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ORIGINAL ARTICLE

Determine the Impact of Prone Positioning in Covid-19 Patients

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ABSTRACT

Objective: To determine the effectiveness of prone positioning in patients of covid-19 deisease presented with respiratory failure.

Study Design: Retrospective/Observational study

Place and Duration: Medicine department of BKMC/MMC, Mardan and Mohiuddin Teaching Hospital, Mirpur AJK for six months during the period from August 2020 to January 2021.

Methods: Total 100 patients of respiratory failure admitted to ICU were included in this study. Patients detailed 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 A had 50 COVID-19 patients underwent prone position and group Bwith50 patients taken as control. Chest X-ray of both groups were taken. Patients of group A were kept in prone position whilegroup B 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. Complete data was analyzed by SPSS 22.0 version.

Results: Majority of the patients was males 76% and the rest were females 24%. Mean age of the patients in prone positioning group was 52.42±13.18 years with mean BMI 26.14±7.13 kg/m^2 and in control group A itwas 50.44±14.65 years with mean BMI 26.41±7.13 kg/m^2. 55% patients had moderate and 45% had severe covid-19 disease. Mean duration of prone position was 5.14±6.31 hours. Most of the patients 81% had bilateral lung involvementinterstitial infiltrates. 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 A was 12.9±4.76 days and in group B mean hospital stay was 17.32±10.24 days. Mortality in group A was 3 (3%) and in group Bmortality was found in 7 (7%). No any severe complications were observed among both groups.

Conclusion: We concludedin this study that 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

NEW VIRUS COVID-19 Affects Respiratory System According to the Surviving Sepsis Campaign panel, every patient with an acute severe respiratory illness should be treated in the Intensive Care Unit (ICU) [2]. For example, around 19 percent of COVID-19-infested people will suffer from hypoxic respiratory failure, and about 14 percent will have severe infections requiring oxygen treatment, and 5 percent would need mechanical ventilation and ICU hospitalization. The 52 patients with severe COVID-19 infection had a 67 percent ARDS rate, and 63.5 percent, 42 percent, and 56 percent of them used high-flow nasal cannula (HFNC), invasive mechanical ventilation, and noninvasive mechanical ventilation, respectively [5] [6].

When it comes to promoting oxygenation in Acute Respiratory Distress Syndrome (ARDS) patients who need mechanical ventilation, prone position is a conventional method. On the other hand, it's well-known that oxygenation is far more beneficial in prone than supine position. Numerous studies have also shown that a prone position may reduce the amount of lung damage caused by ventilators [6, 7]. Because of the heart and its associated organs, the lungs' central posterior portions are prone to be compressed while lying on one's back. When lying on your back in prone posture, the central anterior areas are compressed, increasing cardiac output and facilitating pulmonary respiration [8]. By restricting ventral alveolar expansion and dorsal collapse, prone posture, according to the current thinking, contributes to more equal ventilation. Reduced dorsal-ventral transpulmonary pressure difference, reduced lung compression and increased perfusion result from this [9]. In patients with ARDS and severe hypoxemia (Pao2:Fio2 ratio 150 mm Hg, Fio2 0.6, PEEP 5 cmH2O), prone posture may be beneficial if it's done early and for a long period of time [6, 7].

It is difficult to anticipate how patients would react to prone posture since it may take several forms. Numerous randomized trials and meta-analyses have shown, however, that prone position in combination with a lung-protective approach, when done early and for a sufficient period of time, may improve survival rate among patients with ARDS Decreased 28-day mortality and 90-day mortality, as well as extubation and ventilator-free days, were also seen with prone positioning [10]. It is

recommended that patients with moderate to severe ARDS be ventilated in the prone position during the first week after infection. Patients who were ventilated for at least 12 hours had a reduced death rate when placed prone. Pressure sores and endotracheal tube obstruction were also increased with prone positioning [9].

Oxygen therapy, high-flow nasal cannulas, and non-invasive ventilation may reduce the need for endotracheal intubation, as well as ventilator-associated complications and death. Patients may benefit from safe non-invasive ventilation; nevertheless, health care workers may be at danger owing to the presence of infectious aerosol. The use of non-invasive respiratory support in selected COVID-19 infected individuals with less acute hypoxemic respiratory failure is thus recommended [4]. Healthcare professionals must work together to implement prone posture techniques that aren't simple (6). While proning, enteral nutrition may also be maintained via nasogastric or nasoduodenal tubes [9, 10].

MATERIAL AND METHODS

This retrospective /observational study was conducted atthe medicine department of BKMC/MMC, Mardan and Mohiuddin Teaching Hospital, Mirpur AJK for six months during the period from August 2020 to January 2021. The study was comprised of 100 patients with respiratory failure admitted to ICU. Patients' detailed 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 25-80years. . Patients were divided in to two groups I and II. Group A had 50 COVID-19 patients underwent prone position and group B with 50 patients taken as control. Chest X-ray of both groups were taken. Patients of group A were kept in prone position whilegroup B 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.

Complete data was analyzed by SPSS 22.0 version.Categorical variables were assessed by frequency and percentage but descriptive variables were calculated by standard deviation.

RESULTS

In group A 38 (76%) patients were males and the rest were females 12 (24%). Mean age of the patients in prone positioning group was 52.42±13.18 years with mean BMI 25.22±3.18 kg/m^2 and ingroup B 40 (80%) and 10 (20%) patients were males and females with mean age 50.44±14.65 years and mean BMI was 25.24±2.34 kg/m^2. (Table 1)

Most of the patients 81 (81%) had bilateral lung involvement (40 in group A and 41 in group B). Interstitial infiltrates was found in 78 (40 in group A and 38 in group B)patients followed by consolidation and unilateral infiltrates. Fever, cough and dyspnea was the most common symptom found in both groups. (Table 2)

Mean PF ratio in prone group significantly increases in moderate 311.2±16.25 and in severe patients 318.36±10.22 as compared to group B as in moderate patients it was302.1±5.38 and 306.1±10.62 in severe patients. A statistical significant improvement was found as compared to group B with p-value 0.028(Table 3)

Table1: Baseline details demographics of enrolled cases

Variables	Group A (n=50)	Group B (n=50)
Mean age	52.42±13.18	50.44±14.65
Mean BMI	25.22±3.18	25.24±2.34
Sex		
Male	38 (76%)	40 (80%)
Female	12 (24%)	10 (20%)
Severity of disease		
Moderate	30 (60%)	32 (64%)
Severe	20 (40%)	18 (36%)

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

Variables	Group A	Group B
X-ray Results		
Bilateralinfiltrates	40	41
interstitial infiltrates	40	38
consolidation	6	6
unilateral infiltrates	3	3
Symptoms		
Fever	40	41
Cough	36	32
Dyspnea	30	28
Myalgia	10	8
Vomiting	6	3
Headache	4	6

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

Variables	Group A	Group B
Severity of disease		
Moderate	311.2±16.25	302.1±5.38
Severe	318.36±10.22	306.1±10.62

p-value 0.028

Mean hospital stay in group A was 12.9±4.76 days and in group B mean hospital stay was 17.32±10.24 days. Mortality in group A was 2 (4%) and in group B mortality was found in 3 (6%). No any severe complications were observed among both groups. (Table 4)

Table 4: Outcomes among both groups

Variables	Prone Group	Control group
Mean Hospital Stay	12.9±4.76	17.32±10.24
Mortality		
Yes	2 (4%)	3 (6%)
No	48 (96%)	47 (94%)

DISCUSSION

The development of prone positioning in 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 this study total 50 patients were presented and divided into 2-groups, 25 Covid patients and other had 25 controlled patients and there was no any difference among mean age and BMI among patients of both groups. Majority of the patients 40 (90%) were males. These

findings were comparable to the previous some studies.[11,12]

In our study Most of the patients 81 (81%) had bilateral lung involvement (40 in group A and 41 in group B). Interstitial infiltrates was found in 78 (40 in group A and 38 in group B) patients followed by consolidation and unilateral infiltrates. Fever, cough and dyspneawere the most common symptom found in both groups. These results were comparable to some previous studies[11,13,14]. 62%) patients had moderate and 36% had severecvid-19. Fever, cough and myalgia were the most common symptom found in both groups.

Mean hospital stay in group A was 12.9±4.76 days and in group B mean hospital stay was 17.32±10.24 days. Mortality in group A was 2 (4%) and in group B mortality was found in 3 (6%). 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. 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 311.2±16.25 and in severe patients 318.36±10.22 as compared to group B as in moderate patients it was 302.1±5.38 and 306.1±10.62 in severe patients. A statistical significant improvement was found as compared to group B with p-value 0.028. Sympa PB et al presented that awake PP is associated with significant improvement in oxygenation and may reduce the need for MV in subjects with COVID-19.[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

We concludedin this study that 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.

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