Respiratory support in patients with suspected or confirmed COVID-19 infection - Full Clinical Guideline

Reference No.: COVID-RESP/2020/3565

The following is guidance issued by the Respiratory department at RDH on the use of respiratory support in patients admitted with respiratory failure in whom COVID-19 infection (Coronavirus) is suspected or confirmed. **It applies to patients on both the Derby and Burton sites.** It is divided into 3 sections;

1) General guidance

2) Guidance for patients with decompensated acute hypercapnic respiratory failure (AHRF) (i.e. hypercapnia (pCO_2 >6 kPa) with respiratory acidosis (pH <7.35)).

3) Guidance for patients with acute hypoxaemic respiratory failure (paO_2 < 8 kPa).

1) General guidance

For local guidance on medical management of COVID-19 see: "Summary: Initial medical management of patients with suspected or confirmed COVID-19 infection" available via Koha in the COVID-19 resource section.

This document is based on the following national/international guidance;

Guidance from NHS England and NHS Improvement on the Clinical management of persons admitted to hospital with suspected COVID-19 infection: **https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/clinical-management-of-persons-admitted-to-hospita-v1-19-march-2020.pdf**

WHO guidance on management of severe acute respiratory infection (SARI) when COVID-19 is suspected; **https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected**

NHS England / NHS Improvement guidance on HFNO / CPAP / NIV: **https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/CLEARED_Specialty-guide_-NIV-respiratory-support-and-coronavirus-v2-26-March-003.pdf**

The virus can be spread by both droplets and in aerosol form and interventions that generate aerosols in particular may contribute to spread of the virus.

Supplemental oxygen (lower flow devices)

- Supplemental oxygen use via nasal cannulae, venturi masks or non-rebreathe masks is not considered an aerosol-generating intervention.

Nebuliser therapy

- Nebuliser therapy is not considered an aerosol-generating intervention.

Chest physiotherapy

- Chest physiotherapy is not considered an aerosol-generating intervention.

Cough assist devices

- Cough assist devices should be avoided

Non-invasive ventilation

- NIV may cause viral shedding predominantly via droplet spread but may also contribute to aerosol-generation. However, NIV is thought to pose a risk of viral transmission similar to that of chest physiotherapy. Leakage around the mask may contribute to droplet spread. The decision to offer NIV should be made primarily with reference to the likely clinical benefit of NIV, whilst also taking into account infection prevention and control (IPC) considerations.

- Factors such as proposed location of treatment and availability of appropriately trained staff and personal protection equipment (PPE) must be considered alongside clinical need before deciding to offer NIV.

- If invasive mechanical ventilation is appropriate on clinical grounds, it is preferred over NIV for infection prevention and control reasons.

High flow nasal oxygen (HFNO – also known as 'AIRVO')

- HFNO may risk virus transmission and if offered to patients admitted with suspected or confirmed COVID-19 respiratory failure it should be used in specific areas on the respiratory base wards (wards 402 or 404 at Derby and ward 3 at Burton) including negative pressure rooms, side rooms, or the sealed CPAP bays.

2) Respiratory support for patients with decompensated AHRF.

In patients with decompensated AHRF with suspected or confirmed COVID-19 infection;

NIV may be indicated	NIV not indicated
Acute or infective exacerbation of COPD	Community or hospital acquired pneumonia
Obesity hypoventilation syndrome	Aspiration pneumonia
Neuromuscular disease (e.g. Motor neurone disease, Myotonic dystrophy, Duchenne muscular dystrophy)	Viral pneumonitis
Chest wall disease (e.g. Kyphoscoliosis)	Acute asthma
Immunosuppressed patients with pulmonary infiltrates likely due to infection. (Unlikely to be appropriate if metastatic / palliatively treated malignancy).	Acute pulmonary oedema
	Acute respiratory distress syndrome (ARDS)
	Patients without underlying lung / chest wall or neuromuscular disease who develop AHRF due to a non-respiratory cause (e.g. cellulitis, urinary sepsis)
	Frail older patients in whom AHRF is likely to be a marker of transition towards End of life

This list of indications / contraindications is not absolute and a degree of clinical judgement should be exercised.

For example, a patient with known COPD, AHRF and a minimal amount of consolidation on CXR may be judged to be clinically appropriate for NIV.

- **Target saturations should be prescribed on ICM as 88-92%**

Location of treatment

- NIV on the respiratory wards should initially be offered in SR14 (negative pressure room) on ward 402 if available.
- Subsequent patients needing NIV should be managed in sealed CPAP bays on 404 or 402. Air exchanges should be checked and adhere to standard IPC guidelines.
- If possible, NIV should preferentially be started on the respiratory wards (402 or 404) rather than in ED given the possible risk of infectious transmission on patient transfer from ED to the respiratory wards.
- If NIV must be started in the Emergency department this should be in side room 17 in ED resus.
- Medical High Dependency Unit (Ward 407) will not be providing NIV routinely to patients

with suspected or confirmed COVID-19. Any patients in respiratory failure who may be in need of medical HDU care in whom COVID-19 is suspected or confirmed must be discussed with the on call Renal Consultant prior to admission.

- We cannot currently support the delivery of NIV for patients with suspected or confirmed COVID-19 outside of the clinical areas mentioned above.

- Patients subsequently testing negative for COVID-19 may be transferred for NIV weaning from a side room on 402 to beds on 403. If still acidotic and not yet suitable for weaning they may be transferred to a respiratory HDU bed on 403 (if clinically stable for transfer and confirmed COVID-19 negative). **These patients must not be transferred if they are known or suspected contacts of other patients on the ward with known or suspected COVID-19. If unsure, discuss with Infection Control prior to any transfer.**

- At the Burton site, NIV can currently be offered in side rooms on Ward 3. If these rooms fill the next options would include side rooms in AAC or a cohorted bay on ward 3. Discuss with the Consultant on call for General medicine at Burton.

<u>Patients referred from Burton hospital for NIV</u>

- **Patients on CPAP or HFNO for hypoxaemic respiratory failure secondary to known or suspected COVID19 infection will not be transferred from the Burton site to the Derby respiratory wards.**

- If patients at Burton hospital are thought to need NIV they must first be discussed with the Consultant on call for General medicine at Burton in order to ascertain whether a bed can be made for the patient on the Burton site.

- The agreed pathway is that these patients will first be accommodated in a side room or HDU bed at Burton, or if appropriate, in ICU at Burton. If no beds are available then transfer of a *clinically stable patient weaning from NIV* from Burton may be acceptable.

- **No patient should be transferred from Burton on NIV unless discussed with and accepted by the Respiratory Consultant on call at Derby.**

- Clinically unstable patients (high respiratory rate >20, high oxygen requirement >40%, respiratory acidosis or septic shock - whether or not they have been commenced on NIV) will **not** be accepted for transfer from Burton given concerns about the lack of appropriately trained clinical staff to support safe patient transfer.

- Transfers accepted from Burton may be admitted;

    - direct to a side room on 402, if available, if suspected or confirmed COVID-19 infection.

        - In order to limit the potential for virus dispersion, patients weaning from NIV and stable for transfer from Burton should be temporarily taken off NIV for the transfer. This will depend on the clinical stability of the patient.

- direct to a respiratory ward bed (404 or 402) if weaning from NIV (not acidotic) and not suspected or confirmed COVID-19, or COVID-19 excluded by microbiological testing.
- If no respiratory beds are available the patient will **not** be transferred to ED at Derby.

Infection prevention and control (IPC) measures for healthcare workers

- Healthcare workers looking after patients on NIV should wear full PPE (FFP3 masks, gloves, visors or goggles and long-sleeved gowns).
- Attention should be given to minimising mask leak in order to reduce the chances of infectious transmission (e.g. by ensuring correctly sized mask for patient, appropriate tension on mask head straps, avoiding excessive ventilation pressures and minimising patient-ventilator asynchrony).
- Circuits should be switched from a vented mask to a non-vented mask and an exhalation port, if available. An expiratory antimicrobial filter should be included and should be changed every 24 hours and between different patients. Humidification should not be used.
- The mask should be applied to the patient **before** turning on the ventilator. The ventilator should be turned off **before** removing the mask.

Weaning and palliation

- Safe and timely NIV weaning is key to maintaining an available bed base and patient flow.
- Frequent blood gases are usually unnecessary. One blood gas at 1-2 hours post-commencement of NIV is usually sufficient, particularly if clinically improving.
- Patients started on NIV should be weaned as soon as pH is within the normal range (>7.34) usually regardless of pCO2.
    - Day 1 – Reduced NIV usage to '2 hours on and 2 hours off'
    - Day 2 – NIV usage overnight only.
    - Day 3 – Stop NIV.
- The weaning process may need to be slower if patients develop respiratory acidosis on attempted weaning or are felt to be clinically unstable.
- Some patients may be suitable to wean more quickly (e.g. within a few hours of starting NIV) particularly if decompensation is precipitated by 'oxygen toxicity'.
- Most patients will respond within 48 hours of starting NIV if they have acceptable compliance (at least 6 hours per 24 hour day) and are on adequate pressures. If no clinical improvement or NIV dependent beyond 72 hours of treatment (particularly if COPD)

consideration should be given to withdrawl of care/palliation as mortality in this group is very high.

3) Respiratory support for patients with acute hypoxaemic respiratory failure.

- Acute hypoxaemic respiratory failure in patients with Covid-19 may be due to any or a combination of the following:
    - ARDS
    - Viral and co-existent bacterial pneumonia (be aware that viral pneumonic change may not be visible on plain CXR)
    - Viral exacerbation of underlying airways disease
- Avoid hyperoxia in COVID-19 patients**;**
    - **Give supplemental oxygen therapy to target saturations of 92-94%** (if no risk factors for hypercapnic respiratory failure).
    - This is a different range to most hypoxaemic patients who would be targeted at 94-98% (if no risk factors for hypercapnic respiratory failure).
- Give empiric broad spectrum antibiotic therapy within 1 hour of assessment for patients with sepsis.
- If known/suspected COVID-19 pneumonia patients should be prescribed Dexamethasone 6mg orally or intravenously once daily for 10 days or until discharge if they have an oxygen requirement or a respiratory rate >30 on air.
- Patients should be assessed for suitability for IV Remdesivir (see Trust Guideline on Initial Management of known or suspected COVID-19).
- Use a conservative fluid management strategy in patients with severe respiratory infection where there is no evidence of shock.
- All patients with an oxygen requirement of ≥28% Venturi or >2L/min via nasal cannulae should be encourage to adopt prone positioning (with the aid of nursing/physiotherapy assistance if needed). Please consult Trust guideline on proning available via Koha.
- Some patients will have a high oxygen requirement. This can be delivered using a mask and reservoir bag, with flow rates of oxygen from 10-15L/min.
- In patients at risk of hypercapnic respiratory failure (e.g. morbid obesity, severe COPD,

restrictive chest wall disorders, neuromuscular disorders) use nasal prongs to deliver oxygen and titrate saturations to 88-92%. Venturi facemasks may be used if significant oxygen sensitivity.

- Patients with saturations <93% on a reservoir bag AND clinical signs of respiratory distress should be referred urgently to ICU for consideration of intubation and invasive mechanical ventilation if clinically appropriate, taking in to account comorbidities and functional status.
- CPAP therapy may be indicated in *selected* patients with hypoxaemic respiratory failure. It may have a role in both delaying the time to intubation or preventing the need for intubation in some cases. See Trust algorithm on use of CPAP in COVID patients with respiratory failure.
- NIV should **NOT** be used routinely in patients with hypoxaemic respiratory failure but **MAY** have a role as a ceiling of care treatment in selected patients not suitable for intubation.
- High flow nasal oxygen (HFNO) should may be appropriate in patients with hypoxaemic respiratory failure, particularly if intolerant of CPAP treatment.
- **Any decision regarding the potential use of HFNO, CPAP or NIV should be discussed with the ward Consultant (if the patient is situated on a respiratory base ward) or the Respiratory Consultant on call (if out of hours, or patient is on a non-respiratory ward).**
- NIV or CPAP should be used either in a negative pressure side room (402) or in the sealed CPAP bay on ward 404. Attending healthcare workers should use full PPE (see above).