Effects of hypertension on the outcomes of Covid-19 infected patients- A retrospective study

Sabina yeasmeen1, Montosh Kumar Mondal2, AKM Faizul Hoque3, Sanaul Haque Masud4, Shofina Sultan5, Debabrata Banik6

Associate Professor1,2,5, Department of Anaesthesia, Analgesia & Intensive Care Medicine, BSMMU, Medical Officer, Department of Anaesthesiology, Sheikh Hasina National Institute of Burn And Plastic Surgery4, Medical Officer, Department of Anaesthesia, Analgesia & Intensive Care Medicine, BSMMU6, Professor, Department of Anaesthesia, Analgesia & Intensive Care Medicine, BSMMU6.

Corresponding Author: E-mail : sabinay0970@gmail.com

Abstract:

Background: Hypertension has been reported as the most prevalent comorbidity in patients with corona virus disease 2019 (COVID-19). Since hypertension is exceedingly frequent in the elderly and older people appear to be at particular risk of being infected with SARS-COV-2 virus and of experiencing severe forms and complications of COVID-19.

Objective: This retrospective study aim to compare the outcomes in COVID-19 infected patients with or without hypertension.

Method: A total 180 hospitalized patients with laboratory confirmed COVID-19 were included. The medical record including clinical feature, history of hypertension were included in this study. This study was conducted in COVID-19 ICU of Bangabandhu Sheikh Mujib Medical University from August 2020 to January 2021. Information were obtained from medical record including clinical features, complication, treatments and clinical outcome were extracted for the analysis.

Results: There were 180 patients selected for this study. 50(27.8%) patients had 51-60 years, 79(43.5%) patients had 61-70 years and 27(15%) patients had 71-80 years. This study showed that 71.7% patients was hypertensive and 29.3% patients was non-hypertensive. In total 180 patients, mortality rate was 65.1% in hypertensive patients and mortality rate was 41.1% in non-hypertensive patients. Among them patients comorbidity was 50% Diabetes mellitus, 14% Bronchial asthma, 14% patients Ischemic heart disease, 11% Chronic Kidney disease, 6% hypothyroidism and 5% cerebrovascular disease.

Conclusion: This study concluded that hypertension does not affect the outcome of COVID-19. Compared with the group of survivors and non-surviving COVID-19 patients with hypertension, most of the patients were older and had more comorbidity.

Keywords: COVID-19, Coronavirus disease, Hypertension, Clinical characteristics, Comorbidites, Mortality, Morbidity, ACE2.
blood pressure control in hypertension patients during the clinical course of COVID-19. The mechanisms of exacerbation of underlying cardiovascular condition after COVID-19 infection remain unclear. One of the cited hypothesis is overexpression of angiotensinconverting enzyme II (ACE2) in arterial endothelial and smooth muscle cells. A recent experimental study demonstrated elevated levels of ACE2 in the cardiomyocytes of patients with heart disease. Similar to SARS-COV, the causal pathogen of COVID-19, SARS-COV-2 virus also target, ACE2 receptors as entry points human host cells. Two of these RASS inhibitors, angiotensin II receptor blockers (ARBs) and ACE inhibitors (ACEIs) have caused great concern due to their direct interactions with ACE2 and ACE2 receptor. Notably DM was the second most common comorbidity found in hospitalized patients with COVID-19. As a result, concern have been raised that ARB and ACEI drugs could result in overexpression of ACE2, facilitating virus entry and increasing susceptibility to and the clinical severity of COVID-19 infection. The objective of this study was to evaluate the risk and severity of COVID-19 among with comorbid hypertension.

**Method:**
This was a retrospective study conducted in the department of Anaesthesia, Analgesia and Intensive Care Medicine in COVID-19 ICU of Bangabandhu Sheikh Mujib Medical University over the period from August 2020 to January 2021. This study was approved by ethics committee and written informed consent were obtained. The inclusion criteria were as follows:1. Adults>18 years old. 2. Laboratory (RT-PCR) confirmation of severe acute respiratory syndromes coronavirus (SARA-COV-2) infection in throat swab, sputum and lower respiratory tract samples and. In hospital treatment >72 hours. Total 180 patients were enrolled in this study, they were divided into hypertensive group and non-hypertensive group. In hypertensive group, data was obtained from male and female patients according the age group. In non-hypertensive group data was obtained from male and female patients according to age. Mortality rate was obtained from hypertensive group and non-hypertensive group. In this study we also recorded comorbidity such as Diabetes Mellitus, Bronchial asthma, Chronic Kidney disease, Cerebrovascular disease, Hypothyroidism, and Ischemic heart disease. All data were analysed by student-t test & percentage column done.

**Results:**

Table 1: Distribution of hypertensive patients and non-hypertensive patients by age

<table>
<thead>
<tr>
<th>Age</th>
<th>Hypertensive patients</th>
<th>Non-hypertensive Patients</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>41-50</td>
<td>4</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>51-60</td>
<td>27</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>61-70</td>
<td>45</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>71-80</td>
<td>16</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>81-90</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>91-100</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>95</td>
<td>34</td>
<td>31</td>
</tr>
</tbody>
</table>

Mean ±SD: 64.4±8.34, 61.9±7.26, 59.6±7.35, 61.8±8.54, 62.2±7.81

Values are expressed as Mean± SD and within parentheses percentage(%) over column in total

This table showing that 43.5% patients age was 61-70 years. Mean age was 62.2±7.81.
Table 2: Distribution of Hypertension and Nonhypertension groups

<table>
<thead>
<tr>
<th>Character</th>
<th>Male (n=126)</th>
<th>Female (n=54)</th>
<th>Total (n=180)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>95 (73.65%)</td>
<td>34 (26.35%)</td>
<td>129 (71.7%)</td>
</tr>
<tr>
<td>Non-hypertension</td>
<td>31 (60.8%)</td>
<td>20 (39.2%)</td>
<td>51 (29.3%)</td>
</tr>
</tbody>
</table>

Table 2 shows that 71.7% patients was hypertensive out of 180 patients and 29.3% patients was non hypertensive out of 180 patients.

Table 3: Distribution of patients by mortality

<table>
<thead>
<tr>
<th>Character</th>
<th>Mortality</th>
<th>Total Patients</th>
<th>Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertensive</td>
<td>84</td>
<td>129</td>
<td>65.1%</td>
</tr>
<tr>
<td>Non-hypertensive</td>
<td>21</td>
<td>51</td>
<td>41.1%</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>180</td>
<td>58.3%</td>
</tr>
</tbody>
</table>

Table 3 shows that total 180 patients mortality rate was 65.1% in hypertensive patients and mortality rate was 41.1% in non-hypertensive patients and total mortality was 58.3% out of 180 patients.

Discussion:
Compared to the diseases associated with previous corona virus epidemics, such as the Severe Acute Respiratory Syndromes, and Middle East Respiratory Syndromes COVID-19 is more severe and has a faster spread. SARS-COV-2 enters the cell through the ACE2 receptor. Due to interaction between SARA-COV-2 and ACE2, it is believed that hypertension may be related to the pathogenesis of COVID-19 by working directly as a previous clinical predictor of the disease severity or by feeding to late deterioration in the disease process. In our retrospective study shows that patients had 50 (27.8%) in 51-60 years, 79 (43.5%) had 61-70 years and 27 (15%) had 71-80 years. Mean age was 62.2±7.8. Among 180 patients 71.7% patients was hypertensive and 29.3% patients was non hypertensive. In other study we
found the median age of the COVID-19 patients was 60 years and the prevalence rate of hypertension was 32.5%. They found no difference in the patients sex distribution, but the patients were older and high blood pressure. Based on the recently published clinical and epidemiological characteristics of COVID-19 patients. Several editorials and review published in famous cardiology journals, pointed to the higher risk of COVID-19 infection, the more severe disease and augmented mortality out comes among the infected elderly. As reviewed elsewhere, it has been stated male patients had higher expression of angiotensin-converting enzyme 2 (ACE2) which may be regulated by male sex hormones rendering them to more risk for SARS-COV-2 infection and poor clinical outcome. In our retrospective study out of 180 patients mortality rate was 65.1% in hypertensive patients and 41.1% in non-hypertensive patients and total mortality was 58.3%. However, there was no sufficient evidence to show that subjects with hypertension are more likely to be diagnosed with the severe COVID-19 illness or proceed to poor clinical outcome including death due to COVID-19 than those with hypertension. In this retrospective study shows that comorbidity among the patient out of 180 patients, 50% patients had Diabetes mellitus, 14% Bronchial asthma, 14% had Ischemic heart disease, 11% had chronic kidney disease, 6% Hypothyroidism and 5% had cerebrovascular disease. Comorbidity may also reduce immune function. For example, in diabetic patients, natural immune function reduced substantially which may restrict the body to produce respective antibody against any infection. Since natural immunity is declined profoundly in comorbid conditions and as patients are taking more drugs concurrently, the notorious adverse drug reaction alongside downregulation of immune function may expected to occur in these patient and may increase risk of mortality eventually.

**Conclusion:**
This study concluded that hypertension does not affect the outcome of COVID-19. Compared with the group of survivors and non-surviving COVID-19 patients with hypertension, most of the patient were older and had more comorbidity.

**References:**


