input will be required to assess the patient for suitable transfer to HDU or ITU.

When an NIV bed becomes available on ward 2C the patient can be transferred if appropriate.

Protocol written by Clinical Director in Respiratory Medicine, June 2018, to be reviewed in June 2019.



NIV Clinician User
Guide June 18