

GUIDANCE FOR AWAKE PRONE VENTILATION IN THE NON-INTUBATED CONSCIOUS PATIENT



Prone positioning in spontaneously breathing non-intubated COVID-19 patients

This document provides guidance for African Union Member States on the use of awake prone positioning in non-intubated coronavirus disease (COVID-19) patients. It is intended for use among clinicians taking care of moderate to severe COVID-19 cases.

The COVID-19 outbreak has brought with it the need for improved critical care for patients who develop severe disease. The majority of COVID-19 patients present with mild to moderate illness, 15% develop severe illness and about 5% develop critical conditions needing intensive care unit (ICU) care, requiring non-invasive or invasive ventilation (1).

The mainstay of treatment for COVID-19 is supportive care; meaning close monitoring of signs and symptoms (especially respiratory status), nutritional support, thromboprophylaxis, pain management and, in severe cases, oxygen therapy. Oxygen therapy can be delivered via nasal cannula, face masks, high flow nasal oxygen therapy, continuous positive airway pressure therapy, and invasive ventilation. Each of these modalities delivers an increasing amount of fractional inspired oxygen (FiO₂). The targeted oxygen saturation

(SpO₂) level in COVID-19 patients is 93% and above. Supplemental oxygen is the first essential step for the treatment of COVID-19 patients with hypoxaemia and should be a primary focus in resource-limited settings, where capacity for invasive ventilation is limited.

With the increasing number of COVID-19 cases in most countries worldwide, it is vital to look at alternatives to mechanical ventilation, particularly in resource-limited settings where few or no ventilators may be available.

In patients with acute respiratory distress syndrome who are invasively ventilated, prone ventilation is a strategy that improves oxygenation status and reduces mortality compared to conventional supine ventilation (2). It was part of the standard of care in Wuhan City, China at the height of the epidemic there (3). Its use is also supported by the findings of the 'PROSEVA' trial (4) and a recent Cochrane systematic review and meta-analysis.

Prone positioning in spontaneously breathing COVID-19 patients has been used by some clinicians and has improved oxygenation in non-ventilated

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patients (2, 5). Although no randomized controlled trial data exist on the extent to which prone positioning in self-ventilating patients improves outcomes, many published series have noted marked decreases in the need for intubation including from 60% to 10% in one series (6). Other studies have observed a marked and sustained improvement in SpO₂ when prone position has been adopted (7, 8).

Improved oxygenation as a result of prone positioning is thought to be related to:

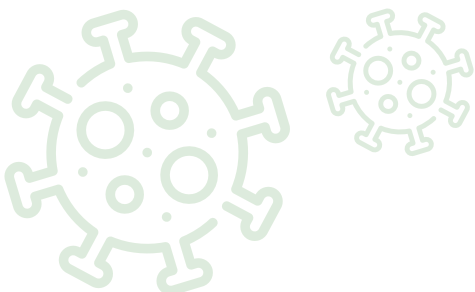
- recruitment of previously collapsed alveoli in the posterior lungs;
- improved resorption of lung secretion to prevent atelectasis;
- improved ventilation–perfusion matching (6).

Prone positioning in a spontaneously breathing COVID-19 patient is a simple, limited cost, and safe intervention that can be performed while patients receive oxygen therapy, including continuous positive airway pressure therapy. Given its potential for improving oxygenation in COVID-19 patients [3], we advocate that a trial involving conscious, prone-positioned cases be performed on all suitable ward patients. Prone positioning should be applied for a minimum duration of three hours per day, up to a maximum of 18 hours per day if tolerated by the patient. If the patient is uncomfortable, he/she might be allowed to rotate between full prone and semi-prone/lateral position while minimizing their stay in a full supine position.

The presence of hypoxaemia should not always trigger intubation because hypoxemia is often well tolerated. Patients who are fatigued and at increased risk of exhaustion because of respiratory distress will, however, require invasive ventilation (9).

Indications

1. Patient is conscious and requires FiO₂ ≥ 28%.
2. Patient is conscious and requires basic respiratory support to achieve an SpO₂ of 92% to 96% (88% to 92% if risk of hypercapnic respiratory failure exists).



Absolute contraindications

- Increased intracranial pressure > 30 mm Hg.
- Massive haemoptysis requiring an immediate surgical or radiological intervention.
- Facial injury, trauma or surgery during previous 15 days.
- Deep venous thrombosis treated for less than two days.
- Cardiac pacemaker inserted in the past two days.
- Open chest surgery, heart surgery or chest trauma.
- Spinal instability.
- Unstable spine, femur or pelvic fractures.
- Lung transplantation.
- Burns on more than 20% of the body surface, especially on the ventral surface.
- Second and third trimester of pregnancy.
- Life-threatening cardiac arrhythmias.

Relative contraindications

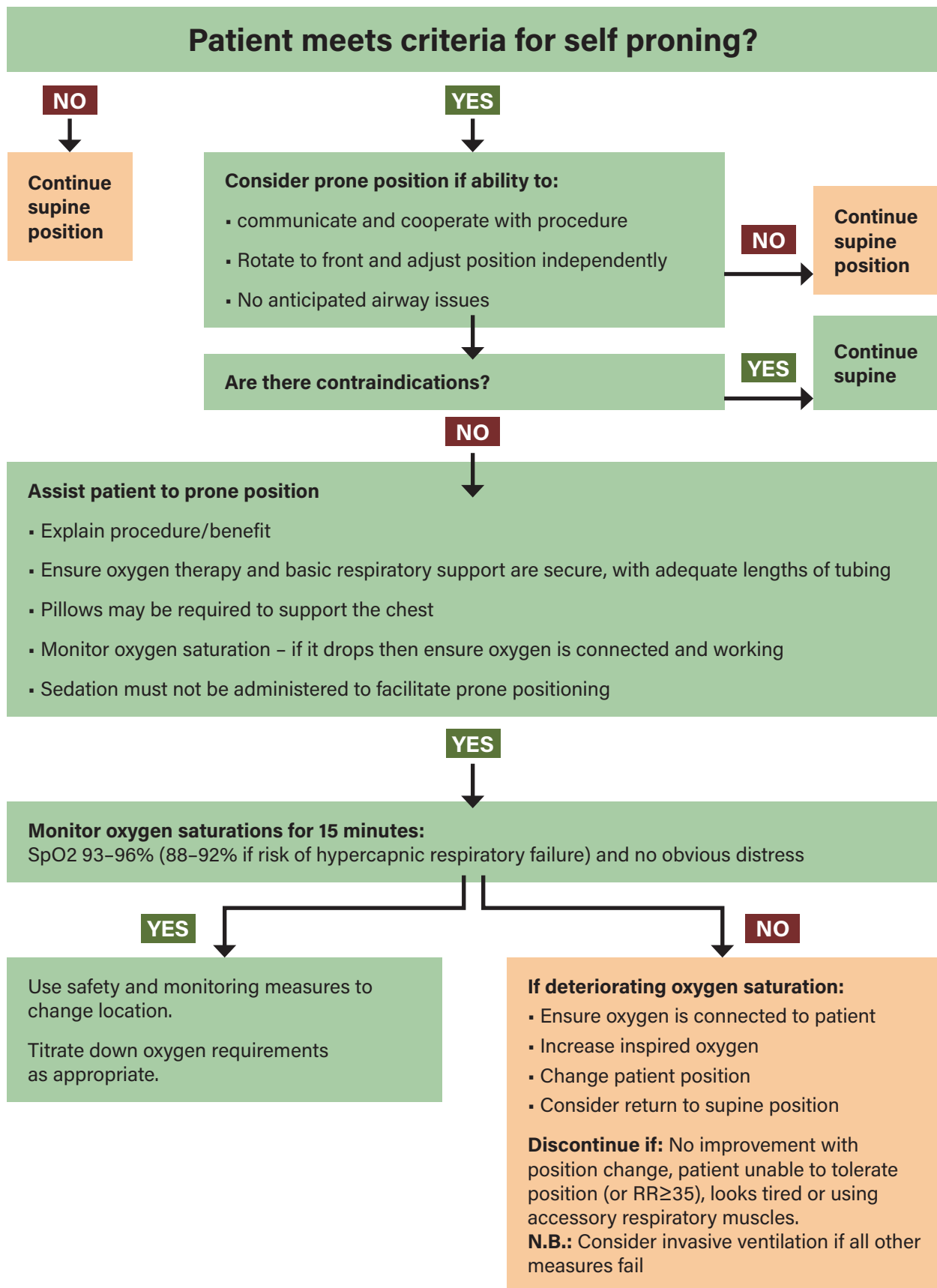
- Recent tracheostomy < 24 hours.
- Cardiovascular instability despite fluid resuscitation.
- Respiratory distress (RR ≥ 35, PaCO₂ ≥ 6.5, use of accessory respiratory muscles).
- Haemodynamic instability (systolic blood pressure < 90 mmHg) or arrhythmia.
- Pressure sores or ulcers.
- Morbid obesity.
- Previous poor tolerance of prone position.
- Agitation or altered mental status.

Safety and monitoring measures

Use timed position changes for patients undergoing conscious prone positioning on a flatbed.

- a. Monitor oxygen saturations 15 minutes after every position change.
- b. The patient can position themselves with their arms to their side or abducted to less than 90 degrees at the shoulder and flexed at the elbow ('prone Superman' or 'chicken wings posture')(6).
- c. Instruct patient to change positions as follows:
 - i. 30 mins to 2 hours of lying fully prone on a flatbed.
 - ii. 30 mins to 2 hours of lying on the right side on a flatbed.
 - iii. 30 mins to 2 hours sitting up at 30–60 degrees by adjusting the head of the bed.
 - iv. 30 mins to 2 hours lying on the left side on a flatbed.
 - v. 30 mins to 2 hours of lying prone again.

Figure 1. Algorithm decision tool and the conscious prone positioning process



The algorithm above (Figure 1) outlines the process for using a prone position among COVID-19 patients after assessing the patients need for respiratory support to achieve SpO2 93%, and ensuring absence of contraindications. Patients must be closely monitored during prone positioning, to check for fatigue and any deterioration in oxygen saturations.

References

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