Morning Brief : Scientific Review

8 May 2020

The purpose of the Morning Brief is to **summarize** and present key information, research articles and other relevant publications pertaining to critical care and COVID-19. We aim to prioritise information, articles and publications released in the preceding 24-48hours.

Stellenbosch University Research Response Team

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Content of the brief

- **Global Statistics**
- **South African Statistics**
- **Topic: Awake/self-proning for COVID-19**

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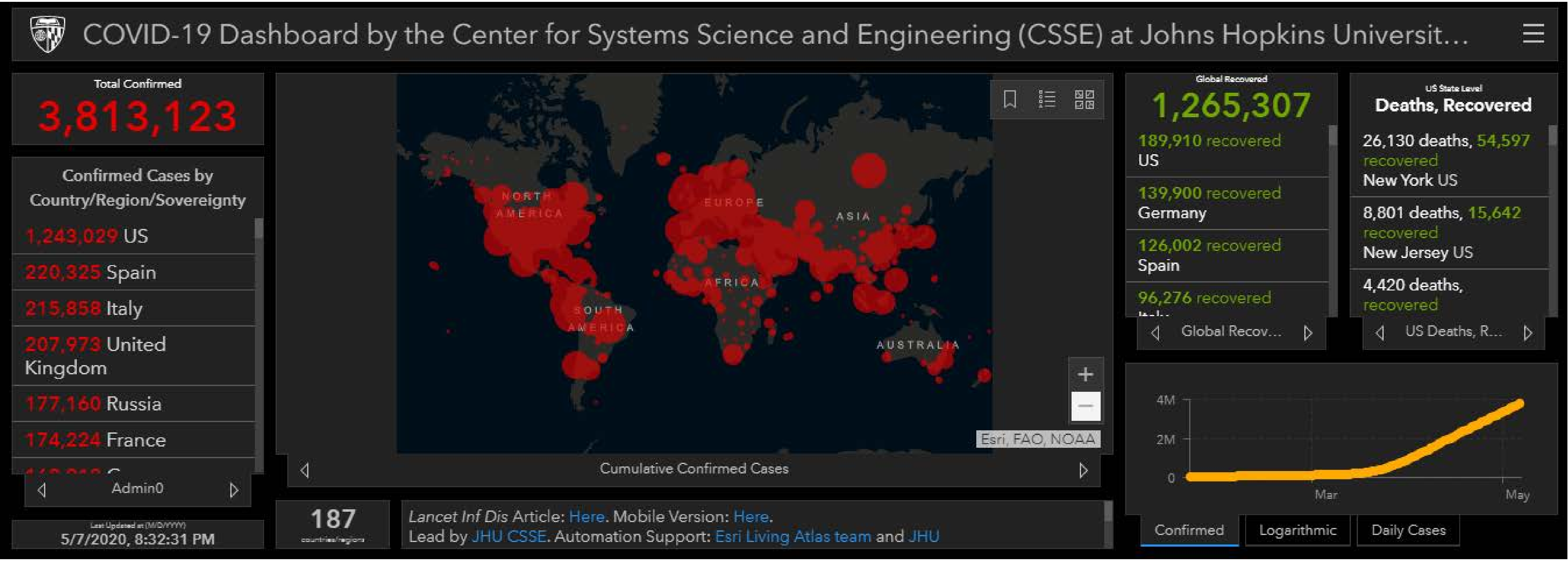
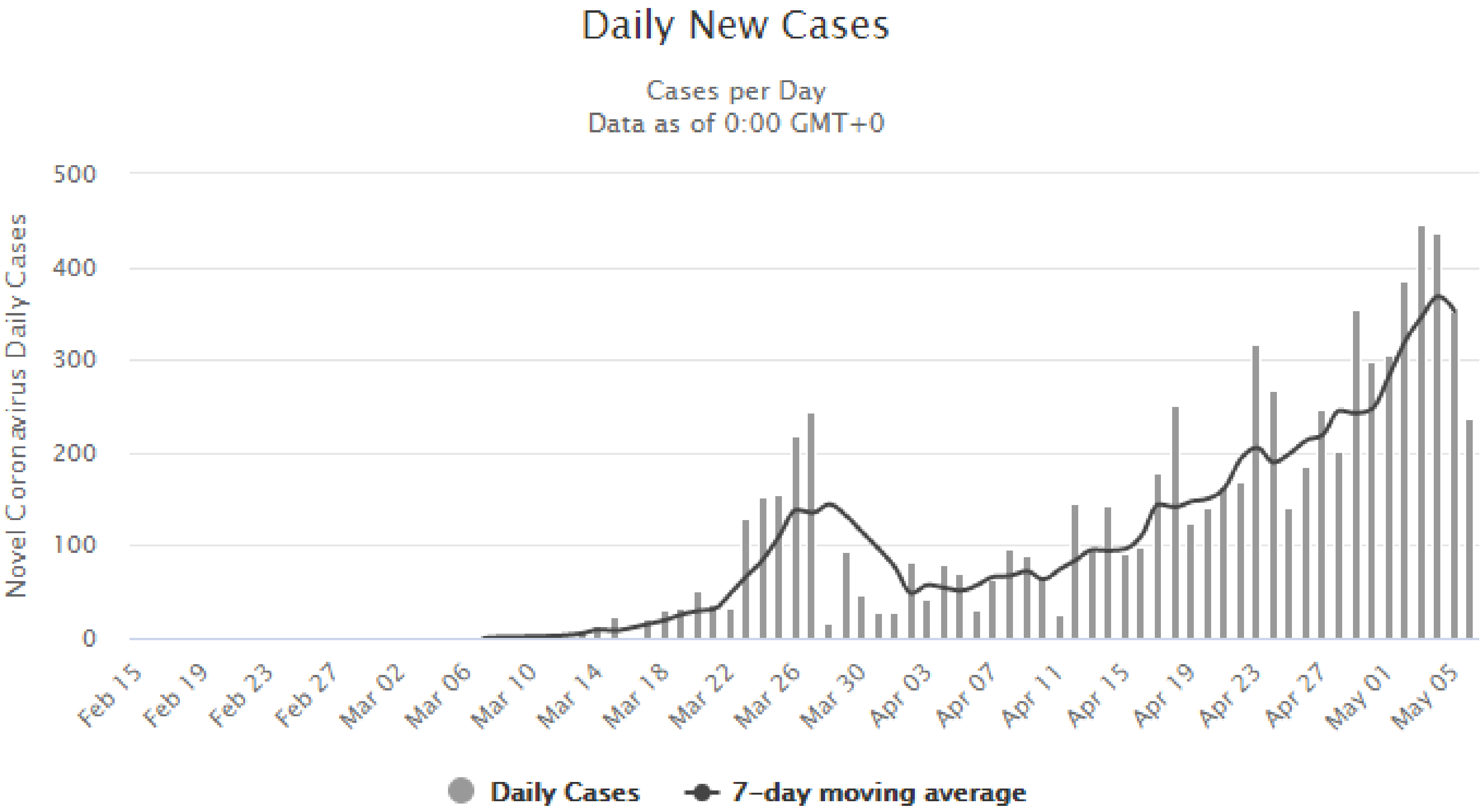
Global Statistics



Accessed at 20:53 on 7 May 2020
Source: https://coronavirus.jhu.edu/map.html

South African Statistics



Accessed at 20:55 on 7 May 2020

Source: https://www.worldometers.info/coronavirus/country/south-africa/ & https://www.covidvisualizer.com/

Articles of Interest

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Contents lists available at ScienceDirect

Journal of Critical Care

journal homepage: www.jccjournal.org

Prone positioning improves oxygenation in spontaneously breathing nonintubated patients with hypoxemic acute respiratory failure: A retrospective study☆,☆☆,★

Vittorio Scaravilli [a,*], Giacomo Grasselli [b], Luigi Castagna [a], Alberto Zanella [a], Stefano Isgrò [b], Alberto Lucchini [b], Nicolò Patroniti [a,b], Giacomo Bellani [a,b], Antonio Pesenti [a,b]

A B S T R A C T

Purpose: Prone positioning (PP) improves oxygenation and outcome of patients with acute respiratory distress syndrome undergoing invasive ventilation. We evaluated feasibility and efficacy of PP in awake, non-intubated, spontaneously breathing patients with hypoxemic acute respiratory failure (ARF).
Material and Methods: We retrospectively studied non-intubated subjects with hypoxemic ARF treated with PP from January 2009 to December 2014. Data were extracted from medical records. Arterial blood gas analyses, respiratory rate, and hemodynamics were retrieved 1 to 2 hours before pronation (step PRE), during PP (step PRONE), and 6 to 8 hours after resupination (step POST).
Results: Fifteen non-intubated ARF patients underwent 43 PP procedures. Nine subjects were immunocompromised. Twelve subjects were discharged from hospital, while 3 died. Only 2 maneuvers were interrupted, owing to patient intolerance. No complications were documented. PP did not alter respiratory rate or hemodynamics. In the subset of procedures during which the same positive end expiratory pressure and FIO_2 were utilized throughout the pronation cycle (n = 18), PP improved oxygenation (PaO_2/FIO_2 124 ± 50 mmHg, 187 ± 72 mmHg, and 140 ± 61 mmHg, during PRE, PRONE, and POST steps, respectively, $P < .001$), while pH and $PaCO_2$ were unchanged.
Conclusions: PP was feasible and improved oxygenation in non-intubated, spontaneously breathing patients with ARF.

Retrospective

15 patients with hypoxaemia, mostly due to pneumonia (NON-COVID)

Most were on facemask oxygen, some on NIV via facemask or helmet CPAP, one of HFNC (non-uniform practice in the cohort, some devices and settings changed between supine and prone)

Median 3 hours in prone, median twice per patient

Transient improvement in P:F ratio across all patients and proning events

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Ding *et al. Critical Care* (2020) 24:28
https://doi.org/10.1186/s13054-020-2738-5

Critical Care

RESEARCH Open Access

Efficacy and safety of early prone positioning combined with HFNC or NIV in moderate to severe ARDS: a multi-center prospective cohort study

Lin Ding[1,2,3,4†], Li Wang[1,2,3†], Wanhong Ma[5†] and Hangyong He[1,2,3*]

Abstract

Background: Previous studies suggest that prone positioning (PP) can increase PaO_2/FiO_2 and reduce mortality in moderate to severe acute respiratory distress syndrome (ARDS). The aim of our study was to determine whether the early use of PP combined with non-invasive ventilation (NIV) or high-flow nasal cannula (HFNC) can avoid the need for intubation in moderate to severe ARDS patients.

Methods: This prospective observational cohort study was performed in two teaching hospitals. Non-intubated moderate to severe ARDS patients were included and were placed in PP with NIV or with HFNC. The efficacy in improving oxygenation with four support methods—HFNC, HFNC+PP, NIV, NIV+PP—were evaluated by blood gas analysis. The primary outcome was the rate of intubation.

Results: Between January 2018 and April 2019, 20 ARDS patients were enrolled. The main causes of ARDS were pneumonia due to influenza (9 cases, 45%) and other viruses (2 cases, 10%). Ten cases were moderate ARDS and 10 cases were severe. Eleven patients avoided intubation (success group), and 9 patients were intubated (failure group). All 7 patients with a $PaO_2/FiO_2 < 100$ mmHg on NIV required intubation. PaO_2/FiO_2 in HFNC+PP were significantly higher in the success group than in the failure group (125 ± 41 mmHg vs 119 ± 19 mmHg, $P = 0.043$). PaO_2/FiO_2 demonstrated an upward trend in patients with all four support strategies: HFNC < HFNC+PP ≤ NIV < NIV+PP. The average duration for PP was 2 h twice daily.

Conclusions: Early application of PP with HFNC, especially in patients with moderate ARDS and baseline $SpO_2 > 95\%$, may help avoid intubation. The PP was well tolerated, and the efficacy on PaO_2/FiO_2 of the four support strategies was HFNC < HFNC+PP ≤ NIV < NIV+PP. Severe ARDS patients were not appropriate candidates for HFNC/NIV+PP.

Trial registration: ChiCTR, ChiCTR1900023564. Registered 1 June 2019 (retrospectively registered)

Keywords: Acute respiratory distress syndrome (ARDS), Prone positioning (PP), Non-invasive ventilation (NIV), High-flow nasal cannula (HFNC)

Moderate to severe NON-COVID ARDS
Prospective, Observational

NON-intubated, AWAKE patients
HFNC alone vs HFNC and Proning vs
NIV alone vs NIV and Proning

Measured P:F ratios, improved in all four strategies but most in the NIV+prone group.

Short duration of proning: average 2h twice daily

Sun et al. Ann. Intensive Care (2020) 10:33
https://doi.org/10.1186/s13613-020-00650-2
Annals of Intensive Care
LETTER TO THE EDITOR Open Access

Lower mortality of COVID-19 by early recognition and intervention: experience from Jiangsu Province

Qin Sun[1], Haibo Qiu[1], Mao Huang[2*] and Yi Yang[1*]

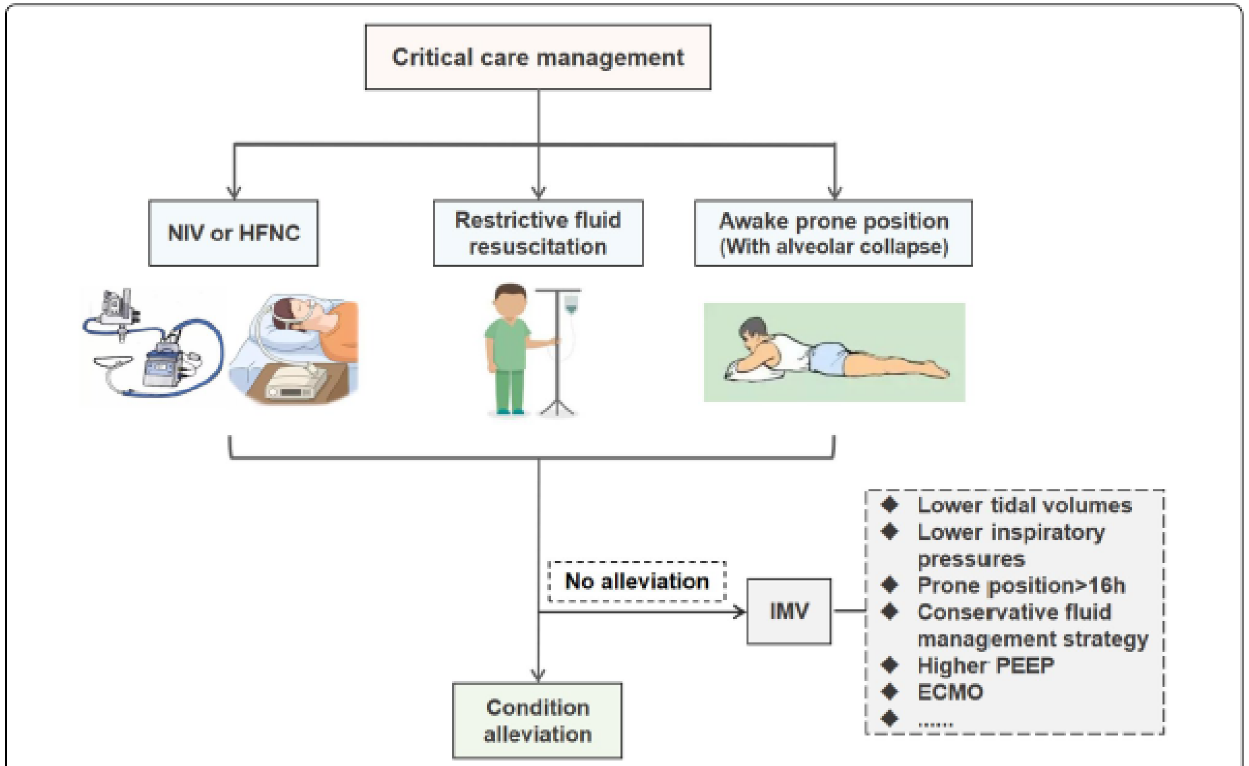

Fig. 2 Early intervention for patients with critical condition

Describes the approach to care of COVID-19 pneumonia patients in Jiangsu Province, China, where outcomes of critically ill patients was better than in Hubei Province.

With these interventions, the rate of critically ill patients was 10% but the rate of invasive mechanical ventilation was under 1%.

Interventions included early application of HFNC or NIV, and awake proning

Early Self-Proning in Awake, Non-intubated Patients in the Emergency Department: A Single ED's Experience during the COVID-19 Pandemic

Nicholas D. Caputo MD, MSc[1], Reuben J. Strayer MD[2], Richard Levitan MD[3]

Abstract

Objective: Prolonged and unaddressed hypoxia can lead to poor patient outcomes. Proning has become a standard treatment in the management of patients with ARDS who have difficulty achieving adequate oxygen saturation. The purpose of this study was to describe the use of early proning of awake, non-intubated patients in the emergency department (ED) during the COVID-19 pandemic.

Methods: This pilot study was carried out in a single urban ED in New York City. We included patients suspected of having COVID19 with hypoxia on arrival. A standard pulse oximeter was used to measure SpO_2. SpO_2 measurements were recorded at triage and after five minutes of proning. Supplemental oxygenation methods included non-rebreather mask (NRB) and nasal cannula. We also characterized post-proning failure rates of intubation within the first 24 hours of arrival to the ED.

Results: Fifty patients were included. Overall, the median SpO_2 at triage was 80% (IQR 69 to 85). After application of supplemental oxygen was given to patients on room air it was 84% (IQR 75 to 90). After 5 minutes of proning was added SpO_2 improved to 94% (IQR 90 to 95). Comparison of the pre- to post-median by the Wilcoxon Rank-sum test yielded P=0.001. Thirteen patients (24%) failed to improve or maintain their oxygen saturations and required endotracheal intubation within 24 hours of arrival to the ED.

Conclusion: Awake early self-proning in the emergency department demonstrated improved oxygen saturation in our COVID-19positive patients. Further studies are needed to support causality and determine the effect of proning on disease severity and mortality.

Caputo et al. Academic and Emergency Medicine. 22 April 2020. https://doi.org/10.1111/acem.13994

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Figure 1 – Flow diagram decision tool for Conscious Proning process

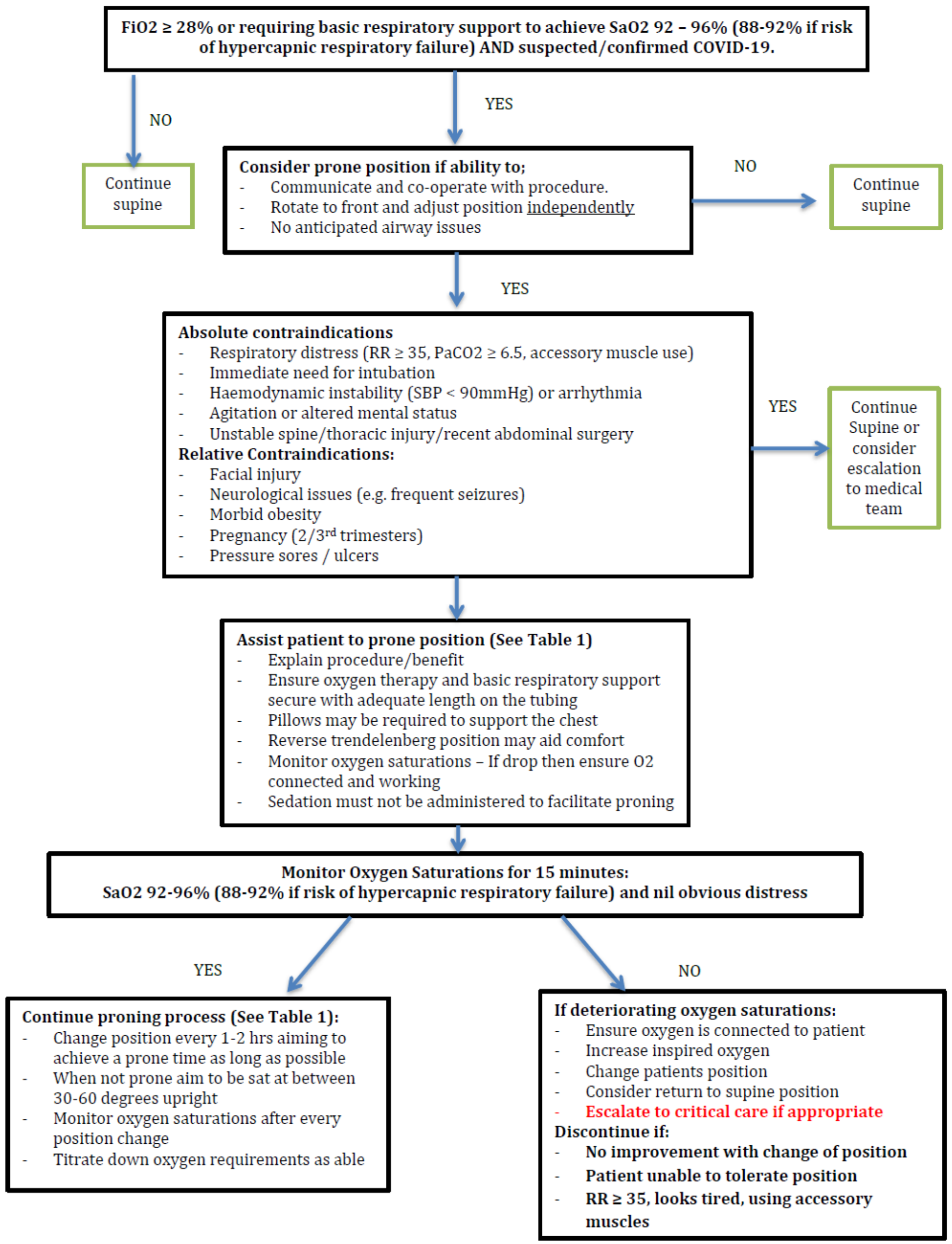

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Table 1 – Timed position changes for patients undergoing conscious proning process

Timed Position Changes:

If patient fulfils criteria for proning ask the patient to switch positions as follows. Monitor oxygen saturations 15 minutes after each position change to ensure oxygen saturation has not decreased. Continue to monitor oxygen saturations as per the National Early Warning Score (NEWS)

- 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
- Continue to repeat the cycle…….