



Non-Invasive ventilation in acute medical care

What is Non-invasive ventilation?

Non invasive ventilation (NIV) is the provision of ventilator support through the patients upper air way using a mask or a similar device
Non invasive interface: nasal mask, face mask, or nasal plugs (rather than an invasive interface – endotracheal tube/ tracheostomy)

Selecting patients for NIV requires careful consideration of it's indications and contraindications.

This supports breathing by delivering positive pressure to the lungs.
The patient remains awake and can talk, eat, and cough (to some extent).

Types of NIV Indications

NIV/NIPPV

Acute Hypercapnic respiratory failure secondary to

- COPD
- Chest wall disease
- Neuromuscular disease
- Obstructive sleep apnoea
- Obesity Hypoventilation syndrome (OHS)

CPAP

Acute Hypoxemic respiratory failure secondary to

- Pulmonary Oedema
- Pneumonia (Mild to Moderate)
- Obstructive sleep apnoea
- Obesity Hypoventilation syndrome (OHS)

HFNO

Acute Hypoxemic respiratory failure secondary to

- Pneumonia (Mild to Moderate)

Contraindications

Absolute

- Cardiorespiratory arrest
- Need of emergency intubation
- Unable to maintain airway <GCS 7
- Uncooperative/extremely anxious patient
- Facial trauma or burns
- Patients with tracheostomy
- Undrained pneumothorax
- Recent facial, oesophageal or gastric surgery
- Severe Persistent vomiting'
- Bowel obstruction
- Toxic inhalation

Relative

- Hypotension
- Copious amount of respiratory secretions
- Inability to obey commands
- Recent ENT surgery
- Laryngeal trauma or recent tracheal anastomosis
- Epistaxis
- DNACPR in place

COPD

pH <7.35

pCO2> 6.5kPa (48.75mmhg)

RR >23

If persisting after optimizing initial medical therapy

NMD

pH< 7.35

pCO2 > 6.5kPa (48.75mmhg)

Respiratory illness with RR >20 and VC<1L

OHS

pH<7.35

pCO2 >6.5kPa (48.75mmhg)

RR >23 or Daytime pCO2 >6kPa and somnolent

Rule out absolute and relative contraindications.

ICU care is indicated in case of Cardiorespiratory arrest, failing NIV etc.

Initial Set up

Mask: Full face mask

Initial pressure settings

EPAP: 3cmH₂O(or high in OSA)

IPAP: 15cmH₂O (Ramp up IPAP over 10–30 min, upto 20–30, to achieve adequate augmentation of chest wall and slow RR)

(Do not exceed IPAP>30 and/or EPAP>8 without expert review)

Back up rate: 16–20

Inspiratory time: 0.8 to 1.2s in COPD and 1.2–1.5 sec in OHS, NM and CWD

I:E ratio: COPD 1:2 to 1:3, OHS/CWD 1:1

Use NIV for a maximum duration during the first 24 hours and plan to wean off after 48–72hrs according to the clinical improvement

ABG in 1 hour or sooner if any concerns

Red flags

pH< 7.25 on optimal NIV
Persistent high RR>25
New onset confusion or deterioration

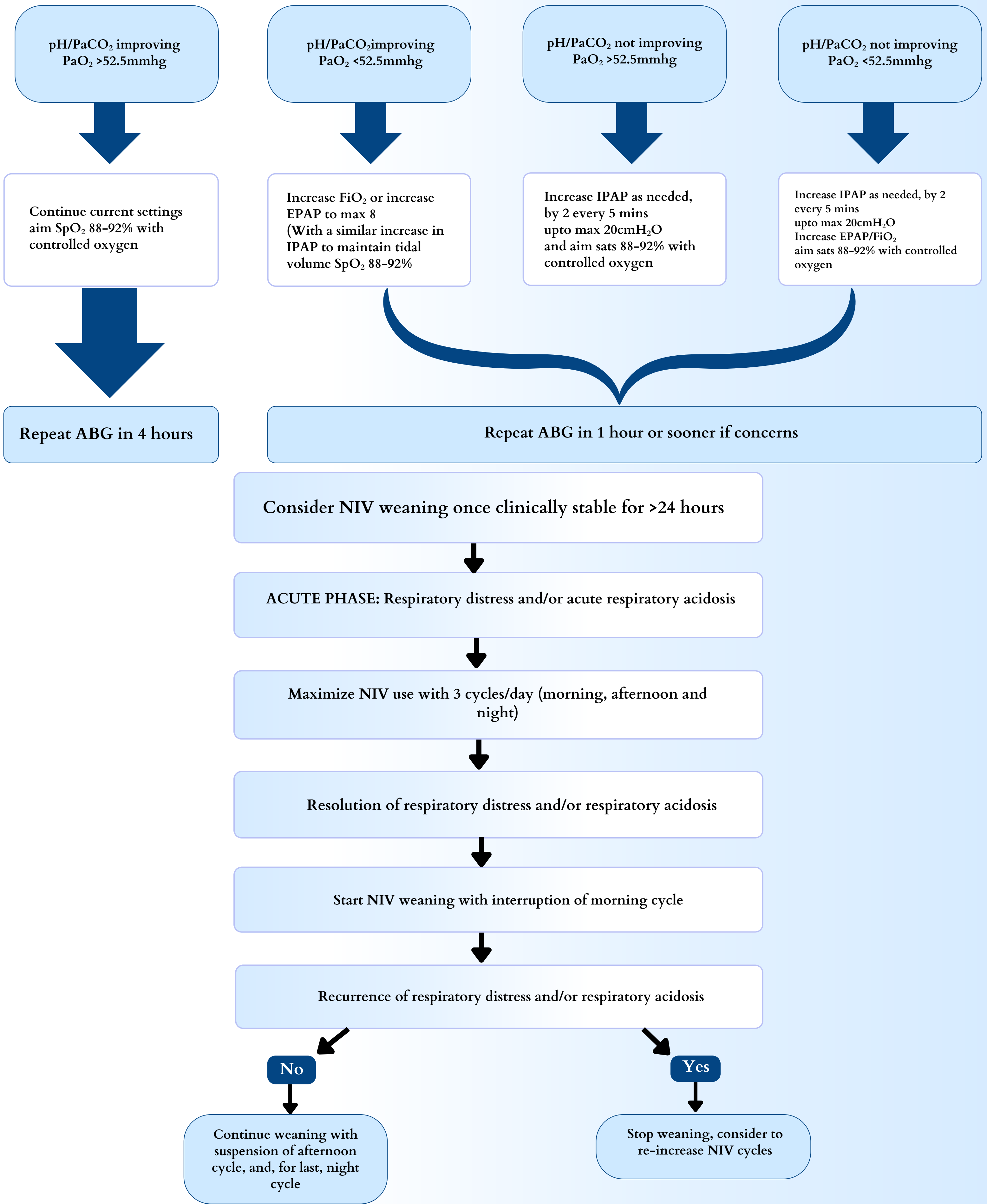
Actions

Check patient asynchrony, mask fit etc.
Bronchodilators, Nebulization, Anxiolytics,
Chest physiotherapy
Consider IMV



ABG Interpretation of patient on NIV/NIPPV

(1kPa=7.5mmhg) and Weaning off



Continuous positive airway pressure

Initiation and weaning off process of CPAP

CPAP

Usual starting pressure: 5–8 cmH₂O

Signs of improvement

Stable breathing patterns,
Adequate oxygen saturation (SpO₂ >94%)
Minimal work of breathing (RR 12–16)

Weaning protocols

Pressure reduction
Cycling on and off

Weaning–Pressure reduction method

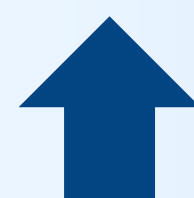
on CPAP:6, FiO₂ <30% and stable >12hrs



Decrease CPAP by 1cmH₂O every 12 hrs
until CPAP 4cmH₂O for 24 hrs



if Stable parameters
Stop CPAP and start nasal oxygen



if deteriorates,
Escalate to previous step

High Flow Nasal Oxygen

