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Outcomes of Patients Taking Corticosteroids Hospitalized for COVID-19: A Comparative Cross-sectional Study Between Hypertensive and Non-Hypertensive Patients

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ABSTRACT

Background and Objective: Independently or combined with other factors, such as corticosteroids, hypertension can increase the risk of death and worsen hospital outcomes among patients with the coronavirus disease of 2019 (COVID-19). This study aimed to compare the outcomes of hospitalized COVID-19 patients using corticosteroids in a sample of 246 hypertensive and 176 non-hypertensive patients in Lebanon. **Materials and Methods:** A comparative cross-sectional study was performed over three months in which data were collected from patients' medical charts. Hospitalized patients for COVID-19 taking corticosteroids were grouped into hypertensive and non-hypertensive groups. Statistical analyses were conducted using SPSS version 27 by taking all-cause mortality as the independent variable and (i) General information about the patients, (ii) Medical history and (iii) Corticosteroid regimen characteristics as dependent variables. **Results:** The hypertension group had older patients and a higher proportion of ICU admissions and positive COVID-19 tests during hospitalization. Among hypertensive patients, older age, severe cases and shorter corticosteroid treatment correlated with higher all-cause mortality. Non-hypertensive patients with severe cases and high blood pressure also faced increased mortality risk. Hypertensive patients had more ventilator-free days but used convalescent plasma less frequently. **Conclusion:** Although the corticosteroid treatment was comparable between hypertensive and non-hypertensive patients, they had different hospital outcomes. Findings from this study suggest additional clinical support for hypertensive patients to secure better in-hospital management of cases.

KEYWORDS

Patients with hypertension, corticosteroids, COVID-19, hospital mortality, comparative predictors

INTRODUCTION

Non-communicable disease management was altered during the Coronavirus disease of 2019 (COVID-19) pandemic[1], resulting in delays in screening new cases and the follow-up of previously diagnosed ones[2,3]. Frontline workers faced ethical dilemmas in prioritizing hospital admission to certain infected patients

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due to the unavailability of beds and the exhaustion of the health system[4]. Hypertension was shown to be a risk factor for several chronic diseases and events, such as cardiovascular disease[5], renal disease[6], diabetes[7] and fractures[8]. Reports revealed a significant association between hypertension, severity and mortality among COVID-19 patients[9]. Furthermore, the co-existence of hypertension with other risk factors and comorbidities predisposed patients to a higher risk for adverse hospital outcomes when infected[10].

Globally, hypertension is the most significant single contributor to the global disease burden and is associated with high odds of morbidity and mortality[11]. Low-Middle-Income Countries (LMIC) had a higher prevalence of hypertension (31.5%) than high-income countries due to several factors such as unhealthy diet, physical inactivity, alcohol consumption and obesity[12]. According to a report published recently, around 8.5 million deaths were associated with hypertension in 2015, of which 88% were in low-income and middle-income countries[13]. Recently classified as LMIC, Lebanon had a similar prevalence of hypertension (31.2%), with more than a third of patients undiagnosed[14]. Independently or combined with other factors, hypertension was shown to confer a greater risk of death and poorer patient outcomes[15]. Doctors used personalized treatments such as corticosteroids during the pandemic despite lacking clinical evidence[16]. However, patients with hypertension treated with corticosteroids may have experienced different outcomes during their hospitalization. The objective of this research is to examine and contrast hospital-related outcomes in patients with hypertension and those without hypertension. The primary focus of the study was to assess overall mortality.

MATERIALS AND METHODS

Study design: A comparative cross-sectional study was carried out in Lebanon over three months (December, 2021-February, 2022) in which data were obtained from patients' medical charts. Hospitalized patients for COVID-19 taking corticosteroids in the above mentioned period were grouped into hypertensive and non-hypertensive groups if they had a previous clinical diagnosis of hypertension and started their anti-hypertension treatment at least 6 months.

Study sample and sample size calculation: The research sample comprised 422 adult patients hospitalized for COVID-19, regardless of the disease's stage or severity. Data were gathered from the patient's medical records throughout the study period. To determine the necessary sample size for comparing proportions, with an 80% statistical power and a significance level of 5%, WinPepi software version 11.65 was employed. To adequately investigate the outcomes of interest, a minimum of 128 patients with hypertension and 128 controls were needed, with an equal allocation ratio of 1:1. To enhance control over potential confounding variables, all COVID-19 patients treated at the hospital were included in the study, resulting in 246 patients with hypertension and 176 in the non-hypertensive group.

Data collection: Two clinical pharmacists gathered data by employing a standardized data collection form crafted following an in-depth review of existing literature and consulting with two experts for their insights. The initial data collection process required an average of 13 min per patient and was subsequently updated to reflect their medical status.

General information about the patients: These data included the sex, age, height, weight and smoking status of the patients. Age was then categorized (18-60, 61-70 and >70) and the Body Mass Index (BMI) was calculated. This section also recorded if patients were admitted to the internal medicine floor or the ICU. The blood pressure (systolic/diastolic) was registered on admission and at discharge (last reported value) and was then classified following the American Heart Association[17] criteria. Information on performing a real-time Polymerase Chain Reaction (PCR) test and its timing (before or during the admission) was also registered. Patients were then classified as critical (septic shock, sepsis, mechanical ventilation, or vasopressor therapy), severe (Oxygen saturation $\leq$90%, respiratory rate >30 breaths/min or the existence of signs of severe respiratory distress) and non-severe cases (absence of any signs of severe or critical COVID-19)[18].

Medical history of the patients: In this section, the presence of comorbid conditions was recorded, which encompassed diabetes, coronary artery disease, dyslipidemia, heart failure, chronic kidney disease, Chronic Obstructive Pulmonary Disease (COPD), asthma and cancer dyslipidemia, heart failure, chronic kidney disease, Chronic Obstructive Pulmonary Disease (COPD), asthma and cancer. Participants were permitted to provide multiple responses in this regard.

Treatment characteristics: Dexamethasone, methylprednisolone (administered intravenously) and oral prednisone presented the types of corticosteroids employed. The prescribed dosage was categorized as low, moderate or high following the recommendations of the American Society of Health-System Pharmacists, which assessed evidence for COVID-19 treatments and previously used in simil[19]. Treatment duration was classified into 2 groups: Seven days or less or more than seven days based on a meta-analysis conducted in 2021[20]. Instances of hyperglycemia and superinfection were documented, along with the use of antibiotics, remdesivir, ivermectin and convalescent plasma. The necessity for mechanical ventilation, if required and its duration, along with the length of ICU stays when applicable, were also recorded in this section.

Ethical considerations: The research protocol and survey underwent a comprehensive review and received approval from the institutional review board of Ain Wazein Medical Village. The data collected were entirely anonymous and devoid of any identifying information. Pharmacists responsible for data collection had no roles in the coding and analysis processes. Data storage adhered to the guidelines outlined in the Lebanese University's general data protection regulations.

Statistical analysis: Statistical analyses were done using Version 27 of the Statistical Package for Social Sciences (SPSS Inc., Chicago, Illinois). Based on the skewness and kurtosis values, it was determined that the data exhibited a normal distribution and converged toward their expected values[21]. Patient age, height, weight, Body Mass Index (BMI), length of hospital stay, ICU stay duration and the duration of corticosteroid treatment were presented using means and standard deviations. Conversely, categorical variables were presented in terms of frequencies and percentages. Bivariate analyses were conducted, with all-cause mortality as the independent variable and (i) Patients' general information, (ii) Medical history and (iii) Corticosteroid regimen characteristics as dependent variables. Chi-square/Fisher exact Tests were utilized to compare percentages among associated categorical variables, while the independent t-test was employed to compare means between groups. A $p<0.05$ was considered statistically significant.

RESULTS

Patients with hypertension were notably older than non-hypertensive patients, with a higher proportion above 70. Blood pressure on admission and discharge were similar between the groups, but hypertensive patients had a higher rate of ICU admission, more smokers and a greater percentage underwent PCR testing during hospital admission. Additionally, a larger proportion of non-hypertensive patients were classified as critical cases. Diabetes, coronary artery disease, dyslipidemia and heart failure were more prevalent among hypertensive patients. Both groups had similar corticosteroid regimens, primarily using dexamethasone, with a third of patients on high doses. Side effects from corticosteroids including hyperglycemia, were reported by 23.1% of hypertensive patients. The hypertensive and non-hypertensive groups had a substantial mortality rate, with 18.7 and 26.1% of patients, respectively, passing away. Among hypertensive patients, increasing age, blood pressure at discharge >120/80 mm Hg, smoking status, case severity and comorbidities were significantly associated with higher all-cause mortality. Furthermore, a shorter duration of corticosteroid treatment and superinfections during hospitalization were also linked to increased mortality in the hypertensive group and superinfections, with no significant differences compared to non-hypertensive patients. Hypertensive patients had a notably higher number

of ventilator-free days, while other patients required more mechanical ventilation and had a higher utilization of plasma from recovered donors.

General characteristics of the patients: Table 1 represents the general characteristics of the patients. The sample included more men than women in both hypertensive (57.7 vs 42.3%) and non-hypertensive patients (60.8% vs. 39.2%) (p = 0.527). Patients with hypertension were significantly older (68.8±12.6) than the non-hypertensive ones [56.2 (16.5), p<0.001], namely those more than 70 years of age (52.8 vs 21.6% in the non-hypertensive group) (p<0.001). No significant differences were noted regarding the patients' height, weight and BMI in both groups (p>0.05). The reported blood pressure on admission and discharge were comparable between the groups, with most patients having a blood pressure <120/80 mm Hg. More hypertensive patients were admitted to the intensive care unit (33.7 vs 22.7%, p = 0.014). This group also accounted for a significantly higher percentage of smokers (16.3 vs 9.2%, p = 0.037). More than 90% of patients did a PCR Test, with significantly more patients in the hypertensive group performing it during their admission to the hospital (p = 0.003). Among the patients with hypertension, 46.7% were classified as non-severe cases, 30.5% as severe cases and 22.8% as critical cases, while among the non-hypertensive patients, more critical cases were found (31.3%, p = 0.015).

Medical history of the patients and the corticosteroid regimen characteristics: Over half (55.1%) of non-hypertensive patients had no previous comorbidities. Among those with comorbidities, most hypertensive patients had two or more comorbidities, while 74.7% of the non-hypertensive group had only one (p>0.001). Among others, diabetes, coronary artery disease, dyslipidemia and heart failure were significantly higher among hypertensive patients (Table 2). No significant differences were noted between

Table 1: Distribution of the general characteristics of the patients

		Hypertensive patients (N = 246)	Non-hypertensive patients (N = 176)	
		Frequency	Frequency	p-value
Sex	Man	142 (57.7%)	107 (60.8%)	0.527
	Woman	104 (42.3%)	69 (39.2%)	
Age (years)	Mean±SD	68.8±12.6	56.2±16.5	<0.001
	18-60	66 (26.8%)	106 (60.2%)	
	61-70	50 (20.4%)	32 (18.2%)	<0.001
	More than 70	130 (52.8%)	38 (21.6%)	
Height (cm)	Mean±SD	166.8±6.9	167.3±9.0	0.779
Weight (kg)	Mean±SD	75.6±12.7	81.4±17.0	0.123
BMI (kg m^{-2})	Mean±SD	26.9±3.6	29.0±5.5	0.082
Blood pressure on admission	<120/80 mm Hg	168 (71.8%)	130 (77.4%)	0.207
	>120/80 mm Hg	66 (28.2%)	38 (22.6%)	
Blood pressure at discharge	<120/80 mm Hg	187 (80.3%)	128 (76.6%)	0.384
	>120/80 mm Hg	46 (19.7%)	39 (23.4%)	
Admission floor	Internal medicine	163 (66.3%)	136 (77.3%)	0.014
	Intensive care unit	83 (33.7%)	40 (22.7%)	
Smoking status	Non-smoker	201 (83.8%)	158 (90.8%)	0.037
	Smoker	39 (16.3%)	16 (9.2%)	
Did you do a PCR Test?	Yes	236 (95.9%)	163 (92.6%)	0.138
	No	10 (4.1%)	13 (7.4%)	
If yes, when was it done?	Before admission	46 (19.5%)	53 (32.5%)	0.003
	During admission	190 (80.5%)	110 (67.5%)	
Severity of cases	Non-severe	115 (46.7%)	58 (33.0%)	
	Severe	75 (30.5%)	63 (35.8%)	0.015
	Critical	56 (22.8%)	55 (31.3%)	

Results are given in frequency (%) or Mean±Standard Deviation

Table 2: Medical history of the patients and corticosteroid regimen characteristics

		Hypertensive patients (N = 246)	Non-hypertensive patients (N = 176)	
Medical history		Frequency (%)	Frequency (%)	p-value
Comorbidities	None	-	97 (55.1)	
	One	57 (23.4)	59 (74.7	
	Two	101 (41.4)	15 (19.0)	<0.001
	More than two	86 (35.2)	5 (6.3)	
Diabetes		106 (43.1)	23 (13.1)	<0.001
Coronary artery disease		81 (32.9)	11 (6.3)	<0.001
Dyslipidemia		31 (12.6)	4 (2.3)	<0.001
Heart failure		18 (7.3)	5 (2.8)	0.046
Chronic kidney disease		15 (6.1)	6 (3.4)	0.210
COPD		14 (5.7)	5 (2.8)	0.164
Asthma		10 (4.1)	8 (4.5)	0.812
Cancer		7 (2.8)	7 (4.0)	0.587
Corticosteroid regimens		Frequency (%)	Frequency (%)	p-value
Number of corticosteroids used	One	216 (87.8)	143 (81.3)	0.062
	Two	30 (12.2)	33 (18.8)	
Type of corticosteroids	Dexamethasone	156 (63.9)	103 (58.9)	0.536
	Methylprednisolone	82 (33.6)	66 (37.7)	
	Prednisone	6 (2.5)	6 (3.4)	
Dosage	High	89 (36.2)	60 (34.1)	0.852
	Moderate	101 (41.1)	77 (43.8)	
	Low	56 (22.8)	39 (22.2)	
Duration of treatment	Mean ±SD	6.0±3.9	5.4±3.4	0.194
	≤7 days	201 (81.7)	151 (85.8)	0.266
	>7 days	45 (18.3)	25 (14.2)	
Side effects	Yes	49 (23.1)	37 (24.5)	0.759
	No	163 (76.9)	114 (75.5)	
	Hyperglycemia	37 (75.5)	30 (81.1)	0.643
	Superinfection	16 (32.7)	16 (43.2)	0.816

Results are given in terms of frequency (%) or Mean±Standard Deviation

the groups regarding the regimen of corticosteroids, with the majority having one type used. Dexamethasone was the primary prescribed drug in both groups, followed by methylprednisolone. Around a third of the patients took a high dosage of corticosteroids (36.2 and 34.1%, respectively in the hypertensive and non-hypertensive groups) and more than 40% took a moderate dose. The 49 hypertensive patients (23.1%) encountered side effects from corticosteroids, out of which 75.5% had hyperglycemia and 32.7% had a superinfection, with no statistically significant differences between groups (Table 2).

Comparison of outcomes among hypertensive and non-hypertensive hospitalized COVID-19 patients: As 46 patients died in the hypertensive group (18.7%) and 46 (26.1%) died in the non-hypertensive group. The documented reasons for patient death were as follows: Heart failure accounted for 23 patients (25%), septic shock for 21 patients (22.8%), respiratory failure for 20 patients (21.7%), pulmonary embolism for 17 patients(18.5%) and unknown cause of death for 11 patients (12.0%). Table 3 compares overall mortality and patients' characteristics within each group. Among hypertensive patients, there was a significant increase in all-cause mortality with each increment in age ($p = 0.049$), with 23.8% of those over 70 years having passed away. Higher all-cause mortality was associated with blood pressure at discharge >120/80 mm Hg in both groups ($p<0.001$). Around 21% of non-smokers died compared to only 7.7% of smoking hypertensive patients ($p = 0.036$). The more severe the case, the significantly higher all-cause mortality was noted in both groups ($p<0.001$). All-cause mortality increased per increase in the number of comorbidities among hypertensive patients ($p = 0.010$), while no significant differences were noted among non-hypertensive patients ($p = 0.718$) and 35.5% of hypertensive who had dyslipidemia

Table 3: Association between all-cause mortality and the general characteristics of the patients, medical history and corticosteroid regimen characteristics

		All-cause mortality			
		Hypertensive patients (N = 46)		Non-hypertensive patients (N = 46)	
General characteristics of the patients		Frequency (%)	p-value	Frequency (%)	p-value
Sex	Man	27 (19.0)	0.882	27 (25.2)	0.734
	Woman	19 (18.3)		19 (27.5)	
Age (years)	18-60	7 (10.6)		22 (20.8)	
	61-70	8 (16.0)	0.049	12 (37.5)	0.116
	More than 70	31 (23.8)		12 (31.6)	
The blood pressure on admission	<120/80 mm Hg	28 (16.7)	0.182	30 (23.1)	0.167
	>120/80 mm Hg	16 (24.2)		13 (34.2)	
The blood pressure at discharge	<120/80 mm Hg	26 (13.9)	<0.001	24 (18.8)	<0.001
(last measurement)	>120/80 mm Hg	17 (37.0)		19 (48.7)	
Admission floor	Internal medicine	30 (18.4)	0.868	37 (27.2)	0.552
	Intensive care unit	16 (19.3)		9 (22.5)	
Smoking status	Non-smoker	42 (20.9)	0.036	42 (26.6)	0.765
	Smoker	3 (7.7)		3 (18.8)	
Severity of cases	Non-severe	2 (1.7)		2 (3.4)	
	Severe	12 (16.0)	<0.001	9 (14.3)	<0.001
	Critical	32 (57.1)		35 (63.6)	
Medical history		Frequency (%)	p-value	Frequency (%)	p-value
Number of comorbidities	One	5 (8.8)		14 (23.7)	0.718
	Two	16 (15.8)	0.010	4 (26.7)	
	More than two	24 (27.9)		2 (40.0)	
Diabetes		19 (41.3)	0.786	7 (30.4)	0.615
Coronary artery disease		19 (23.5)	0.180	3 (27.3)	0.929
Dyslipidemia		11 (35.5)	0.010	--	--
Heart failure		4 (22.2)	0.753	2 (40.0)	0.607
Chronic kidney disease		3 (20.0)	0.894	--	--
Corticosteroid regimens		Frequency (%)	p-value	Frequency (%)	p-value
Number of corticosteroids used	One	37 (17.1)	0.090	38 (26.6)	0.784
	Two	9 (30.0)		8 (24.2)	
Type of corticosteroids	Dexamethasone	25 (16.0)		21 (20.4)	
	Methylprednisolone	17 (20.7)	0.441	22 (33.3)	0.156
	Prednisone	2 (33.3)		2 (33.3)	
Dosage	High	12 (13.5)		17 (28.3)	0.657
	Moderate	25 (24.8)	0.118	21 (27.3)	
	Low	9 (16.1)		8 (20.5)	
Duration of treatment	≤7 days	42 (20.9)	0.043	43 (28.5)	0.082
	>7 days	4 (8.9)		3 (12.0)	
Side effects	Hyperglycemia	8 (21.6)	0.915	10 (33.3)	0.591
	Superinfection	11 (68.8)	<0.001	6 (37.5)	0.793

Results are given in frequency (%) or Mean±Standard Deviation

deceased (p = 0.010). When associating all-cause mortality with corticosteroid regimen characteristics, hypertensive patients were more likely to die if they were treated for 7 days or less (20.9%) compared to those treated for more than 7 days (8.9%, p = 0.043) and 68.8% of those having superinfections during their hospitalization in the aforementioned group died (p<0.001).

Table 4 presents the comparison of the observed secondary outcomes between the hypertensive and the non-hypertensive groups. No significant differences were noted between groups as regards the time of corticosteroid initiation, length of hospital stay, days till death, the duration of mechanical ventilation and the use of antibiotics, remdesivir or ivermectin (p>0.050). Nonetheless, patients with hypertension had a significantly higher number of ventilator-free days than others (p = 0.022). Non-hypertensive patients (37.5%) needed more mechanical ventilation than hypertensive ones (29.3%) in addition to their higher use of plasma from recovered donors (p = 0.048).

Table 4: Comparison of the secondary outcomes between hypertensive and non-hypertensive COVID-19 patients

		Hypertensive patients (N = 246)	Non-hypertensive patients (N = 176)	
		Frequency	Frequency	p-value
Time of corticosteroid initiation<72 hrs		236 (95.9%)	172 (97.7%)	0.311
	>72 hrs	10 (4.1%)	4 (2.3%)	
Length of hospital stay	Mean±SD	7.8±3.9	7.5±3.6	0.477
Days till death	Mean±SD	9.8±9.9	7.8±4.4	0.228
Ventilator-free days	Mean±SD	2.5±3.7	1.3±1.8	0.022
Mechanical ventilation	Yes	72 (29.3%)	66 (37.5%)	0.076
	No	174 (70.7%)	110 (62.5%)	
Duration of the mechanical ventilation	Mean±SD	4.8±3.5	4.8±2.4	0.999
Length of ICU stay	Mean±SD	6.2±3.5	6.2±3.7	0.950
Use of antibiotics		231 (93.9%)	170 (96.6%)	0.210
Use of remdesivir		100 (40.8%)	74 (42.0%)	0.801
Use of ivermectin		12 (4.9%)	10 (5.7%)	0.721
Use of plasma		1 (0.4%)	5 (2.9%)	0.048

Results are given in frequency (%) or Mean±Standard deviation

DISCUSSION

The present study compares the outcomes between hypertensive and non-hypertensive patients hospitalized for COVID-19 and taking corticosteroids. The study sample included more men than women in both groups. Corticosteroid regimen characteristics were comparable between the groups. Hypertensive patients had a significantly higher all-cause mortality per increase in age and severity of infection. It was also higher among those treated with corticosteroids for 7 days or less or those acquiring superinfections during their hospital stay. Increased severity of cases and high blood pressure were associated with increased all-cause mortality among patients without diagnosed hypertension. Hypertensive patients had a significantly higher number of ventilator-free days and fewer were given plasma from recovered donors than non-diabetic patients.

The sample included more men. Previous research reported a higher likelihood of men being critically ill or dying during hospitalization[22]. However, this distribution was comparable between groups, putting them at equal risks. Hypertensive patients were older and more prone to be admitted to the ICU. Despite the beneficial effect of anti-hypertensives[23], the severity of cases increased in older hypertensive patients[24], which might have led to higher ICU admission[25]. Moreover, all-cause mortality was higher among hypertensive patients above 70 years, in agreement with a multi-center study revealing that older age groups had twice the odds of death[26]. The number of comorbidities was significantly higher among hypertensive patients, particularly diabetes, dyslipidemia, coronary artery disease and heart failure. Similarly, a study published in 2019 reported that hypertensive patients had a high prevalence of other cardiovascular risk factors and diseases[27]. Nevertheless, since the study's primary outcome was all-cause mortality, comorbidities were reported to be associated with higher mortality in COVID-19 patients[28], as shown in the present study. Patients with high last blood pressure measurements were significantly those with higher all-cause mortality in both groups. High systolic blood pressure was shown to be a covariate in mortality and survival prediction, not the actual hypertension diagnosis[29], which can explain this finding. Non-smokers in the hypertensive group were mainly those who were dead. Contradictory results were found in the literature regarding the impact of smoking on all-cause mortality[30-32]. Although smoking was known to aggravate respiratory outcomes, smokers in the hypertensive group may be taking other medications that can interfere with the progression of the infection.

The corticoid regimen was comparable between the groups. Nonetheless, hypertensive patients treated for 7 days or less and those with superinfections had a higher all-cause mortality risk. A delay in viral clearance was reported among hypertensive patients[33], which made the anti-inflammatory effect of

corticosteroids insufficient. Dexamethasone use was found to be associated with superinfections in COVID-19 patients[34], which could have elevated the blood pressure of hypertensive patients. This group also had significantly more ventilator-free days than a previous investigation[35]. The limited number of hospital ventilators could have affected doctors' decision to select patients with a higher need. Plasma from recovered donors was less used in hypertensive patients, possibly explained by the presence of anti-angiotensin II autoantibodies in the plasma of donors, which can interfere with their treatment[36].

This study has limitations. Data were obtained from medical charts, which might lack comprehensive information, including side effects and documented causes of mortality for all patients. Additionally, the study's scope was confined to a single hospital, which may constrain the generalizability of the results to different healthcare settings. Nonetheless, using a standardized data collection form administered by trained pharmacists enabled a meaningful comparison between the groups, a different researcher also performed data coding and analysis. The present study is the first to explore the outcomes between hypertensive and non-hypertensive patients. It may provide additional information for the management of this sensitive group. Additionally, secondary outcomes encompassed various parameters such as the timing of corticosteroid initiation, the duration of hospitalization, the interval until death, the number of ventilator-free days, the necessity for and duration of mechanical ventilation, the length of stay in the Intensive Care Unit (ICU) and the utilization of antibiotics, remdesivir, ivermectin, as well as plasma obtained from individuals who had recovered from the illness.

CONCLUSION

Hospital outcomes differed between hypertensive and non-hypertensive patients despite similar corticoid treatment characteristics. Older hypertensive patients and those with higher blood pressure had higher risks of all-cause mortality. This risk also increased with the severity of cases and if treated for 7 days or less with corticosteroids. Furthermore, hypertensive patients with superinfections in the hospital had a higher risk of death. Findings from this study highlight the need for special management of hypertensive patients with specific characteristics.

SIGNIFICANCE STATEMENT

This study compares hospital-related outcomes in COVID-19 patients taking corticosteroids with and without hypertension. Hypertensive patients were notably older, with a higher percentage above 70 years. While blood pressure levels on admission and discharge were similar between groups, hypertensive patients had a higher rate of ICU admission, were more smokers and underwent PCR testing during hospitalization. They exhibited a higher prevalence of comorbidities, including diabetes, coronary artery disease, dyslipidemia and heart failure. The mortality rate was 18.7% for hypertensive patients and 26.1% for non-hypertensive patients. Factors linked to higher mortality included age, blood pressure at discharge, smoking, case severity, comorbidities, shorter treatment duration and superinfections. Ventilator-free days were higher for hypertensive patients, while non-hypertensive patients required more plasma from recovered donors.

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