

# Guideline for Non-Invasive Positive Pressure Ventilation (NIPPV) for Acute Type II Respiratory Failure (July 2015 version)

Please complete the NIV care bundle for every patient started on NIPPV

The decision to commence NIPPV should be made by a doctor of ST2+ or above, or other competent designated healthcare professional locally agreed, who is competent to do so.

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- Pg 2. Flow diagram for NIV in acute type II respiratory failure
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#### **QUICK ASSESSMENT FOR NIPPV IN ACUTE TYPE 2 RESPIRATORY FAILURE**

Criteria for considering NIV in <u>COPD</u>: Decompensated respiratory acidosis (pH< 7.35, PaCO2 >6 kPa), despite previous maximum standard medical treatment for no more than 1 hour.



-An appropriate sleep study has been booked if suspected new diagnosis of OHVS/OSA.

#### Abbreviations and acronyms:

- ABG: Arterial blood gas
- BE: Base excess
- BR: Back-up rate
- **COPD**: Chronic Obstructive Pulmonary Disease
- ELBG: Earlobe blood gas
- EPAP: Expiratory positive airway pressure
- FEV1: Forced expiratory volume in the first second
- FVC: Forced vital capacity
- FiO<sub>2</sub>: Fraction of inspired oxygen
- HR: Heart rate
- IPAP: Inspiratory positive airway pressure
- IT: Inspiratory time
- NIPPV: Non-invasive positive pressure ventilation
- OHVS: Obesity hypoventilation syndrome
- PC: Pressure control
- PS: Pressure support
- RR: Respiratory rate
- SaO<sub>2</sub>: Arterial oxygen saturation measured by blood gas
- SpO2: Arterial oxygen saturation measured by pulse-oximetry

# 1. Assessing eligibility for NIPPV and escalation plan.

## Criteria for considering NIPPV:

Decompensated respiratory acidosis (pH< 7.35, PaCO<sub>2</sub>>6 kPa), despite previous maximum standard medical treatment for no more than 1 hour.

## Criteria for <u>inclusion</u> of NIPPV

- Able to protect airway
- Conscious and cooperative
- Potential for recovery to quality of life acceptable to the patient
- Patient's wishes considered

## Criteria for exclusion of ward-based NIPPV

- Acute asthma or pneumonia
- Undrained pneumothorax / life threatening hypoxaemia
- · Inability to protect the airway/ vomiting
- Copious respiratory secretions or patient moribund
- Confusion/agitation/severe cognitive impairment
- Facial burns/trauma, recent facial or upper airway surgery
- Fixed upper airway obstruction / Bowel obstruction
- Upper gastrointestinal surgery
- Haemodynamically unstable requiring inotropes (unless on ITU)

## Assess and document performance status before exacerbation:

- Unrestricted
- Strenuous activity limited
- Limited activity but selfcaring
- Limited activity and limited self-care
- Confined to bed/chair, no self-care

# Escalation plan. Please assess and document if:

- Patient requiring immediate intubation and ventilation
- Patient suitable for NIPPV and suitable for escalation to ITU treatment/intubation and ventilation if required
- Suitable for NIPPV but not suitable for escalation to ITU treatment/intubation and ventilation
- Not suitable for NIPPV but for full active medical management
- Palliative care agreed as most appropriate management
- DNAR form completed if appropriate
- · Patient or relatives involved in above decision

# 2. Step by step guide for acute NIPPV.

# Step 1 - Baseline ABG.

- Full face mask (first 24 hours), then switch to nasal if preferred by the patient
- Start with pressure support (PS) mode in most cases
- Initial IPAP of 10 cmH<sub>2</sub>O, EPAP of 4-5 cmH<sub>2</sub>O
- Increase IPAP by 5 cmH<sub>2</sub>O every 10 min to a minimum Target pressure: 20 cmH<sub>2</sub>O (may need to be higher particularly in OHVS), or therapeutic response achieved, or patient tolerability reached
- There should be no breaks in NIPPV in the first hour
- Target SpO<sub>2</sub> 88-92% (with supplemental oxygen if required)
- Continuous pulse-oximetry and cardiac monitor for the first 12 hours
- Monitor the patient every 15 min for the first hour  $\rightarrow$  Go to <u>Step 2</u>

# Step 2 - ABG after 1 hr of NIPPV therapy

- **If ABG improved**, RR stable or improved and SpO<sub>2</sub>>88-92%:
  - Continue NIPPV and repeat ABG in 4 hours
  - Monitor the patient every 30 minutes
  - $\circ \rightarrow$  Go to <u>Step 3</u>
- If ABG worse: (pH 7.20-7.25, pO<sub>2</sub> or pCO<sub>2</sub> worse, SpO<sub>2</sub><88%)  $\rightarrow$  Go to <u>Step 2b</u>
- If <u>NIPPV Fails</u>: decreasing conscious level (GCS<8), pH <7.20, pO<sub>2</sub><6 kPa → Contact ITU if appropriate.</li>

# Step 2b - If ABG worse after 1 hr of NIPPV (pH 7.20-7.25, pO<sub>2</sub> or pCO<sub>2</sub> worse, SpO<sub>2</sub><88%):

- If CO<sub>2</sub>↑: Try to increase IPAP, patient may need IPAP above 20 cmH<sub>2</sub>O
- If O<sub>2</sub>↓, CO<sub>2</sub> stable: ↑FiO<sub>2</sub> to achieve >88-92% SpO<sub>2</sub>
- Check mask fitting and patient-ventilator synchrony (may need to adjust triggers)
- After above changes, monitor every 15 minutes, repeat ABG in 1 hour
- Follow instructions at <u>Step 2</u>
- Use troubleshooting guide as needed
- If ABG still worse despite optimal settings in the first 4 hours of treatment, consider escalation if appropriate, or withdrawal and palliative treatment

## Step 3 - ABG after 4 hr on NIPPV

- If ABG worse: (pH 7.20-7.25, pO<sub>2</sub> or pCO<sub>2</sub> worse, SpO<sub>2</sub><88%) go back to <u>step 2b</u>
- If ABG improved: Monitor every hour, and perform ABG in 12 hours
- Please use the chart on page 6
- Patients who benefit from NIPPV during the first 4 hours of treatment should receive NIPPV for as long as possible (minimum of 6 hours) during the first 24 hours
- If NIPPV is successful (pH > 7.35 achieved, resolution of the underlying cause and symptoms, RR normalized) following the first 24 hours or longer, it is appropriate to start a weaning plan. Please go to step 4.

## Step 4 - Weaning plan:

## DAY 1 of weaning:

**Continue NIPPV for 16 hours (Refer to GGH CDU if in other UHL hospital).** Weaning should occur during the day, with extended periods off the ventilator for meals, physiotherapy, nebulized therapy, etc.

After day 1, please take blood gases before continuing the weaning process on day 2. If pH still normal, continue weaning process on day 2. If weaning failed (pH <7.35), please follow the instructions on step 2b.

## DAY 2 of weaning:

Continue NIPPV for 12 hours, including 6-8 hrs overnight use.

After day 2 completed, please take blood gases before continuing the weaning process on day 3. If pH still normal, continue weaning process on day 3. If weaning failed (pH <7.35), please follow the instructions on step 2b.

## DAY 3 of weaning:

Discontinue NIPPV, unless continuation is clinically indicated.

For advice regarding referral for long-term NIPPV, please contact either Dr. RA Evans, Prof. MC Steiner or Prof. MDL Morgan