

COVID- 19 infections with and without co-morbidities and clinical outcome

Abstract

Aim: To evaluate the clinical outcomes and severity of disease in COVID-19 patients presenting with and without comorbidities.

Study Design: Cross-sectional study

Place and duration: ICUs, wards of Jinnah Postgraduate Medical Center Karachi from March, to June 2021

Methodology: The enrolled patients diagnosed with COVID-19 ie according to the provisional directions given by WHO, were assessed for clinical outcomes. Comorbidities were determined based on patients self-report on admission.

Results: Total 200 COVID patients were enrolled in the study, out of them 179 were with comorbidities like type 2 Diabetes mellitus, hypertension, cardiac disorders and asthma, while 21 COVID patients were with no co morbidity. In present study (n=200), 55.5% were belonging to the age group more than fifty five years old, there were 50.5% males and 29.5% patients came in the month of June 2021. There were 84% hypertensive, 54% were diabetic, 10% were Ischemic Heart Disease and 5% were Asthmatic patients. Clinical outcomes, i.e., pneumothorax, pulmonary embolism, Myocardial Infarction, septic shock, heart failure, Disseminated

Intravascular Coagulation was compared regarding associated co-morbidities at the time of admission, p-value was <0.01 and $\chi^2=20.15$

Conclusion: COVID patients with comorbidities are more at risk of developing worst clinical outcomes.

Key words: COVID 19, co-morbidities, clinical outcomes

INTRODUCTION:

Coronavirus disease 2019 (COVID-19) is a diverse infectious health condition concerning miscellaneous causal pathophysiological processes include endothelial damage, hyper inflammation, thrombotic microangiopathies as well as end-organ injuries.¹ It has been revealed as being caused by severe acute respiratory syndrome coronavirus 2 abbreviated as SARS-CoV-2 and it be initially recognized in December of 2019 in Wuhan city of China, and it had been spread world –wide and created HAVOC globally and culminated in increased mortality in about two hundred and twenty countries. Owing to constantly mounting numbers of confirmed cases as well as to stay away from devastating health systems, world health organization and community health system globally encompass prevention from spread of this outbreak via focus on social distancing, lockdowns and self-isolation.² Most of such patients suffer from pneumonia and present with augmented temperature as the first symptom, and the majority of them show characteristic manifestations of viral pneumonia on chest x-ray. Older age individuals and young adults with co-morbidities are vulnerable to respiratory failure and worse clinical outcomes.³ Co-morbidities found significantly highly prevailing in severe COVID-19 cases, i.e., raised blood pressure but yet no understandable alliance exist between COVID-19 mortality and comorbidity.⁴

COVID-19 patients mostly present with increased temperature, shortness of breath, cough, headache, muscle ache, sore throat, confusion, chest pain, nausea, vomiting and loose motions. In radiological findings, bilateral pneumonia found commonly, and to certain extent, mottling and ground-glass opacities and pneumothorax also found. Most of the patients also undergo respiratory distress syndrome and 11 % worsen in a small period of time and pass away due to multiple organ failure.⁵ Novel COVID-19 is well thought-out similar to SARS-CoV and it is suggested as invading human cells by means of angiotensin converting enzyme 2 (ACE2) receptors. Lung cells that contain ACE2 receptors, might be the actual target cells for COVID-19. Conversely, a number of patients also show non-respiratory symptoms, such as renal failure and other organs failure. The data about scRNA-seq of human heart demonstrated that > 7.5 percent myocardial cells encompass positive ACE2 expression, in that way entail that heart possibly will be in elevated possibility of involvement in COVID-19 infection.⁶ This study has been designed to assess the severity and outcome in COVID19 patients having co-morbidities.

Methods:

This cross sectional research study was conducted on patients with definite COVID-19 infection and hospitalized at ICUs, wards of Jinnah Postgraduate Medical Center Karachi from March to June 2021. The enrolled patients diagnosed with COVID-19 according to the provisional directions given by WHO and the clinical outcomes measured. Comorbidities were determined based on patients self-report on admission. This study was approved by the Ethical review committee of institute. Written informed consent was putted aside due to the infection related trouble and stress. Data analyzed on SPSS version 22.0

Results:

Total 200 COVID patients enrolled in the study, out of them 179 were with comorbidities like type 2 Diabetes mellitus, hypertension, cardiac disorder and asthma while 21 COVID patients were with no known co morbidity.

In present study (n=200), 55.5% were belonging to the age group more than fifty five years old, 50.5% were male , and 29.5% patients came in the month of June 2021. (As shown in Table No.1) There were 84% hypertensive, 54% were diabetic, 10% were IHD and 5% were Asthmatic patients. (As shown in table no. 2)

Clinical outcomes, i.e., pneumothorax, pulmonary embolism, MI, septic shock, heart failure, DIC were associated with co-morbidities at the time of admission, p-value was <0.01 and $\chi^2=20.15$ (Table No. 3)

Table 1: Baseline Characteristics of studied population (n=200)

Characteristics		n	%
Age Group (Years)	17 - 35	18	9.0
	36 - 55	71	35.5
	>55	111	55.5
Gender	Female	99	49.5
	Male	101	50.5
Month	March	50	25.0
	April	43	21.5
	May	48	24.0
	June	59	29.5

Table 2: Co-morbidities in participants (n=200)

Co morbidities		n	%
Hypertension	Yes	168	84.0
	No	32	16.0
Diabetes Mellitus	Yes	108	54.0
	No	92	46.0
Ischemic Heart Disease	Yes	20	10.0
	No	180	90.0
Asthma	Yes	10	5.0
	No	190	95.0

**Table 3: Clinical outcome in COVID patients with presence of co-morbidities
(n=200)**

Clinical outcome	Co-morbidities		Total
	Yes	No	
Pneumothorax	39	0	39
	19.5%	.0%	19.5%
Pulmonary embolism	28	4	32
	14.0%	2.0%	16.0%
Myocardial infarction	25	2	27
	12.5%	1.0%	13.5%
Stroke	10	0	10
	5.0%	.0%	5.0%
Septic shock	10	0	10
	5.0%	.0%	5.0%
Heart failure	10	0	10
	5.0%	.0%	5.0%
Disseminated intravascular coagulation	13	1	14
	6.5%	.5%	7.0%
Discharged within 2 days	44	14	58
	22.0%	7.0%	29.0%
Total	179	21	200

	89.5%	10.5%	100.0%
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*p-value =0.005 and $\chi^2=20.15$

Discussion:

In present study, total 200 COVID patients enrolled in the study, out of them 179 were with comorbidities, i.e., 84% hypertensive, 54% were diabetic, 10% were IHD and 5% were asthmatic patients. Frequently observed clinical outcomes in COVID patients with comorbidities were pneumothorax, pulmonary embolism, MI, septic shock, heart failure, DIC. Similar to this study, Bajgain KT, et al. ⁴ also revealed hypertension, diabetes and cardiovascular diseases as commonly occurring co-morbidities in the COVID-19 patients world-wide. Huang C et al. ⁷ revealed about occurrence of pneumonia in such patients and the frequent complications of acute respiratory distress syndrome, acute cardiac injury and also the secondary infection. Invasive mechanical ventilation be required in 10 percent of these patients, with 5percent suffering from refractory hypoxemia and conventional extracorporeal membrane oxygenation as salvage therapy. Guan WJ, et al., ⁸ revealed that 20–51% of patients on admission, reported as having at least one comorbidity, i.e., 10 to 20 percent diabetic, 10-15 percent hypertensive and also cardiovascular and cerebrovascular co-morbidities. They concluded that confirmed cases of COVID-19 infection presenting with any co morbidity yield poor clinical outcomes as compared to those having no co-morbid condition. M Madjid et al. ⁹ observed that COVID-19 infection may lead to the viral pneumonia with further extra pulmonary involvement signs and might culminate in fatal

complications. Most of the patients found with underlying co-morbid condition involving cardiovascular system. Feature linked with death in such patients encompass male gender, old age, and presence of co-morbid conditions i.e., hypertension or diabetes mellitus or cardiovascular diseases or cerebrovascular accidents. In severe cases, troponin levels found elevated i.e., indicating cardiac involvement and this might lead to death. COVID-19 cases with acute respiratory distress syndrome also found associated with mortality.

The average observed case-fatality ratio is around 4% but this vary widely. Previous reports suggested that old age patients with diabetes and hypertension, go through more complications as compared to younger patients. However, younger patients with no obvious disease also emerge prone to rapid progression to critical disease and finally to death.^{10, 11}

A multi-center study,¹² found the independent risk factors associated with mortality in COVID-19 patients were hypercholesterolemia, type 2 diabetes mellitus, chronic obstructive pulmonary disease, old age, male gender, high positive end-expiratory pressure or low Pao₂:Fio₂ ratio on ICU admission and high fraction of inspired oxygen. Jain V et al.¹³ revealed that dyspnea was the only warning sign predictive of fatal COVID-19 condition and ICU admission. COVID-19 has a varied clinical presentation. Elderly patients with other co-morbid conditions have been found more susceptible to fatal clinical outcomes.

Conclusion:

COVID-19 patients with co-morbidities are more at risk of developing worst clinical outcomes.

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