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DEVELOPMENT OF POST-COVID-19 CARDIOVASCULAR EVENTS: AN INDIAN PERSPECTIVE

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ABSTRACT

Background: Most common cardio vascular disease events after COVID-19 were hypertension, pulmonary embolism, acute coronary syndrome, myocarditis, stress-Cardiomyopathy, arrhythmias, carcinogenic shock, and cardiac arrest.

Aim: To evaluate cardio vascular disease events in patients recovered from COVID-19 in central Indian population

Methods: This retrospective observational study was carried out in the department of medicine in a tertiary care hospital, central India. Asses all the participants for post covid cardio vascular events, detailed history, clinical examination and all necessary investigation was done

Results: in our study Post COVID 19 cardio vascular events was occur in 17.6%. Majority of the patient was male (69.3%), most common age group were 51-60 years. Higher incidence of cardio vascular disease was reported in obese person. Common cardio vascular diseases found after COVID 19 infection were, hypertension (35.3%), pulmonary embolism (23.5%), Myocarditis (20.6%), myocardial infection (11.8%) and Arrhythmias were in 8.8% cases.

Conclusion: Overall observations indicate an increased incidence of hypertension and CVDs post recovery from COVID-19. A dual therapy of ARBs was the preferred choice for management of hypertension. Regular follow-up and close monitoring of symptoms to prevent further CV complications in COVID-19 recovered patients is recommended.

Keywords: Cardio-vascular, disease events, COVID 19, hypertension, obesity

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INTRODUCTION

Corona virus disease 2019 (COVID-19) has presented with a heterogeneous clinical course, ranging from asymptomatic carrier state to a lethal outcome with multi-organ failure and with a wide variety of case fatality rates ranging from 0.7 to 67% [1-2]. Although the respiratory tract is the most commonly involved organ system in this disease, other organs and particularly the heart are also affected with a negative impact on outcome [3]. Post-acute sequelae of SARS-CoV-2—the virus that causes corona virus disease 2019 (COVID-19)—can involve the pulmonary and several extrapulmonary organs, including the cardiovascular system [4]. The patients with covid-19 with cardiovascular comorbidities have higher mortality, and the severity of COVID-19 disease correlates with cardiovascular manifestations [5-6]. Hypertension (HTN) is the major risk factor to cardiovascular (CV) morbidity and mortality in India and is responsible for 28% of total deaths. Studies report that HTN and cardiovascular diseases (CVD) are the most frequent co-morbidities in patients with COVID-19 infection. [7-8]. COVID-19 significantly impacts CV system by causing complications such as acute coronary syndrome and myocardial infarction, blood pressure fluctuations or worsening pre-existing CVDs [9]. COVID-19 with secondary to acute lung injury, leads to increased cardiac workload, potentially challenging in patients with pre-existing heart failure, acute cardiac injury, myocardial injury, arrhythmias. Prominent increase in cardiac troponin levels is reported that is associated with other inflammatory markers, such as C-reactive protein, ferritin, and interleukin-6, suggesting inflammatory damage leading to myocarditis [10]

The aim of this study was to analyze the incidence of cardiovascular events in patients hospitalized for SARS-CoV-2 infection.

MATERIAL & METHODS

This was a retrospective, observational cohort study carried out in the department of medicine, a tertiary care center, central India. The study population was adults (≥18 years) with COVID-19 confirmed by polymerase chain reaction (PCR). All subjects who survived had a 30-day follow up after hospital discharge. Data on baseline signs, symptoms, comorbidities, treatments, outcomes, blood count, and biochemical and cardiac markers were collected. All data, including electrocardiograms (ECGs), were electronically recorded. The serum level of hypersensitive

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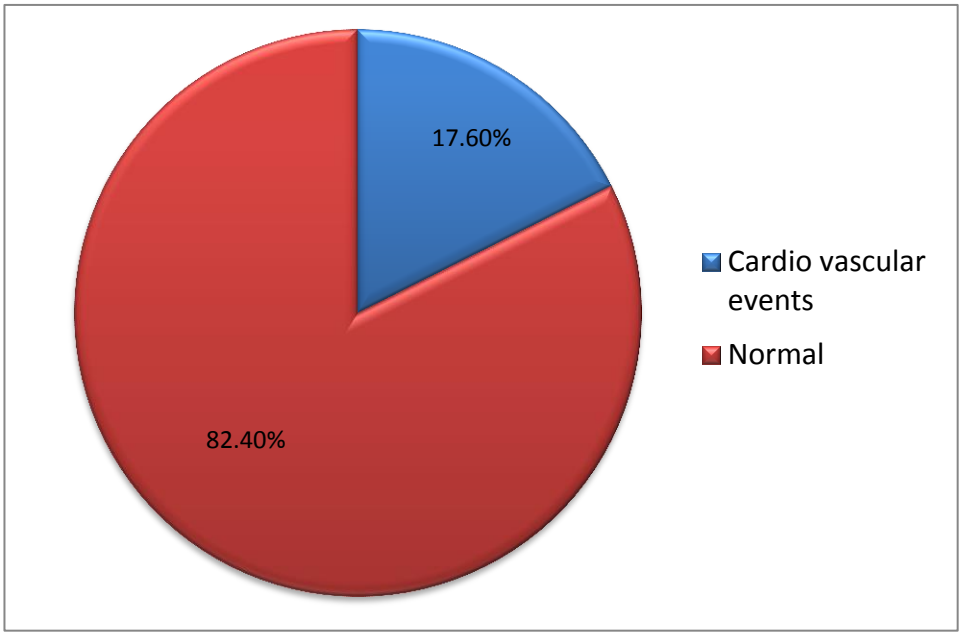
troponin I (cTnI) exceeding >40 pg/ml was considered cardiac injury [11]. Blood pressures were obtained three fixed times in the morning using standard measurement. History of hypertension was defined as brachial blood pressure > 140/90 mmHg. Cardiovascular events were diagnosed according to standard guidelines.

Statistical analysis: Data was entered into Microsoft Excel and analyzed using SPSS software Version 20. Pearson's Chi Square test was applied. P value< 0.05 was considered significant.

RESULTS:

During the observation period, 386 patients were enrolled, out of them 68 (17.6%) were developed cardiovascular events after COVID 19 infection.

Figure 1: incidence of cardio vascular disease events after COVID 19



Majority of the study

participants (69.4%) were male. 53.1% residing at urban areas. Family history of cardio vascular disease was present in 23.3% cases. Most of the participant had obese (68.9%), table: 1.

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Table 1: General characteristics of the study population (n=386)

General characteristics		**Number** (N=386)	**Percentage**
Gender	Male	268	69.4%
	Female	118	30.6%
Place of residence	Urban	205	53.1%
	Rural	181	46.9%
Family history of cardio-vascular disease	Absent	296	76.7%
	Present	90	23.3%
BMI	Normal	120	31.1%
	Mild obesity	123	31.9%
	Moderate obesity	85	22%
	Severe obesity	58	15%

Most common cardio vascular events deloped after COVID 19 were hypertension (35.3%), Pulmonary embolism (23.5%) and Myocarditis (20.6%). Details shown in table: 2

Table 2: Development of cardiovascular disease events after COVID 19

Cardiovascular events	**Number (68)**	**Percentage**
Hypertension	24	35.3%
Pulmonary embolism	16	23.5%
Myocarditis	14	20.6%
Arrhythmias	6	8.8%
Myocardial infarction	8	11.8%

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Table 3: comparison between patients who developed cardiovascular events and patients who did not

Socio demographic variables		Patients with cardiovascular event (N=68)	Patients with no cardiovascular event (N=318)	P- value
Age (in years)	18-30	10	45	0.999
	31-40	13	62	
	41-50	15	70	
	51-60	23	109	
	>60 years	7	32	
Gender	Male	39	183	0.976
	Female	29	135	
Body Mass Index (Kg/M^2)	Normal (<25)	23	109	0.998
	Over weight (25-30)	17	79	
	Obese (31-40)	20	92	
	>40(morbid obesity)	8	38	
Comorbidities	Diabetes	32	152	0.994
	Hypertension	37	174	
	Previous CVD	20	92	
	Chronic renal disease	16	76	
	Hematological disease	11	53	
	Neoplastic disease	8	38	

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DISCUSSION

A large number of patients with COVID-19 have pre-existing HTN and/or CVD or may develop new onset HTN and cardiac diseases during the course of infection. However, the understanding about their impact on the clinical outcomes in COVID-19 is still ambiguous.

Incidence of cardio vascular disease events was occurs in 17.6% of COVID-19 patients in our study, consistent finding also reported by C. Lazaridis et al [12].and Momtazmanesh et al [13].

In present study the most common cardio vascular disease events after COVID-19 were, hypertension, pulmonary embolism, acute coronary syndrome, myocarditis, stress-Cardiomyopathy, arrhythmias, carcinogenic shock, and cardiac arrest, our finding are similar to other studies: Kang Y, et al [14] and Sala S et al [15].

In our study majority of the study participant (69.4%) was male, concordance with the Xie Y et al [16] and Chen G, et al [17], reported male predominance in their study.

Current study was found obesity was the major risk factor of cardio vascular diseases after COVID 19, our finding are comparable with the many other studies, Wu X et al [18] and Tadic M et al [19]

COVID-19 infection is associated with an increase in the incidence and burden of long-term CVD, including arrhythmias, ischemic and non-ischemic heart disease, myopericarditis, ischemic stroke, and venous thromboembolism [20].

Most of the study population was belong to urban area (53.2%), concordance finding reported by Valentina O et al [21]

In our study majority of the cardio vascular disease event patient s were 51-60 years age group, similar to the study conducted by Collard D, et al [22] and Wang W et al [23].

Diabetes and hypertension was the most common cardio vascular disease event occur in COVID 19 observed in current study, which was similar to the Krishnakumar B et al [24].and Cuomo C et al [25].

CONCLUTION

We have observed that post-COVID-19 cardiovascular complications are more frequent in elderly patients with hypertension and with more severe courses of COVID-19, as represented by

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the need for orotracheal intubation. The state of hyper inflammation and increased coagulation seems to favor the development of cardiovascular events in subjects already predisposed due to age and co-morbidity.

Conflict of interest: none

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