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Role of Awake Prone Positioning in mild to moderate COVID-19 infection

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Abstract

Background: WHO declared SARS-CoV-2 as pandemic. COVID-19 patients present primarily with respiratory symptoms. Prone position hasbeen traditionally used in acute respiratory distress syndrome (ARDS) to improve oxygenation. Awake proning is being used as an investigational therapy in COVID to defer invasive ventilation, improve oxygenation, and outcomes. Hence, we conducted this retrospective case study to eval ate benefits of awake proning with oxygen therapy in non-intubated COVID patients. **Methods:** A retrospective study of 50 COVID patients admitted at DCHC Parour and MSH, Palakwah, Una was conducted. Co-operative patients who were hemodynamically stable and SpCh 90 to <93% on presentation were included. Oxygen was administered through facemask, non-rebreathing mask and nasal prongs to patients as per requirement. Patients were encouraged to maintainprone position and target time was 10-12 hours/day. SpO2 and P/f ratio in supine and prone position was observed till discharge. Primary targetwas SpO2> 95% and P/f > 200 mm Hg. **Results:** The mean SpCh on room air on admission was 80%. In day 1 to 3, the mean P/f ratio in supine position was 98.8 ± 29.7 mm Hg whichimproved to 136.6 ± 38.8 mm Hg after proning (p = 0.005). The difference was significant from day 1 to day of discharge. **Conclusion:** Awake prone positioning showed marked improvement in SpO2 in COVID-19 patients.

Keywords: Awake prone position, Coronavirus, COVID-19, SARS-CoV-2.

Introduction

A novel strain of coronavirus SARS-CoV-2 started from China has now spread to over 200 countries across the world.[1]-[2] This has been declared as pandemic by the WHO. COVID-19 is primarily a respiratory illness. The symptoms of COVID-19 are from mild flulike illness to severe acute respiratory distress syndrome (ARDS)- like requiring mechanical ventilation.[2]-[3] The COVID- 19 patients often present with low oxygen saturation requiring supplemental oxygen. However, absence of dyspnea and tachycardia is seen aptly described as "happy hypoxia".[4-6]

Prone ventilation is a recommended recruitment strategy in ARDS for many years in intubated patients.[7-9] In recent time, awake prone position therapy has come up with great benefits. This technique improves oxygenation and decreases the need for invasive ventilation.[10]-[11] With the global pandemic putting a strain on many countries' resources, a high-flow oxygen therapy with awake prone position seems to be of low risk, easy to perform, and low-cost management strategy in nonintubated patients.[11] So, we

conducted a retrospective observational study in DRU Paprola toevaluate the effect of awake prone position therapy in mild to moderate COVID-19 patients.

Methods

This study included 50 patients with COVID-19 infection requiring oxygen supplementation. All patients were diagnosed with COVID-19 disease by RT-PCR (real time-polymerase chain reaction) technique. Patients who were
hemodynamically stable, SpO2 90 to <93% on presentation, and able to adjust their prone position were included in the study. Those who were hemodynamically unstable, drowsy, or uncooperative were excluded from the study.

Continuous vital signs were monitored. A wake prone position was explained to every patient and they were encouraged to spend as much time in prone position as they could tolerate. The target time in prone position was 5 to 6 hours per day. Proning was performed 1 hour after meals to avoid gastrointestinal side effects. Specific COVID-19 treatment was given to all patients according to the institutional protocol which included remdesivir, dexamethasone, and low- molecular weight heparin. Target for discharging from HDU was SpO2 of >95% and P/f ratio of >200 mm Hg. Patients were shifted toward when they were weaned off oxygen at least for 24 hours.

Data were presented as mean, standard deviation, frequency, percentage. Paired t- test was used to compare SPO2 levels at different point of time. P value<0.05 was considered significant. Statistical analysis was performed using SPSS v21.0 (IBM, USA).

Results

The mean age of the sample was 48.54±8.23years. 66% were males. Obesity was the most common comorbidity (40%) followed by hypertension (34%). Mean duration of stay was 14.28±3.60 days (Table 1).

The mean SpO2 on room air on admission was 77.62±4.89%. Oxygen therapy was started immediately through face mask to 8% patients, Face mask to 44% patients, Nasal prongs to 40% and NRBM to 16% patients (Table 2).

SpO2 improved as soon as oxygen therapy was started. A further rise in SpO2 was seen with change in the position from supine to prone owing to the reduction in intrapulmonary shunting. This increasing SpO2 trend with prone positioning was seen in all patients (Table 3).

Outcome
Mortality rate was 6% (Figure 1).

Table 1: General characteristics

General characteristics	**N**	**Percentage**
Sex		
Male	33	66.0
Female	17	34.0
Comorbidities		
Diabetes	12	24.0
Hypertension	17	34.0
Obesity	20	40.0
COPD	1	2.0
Mean age (years)	48.54±8.23	
Mean hospital stay (days)	14.28±3.60	

Table 2: Mode of oxygen therapy

Mode of oxygen therapy	N	Percentage
Face mask	22	44.0
Nasal prongs	20	40.0
NRBM	8	16.0

Outcome

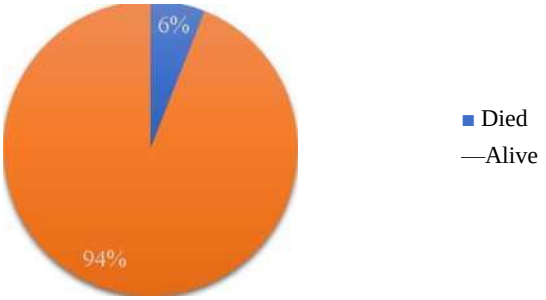

Figure 1: Outcome

Table 3: Spo2

	On Day	Day-1	Day of discharge	P-value
SpO2	77.62±4.80	91.54±1.68	95.22±1.53	<0.001

Discussion

COVID-19 pneumonia is a specific disease whose distinctive features are severe hypoxemia often associated with near normal respiratory system compliance. [12]Hence, an unusual phenomenon of "happy hypoxia" or "silent hypoxemia" is seen in many patients.[5-6]

Patients with severe disease often require high oxygenation support. High-flow oxygen therapy and non-invasive positive pressure ventilation have been used. Some patients may develop ARDS and warrant invasive ventilation.[13] Hence, any therapy which can improve oxygenation and reduce lung injury should be used to improve the survival rate.

The role of prone position ventilation is well established in classical ARDS . 8 In prone position, there is hemogeneous distribution of the gas which reduces the ventilation-perfusion (VQ) mismatch. This reduces the intrapulmonary shunt and opens the atelectatic lung areas with adequate sputum drainage, improving oxygenation.[7-9] Also, the transpulmonary pressure gradient is reduced which decreases barotrauma.[9]

In recent studies, awake prone positioning was used in emergency department and ward settings to maintain oxygenation of COVID-19 patients.[14,15] Studies have shown to avoid intubation with early application of prone positioning with high- flow nasal cannula (HFNC) in moderate ARDS patients.[16-18]

Most patients tolerated the prone position well and reported the improvement in symptoms. We are also cognizant that other COVID-19 therapies could have modified the disease course as well.[19-22] Hence, awake proning with high-flow oxygen therapy proved to be a low risk, easy to perform, easily tolerated, and lowcost rescue therapy in COVID-19 patients.

Conclusion

Awake prone positioning showed marked improvement in SpO2 in COVID-19 patients.

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