FREQUENCY OF MYOCARDITIS IN PATIENTS WITH COVID-19 AND IN-HOSPITAL MORTALITY

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ABSTRACT:

BACKGROUND: Corona virus infection has become a recognized infectious disease spreading in several countries of the world. Number of cases of COVID-19 are increasing day by day in whole world. Previous studies showed that COVID-19 is rapidly deteriorating disease in patients suffering from chronic illness. This study is conducted to determine the Incidence of myocarditis in patients with COVID-19 and in-hospital mortality.

AIMS & OBJECTIVE: To see the frequency of myocarditis in patients with COVID-19 and in-hospital mortality.

MATERIAL & METHODS: This observational cohort study was carried out at corona ward of Aziz Bhatti Shaheed Teaching Hospital, Nawaz Sharif Medical College, Gujrat from 15 to 30th March 2020. Fifty five patients between 15-70 years of age, admitted with positive PCR results for covid-19 were included in this study after informed consent; patients with prior history of any cardiovascular, pulmonary or other co-morbidity were excluded while patients having history of hypertension, diabetes or smoking were included in the study. All the patients remained admitted for 14 days. Patients were evaluated clinically, by ECG, troponins and Echocardiography for diagnosis of myocarditis. Global hypokinesia and ejection fraction less than or equal to 40% were used to diagnose myocarditis with no other cause. Patients were managed conservatively. Frequency of myocarditis and in-hospital mortality was noted. Successful treatment towards hospital discharge was relief of clinical symptoms, a-febrile, clear chest X-Ray and at least two consecutive negative PCR for covid-19. p value <0.05 was considered as significant. Data was analyzed with SPSS -23.

RESULTS: Out of fifty five, 5(9%) patients were diabetics and 4 were hypertensive. Five (9%) developed mild pneumonia which recovered conservatively and three (5.4%) patients developed myocarditis. There were 7% patients hypertensive and 9% were diabetic. One (1.8%) patient expired having myocarditis. Duration of follow up was only during hospital stay. So our in-hospital mortality was 1.8%, p value was calculated as significant < 0.05.

CONCLUSION: Myocarditis is a known but less common complication of COVID-19. Cardiac injury is more in those with previously having cardiovascular or other co-morbidities. In healthy and immunocompetent population its incidence is quite low.

KEYWORDS: COVID-19, Myocarditis, in-hospital mortality

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INTRODUCTION:

Corona virus infection has become a recognized infectious disease spreading in several countries of the world. Number of cases of COVID-19 are increasing day by day in whole world. Previous studies showed that COVID-19 is rapidly deteriorating disease in patients suffering from chronic illness.[1-4] Huang et al[5] reported that 12% of patients with COVID-19 were having acute myocardial injury. Another study showed that in 138 patients admitted with COVID-19 16% were having arrhythmia and 7.2% had acute myocardial injury[6]. It was also found that patients with underlying cardiovascular diseases hospitalized with COVID-19 are at greater risk of myocardial injury and poor in-hospital outcome[7]. Myocarditis is an inflammation of the heart muscle that can be identified clinically or histopathologically. Viruses including COVID 19 are known to cause myocarditis[8] that's why several cases of myocarditis noted after COVID-19.[9,10] Myocarditis is an acute severe heart failure which can lead to cardiogenic shock and hypotension with a mortality rate of upto 50-70%[8]. Myocardits is diagnosed clinically and by imaging aid.

Echocardiography is an important tool to assess left ventricle function and to diagnose myocarditis.[11] MRI is very useful for the diagnosis of myocarditis[12]. Our study was conducted to see the frequency of myocarditis and in-hospital mortality in previously healthy population without any co-morbidities especially cardiovascular diseases.

MATERIAL & METHODS:

This was a cross sectional cohort study, 55 patients between 15-70 years of both genders having positive PCR results for COVID-19 were included in this study after informed consent. Whereas patients with prior history of any cardiovascular, pulmonary or other co-morbidity were excluded, patients having hypertension, diabetes or smoking were included in study group. All patients remained admitted and followed up for 14 days. Patients were evaluated clinically, by ECG, troponins and echocardiographically for diagnosis of myocarditis. Global hypokinesia and ejection fraction less than or equal to 40% were used to diagnose myocarditis with no other cause. Incidence of myocarditis and in-hospital mortality was noted. Successful treatment towards hospital discharge was relief of clinical symptoms, a-febrile, clear chest X-Ray and

Table 1: Clinical characteristics of patients in the study		
		N (%)
Age		35±10
Gender	Male	45 (82%)
	Female	10 (18%)
Hypertension	Present	04 (7.2%)
	Absent	51 (92.8%)
Diabetes	Present	05 (9%)
	Absent	50 (91%)
Smoking	Present	10 (18%)
	Absent	45 (82%)
Obesity	Present	20 (36%)
	Absent	35 (64%)

Table: 2. In-hospital mortality with myocarditis		
Total Patients	55	Mortality
With Myocardits	3 (5.4%)	1(1.8%)
Without Myocarditis	52(94.6%)	0
P-value < 0.05		

at least two consecutive negative PCR for covid-19. For quantitative variables like age, mean and standard deviations were calculated. For qualitative variables like gender, smoking, hypertension and diabetes Mellitus frequency and percentages were calculated. Stratification was used to control the effect modifiers. After stratification Chi square test was applied to see the effects of the outcome. Data was analyzed with SPSS -23 and p value <0.05 was considered as significant.

RESULTS:

A total number of 55 patients were enrolled in the study out of which 45(82%) were male while 10(18%) were female. Mean age of patient was 35 ± 10. Out of fifty five, 5(9%) patients were diabetics, 4 were hypertensive (7%) and 10 were smokers.(table-1) Five (9%) developed mild pneumonia which recovered conservatively and three (5.4%) patients developed myocarditis. One (1.8%) patient expired having myocarditis. Duration of follow up was only during hospital stay. So our in-hospital mortality was 1.8%. p value was calculated as significant < 0.05. (table-2)

DISCUSSION:

Exact incidence of myocarditis is difficult to ascertain in patients of COVID-19. Because this disease is affecting the population of different areas in different ways, in developed countries like America and Europe overall mortality due to COVID-19 is quite high than Asian countries. Myocarditis is difficult to diagnose and uncommon entity. We used the Echocardiography and cardiac-biomarkers to diagnose the disease. In recent pandemic of COVID-19 lot of patients had cardiovascular problems and one of them was myocarditis leading to heavy death toll. [9]

Our study was conducted on previously healthy patients; therefore myocarditis was diagnosed in 3 (5.4%) cases of COVID-19 out of which one patient was expired so in-hospital mortality was noted 1.8% which is quite low than calculated in a study by Fabre A et al where myocarditis was responsible for sudden cardiac death in 8.6% of cases and is present in 9% of routine post partum examination[13]. The difference may be due to sample size, duration of study, sample technique and baseline characteristics of patients. Incidence of cardiac injury with covid-19 is noted more in previously known cardiac patients. In a European study of epidemiology and treatment of cardiac inflammatory diseases 72% patient had dyspnea, 32% had chest pain and 18% had arrhythmia[14]. Acute myocarditis resembles myocardial infarction with acute chest pain, arrhythmias, and sudden death[15]. COVID-19 patients may develop severe cardiac complications such as myocarditis and heart failure leading to shock[6,8]. Results of our study were consistent with a study conducted by Peiris JS and colleagues in which incidence of myocarditis in patients with COVID-19 was 0.2-2%[16]. Further studies and research work is required to see the effect of this deadly virus on myocardium.

CONCLUSION:

Myocarditis is a known but rare complication of COVID-19. Cardiac injury is more common in those with previously having cardiovascular or other co-morbidities. In healthy and immune competent population its incidence is quite low.

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