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Self Proning in COVID-19; A Physician's Experience

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Abstract

Presentation
We report the effects of self-proning in a 23-year-old anaesthesia trainee with severe respiratory failure, focusing on his subjective experience of symptoms, as a patient, physician and as an author of this paper.

Diagnosis
The patient presented with severe respiratory failure in the midst of the COVID-19 pandemic and subsequently tested positive for COVID IgG and IgM antibodies.

Treatment
Our patient was electively proned in the 'swimmers' position, one arm at his side and the other extended above his head. This position was assumed while awake and self-ventilating

Conclusion
This resulted in an improvement in his arterial blood gas (ABG) results, subjective improvement of symptoms and obviated him from requiring intubation and mechanical ventilation.

Introduction

The patient presented to our emergency department with a 4-day history of pyrexia, nausea, vomiting, diarrhoea and a dry cough. The previous week, he had been working in a dedicated COVID-19 ICU. He had no background medical history or recent travel.

Case report

On admission, he was tachycardic (HR 123), tachypnoeic (RR 27) and pyrexial (temperature 39.7C). His oxygen saturation was 98% on room air. Physical examination was unremarkable. His electrocardiogram (ECG) showed widespread T-wave inversion. He was lymphopenic ($0.41x10^9$ L^{-1}) and had elevated C-reactive protein levels of 124.9mg L^{-1}. Although a throat swab was negative for COVID-19 he was diagnosed on clinical grounds and treated as per local protocol.

On day 3 of his admission he described the sudden onset of dyspnoea associated with pleuritic chest pain. A decline in oxygen saturation was documented and supplemental high flow O2 was commenced. He had decreased air entry at the right base and was unable to complete full sentences. A CT Thorax showed dense right basal consolidation, consistent with a lobar pneumonia. Troponin levels rose, from 136ng L^{-1} on admission to 9634ng L^{-1}. With worsening arterial partial pressure of oxygen (PaO2), and requiring high inspired oxygen concentrations (FiO2), he was transferred to Intensive Care.

On admission to ICU, a trial of self-proning was suggested. The patient was conscious and self-ventilating via high flow nasal Oxygen (Airvo). Within 2 hours he had a remarkable improvement in PaO2 and felt symptomatic relief and lower levels of anxiety. He remained prone for 6 hours but within two hours of returning to the supine position, experienced another decline in his PaO2. He returned to the prone position and improved again over the next few hours. His changes on ABG are summarised in the following table:

	Day 3 Supine	**Day 3 Prone**	**Day 4 Supine**	**Day 4 Prone**
SpO2	83%	98%	95%	100%
FiO2	50%	60%	60%	55%
Resp rate	27	27	32	27
PaO2	6.6kPa	16.7kPa	7.8kPa	26.9kPa
P/F ratio	13.1kPa	28kPa	13.1kPa	48.9kPa
pH	7.49	7.46	7.48	7.44
PCO2	4kPa	4.2kPa	4.2kPa	4.4kPa

Table 1. Clinical parameters and ABG results in supine/prone position.

On day 5, the patient's condition continued to deteriorate. He became more dyspnoeic, hypoxic and hypotensive, requiring inotropic support. Bedside echocardiography showed severe left ventricular ejection fraction (EF) of 20-30%. His COVID-19 antibody tests were positive for IgG and IgM. He underwent frequent changes to the prone position to help oxygenation and comfort. The benefits were sustained throughout the severe stage of the illness.

On day 6 the patient began to improve clinically and symptomatically. Echocardiography showed his EF to be 45-50% and all supports were weaned by day 7. The requirement for prone positioning became less frequent.

Three days later, the patient was discharged home. A month after discharge, he can walk more than a mile comfortably and is returning to work.

Discussion

During the illness, when asked about his symptoms and the effect of proning, the primary benefit noted was amelioration of the cough. This was tolerable for 3-4 hours before stiffness became troublesome and a switch in position was needed.

The patient's main concern during proning was generalised stiffness that set in after a few hours. Repositioning was visibly arduous, taking considerable exertion and recovery time. This challenge was exacerbated by vascular access devices, catheters and monitoring cables.

Unlike proning in an intubated patient, which requires upwards of 6 people to co-ordinate and potentially expose themselves, self proning in this awake patient was done with a single assistant to mind the monitoring cables and catheters as the patient was able to turn himself.

Given his background, the patient was acutely aware of protecting vascular catheters. He also described anxiety about reaching an alarm to call the nurses due to his limited movement once prone. As with Covid-19 patients, contact was being minimised. No pressure areas were injured as he remained conscious and could redistribute his bodyweight throughout the admission. Patient education about the need to protect pressure areas and about frequent self-initiated adjustments to position will help avoid pressure sores in the general population.

Proning is an established technique in intensive care in the management of severe ARDS[2]. It improves arterial oxygenation and reduces posterolateral densities in the lung by shifting the blood supply from the posterior diseased lung to the anterior healthy lung, thus improving the ventilation/perfusion ratio[3]. During the recent viral outbreak of SARS-cov-2, proning has become more common in the intensive care setting[4].

Self proning of awake, non-intubated patients is now being assessed in response to the COVID-19 pandemic[1]. The benefits are not only subjective as described above but also delaying the need for, and potentially avoiding intubation[5] at a time where a surge in disease numbers could result in the need to rationalise ventilators and intensive care beds[6].

Declaration of Conflicts of Interest:
There are no conflicts of interest to declare.

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References:

1. Nicholas D. Caputo MD, MSc, Reuben J. Strayer MD, Richard Levitan MD. Self-Proning in Awake, Non-intubated Patients in the Emergency Department: A Single ED's Experience during the COVID-19 Pandemic. Academic Emergency Medicine. https://doi:10.1111/acem.13994
2. Abroug, F., Ouanes-Besbes, L., Dachraoui, F et al. An updated study-level meta-analysis of randomised controlled trials on proning in ARDS and acute lung injury. Crit Care 15, R6 (2011). https://doi.org/10.1186/cc9403
3. Langer, M., Mascheroni, D., Marcolin, R., Gattinoni, L. The Prone Position in ARDS Patients: A Clinical Study. Chest, Volume 94, Issue 1, July 1988, Pages 103-107 https://doi.org/10.1378/chest.94.1.103
4. Ghelichkhani P, Esmaeili M. Prone Position in Management of COVID-19 Patients; a Commentary. Arch Acad Emerg Med. 2020;8(1):e48. Published 2020 Apr 11. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7158870/
5. Slessarev, M., Cheng, J., Ondrejicka, M. et al. Patient self-proning with high-flow nasal cannula improves oxygenation in COVID-19 pneumonia. Can J Anesth/J Can Anesth (2020). https://doi.org/10.1007/s12630-020-01661-0
6. Truog RD, Mitchell C, Daley GQ. The toughest triage - allocating ventilators in a pandemic. N Engl J Med. 2020. https://doi.org/10.1056/NEJMp2005689