Publications approval reference: 001559

Specialty guides for patient management during the coronavirus pandemic

Clinical management of persons admitted to hospital with suspected COVID-19 infection

NHS England and NHS Improvement

Contents

1. Introduction

This document has been produced by the COVID-19 clinical cell and is based on the World Health Organization's (WHO) interim guidance dated 28 January 2020 and existing relevant national guidance (eg National Institute for Health and Care Excellence (NICE) sepsis guideline and pneumonia guideline, and the British Thoracic Society (BTS) emergency oxygen guidelines).

This guidance is for clinicians caring for adults and children admitted to hospital with suspected COVID-19 infection. It does not replace clinical judgement or specialist consultation. **As we gain experience in treating COVID-19, recommendations will rapidly change so please check key professional websites and www.england.nhs.uk/coronavirus/**

The interventions in this guidance are based on currently available information or best practice statements.

2. Early recognition of patients with suspected COVID-19 infection

COVID-19 infection may present with mild, moderate or severe illness; the latter includes severe pneumonia, acute respiratory distress syndrome (ARDS), sepsis and septic shock. Early recognition of suspected patients allows timely initiation of infection prevention and control (IPC) measures.

Early identification of those with severe manifestations allows immediate optimised supportive care and safe, rapid admission (or referral) to critical care units.

For those with mild illness, hospitalisation may not be required unless there is concern for rapid deterioration. **All patients discharged home should be instructed to return to hospital if they develop any worsening of the illness**.

Persons under 15 years of age have been less affected (about 1% of hospitalised cases in Guan, China).

2.1 Definitions

Case definitions for COVID-19: see GOV.UK for latest case definitions.

Patients who require admission to hospital **and** have:

- either clinical or radiological evidence of pneumonia **or**
- acute respiratory distress syndrome (ARDS) **or**
- influenza-like illness

are considered possible cases, regardless of their epidemiological links.

Clinical features at presentation are not discriminatory for COVID-19 infection, particularly when symptoms are mild. A combination of new fever, cough, lymphopaenia and bilateral lung infiltrates is characteristic, but not diagnostic.

Clinicians should be alert to the possibility of atypical presentations in patients who are immunocompromised.

2.2 Categorisation of types of clinical syndromes associated with COVID-19 infection

2.2.1 Mild respiratory tract illness, similar to acute bronchitis, in previously healthy persons

These persons do not usually require hospital management for illness severity alone, but may be hospitalised for other reasons.

2.2.2 Mild respiratory illness, similar to acute bronchitis, in persons with chronic comorbid illness(es)

These persons may require hospital management for worsening of their chronic comorbid illness(es), such as exacerbation of asthma.

2.2.3 Persons presenting with pneumonia

These persons may be severely ill and present with features of sepsis or septic shock. Progression to respiratory failure and ARDS may occur in a minority around 5 to 12 days following symptom onset. Most patients presenting with pneumonia can be expected to require hospital management.

2.3 Clinical course associated with COVID-19

Uncomplicated illness	Patients with uncomplicated upper respiratory tract viral infection may have non-specific symptoms such as fever, cough, sore throat, nasal congestion, fatigue, headache or muscle pain. Incubation period is 14 days. The elderly or immunosuppressed may present with atypical symptoms.
Complicated illness (pneumonia, ARDS or septic shock)	**Onset** Clinical deterioration is described in about 15–25% of reported cases, with new or worsening respiratory symptoms within 5 to 12 days of the onset of mild symptoms. The average time from symptom onset to: • admission to hospital is 7 days • ARDS is 8 days • admission to intensive care unit (ICU) is 10 days. Those with underlying medical conditions (diabetes mellitus (any type), chronic respiratory disease including asthma, chronic cardiovascular disease including hypertension and severe immunosuppression as per Green Book definition) are significantly more likely to progress to complicated illness. Lymphopaenia is common (>75%). **Chest imaging** (plain radiograph, CT scan or lung ultrasound) Three patterns are described on CT chest imaging according to stage of illness (from symptom onset): • early (0-2 days): normal or rounded ground-glass opacities • intermediate (5-10 days): crazy-paving opacities • late (>10 days): consolidation. The changes are bilateral in most (>60%) with the lung periphery and lower lobes most involved. Early ground-glass appearances may not be visible on plain chest X-rays. **Organ failures** Up to 50% of critical care cases have exhibited cardiac injury (troponin rise), renal injury or liver dysfunction, and up to 30% have developed shock with multi-organ dysfunction. Mortality in ICU-admitted patients is about 50%.

3. Early supportive therapy and monitoring

3.1 Assess the need for oxygen supplementation in line with BTS guidelines

3.2 Assess the need for fluid replacement/resuscitation

In line with sepsis guidelines: NICE Sepsis: recognition, diagnosis and early management (NG51).

3.3 Consider empirical antimicrobial treatment

In line with NICE pneumonia guidance, lower respiratory tract infection (LRTI) guidelines and sepsis guidelines

There is no observed predilection for particular secondary bacterial infections with COVID-19. The main value of antimicrobial agents will be to treat non COVID-19 infections, either before a COVID-19 test result is available or because of suspected co-infection. The choice of antibiotic should follow local protocols for treating respiratory infections.

Empirical therapy should be de-escalated on the basis of microbiology results and clinical judgement.

For patients in whom COVID-19 infection is **confirmed** and there are no indications of a secondary bacterial infection, stopping **empirical antibiotics early should be considered.**

3.4 Corticosteroids

High-dose corticosteroids should **not** be routinely given to treat viral pneumonia or ARDS: their effectiveness is unproven and they are possibly harmful.

Low-dose corticosteroids may be given if indicated for another reason (such as exacerbation of asthma or chronic obstructive pulmonary disease, COPD) or as part of a clinical trial.

3.5 Non-invasive ventilation

Clinical need should determine the use of non-invasive ventilation (NIV) and high-flow nasal oxygen (HFNO), taking into account IPC considerations. There are no grounds for an indiscriminate ban on the use of NIV or HFNO.

In general, if invasive mechanical ventilation (IMV) is appropriate, its use is preferred over NIV for IPC reasons. NIV is preferred over HFNO because of its lower risk of disease transmission and lower consumption of oxygen supplies.

If a patient is failing to respond to non-invasive support, early transfer from NIV (or HFNO) to IMV is advisable to prevent delay in intubation (with the exception of patients with a ceiling of non-invasive respiratory support).

Appendix 1 gives further advice on the use of NIV and HFNO from the New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG).

Please also refer to the latest IPC guidance regarding the use of NIV (and HFNO).

4. Management of hypoxaemic respiratory failure and ARDS

4.1 Recognise severe hypoxaemic respiratory failure when a patient with respiratory distress is failing standard oxygen therapy

Patients may continue to have laboured breathing or be hypoxaemic even with oxygen delivered via a face mask with a reservoir bag (flow rates of 10–15 L/min, which is the minimum flow typically required to maintain bag inflation; FiO_2 0.60–0.80).

4.2 Endotracheal intubation should be performed by a trained and experienced provider using airborne precautions

Facemask ventilation is a potentially aerosol-generating procedure. The operator should wear appropriate respiratory personal protective equipment (PPE); please refer to Public Health England's (PHE) guidance.

4.3 Strategies for the management of ARDS

4.3.1 Follow established ARDS management guidance

- Lung protective ventilation.
- Conservative fluid management.
- Neuromuscular blockade.
- Lung recruiting manoeuvres or ventilatory modes.
- Prone positioning.

4.4 Extracorporeal membrane oxygenation (ECMO)

Consider referring patients with refractory hypoxaemia or respiratory acidosis despite optimal conventional ventilation.

In cases of refractory severe respiratory failure, follow established NHS England guidance for referral to the ECMO network.

ECMO should only be offered in a designated centre with ECMO capability.

5. Management of septic shock

Follow recognised guidance for the management of sepsis and septic shock.

Although published data indicates intravenous immunoglobulin (IVIg) is used in up to 70% of cases of septic shock, its routine use in COVID-19 is **not recommended**.

6. Practical management in critical care

Where possible, patients should be moved to an isolation environment within critical care. Ideally, this will be a negative pressure room or a neutral pressure single occupancy room. The verification code for this document is 762796

Critical care departments are advised to review isolation room air handling systems to ensure pressure and air cycling functions are operational.

Avoid disconnecting the patient from the ventilator as this may aerosolise respiratory secretions. Manual ventilation, or ‘hand-bagging’, is not advised. Tighten all ventilatory circuit connections to ensure that accidental disconnection does not occur. Use in-line catheters for airway suctioning and clamp the endotracheal tube when disconnection is required (eg when transferring patient to a transport ventilator or changing an in-line heat and moisture exchange (HME) filter).

All ventilator circuits should be protected with a high efficiency filter. Consider using an expiratory limb or ventilator exhaust HME filter. Be aware that in-line HME filters can increase resistance and possibly obstruct the ventilator circuit. Routine exchange is advised to avoid unintended consequences. Some models of ventilator may accommodate a filter to further protect against contaminating the environment.

A greater number of critical care staff are likely to be required to safely manage suspected patients. Donning and doffing PPE can be time-consuming and individuals will vary in how long they can tolerate wearing a FFP3 mask. See the PHE guidance for details.

Restrict access for non-essential staff members and visitors.

Aerosol-generating procedures such as bronchoscopy and respiratory physiotherapy should be limited to essential indications.

Routine testing of body fluids should be limited to those that are essential. If possible, use point-of-care testing for blood gas analysis.

Repeat COVID-19 PCR testing of respiratory samples is useful in guiding management of extubation or tracheostomy formation.

6.1 Cardiac arrest

PPE must be worn by all members of the resuscitation team. Prolonged facemask ventilation should be avoided. Consideration using an automated chest compression device.

6.2 Care of the patient's family and friends

The default position should be to prohibit direct contact between a patient with confirmed COVID-19 and asymptomatic family members.

7. Specific anti-COVID-19 treatments and clinical research

There is no current evidence from randomized controlled trials to recommend any specific anti-COVID-19 treatment. The unique code for this document is 762796.

Consider patient enrollment to UK clinical trials, including the RECOVERY trial.

8. Special considerations for pregnant patients

Pregnant women should be treated with supportive therapies as described above, taking into account the physiological adaptations of pregnancy.

The use of investigational therapeutic agents outside of a research study should be guided by individual risk–benefit analysis, based on potential benefit for mother and safety to fetus and in consultation with an obstetric specialist and ethics committee.

Emergency delivery and pregnancy termination decisions are challenging and based on many factors: gestational age, maternal condition and fetal stability. Consultation with obstetric, neonatal and intensive care specialists (depending on the condition of the mother) is essential.

The Royal College of Obstetricians and Gynaecologists has produced information for healthcare professionals.

Appendix 1: NERVTAG advice on the use of non-invasive ventilation (NIV) and high-flow nasal oxygen (HFNO) for patients with suspected or confirmed CIVID-19 infection

Key principles

1. NIV is mainly a droplet (>5 μm)-generating procedure rather than an aerosol (<5 μm)-generating procedure.
2. Studies of NIV during the SARS outbreak (2003) are not necessarily applicable today due to improvements in mask design and measures to increase patient tolerance of NIV.
3. More recent studies suggest NIV does not pose a much higher risk of droplet or aerosol generation compared to chest physiotherapy.
4. In clinical practice, leakage (around the mask) is common, and contributes to increased dispersion of droplets.
5. There is scant data on HFNO in relation to disease transmission. Available studies are not directly applicable to COVID-19.
6. In particular, there is insufficient data to indicate whether HFNO is as safe as NIV.
7. Theoretically, because HFNO circuits are ‘leaky’, they may pose a higher risk compared to NIV (especially if the latter is used with full-face or helmet masks, or with double-limbed circuits ± filters over expiratory vents/ports).
8. In general, in terms of disease transmission, NIV and HFNO may be similar but the safety signal (more evidence-based) is stronger for NIV.

Key recommendations: NIV and HFNO

In relation to **patients with <u>suspected or confirmed</u> COVID-19 infection:**

1. Indications for the use of NIV should be based on clinical need, taking into account IPC considerations. There are no grounds for an indiscriminate ban on the use of NIV.

2. In general, if invasive mechanical ventilation (IMV) is appropriate, then IMV is preferred over NIV for IPC reasons.
3. Healthcare workers looking after patients on NIV should wear full PPE (eye protection, N95 or higher respirators, gloves and long-sleeved gowns).
4. Patients on NIV should be managed in negative pressure facilities whenever possible.
5. If required, patients on NIV may be managed in side-rooms, with the door closed. Air exchanges in side-rooms should be checked and adhere to standard IPC guidelines.
6. Under exceptional circumstances, patients on NIV may be managed in a cohort bay where all cohorted patients have **confirmed** COVID-19 infection. Factors to take into account include: access to toilet facilities, thoroughfare for other patients/relatives/staff, air flow and air exchanges.
7. Use of HFNO should follow similar principles as for NIV. However, NIV is preferred over HFNO in relation to the risk of disease transmission, and lower consumption of oxygen supplies.
8. If a patient is failing to respond to non-invasive support, early transfer from NIV or HFNO to IMV is advisable to prevent delay in intubation (with the exception of patients with a ceiling of non-invasive respiratory support). Siting of patients (for NIV or HFNO) will need to take into account, where possible, escalation of care, such as need for intubation and patient transfer.
9. These recommendations should be reviewed before surge capacity is reached or when new evidence becomes available.

This publication can be made available in a number of other formats on request. Please call 0300 311 2233 or email england.contacts@nhs.net

Please contact national Emergency Preparedness Resilience and Response regarding the content of this document at england.eprr@nhs.net

Publication approval reference: 001559