

An observational study to find association between Hypertension and severe and fatal COVID-19 infection in COVID dedicated hospital, Mumbai

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ABSTRACT

Introduction: World Health Organization (WHO) has declared COVID-19 outbreak as a “public health emergency of international concern” on January 31, 2020. After that the epidemic spread rapidly around the world. Chronic non-communicable diseases were identified as risk factors for SARS-CoV-2. Hypertension (HTN) is one of the most common cardiovascular diseases with a prevalence ranging from 10% to 20% among adult population. After COVID-19 outbreak, identification of risk factors for severe or fatal disease is necessary to allocate limited resources. For primary care physicians, this is of vital importance to know the association between hypertension and severe and fatal COVID-19 infection as hypertension is affecting millions of people all over the world and primary health care is of immense importance in a country like India. Duration of stay in hospital which will be taken as proxy measure of duration of illness, symptomatic status, need of ICU care and death will be taken as indicators of severe and fatal COVID-19 infection. There are few researches to find an association between Hypertension and severe and fatal COVID-19 infection. There is a need to assess the same. **Objectives:** To find an association of hypertension and severe and fatal COVID-19 infection. **Methodology:** A hospital-based cross-sectional study was carried out at a COVID dedicated hospital, Mumbai in 9 months from 1 April 2020 to 31 December 2020. All patients admitted in hospital were included in the study by universal sampling. **Ethical Approval:** The permission to conduct the study was taken by Institutional Ethics Committee. **Results:** There was a significant association between hypertension and severe and fatal COVID-19 infection defined by more duration of stay in hospital, admission to ICU and mortality. **Conclusions:** It is concluded from this study that hypertension is associated with severe and fatal COVID-19 infection. It gives a clear idea for primary care physicians to give more focus towards patients with hypertension with COVID-19 infection. Blood pressure monitoring should be strictly practiced during COVID-like illnesses. Special attention is to be given as far as treatment and early referral to higher centre with ICU is concerned for better outcome. Hypertensive patients should be protected more by adopting COVID appropriate behaviour.

Keywords: COVID-19, fatal, hypertension

Introduction

World Health Organization (WHO) has declared COVID-19 outbreak as a “public health emergency of international concern” on January 31, 2020.^[1] After that the epidemic spread rapidly around the world.

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Chronic non-communicable diseases were identified as risk factors for SARS- CoV-2. Hypertension (HTN) is one of the most common cardiovascular diseases with a prevalence ranging from 10% to 20% among adult population.

After COVID-19 outbreak, identification of risk factors for severe or fatal disease are necessary to allocate limited resources. For primary care physicians, this is of vital importance to know the association between hypertension and severe and fatal COVID-19 infection as hypertension is affecting millions of people all over the world and primary health care is of immense importance in a country like India.

Duration of stay in hospital which will be taken as proxy measure of duration of illness, symptomatic status, need of ICU care and death will be taken as indicators of severe and fatal COVID-19 infection. There are few researches to find association between Hypertension and severe and fatal COVID-19 infection. There is a need to assess the same.

Objectives

To find association of hypertension and severe and fatal COVID-19 infection in COVID dedicated hospital.

Methodology

Study design

A hospital-based retrospective study was carried out at a COVID dedicated hospital, Mumbai.

Selection of study group

All admitted patients of COVID-19 in a COVID Dedicated Hospital, Mumbai were selected in 9 months (1 April 2020 to 31 December 2020) by universal sampling technique.

Inclusion criteria

1. Discharged or dead patients

Exclusion criteria

1. Patients admitted in hospital (as their outcome is not certain yet).

Ethical approval

The permission to conduct the study was taken by Institutional Ethics Committee.

Results

Age-wise distribution of COVID cases

The study subjects were divided into 7 groups.

The mean age of study subjects was 46 years.

Age groups (years)	Hypertension		
	Present	Absent	Total
21-30	7 2%	637 25.1%	644 22.3%
31-40	27 7.8%	602 23.7%	629 21.8%
41-50	72 20.9%	470 18.5%	542 18.8%
51-60	119 34.5%	469 18.5%	588 20.4%
61-70	79 22.9%	227 8.9%	306 10.6%
71-80	26 7.5%	104 4.1%	130 4.4%
81-90	15 4.3%	29 1.1%	44 1.5%
Total	345 100.0%	2538 100.0%	2883 100.0%

Gender-wise distribution of COVID cases

Gender	Hypertension		
	Present	Absent	Total
Male	203 58.8%	1654 65.2%	1857 64.4%
Female	142 41.2%	884 34.8%	1026 35.6%
Total	345 100.0%	2538 100.0%	2883 100.0%

64.4% patients were male and 35.6% patients were female.

Association between Hypertension and duration of hospital stay in COVID cases

Duration of hospital stay (days)	Hypertension		
	Present	Absent	Total
0-5	67 19.4%	498 19.6%	565 19.6%
6-10	119 34.5%	966 38.1%	1085 37.6%
11-15	105 30.4%	623 24.5%	728 25.3%
16-20	28 8.1%	296 11.7%	324 11.2%
21-25	18 5.2%	101 4%	119 4.1%
26-30	5 1.4%	31 1.2%	36 1.2%
31-35	0 0.0%	15 0.6%	15 0.5%
≥36	3 0.9%	8 0.3%	11 0.4%
Total	345 100.0%	2538 100.0%	2883 100.0%

Chi-Square=14.342, df=7, P=0.045

There was significant association between Hypertension and duration of hospital stay in COVID cases as the *P* value was less than 0.05.

Association between Hypertension and Symptomatic status in COVID cases

Symptomatic status	Hypertension		Total
	Present	Absent	
Symptomatic	260 75.4%	1993 78.5%	2253 78.1%
Asymptomatic	85 24.6%	545 21.5%	630 21.9%
Total	345 100.0%	2538 100.0%	2883 100.0%

Chi-Square=1.781, df=1, P=0.182

Out of 345 hypertensive patients 260 i.e., 75.4% cases were symptomatic. Out of 2538 non-hypertensive subjects 1993 i.e., 78.5% cases were symptomatic. There was no significant association between them as the *P* value was more than 0.05.

Association between Hypertension and ICU care in COVID cases

ICU care	Hypertension		Total
	Present	Absent	
Yes	13 3.8%	50 2.0%	63 2.2%
No	332 96.2%	2488 98.0%	2820 97.8%
Total	345 100.0%	2538 100.0%	2883 100.0%

Chi-Square=4.594, df=1, P=0.032

Out of 345 hypertensive patients 13 i.e., 3.8% cases were in need of ICU care. Out of 2538 non-hypertensive subjects 50 i.e., 2.0% cases were in need of ICU care. There was significant association between them as the *P* value was less than 0.05.

Association between Hypertension and death in COVID cases

Death	Hypertension		Total
	Present	Absent	
Yes	81 23.5%	106 4.2%	187 6.5%
No	264 76.5%	2432 95.8%	2696 93.5%
Total	345 100.0%	2538 100.0%	2883 100.0%

Chi-Square=13.78, df=1, P=0.000

Out of 345 hypertensive patients 81 i.e., 23.5% patients were died. Out of 2538 non-hypertensive subjects 106 i.e., 4.2% patients were died. There was significant association between them as the *P* value was less than 0.05.

Discussion

After the COVID-19 outbreak, healthcare system was overwhelmed. Various factors like associated co-morbidities

needed to be identified so that patients can be prioritized as per the requirement of hospitalization and ICU care etc.

In our study, duration of stay in hospital was taken as proxy measure of duration of illness. It was significantly associated with presence of hypertension in COVID-19 cases. Similar results were obtained in the study conducted by Chiam *et al.*^[2] While duration of stay in hospital is not significantly associated with presence of hypertension in COVID-19 in the study done by Guo *et al.*^[3] This might be due to other factors responsible for stay in hospital. Duration in stay in hospital gives an idea of bed occupancy in the hospital.

In our study, need for ICU care was significantly associated with presence of hypertension in COVID-19 cases. Similar results were seen in WHO scientific brief 2021.^[4]

In this study, mortality was significantly associated with presence of hypertension in COVID-19 cases. In some studies, hypertension, was one of the parameters in COVID death patients.^[5,6] Thus, hypertensive patients are more prone to develop complications in COVID-19.

The study conducted by Liang *et al.*^[7] suggests that hypertension is an independent risk factor for severity and mortality of COVID-19 patients. The comorbidity like hypertension greatly affects the prognosis of the COVID-19 patients as seen in the study conducted by Zheng *et al.*^[8] and de Souza *et al.*^[9]

In this study, symptomatic status of COVID-19 patients is not significantly associated with severity of COVID-19 infection. Similar findings were seen in the study done by Wu *et al.*^[10] Thus findings of this study are comparable to those from previously published literature.

So, more preventive and therapeutic focus should be given to patients with hypertension during COVID pandemic.

Limitations

This prognostic significance of hypertension and severe and fatal COVID-19 infection is not independent of other risk factors.

Conclusions

It is concluded from this study that hypertension is associated with severe and fatal COVID-19 infection. It gives a clear idea for primary care physicians to give more focus towards patients with hypertension with COVID-19 infection. Blood pressure monitoring should be strictly practiced during COVID like illnesses. Special attention is to be given as far as treatment and early referral to higher centre with ICU is concerned for better outcome. Hypertensive patients should be protected more by adopting COVID appropriate behaviour.

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Conflicts of interest

There are no conflicts of interest.

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