

### Question

What is the latest evidence regarding conscious proning of COVID-19 patients?

At what level of oxygen is it best to commence proning?

When should you stop proning as the patient is improving?

### Short Answer

The current evidence for conscious proning is of poor quality and fails to answer several key questions required to inform clinical practice, including the optimum conditions for commencing and ceasing proning. There are multiple RCTs underway that will address these gaps in knowledge over the coming months.

### Long answer

The following question was submitted to the HSE National Health Library and Knowledge Service COVID-19 Evidence Team in April of this year:

*What is the evidence to support prone positioning of awake COVID-19 patients receiving non-invasive ventilation or ventilating on room air?*

The National Health Library answer was published on April 28<sup>th</sup> and can be found [here](#). This RapidInfo4U RESS will report on the latest evidence regarding conscious proning of COVID-19 patients, that is, evidence published after April 2020.

### The current evidence for conscious proning

The goal of prone positioning in awake non-intubated COVID-19 patients is to improve oxygenation and thereby delay or prevent intubation and improve patient outcomes. While there is strong evidence to support prone positioning for intubated mechanically ventilated patients with moderate to severe ARDS [1, 2, 3], there is limited evidence for prone positioning in awake non-intubated patients [4]. Mechanically ventilated patients require greater than

12 hours of prone positioning to receive a mortality benefit [2, 3]. It is unlikely that this duration would be tolerable for a conscious patient [5]. Recent reviews [5,6,7] of the research evidence for conscious proning in COVID-19 have reached the same conclusions; there is insufficient evidence and several key questions that remain unanswered:

1. What are the effects of conscious proning on patient outcomes?
2. Can conscious proning delay or avoid the need for invasive ventilation?
3. What is the optimal dose (frequency and duration) of conscious prone positioning?
4. What are the criteria for commencing and stopping prone positioning?
5. Which patients are most likely to improve and which ones should be excluded?
6. What are the potential adverse events that could occur?

There are currently a number of clinical trials underway that will provide answers to these questions in the near future, for example: [NCT04402879](#), [NCT04383613](#), [NCT04383613](#), [NCT04350723](#), [NCT04365959](#), [NCT04347941](#).

To date, there are no published RCTs on conscious proning for non-intubated COVID-19 patients. A recent review of the research literature found 29 studies that reported on the use of conscious proning in COVID-19 patients [5]. These 29 studies included a total of 364 patients in 11 prospective cohorts, 13 retrospective cohorts, and 5 case reports. Only one study included data from a control group and this was submitted as a letter to the editor of the journal *Intensive Care Medicine* [8]. The studies all varied in the prone positioning protocols implemented, the study setting and outcomes, the duration of follow-up and severity of hypoxemia. This heterogeneity demonstrates the low-quality nature of the evidence available for conscious proning for non-intubated COVID-19 patients. Nevertheless, this review reports that all but one of the included studies demonstrated improvements in oxygenation while patients were in the prone position although, in many cases these improvements were not sustained after returning to the supine position. It was not possible for the authors of the review to make any conclusions based on the data about the impact of improved oxygenation on clinical outcomes such as survival [5].

Harms that have been reported following proning for COVID-19 patients during mechanical ventilation include facial pressure ulcers (due to contact with pillow or fixation of

breathing tube), ear necrosis (due to folding of pinna), peripheral nerve injury (commonly in the upper limb) and meralgia paresthetica resulting in sensory abnormalities in the anterolateral thigh [9,10,11, 12]. These harms have not been reported in the case of conscious proning, however pain and discomfort have been reported [13].

### Current guidelines for conscious proning

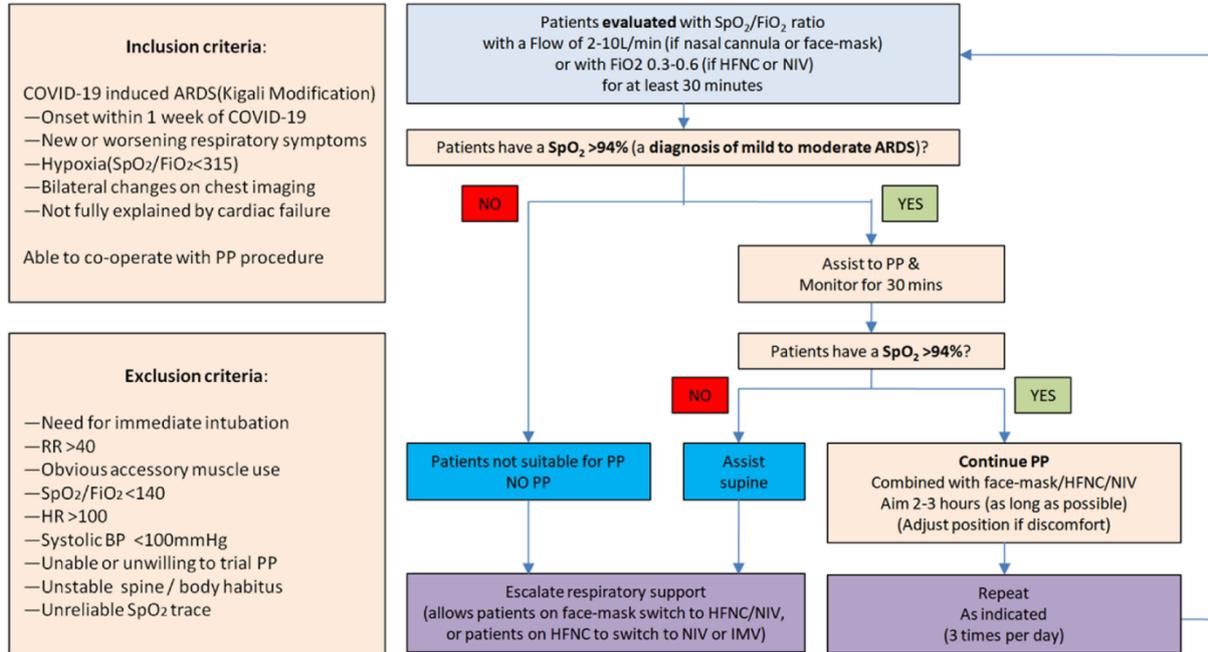
The UK Intensive Care Society (ICS) have developed guidance [14] including a flow diagram decision tool for the conscious proning process for COVID-19 patients, available [here](#). They recommend the following procedure for patients who fulfil the criteria for proning:

- 30 minutes to 2 hours lying fully prone (bed flat)
- 30 minutes to 2 hours lying on right side (bed flat)
- 30 minutes to 2 hours sitting up (30-60 degrees) by adjusting head of the bed
- 30 minutes to 2 hours lying on left side (bed flat)
- 30 minutes to 2 hours lying prone again

The ICS recommends monitoring oxygen saturations 15 minutes after each position change to ensure oxygen saturation has not decreased and to repeat the cycle while it is tolerable to the patient. An expert consensus of US based emergency medicine physicians with critical care training developed the following guidelines based on their review of the literature [15]:

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> <li>• Patients with suspected or confirmed COVID-19 and an oxygen requirement of &gt;4 L NC;</li> <li>• On a stretcher;</li> <li>• On continuous-pulse oximetry monitor;</li> <li>• Awake with a normal mental status;</li> <li>• Able to follow instructions;</li> <li>• Able to tolerate changes in position;</li> <li>• Able to call for help or have call bell within reach</li> <li>• Able to self-prone or change position with minimal assistance</li> </ul>	<ul style="list-style-type: none"> <li>• Normal oxygen saturation without need for supplemental oxygen source;</li> <li>• Altered mental status;</li> <li>• Inability to independently change position or tolerate positional changes;</li> <li>• Hemodynamic instability;</li> <li>• Inability to follow instructions or communicate with care team;</li> <li>• In a setting where patient is unable to be closely monitored.</li> </ul>

Finally, Bower & He [16] present a protocol for awake prone positioning in COVID-19 patients in the journal of Critical Care, reproduced here:



PP = prone position

## Conclusion

The current evidence for conscious proning is of poor quality and fails to answer several key questions required to inform clinical practice, including the optimum conditions for commencing and ceasing proning. There are multiple RCTs underway that will address these gaps in knowledge over the coming months.

## Disclaimer

This document has not been peer-reviewed; it should not replace individual clinical judgement. The views expressed in this document are not a substitute for professional medical advice. The content of this document is correct as of 27/11/20.

## Rapid Evidence Search & Summary (RESS)

Our team of multidisciplinary researchers and clinicians in conjunction with the University of Limerick Library and Information Services have developed a detailed protocol for conducting a Rapid Evidence Search & Summary (RESS) to answer questions submitted to RapidInfo4U. Our RESS protocol uses PICO or PEO methods to refine your question and follows a detailed search procedure capturing guidance

documents from governments, institutions and professional bodies; searching clinical and COVID specific repositories; and identifying the most recent reviews and RCTs in the scientific literature using established databases.

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