A Comparative Study to Assess the Cardiac Profile Among Post Covid and Non-Covid Patients

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Abstract

Background: The present study aims to study is to compare and assess the cardiac profile among post COVID patient and Non COVID patients in Saveetha Medical College and Hospital. Material and Methods: The quantitative approach with comparative study was conducted in host institution of Saveetha Medical College and Hospital. A total of 30 participants were recruited using non-probability convenient sampling technique based on the inclusion criteria, the demographic and clinical data was collected by using structured questionnaire and the D-Dimer test was used to assess the blockage in the heart among the patients during a period of time. Result: The outcome results identified that the mean score of D-Dimer test among post – COVID patients was 577.27±49.36 and the mean score among non-COVID patients was 300.20±60.08. The mean difference score was 277.07. The calculated student independent't' test value of t = 13.801 was found to be statistically significant at $p<0.001$ level which clearly infers that there was significant difference in the D-Dimer test scores between post – COVID patients and non-COVID patients. Conclusion: This study demonstrates that there was significant difference in the cardiac profile among the post COVID patients and non-COVID patients

Keywords: D-Dimer variability, Cardiac diseases, COVID and Non-COVID patients

1. Introduction

The 2019 novel coronavirus (2019-nCoV), also known as the severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), is currently spreading quickly throughout the world from its origin in Wuhan City, Hubei Province, China.1

Through direct, indirect, or close contact with infected individuals, infected fluids, such as saliva and respiratory secretions or their respiratory droplets, which are expelled when an infected person coughs, sneezes, or talks, can spread SARS-CoV-2.2 Aerosols and droplet nuclei are droplets with a diameter of less than 5 m, whereas respiratory droplets range in size from 5 to 10 m. When a person is in close proximity to an infected individual who is exhibiting respiratory symptoms or who is speaking, respiratory droplets that contain virus may enter the mouth, nose, or eyes of a vulnerable person and cause infection.3 It is also possible for indirect contact transmission to occur when a vulnerable host comes into contact with a contaminated object or surface.4

Because of its structural resemblance to SARS, the pathogen that causes COVID-19 has taken on the name SARS-CoV-2.5 The most frequent early COVID-19 symptom is pneumonia, which is marked by fever, coughing, shortness of breath, and bilateral infiltrate on chest imaging. Additionally, COVID-19 can cause deadly lung damage, multiple organ failure, and passing away.6

The current coronavirus pandemic's epidemiological statistics show a strong link between COVID-19 and cardiovascular illness (CVD). It is presently unknown if SARS-CoV-2 directly damages the myocardium or if it largely causes endothelial dysfunction.7 In a recent groundbreaking study, Bailey et al. used human postmortem tissues, cardiomyocytes generated from human pluripotent stem cells, and synthetic heart tissues to show that SARS-CoV-2 only infects cardiomyocytes directly; it has no effect on cardiac macrophages, fibroblasts, or endothelial cells. Additionally, they discovered that infection led to cytokine production, sarcomere disintegration, and cell death in cardiomyocytes. These data offer significant further information into particular SARS-CoV-2 pathology within the heart, in addition to a wide range of prior clinical research into the numerous other features of COVID-19.8

Even while coronary artery disease is more common in males than in women, it still kills more women than any other cause. In 2009, just 54% of women were aware of this. In women, cardiovascular disease was a factor in almost one third of fatalities. Contrary to men who more frequently had obstructive CAD, women were found to have non-obstructive CAD in 57% of cases. This has been explained by many processes, including altered endothelial tone, structural alterations, and altered responses to vasodilator stimuli.11 In addition to being expected to play a protective function in coronary vascular system, oestrogen is also known to have an anti-

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inflammatory effect on atherosclerosis, which may help to promote plaque stabilization. Health disparities have also been brought on by a lack of knowledge and comprehension of coronary artery disease in women.9

In order to better understanding in the change in the relative rates of incident cardiovascular outcomes before and after the COVID-19 exposure, we created a difference-in-differences analysis to estimate the adjusted incident rate ratios of the cardiovascular outcomes relative to both the current and historical control groups in the pre-COVID-19 and post-COVID-19 exposure periods. The results showed a graded increase by the severity of the acute phase of the disease and showed that the adjusted incident rate ratios for cardiovascular outcomes in the post-COVID-19 exposure period were significantly higher than those in the pre-exposure period (ratios of incident rate ratios for all cardiovascular outcomes were significantly higher than 1).10

However, it is critical for clinicians treating cardiovascular patients to comprehend COVID-19 infection risk factors, natural history, and clinical presentation. In order to better understand the cardiovascular risk profile of COVID-19 patients and the CV problems that emerged during hospitalisation, this study describes these variables and looks at how they affected case fatality rates.11

The objective of the study are to assess the cardiac profile among post COVID patient and non-COVID patient, to compare the cardiac profile between the post COVID patient and non-COVID patient & to find the association of cardiac profile among post COVID patient and non-COVID patient with selected demographic variables.

2. Methods and Materials

The Quantitative research approach was adopted for this study and comparative research design used. The study was conducted for the duration of 1 week in Saveetha Medical College and Hospital. After obtaining the Ethical Clearance from the Institutional Ethical Committee (IEC) of Saveetha Institute of Medical and Technical Science and a formal permission from the Department Head of Medical Surgical Nursing the study was conducted. The sample size of the study comprises of 30 patients (15 – Post COVID patients and 15 – Non COVID patients) with cardiac problem admitted in Saveetha Medical College & Hospital, Chennai. The Inclusion criteria include both the genders, clients who are willing to participate in the study, clients with other co-morbid condition. The exclusion criteria includes clients who are absent at the time of data collection. The samples for the present study were selected by non-probability convenient sampling technique method. The purpose of the study was explained clearly in-depth to each of the study participants and a written informed consent was obtained from them. The demographic and clinical data was collected by using a self- structured questionnaire and after estimating the D-Dimer test. The collected data were analysed with descriptive & inferential statistics.

3. Results &Discussion

Demographic and Clinical variables

Among the 15 post COVID patients, 7(46.7%) were aged between 51 – 70 years, 8(53.3%) were male and had higher secondary education, 5(33.3%) were employee, unemployed and businessmen respectively, 11(73.3%) had family history of cardiac disease, 7(46.6%) were Hindus, 15(100%) were married, 8(53.3%) had no bad habits, 10(66.7%) were interested in physical exercise, 8(53.4%) had low sodium diet pattern, 15(100%) were previously affected with COVID, 8(53.4%) were in the post COVID period of 7 – 12 months, 8(53.3%) had the complication of palpitations, 10(66.7%) had the presence of myocardial infarction and 12(80%) had undergone cardiac treatment for less than 2 years.

Among the 15 Non-COVID patients, 7(46.7%) were aged between 51 – 70 years, 10(66.7%) were male,6(40%) had middle school education, 9(60%) were employee, 10(66.7%) had family history of cardiac disease, 6(40%) were Hindus, 12(80%) were married, 7(46.7%) had no bad habits, 9(60%) were not interested in physical exercise, 7(46.7%) had low fat diet pattern, 15(100%) were not previously affected with COVID, 6(40%) had the presence of angina pectoris and myocardial infarction and 5(33.3%) had undergone cardiac treatment for a period of 2 – 5 years and more than 5 years respectively [1].

Section A: Assessment of cardiac profile among Post COVID and Non-COVID patients.

Table 1. Frequency and percentage distribution of cardiac profile (D-Dimer) among post COVID and Non-COVID patientn = 30(15+15)

D-Dimer	Post COVID Patients		Non-COVID Patients	
	F	%	F	%
Positive (Above 500 ng/ml)	15	100.0	0	0
Negative (220 – 500 ng/ml)	0	0	15	100.0

The above table 1 shows that all the post COVID patients were positive and all non-COVID patients were negative. (Fig 1)

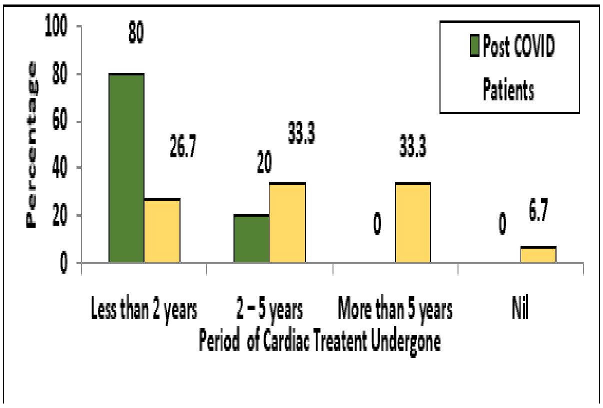

Fig 1: Percentage distribution of period of cardiac treatment undergone by the post COVID and Non-COVID patients

Section B: Association of Level of Cardiac Profile (D-Dimer Test) With Selected Demographic Variables.

Table 2. Association of D-Dimer test scores among post-COVID patients and non-COVID patients with their selected demographic variables.n= 30(15+15)

Demographic Variables	Post COVID One Way ANOVA/ Unpaired 't' test value	Non-COVID One Way ANOVA/ Unpaired 't' test value
Occupational status	F= 6.619 p=0.012 S*	F= 0.659 p=0.535 N.S
Employee		
Unemployed		
College students		
Business		
Physical exercise	F= 5.714 p=0.033 S*	t= 0.225 p=0.828 N.S
Interested		
Not interested		
Do you undergone cardiac treatment, if yes mention the period of treatment	F= 4.607 p=0.0001 S***	F= 0.970 p=0.442 N.S
Less than 2 years		
2 – 5 years		
More than 5 years		
Nil		

The table 2 shows that the demographic variables occupational status ($\chi2=6.619$, $p=0.012$), and physical exercise ($\chi2=5.714$, $p=0.033$)had shown statistically significant association with post COVID outcome of D-Dimer test at $p<0.05$ level. The demographic variable had under gone cardiac treatment ($\chi2=4.607$, $p=0.0001$)had shown statistically significant association with post COVID outcome of D-Dimer test at $p<0.001$ level and the other demographic variables had shown statistically significant association with post COVID outcome of D-Dimer test among post COVID patients..The table also shows that none of the demographic variables had shown statistically significant association with outcome of D-Dimer test among Non-COVID patients.

The presence study says by the Shahzad Khan, after reviewing the outcomes of the most recent studies on COVID19 patients, it is clear that direct or indirect cardiac involvement is not uncommon in COVID19. The severity of cardiac injury fluctuates depending on patient's age, preexisting cardiac disease, and the etiopathogenesis involved in cardiac injury. Cardiac biomarkers increase in the greater part of COVID19 patients, though their prognostic power for the worst possible outcome increases with disease severity, and a lower threshold of cardiac biomarkers would indeed be applicable for diagnosis and prognosis. A more detailed explanation of the role and application of cardiac biomarkers in COVID 19 is indeed very likely in the future.12

4. Conclusion

The severity of cardiac injury depends greatly on the patient's age, predisposing cardiac disease, and the pathophysiology involved in cardiac injury. Cardiac biomarkers rise in the greater part of COVID19 patients, though their prognostic power for the worst outcome rises with disease severity, and a lower threshold of cardiac biomarkers would be applicable for diagnosis and prognosis. Because SARS-CoV-2 septic shock is frequently associated with multiorgan damage, incorporating cardiac biomarkers with markers of other organ damage is likely to generate a more comprehensive portrayal of the future outcome. In the future, a more detailed description of the role and application of cardiac biomarkers in COVID 19 is very likely. This study concluded that there was a significant difference in the cardiac profile around post COVID patients and non-COVID patients, and that clinicians should consider D-Dimer fluctuation when evaluating patients for cardiac disease risk.

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