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ORIGINAL ARTICLE

Impact of Proning in COVID-19 Patients Admitted in Allama Iqbal Memorial Teaching Hospital Sialkot

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ABSTRACT

Aim: To determine the effects of prone position in patients with COVID-19.
Study design: Retrospective/observational study
Place and duration of study: Department of Medicine Allama Iqbal Memorial Teaching Hospital, Sialkot and its related ICU from 1st November 2020 to 30th April 2021
Methodology: Fifty patients of respiratory failure admitted to ICU were included in this study. Patient's details demographics age, sex and body mass index were recorded after taking informed written consent. Patients were aged between 25-80years.Patients were divided in to two groups I and II. Group I had 25 COVID-19 patients underwent prone position and group II with 25 patients taken as control. Chest x-ray of both groups was taken. Patients of group I were kept in prone position while group II received invasive ventilation and follow up was taken in duration of 15-days.
Results: There were majority of males, 40 (80%) and rest females 10 (20%). Mean age of the patients in prone positioning group was 50.3±18.22 years with mean BMI 26.14±7.13 kg/m^2 and in control group it was 51.5±18.22 years with mean BMI 26.41±7.13 kg/m^2.Thirty (60%) patients had moderate and 20 (40%) had severe covid-19 disease. Mean duration of prone position was 5.14±6.31 hours. Most of the patients 42 (84%) had bilateral lung involvement, interstitial infiltrates 55 (90%). Fever, cough and dyspnea were the most common symptom found in both groups. Mean PF ratio was increases in prone group as compared to controlled group. Mean hospital stay in group I was 6.9±18.8 days and in group II mean hospital stay was 9.7±13.2 days.
Conclusion: The use of prone position among patients of COVID-19 was effective and safe method to reduce intubation, mortality and hospital stay. There was no any complication were found after this treatment.
Keywords: Prone Position, Covid-19, Respiratory Failure, Mortality

INTRODUCTION

COVID-19 is a novel virus that targets the respiratory system[1]. According to the Surviving Sepsis Campaign panel, every patient with an acute severe respiratory disease should be treated in the Intensive Care Unit (ICU)[2]. Around 19% of COVID-19-infected patients experience hypoxic respiratory failure, 14 percent develop severe infection requiring oxygen therapy, and 5% require mechanical ventilation and ICU admission[3,4]. According to one study, 67 percent of the 52 patients with a severe COVID-19 infection had acute respiratory distress syndrome (ARDS), 63.5% used a high-flow nasal cannula (HFNC), 42% used invasive mechanical ventilation and 56% used noninvasive mechanical ventilation.[5]

Prone posture is a conventional method of increasing oxygenation in patients with Acute Respiratory Distress Syndrome (ARDS) who require mechanical ventilation[6]. It is well known that oxygenation is significantly better in the prone position than in the supine position. Furthermore, several lines of evidence have indicated that the prone position can reduce lung damage caused by ventilators[6,7]. The heart and its surrounding organs most likely compress the center posterior areas of the lung when lying supine. The central anterior areas are squeezed in the prone position; as a result, among the benefits of prone positioning are increased cardiac output and improved pulmonary respiration.[8] According to current thinking, prone placement results in more equal ventilation by restricting ventral alveolar expansion and dorsal alveolar collapse. This results in a decrease in the difference between dorsal and ventral transpulmonary pressures, a decrease in lung compression, and an increase in perfusion.[9] Patients with ARDS and severe hypoxemic patients (Pao2: Fio2 ratio 150 mm Hg, Fio2 0.6, PEEP 5 cmH2O) can benefit from prone posture if intervention is initiated early and the positioning is performed in relatively long sessions[6].

Because prone positioning takes many different shapes in different patients, it is impossible to predict how they will react. However, many randomized controlled trials and meta-analyses have shown that prone posture in conjunction with a lung-protective strategy, when conducted early and for an adequate amount of time, may improve survival rate in patients with ARDS. In addition, prone positioning reduced 28-day and 90-day mortality rates, as well as extubation duration and ventilator-free days.[10] Patients with moderate to severe ARDS should be ventilated in the prone position during the first week of infection. Prone positioning reduced mortality in individuals who had been ventilated for at least 12 hours. Furthermore,

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prone positioning increased the risk of pressure ulcers and endotracheal tube occlusion[9].

Oxygen therapy, high-flow nasal cannulas and non-invasive ventilation may reduce the needs for endotracheal intubation as well as ventilator-related complications and mortality. Although non-invasive ventilation can help patients in a safe way, it can also pose risks to health care providers due to the presence of infectious aerosol. As a result, non-invasive ventilation may be used as an early treatment for selected patients infected with COVID-19 who have less acute hypoxemic respiratory failure[4]. The methods of prone placement are not simple, and they necessitate teamwork among members of the healthcare team[6]. Furthermore, enteral nutrition via nasogastric or nasoduodenal tube may be continued during pronation[9,10].

MATERIALS AND METHODS

This retrospective /observational study was conducted at Department of Medicine Allama Iqbal Memorial Teaching Hospital, Sialkot and its related ICU from 1st November 2020 to 30th April 2021 and consultation from pulmonologist taken in every case and comprised of 50 patients with respiratory failure admitted to ICU. Permission was obtained from institutional Ethical Review Board for this research. Patient's details demographics were recorded after taking written consent. Patients who received PP with invasive mechanical ventilation and those did not give any written consent were excluded from this study. Patients were aged between 25-80 years. Patients were divided in to two groups I and II. Group I had 25 COVID-19 patients underwent prone position and group II with 25 patients taken as control. Chest X-ray of both groups was taken. Patients of group I were kept in prone position while group II received invasive ventilation and follow up was taken in duration of 15-days. Reduction of intubation rate, mortality, hospital stay and complications were identified among both groups.

RESULTS

There were 40 (80%) males and 10 (20%) were females. Mean age of the patients in Covid-19 group was 50.3±18.22 years with mean BMI 26.14±7.13 kg/m^2 and in control group was 51.5±18.22 years with mean BMI 26.41±7.13 kg/m^2.30 (60%) patients had moderate and 20 (40%) had severity of disease. Fever, cough and myalgia were the most common symptom found in both groups (Table 1).

Table 1: Demographic details of the patients (n=50)

Variable	Group I	Group II
Gender		
Male	20 (40%)	20(40%)
Female	5 (10%)	5 (10%)
Mean age (years)	50.3±18.22	51.5±18.22
Mean BMI (kg/m^2)	26.14±7.13	26.41±7.13
Severity of Disease		
Moderate	15 (30%)	15 (30%)
Severe	10 (20%)	10 (20%)

Most of the patients 42 (84%) had bilateral lung involvement with interstitial infiltrates 55 (90%) followed by consolidation and unilateral infiltrates. Fever, cough and dyspnea were the most common symptom found in both groups (Table 2).

Mean hospital stay in group I was 6.9±18.8 days and in group II mean hospital stay was 9.7±13.2 days. Mortality in group I was 1 (4%) and in group II mortality was found 2 (8%). No any severe complications were observed among both groups (Table 3).

Mean PF ratio in prone group significantly increases in moderate 309.1±8.14 and severe patients 320.1±4.12 as compared to control group in moderate patients had 298.1±4.41 and 304.1±9.14 in severe patients (Table 4).

Table 2: Frequency of X-ray results and symptoms among enrolled cases

Variable	Group I	Group II
X-ray Results		
Bilateral infiltrates	21	21
Interstitial infiltrates	22	23
Consolidation	3	3
Unilateral infiltrates	2	2
Symptoms		
Fever	19	19
Cough	17	17
Dyspnea	16	16
Myalgia	6	6
Vomiting	4	4
Headache	3	3

Table 3: Outcomes among both groups

Variable	Group I	Group II
Mean hospital stay	6.9±18.8	9.7±13.2
Mortality		
Yes	1 (4%)	2 (8%)
No	24 (96%)	23 (92%)

Table 4: Comparison of PaO2/FiO2 (PF) ratio among both groups according to severity of disease

Severity of disease	Group I	Group II
Moderate	309.1±8.14	298.1±4.41
Severe	320.1±4.12	304.1±9.14

DISCUSSION

The development of awaked COVID-19 patients has become a popular procedure. In addition, a theory is found that better oxygenation can be achieved by taking a proning in non-intubated, waking COVID-19 cases and thereby reducing the requirement for invasive ventilation. In the present study, majority of patients were males 40 (90%). This finding was comparable to the previous some studies[11,12].

In the current study, most of the patients 42(84%) had bilateral lung involvement with interstitial infiltrates 55 (90%) followed by consolidation and unilateral infiltrates. Fever, cough and dyspnea was the most common symptom found in both groups[11,13,14]. Thirty (60%) patients had moderate and 20(40%) had severity of disease. Fever, cough and myalgia were the most common symptom found in both groups. Mean hospital stay in group I was 6.9±18.8 days and in group II mean hospital stay was 9.7±13.2 days. Mortality in group I was 1(4%) and in group II mortality was found 2(8%). No any severe complications were observed among both groups[11]. Proning COVID-19 has been demonstrated to lead to better oxygenation in several minor

trials and hypoxemic air failure has been reported.[15-18] Multiple ways can enhance oxygenation and result in an enhanced fan-perfusion match. In most trials the PaO2/FiO2 ratio and the respiratory rate have been improved among patients who have tolerated PP session. These trials showed brief prone sessions, mainly due to limited tolerance of patients. The results were temporary, and the breathing rates and the measures of oxygenation often came back to base level after the supination.[17] Most of those investigations were retrospectively constrained and were not controlled by a control group. Our study is distinguished by the fact that we have included an unrandomized group with a median of 7 hours/day we have reached a longer PP duration.

Mean PF ratio in prone group significantly increases in moderate 309.1±8.14 and severe patients 320.1±4.12 as compared to control group in moderate patients had 298.1±4.41 and 304.1±9.14 in severe patients. Sympa et al[19] presented that awake PP is associated with significant improvement in oxygenation and may reduce the need for MV in subjects with COVID-19.There were no adverse events and a safe treatment plan was developed in our sample. Previous research also shows that the incidence of complications in most situations is not connected with an increased incidence.[20,21] Due to the restricted capacity of health facilities, in particular the resource deprived countries, many COVID 19 patients receive oxygen treatment at home in the current crisis. PP is a safe and economical therapy that, because of its easy use and good outcomes, has gained universal acceptance among most doctors. It can also be commenced in the home for the management of less severe hypoxemia in patients who are unacceptable in hospitals, thereby reducing the burden on health care institutions. However, additional investigations are necessary to further validate our results with larger samples and control groups.

CONCLUSION

The use of prone position among patients of COVID-19 was effective and safe method to reduce intubation, mortality and hospital stay. There was no any complication were found after this treatment.

SUGGESTIONS

Similar study with large number of samples should be conducted to see the outcome of proning in COVID 19 patients on the basis we can devise a guideline for prone position in the treatment of COVID 19 patients to reduce morbidity and mortality.

Conflict of interest: No conflict of interest between the authors

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