NHS Lothian

Type 2 Respiratory Failure – Nihon Kohden NKV330 NIV Guidelines

Initial NIV settings

S/T Mode

IPAP - 10cm
EPAP - 4cm
RR (backup resp rate) – 10 breaths/min

Set SLOPE[1] - at 2
CONSULT WITH MEDICAL STAFF AND ESTABLISH TARGETS AND PARAMETERS OF THERAPY

ABG within 15-30 minutes

Improved?

Ye

Continue with current settings

Repeat ABGs as clinically indicated and after every change

Once ABGs normalised for patient consider weaning – see suggestions overleaf

No

Adjust Settings

Escalation plan

Must be discussed with ITU as appropriate and clearly documented in the notes prior or upon initiation of treatment

Monitor SaO_2 continuously and check ABGs frequently. Consult medical staff if patient condition does not improve or if patient deteriorates.

Management Tips

$Pa0_2$ low but $PaC0_2$ improved

- CHECK ALL 0_2 CONNECTIONS
- increase $Fi0_2$
- increase EPAP (MAX 5cm. NB: 8cm for obese patients only)

$PaC0_2$ remains elevated

- reduce Fi02 if $P0_2$ high
- patient/machine asynchrony – check circuit, check for leakage, check mask fit
- ? rebreathing – check exhalation port, consider increasing EPAP (MAX 5cm)
- ? inadequate ventilation – consider increasing IPAP (by 2cm increments - MAX 20-22cm)

$PaC0_2$ low

- ? is minute volume too high – consider decreasing IPAP
- ? is ventilation still required

Asynchrony

- check SLOPE[2] is fast enough for resp rate 1 = 0.1 (fastest)5 = 0.5 (slowest)
- if tachypnoeic consider increasing IPAP

Different masks/circuits

Mask with ~ Clear elbow **and anti-asphyxiation valve**
Use with ~ *single limb circuits with exhalation valves on* ***NKV330***

Mask with ~ **Blue** elbow
Use with ~ *ICU dual limb circuits* ***only*** *such as on* ***Draegar V500/800***

Dry Circuits should be used initially. Consider **humidified** circuit after 48hr+

SLOPE - speed at which IPAP rises to set pressure. Acts as a comfort control 1 (fastest) to 6 (slowest)
If SLOPE is too slow for the resp. rate, target pressure will not be achieved for each breath – Monitor TV and peak pressure.

If the patient has an infective respiratory condition, a **bacterial/viral filter** should be attached to or before the disposable exhalation port (DEP) on the tubing. **MUST** be changed 24 hourly.

Troubleshooting

Persistently elevated $PaCO_2$:
Is there excessive leak? **Check mask fit.** Consider total face mask.
Is the system set up correctly? **Check connections** and identify leaks.
Is there re-breathing? **Is the expiratory port patent?**
Consider **increase in IPAP**
Is the patient spending sufficient time on the ventilator? Encourage **longer periods of use.** Address compliance.
Consider **decrease in EPAP** (if very high set level > 8cm H2O)

Persistent hypoxaemia:
Check **correct O_2** into the circuit
If there is OSA or atelectasis consider **increase in EPAP** (need to **increase IPAP too**, to maintain pressure support)
Deteriorating clinical condition with hypoxaemia should lead to **urgent re-evaluation** with reference to the agreed **escalation plan**
Turn off/ reduce slope as patient may not have reached peak pressures.

Mask Leak:
Large leaks can cause inefficient ventilation, eye irritation, noise, dry mouth and nasal symptoms. Consider trying **different masks** and **headgear**, and customised **foam or granuflex** for comfort

Asynchrony between patient and the machine:
Check **correct tubing** is being used
If the patient is **very tachypnoeic increase in IPAP** may help
Ensure the **IPAP rise time** is as quick as possible

Difficulty inflating the chest:
Maybe due to bronchospasm, mucus plugging, pneumothorax, atelectasis/collapse, consolidation, pulmonary oedema: **Clinical examination** is necessary and possible **CXR**
Rarely is due to **circuit tube obstruction/kinking**: Check the circuit

Nasal problems:
Is there nasal soreness/redness/nasal bridge sores? Appropriate **padding or change of mask** is required
Is there **rhinitis/nasal crusting/bleeding?**

Gastric distention:
Try to reduce IPAP if possible and consider nasogastric tube (accepting a small leak)

Patient position:
Patient should be positioned sitting upright with head up
Consider additional support (soft collar/rolled up towel) if necessary
When using the Fischer and Paykel humidifier, if you need to remove the mask from the patient this **device should always be put on standby**. This will stop water from back trapping up the tubing.

Non cooperative/aggressive behaviour:
Maybe due to **hypoxaemia and/or hypercapnia**, consider holding the mask. Relatives may help. Adjust settings as necessary.
Look at RISE TIME – could it be increased for more comfort and better tolerance?

Sedation must be discussed ONLY with Senior Medical Staff:
Haloperidol might reduce agitation and increase NIV tolerance. Or consider oramorph.

Weaning Considerations

Patients who appear to benefit from NIV during the first few hours of treatment should receive NIV for as long as possible (min 6 hours). In patients who have clinically improved (i.e. improved respiratory rate, heart rate, $Pa0_2$ and $PC0_2$ with target range and are no longer acidotic), it is appropriate to start a weaning plan. The gradual reduction of the duration of the treatment should be determined by clinical improvement.

Recommendations

- Ideally during the day
- Trial extended periods off NIV for meals, physio and nebuliser therapy first
- DO NOT decrease IPAP/EPAP during weaning
- Focus on extending the time off NIV
- After successful weaning during the day some patients will require an additional night on NIV

Always closely monitor patients during periods of weaning and if condition worsens consider restarting NIV as soon as possible and inform medical staff. Always consider the indications (see Critical Care

Critical Care Guidelines
FOR CRITICAL CARE USE ONLY

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