

## Study of 109 Patients Who Required Bipap Therapy during Corona Virus Epidemic

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### ABSTRACT:

**Background :** Bipap support is essential for the management of the respiratory failure for the corona virus epidemic. The study focus on the details of the patients, who required bipap support and analyzed characteristics of those patients. **Materials and methods:** A total of 109 patients were studied for their details including their number of comorbid conditions, age and outcomes. **Results:** Out of total patients who were discharged after utilizing the bipap support were 58.7% and those who expired were 41.3%. Hence the study shows that the patients who were kept on bipap support had shown improvement even after onset of respiratory failure during corona epidemic. The recovery may still depend upon the patients' characteristics including age and number of comorbidities. **Conclusion:** The patients with higher age and higher number of comorbid conditions like diabetes and hypertension etc may have higher mortality as compared to the patients having younger age and nil comorbidities. Higher age group patients may carry more chances of poor prognosis. Increased age with higher number of comorbid conditions may lead to higher mortality. However since the ventilated patients have significant high mortality, the bipap therapy still stand a chance to save the patients from being ventilated and may show better outcomes in young patients with less comorbid conditions. The patients presented with worsened respiratory failure at the time of admission and required bipap support immediately, had higher mortality than those who had presented early and then subsequently required further use of bipap after few days of admission.

**Key words:** Respiratory failure, bipap support, age, comorbidities.

### INTRODUCTION

Noninvasive ventilation in the 21<sup>st</sup> century has been made an effective weapon in the fight against the corona virus epidemic. Corona virus epidemic showed many patients with respiratory failure and had significant high mortality across the globe. It has been a very successful therapy to fight against corona virus pandemic and may be used to delay intubation and mechanical ventilation. Non invasive ventilation has several advantages as compared to the mechanical ventilation. The more commonly useful therapy noninvasive ventilation is bipap therapy which includes different inspiratory positive airway pressure and expiratory positive airway pressure. We have tried to understand and evaluate the results of bipap therapy and patients' characteristics on their outcomes. This study focus on the outcome of bipap therapy in corona epidemic and the influence of age and comorbid conditions of patients on their outcome.

### MATERIALS AND METHODS

All patients of covid 19 disease requiring bipap therapy during their hospital stay from January 1<sup>st</sup> 2021 to 30<sup>th</sup> June 2021 were enrolled in this study. Those patients who required bipap were included and those who did not require bipap support were excluded. Data of these patients regarding patients' characteristics and outcome from hospital information system was enrolled in as case record form was analyzed by appropriate statistical software. Their profile details and outcome were studied and taken in consideration. Clinical and demographic details of each patient obtained from the hospital information system and

entered in case records forms. Data such obtained was analysed with MS Excel 2013. Institutional review board permission was taken prior to obtaining the data.

## RESULTS

During study period total 109 patients were subjected to the bipap therapy during hospital stay. Majority of them belonged 36 (33.0%) to the 71-80 years age group followed by 51-60 years age group (18.3%).

**Table1: Distribution of different age groups of patients across the study population.**

Age	Count	%
0-10	0	0.0%
11-20	0	0.0%
21-30	0	0.0%
31-40	14	12.8%
41-50	12	11.0%
51-60	20	18.3%
61-70	17	15.6%
71-80	36	33.0%
81-90	10	9.2%
>90	0	0.0%
<b>Total</b>	<b>109</b>	<b>100.0%</b>

Total number of patients were 109. Out of which 85(78.0%) were male and 24(22.0%) were female. In males 71-80 years of age group was most common while in females 31-40 years was the most common age group.

**Table 2: Distribution of total male and female patients across the study population.**

Age	Male	%	Female	%
0-10	0	0.0%	0	0.0%
11-20	0	0.0%	0	0.0%
21-30	0	0.0%	0	0.0%
31-40	4	3.7%	10	9.2%
41-50	11	10.1%	1	0.9%
51-60	18	16.5%	2	1.8%
61-70	12	11.0%	5	4.6%
71-80	30	27.5%	6	5.5%
81-90	10	9.2%	0	0.0%
>90	0	0.0%	0	0.0%
<b>Total</b>	<b>85</b>	<b>78.0%</b>	<b>24</b>	<b>22.0%</b>

The patients with nil co morbid conditions were 43(39.4%), with 1 co morbid conditions were 19(17.4%), with 2 co morbid conditions were 43(39.4%),with 3 co-morbid conditions were 4(3.7%). Highest comorbid conditions were examined in 71to 80 years age group. The comorbidities including hypertension, diabetes, chronic obstructive lung disease, chronic kidney diseases etc.

**Table 3: Numbers of comorbidities of patients and its percentage distribution in study population with age group.**

Age	Co-morbidity					%				
	Nil	1	2	3	4	Nil	1	2	3	4
0-10	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%
11-20	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%
21-30	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%
31-40	14	0	0	0	0	12.8%	0.0%	0.0%	0.0%	0.0%
41-50	0	12	0	0	0	0.0%	11.0%	0.0%	0.0%	0.0%
51-60	4	1	14	1	0	3.7%	0.9%	12.8%	0.9%	0.0%
61-70	1	2	12	2	0	0.9%	1.8%	11.0%	1.8%	0.0%
71-80	17	4	15	0	0	15.6%	3.7%	13.8%	0.0%	0.0%
81-90	7	0	2	1	0	6.4%	0.0%	1.8%	0.9%	0.0%
>90	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%
<b>Total</b>	<b>43</b>	<b>19</b>	<b>43</b>	<b>4</b>	<b>0</b>	<b>39.4%</b>	<b>17.4%</b>	<b>39.4%</b>	<b>3.7%</b>	<b>0.0%</b>

The total number of patients who were discharged were 64(58.7%) and the total number of patients who expired were 45(41.3%).

**Table 4: Outcome of the patients who has undergone bipap therapy with age group distribution.**

Age	Discharge	%	Expired	0
0-10	0	0.0%	0	0.0%
11-20	0	0.0%	0	0.0%
21-30	0	0.0%	0	0.0%
31-40	14	12.8%	0	0.0%
41-50	12	11.0%	0	0.0%
51-60	16	14.7%	4	3.7%
61-70	11	10.1%	6	5.5%
71-80	8	7.3%	28	25.7%
81-90	3	2.8%	7	6.4%
>90	0	0.0%	0	0.0%
<b>Total</b>	<b>64</b>	<b>58.7%</b>	<b>45</b>	<b>41.3%</b>

**Table 5: Numbers of comorbidities and their percentage in expired patients in study population .**

Co-morbidity	On Bipap	%
0	16	35.6%
1	4	8.9%
2	21	46.7%
3	4	8.9%
<b>Total</b>	<b>45</b>	<b>100.0%</b>

The comparison of the comorbid condition numbers and mortality reveals following findings. the patients who did not have any comorbid conditions were total 16 (35.6%) patients. In expired patients ,those who had only 1 comorbid condition were 4(8.9%), with 2 comorbid conditions were 21 (46.7%) and with 3

comorbid conditions were 4(8.9%). The expired patients were analyzed for the number of co morbid conditions. Out of expired 45 patients 4 patients who had three comorbidities all 4(100%) had expired,. Out of 43 patients with 2 comorbidities 21(48.8%) expired. Out of 19 patients with 1 comorbidity 4(21.05%) expired. The patients without any co-morbidities did have better clinical course. Patients with 3 co-morbidities had the highest mortality rate.

## DISCUSSION

Noninvasive ventilation is an essential bridge to fill the gap between oxygen therapy and invasive ventilation, which can avoid intubation and complications of invasive mechanical ventilation in patients with acute hypoxemic respiratory failure. It can provide PEEP to improve oxygenation to open densely inflamed alveoli which is difficult to provide by conventional oxygen therapy. It also improves functional residual capacity and work of breathing in respiratory failure. In the present study no patients with age less than 31 required noninvasive ventilation. The maximum number of patients belonged to the age group of 71-80 years. Mortality was also highest in the age group of 71-80 years. Mortality also was higher in patients with comorbidities as compared to patients without comorbidities. Diabetes and hypertension were significant in most of the patients. The increased sugar levels were also due to the use of steroids and also due to the stress of infection. The more severe the diabetes more possibility of poor outcomes. Additionally, diabetes is also responsible for altered immune function and leads to difficulty in curtailing against coronavirus infection. Hypertension was also one of the major risk factors and antihypertensive including ace inhibitors were also associated with higher mortality in initial findings during epidemics. However, more severe comorbid diseases were associated with higher Mortality, and well-controlled diseases had better outcomes than uncontrolled diseases. Chronic obstructive airway diseases had more requirements of respiratory support in the form of bipap as they were associated with loss of respiratory function, and it leads to prolong bipap support or increased mortality. Mortality also increased as the number of comorbidities increased. The patients who had more co-morbidities including diabetes and hypertension that too have uncontrolled disease are more likely to have prolonged intensive care unit stay with bipap or higher mortality. The aggressive control of disease including rapid control of diabetes with insulin scale has better outcomes as compared to uncontrolled diabetes. This indicates that age and comorbidities are important factors that may determine the successful outcome of noninvasive ventilation in covid 19. The main cause of mechanical ventilation was acute respiratory failure<sup>1</sup> and bipap has helped to reduce the need for mechanical ventilation. The mechanical ventilation of the lungs using mask is called non-invasive positive pressure ventilation (NIPPV)<sup>2,3</sup>. NIV may have a reasonable clinical outcome<sup>4</sup>. British thoracic society also considered the bipap support should be given to those patient who meet the criteria and it should be made available<sup>5</sup>.

## CONCLUSION

The bipap support has proven a good therapy to fight against respiratory failure. However the high rates of mortality in patients who were ventilated, bipap may prove itself essential for several patients to bridge the gap and also help to avoid intubation. Bipap support may be an important modality for the management of patients with respiratory failure due to the corona virus disease with age and comorbidities being important factor determining outcome.

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