Oxygen therapy with Limited Resources
COVID-19 Severe Acute Respiratory Infection (SARI) and Pneumonia

Key points
1 Practical implementable oxygen therapy. 2 Prevent infections in hospital staff.

Suspect and confirm diagnosis of COVID-19 infection clinically, by case definition or by laboratory test
   Start infection prevention and control (IPC) measures1. Consider issues of staff personal protection (PPE), medical equipment and COVID-19 hospital areas4.

Suspect severe pneumonia and confirm need for oxygen2
   Adult or adolescent with fever or suspected respiratory infection, plus one of: respiratory rate > 30 breaths/min; severe respiratory distress; or SpO2 ≤ 93% on room air.
   Child with cough or difficulty in breathing, plus at least one of the following: central cyanosis or SpO2 < 90%; severe respiratory distress (e.g. grunting, very severe chest indrawing); signs of pneumonia with a general danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions. Other signs of pneumonia may be present: chest indrawing, fast breathing (in breaths/min): < 2 months: ≥ 60; 2–11 months: ≥ 50; 1–5 years: ≥ 40.

Confirm hypoxia with pulse oximeter2
   Start oxygen therapy if SpO2 < 90%
   Use oxygen delivery device: nasal cannula (prongs) or nasal catheter or facemask nasal prongs for child < 5 years
   Adjust O2 flow to target SpO2 > 90% adults, children, SpO2 > 92 - 95% in pregnant patients
   If SpO2 << 90%, suspect Acute Respiratory Distress Syndrome. Consider need for advanced oxygen therapy and mechanical ventilation. If possible these patients should to be moved to another ward with appropriate medical equipment and IPC measures.

Oxygen delivery devices3
   Nasal cannula O2 2 – 4 L/min
   Nasal catheter O2 2 – 4 L/min
   Simple facemask O2 5 – 12 L/min
   High performance mask (venturi). O2 flow rate device specific 4 – 15 L/min
   Non-rebreathing mask with reservoir bag. Need high O2 flow rates > 10 L/min
   Caution with aerosolised droplet spread with high flow O2 from all devices
   Humidification may be used but equipment is a potential site of contamination

The resource limitations are oxygen supply or availability of oxygen delivery devices
   Assess and monitor oxygen supply.
   Consider disinfection of nasal cannula, catheters and masks. Infection prevention and control (IPC) measures are very important with contaminated medical equipment4.

Oxygen supply3
   Oxygen concentrators produce 4 – 10 l/min O2
   Cylinders may not easily be refilled
   Bulk supply may not be available
Decontamination and Disinfection\textsuperscript{4, 5}
Decontaminate by mechanically cleaning oxygen delivery devices of blood, mucus and secretions. Disinfect with 70\% (Ethyl or Isopropyl) alcohol or soak in 0.1\% sodium hypochlorite solution (1000 ppm available chlorine) for 30 mins.

Preparation of 0.1\% sodium hypochlorite solution\textsuperscript{4}
Dilute household bleach (widely available), usually 5\% = 5g sodium hypochlorite /100ml 1:50 with tap water. Add 1 measure of bleach to 49 measures of tap water. 5\% sodium hypochlorite contains 50,000 ppm available chlorine, and the dilution contains 1000 ppm.

Check the concentration of the bleach sodium hypochlorite on label (in g/100ml) and adjust dilutions accordingly. For example: 2.5\% sodium hypochlorite bleach contains 2.5g sodium hypochlorite /100ml. To 1 measure of bleach add 24 measures tap water. 4.2\% sodium hypochlorite bleach contains 4.2g sodium hypochlorite /100ml. To 1 measure of bleach add 41 measures tap water. The dilutions all contain 1000 ppm available chlorine.

Prepare a container of solution in a well ventilated place. Avoid direct contact with eyes. Store covered, cool and shaded. Discard at 24 hours. Do not mix with detergents.

Thoroughly rinse the oxygen delivery devices before reuse.

References:

1 Infection prevention and control during health care when COVID-19 is suspected. Interim guidance 19 March 2020 WHO

2 Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected. Interim guidance 13 March 2020 WHO


Document author: Dr Haydn Perndt AM FFARCS FANZCA MPH &TM
Clinical Associate Professor, School of Medicine, University of Tasmania, Australia

Email: haydn.perndt@utas.ed.au