



## TO STUDY THE SPECTRUM OF ELECTROCARDIOGRAM ANALYSIS IN CORONA VIRUS DISEASE (COVID-19) PATIENTS DURING AND POST COVID AND ITS CORRELATION WITH MORBIDITY AND MORTALITY IN COVID-19 PATIENTS ATTENDING TERTIARY CENTRE AT M.Y.H

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### ABSTRACT

Patients with SARS-CoV-2 are at risk of multiorgan complications, including but not limited to, cardiac injury, arrhythmias, acute respiratory distress syndrome (ARDS), thromboses, sepsis, infarcts, and secondary bacterial infections. One of the major systems affected by this virus is the cardiovascular system. The presence of preexisting cardiovascular disease increases mortality in patients with COVID-19, and cardiovascular injuries, including myocarditis, cardiac rhythm abnormalities, thrombotic events, endothelial cell injury, and myocardial interstitial fibrosis, are observed in some patients with COVID-19. The underlying pathophysiology of COVID-19-associated cardiovascular complications is not fully understood, although direct viral infection of myocardium and cytokine storm have been suggested as possible mechanisms of causing myocarditis and cardiovascular changes in covid-19 patients.

**KEYWORDS :** Covid-19, ECG changes, Morbidity, Mortality, Cardiovascular changes

### INTRODUCTION

There is a direct relationship between Covid-19 & ECG changes. Covid-19 is found to be associated with an increased risk of several cardiovascular changes. These cardiovascular manifestations pose challenges in clinical management & suggest a complex pathophysiology of Covid-19 related ECG changes. Severe acute respiratory syndrome corona virus 2 (SARS - CoV-2), the virus that causes Covid-19, binds to angiotensin converting enzyme 2 (ACE2) receptors, which are expressed in key metabolic organs & tissues, including the myocardium of the heart which expresses ACE2 protein on its cellular surface. This protein has well described roles in the heart function and pathophysiology of diabetes mellitus (DM) and hypertension. SARS-CoV-2 might use this entry pathway as a trajectory to invade myocardial cells and directly damage them. The clinical spectrum of SARS-CoV-2 infection ranges from mild to critically ill cases, manifesting as asymptomatic infection, mild upper respiratory tract illness, & severe viral pneumonia with respiratory failure, cardiovascular changes & even death. Although most infected people are thought to have a favourable prognosis, chronic diseases commonly seen in elderly people, such as hypertension, diabetes mellitus, dyslipidemia, cerebral vascular disease, & other cardio vascular conditions, may lead to poor clinical outcomes.

### AIMS AND OBJECTIVES:

- To study the spectrum of Electrocardiogram analysis in Coronavirus disease 2019 (COVID-19) patients during and post covid and its correlation with morbidity and mortality in COVID -19 patients attending Tertiary Centre at M.Y. Hospital.
- To study the spectrum of electrocardiogram analysis in coronavirus disease 2019 (COVID-19) patients during and

post covid 2. To correlate it with morbidity and mortality in COVID-19 patients.

### MATERIAL AND METHODS:

The present study was an Observational Longitudinal Study planned and carried out in Department of Medicine, MGM college & MY hospital, Indore from 1st Feb 2019 to 30 Sept 2021. This study included 300 consecutive patients with documented and laboratory confirmed COVID-19 disease, at the time of enrollment who were admitted or availing treatment for COVID-19 in wards of Medicine, ICU, and COVID special wards of MY Hospital.

### METHODOLOGY:

300 patients who were newly diagnosed covid positive were assessed and investigated for diagnosis of different types of cardiac disease, correlation of development of different types of Cardiac disease with morbidity and mortality. A pre-tested, pre-validated proforma was used to collect data from patients and medical record. The patients admitted to the hospital with SARS-CoV-2-positive status underwent ECG testing at the time of admission, their clinical profile included symptoms, duration, and severity of the illness, and presence of comorbid status like hypertension, diabetes, COPD etc. were noted from their medical records. The ECGs graphs were reviewed and interpreted.

The ECG data include heart rate, rhythm categorized as normal sinus rhythm or atrial fibrillation/flutter, atrial premature contractions, ventricular premature contractions, atrioventricular block, axis deviation, bundle branch block, intraventricular conduction block (QRS duration of > 110 ms), Bazett-corrected QT interval (in milliseconds), presence of left or right ventricular hypertrophy, myocardial infarction, and

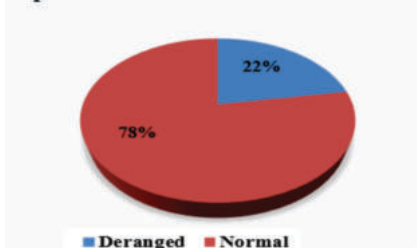
the presence of ST segment or T-wave changes (localized ST elevation, localized T-wave inversion, or other nonspecific repolarization abnormalities).

### OBSERVATIONS AND RESULTS:

In present study, out of total 300 covid-19 positive patients, majority were males(81%) with 57% patients of age group >60 years, 84.7% of total patients were febrile, 68% were having Diabetes, 93.3% hypertension & 15% were having dyslipidemia at the time of presentation to the hospital. Also 2.7% of patients had previous history of cardiac diseases. 78% of patients were having deranged lipid profile at the time of admission.. Also 82.7% of the patients had normal ECG out of total 300.

Around one-third of ECG readings (33.3%,100) were normal with no ECG changes. Following this, Sinus bradycardia was next common finding (17.7%, 53) on ECG followed by sinus tachycardia being present in 15.7% (47) of ECG studied. Block along Atrio-ventricular pathway which included primary AV block, Mobitz Type I and Type II AV blocks and this was seen in around 7.7% (23) of ECG readings. Potassium abnormalities (either hypokalemia or hyperkalemia) and fibrillations (atrial or ventricular) were seen in around 6% (18) of ECG readings obtained from study participants. Myocardial infarction (lateral wall and inferior wall) was seen in 3.7% (11) of ECG readings. Multifocal atrial tachycardia and post supraventricular tachycardia (PSVT) were ECG findings seen in 3.3% (10) out of total ECG readings obtained. Other findings which were seen on ECG readings included left ventricular hypertrophy (2.3%) and pulmonary thromboembolism (1%) respectively.

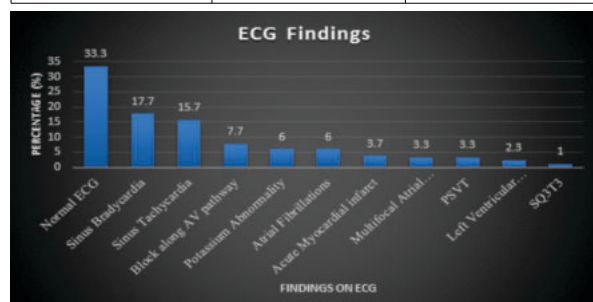
**Lipid Profile at the time of Admission**



**Figure 1:** Lipid profile at the time of admission **Source:** M. Y. Hospital, Indorre, MP, India

**Table – 1 ECG Changes in total patients**

ECG Changes	Number	Percentage (%)
Normal ECG	248	82.7
Abnormal	39	13
Not Available	13	4.3
Total	300	100



**Figure 2:** Electrocardiogram Findings in Covid-19 patients

### CONCLUSION:

As a result of cytokine storm, hypoxic injury, electrolyte abnormalities, plaque rupture, coronary spasm, microthrombi, as well as direct endothelial or myocardial injury, COVID-19 can have a deleterious effect on the

cardiovascular system and result in aberrant ECG results. Sinus tachycardia is the most frequent finding, although there are also SVTs such as atrial fibrillation or flutter, ventricular arrhythmias like VT or VF, bradycardia, interval and axis abnormalities (QT prolongation), ST segment and T wave changes, and others. The examination and treatment of patients with COVID-19 may be aided by emergency doctors' knowledge of certain ECG abnormalities. Given our limited healthcare resources and the fact that SARS-CoV-2 has already gained pace globally, it is crucial to implement quick, low-cost bedside examinations and diagnostic tests. ECG is crucial for risk stratification and is a strong indicator of a negative result, hence it is also of utmost relevance in COVID management.

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