Original Article

Prevalence Of ECG Findings In COVID 19 Patients Admitted To MTI Mardan, A Cross Sectional Study

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DOI: 10.47750/pnr.2023.14.03.490

Abstract

Introduction:

COVID 19 has influenced the world globally. Though it affects the lungs mainly, but it has affected almost every system of human body and so is heart, which is affected too in multiple ways. These findings can easily be detected on doing a twelve lead ECG.

Materials and methods:

This was a cross sectional study conducted at MTI Mardan Medical Complex, from March 2020 to March 2021. The sample size was calculated, using openepi software. Those patients who had there COVID-19 PCR positive were recruited in this study whereas those who already had ischemic heart disease were excluded. Baseline ECG was recorded, and was reviewed by two Cardiologists with at least 3 years' experience. SPSS version 20 was used to study the frequency of various ECG findings.

Results:

The most common findings were Sinus Tachycardia, ST-T changes, QT interval prolongation and Atrial Fibrillation.

Conclusions:

COVID 19 patients are at risk of developing Cardiac complications, which can be detected easily on 12 lead ECG. Therefore baseline ECG is recommended in all COVID 19 patients.

Keywords: COVID-19, ECG, Sinus Tachycardia, ST-T changes, QT interval prolongation, Atrial Fibrillation

Introduction:

The COVID-19 pandemic has had a huge influence on healthcare systems around the world, affecting millions of people leading to a lot of morbidity and mortality worldwide[1].Though it affects the lungs mainly, but it has affected almost every system of human body.Studies have correlated a variety of heart conditions with COVID-19 in an attempt to understand the wide clinical spectrum of the disease by healthcare workers[2].

The effect of COVID-19 on electrocardiogram (ECG) findings is of special relevance[3].Several investigations have found that COVID-19 patients can have an aberrant ECG, with results ranging from sinus tachycardia to more severe abnormalities such ST-segment alterations and arrhythmias. These findings point to myocardial damage or inflammation, as seen in some COVID-19 patients[4].

Due its high prevalence and important role that it plays, it is essential to understand ECG anomalies in COVID-19 patients for effective clinical care and best possible outcomes[5].The recent studies on COVID-19 and ECG results, including the number and nature of abnormalities, their potential causes, and their relationship to clinical outcomes have helped the clinicians to make prompt and accurate decisions regarding cardiac findings. In addition it is critical to investigate the virus's local connections with cardiac problems. Several researches have been conducted to evaluate the link between COVID-19 and ECG results in different parts of world[67].

The rationale of the study is to investigate the prevalence and characteristics of electrocardiogram (ECG) changes in COVID-19 patients in local population. This information can help clinicians to identify COVID-19 patients who are at increased risk of developing cardiac complications and guide their management. Additionally, by identifying specific ECG changes associated with COVID-19, it may also help to improve our understanding of the underlying mechanisms responsible for cardiovascular complications in COVID-19 patients andcan help and guide us in clinical decision-making and resources allocation.

Materials and Methods:

This is cross-sectional study which was performed at the Department of Cardiology MTI MMC Mardan from, from March 2020 to March 2021. The sample size was calculated, using openepi software, taking a 95% confidence interval, and a 5 % margin of error. All baseline information was recorded on a Performa. Those patients who had there COVID-19 PCR positive were recruited in this study. Patients with known ischemic heart disease were excluded from the study. Approval of ethical committee was obtained. Baseline ECG was performed. It was reviewed by two Cardiologists with at least 3 years' experience. Findings were documented on Performa. SPSS version 20 was used to study the frequency of various ECG findings.

Results:

100 patient's data wasanalyzed for ECG changes in COVID 19 patients, which showedmean age of 51± 15 years, out of 75% were male; while 25% were female.Almost 50% patients had some ECG Changes. The most common abnormality was sinus tachycardia, which was 40%, followed by ST-T changes which were present in 20%, whereas15% and 5% were having QT interval prolongation and atrial fibrillations respectively.

ECG Changes in COVID-19 Patients	Number of Patients	Percentage
Total	100	100%
ECG Changes	50	50%
Sinus Tachycardia	40	40%
ST-T Changes	20	20%
QT Interval Prolongation	15	15%
Atrial Fibrillations	5	5%

Discussion:

This study revealed that nearly half of the COVID-19 individuals showed ECG abnormalities. Sinus tachycardia was the most prevalent ECG abnormality detected, occurring in 40% of individuals. Sinus tachycardia is characterized by a rapid heart rate with a regular rhythm that might arise in reaction to fever or other bodily stimuli[8].Sinus tachycardia in the setting of COVID-19 could be related to increased metabolic demand decrease oxygen supply or a response to the virus itself[9].

ST-T alterations were the second most prevalent abnormality detected, occurring in 20% of individuals. ST-T alterations are nonspecific ECG signs that can be produced by a variety of conditions such as myocardial ischemia,

myocarditis, and electrolyte imbalances. The significance of ST-T alterations in COVID-19 individuals is unknown, but they may indicate myocardial damage or inflammation[10].

In this study, 15% of participants had QT interval prolongation. The QT interval is a measurement of how long it takes the heart to repolarize after each beat, and it has been linked to an increased risk of arrhythmias, particularly torsades de pointes, which can be fatal. Several medicines used to treat COVID-19, including hydroxychloroquine and azithromycin, can cause QT interval prolongation, which should be taken into account when interpreting ECG data in these patients[1112].

In this study, 5% of participants had atrial fibrillation. Atrial fibrillation is a kind of arrhythmia that causes an irregular heartbeat, increasing the risk of stroke and other problems. The underlying inflammation and stress on the body may be linked to the development of atrial fibrillation in COVID-19 individuals[1314].

Overall, the study's high prevalence of ECG abnormalities underlines the possible cardiac problems linked with COVID-19. It is critical that healthcare personnel are aware of these findings and that COVID-19 patients be monitored for evidence of myocardial damage or inflammation[15].however more studies are needed to determine the processes behind these ECG abnormalities and their relationship to clinical outcomes in COVID-19 patients. While the study provides valuable insights into the prevalence of ECG changes in COVID-19 patients, there are some research gaps that need to be addressed in future studies. Firstly, the study was conducted on a relatively small sample size of 100 patients and at single center, which may limit the generalizability of the findings. Future studies with larger sample sizes could provide more robust data on the prevalence of ECG changes in COVID-19 patients, and secondly this study did not examine the relationship between ECG changes and clinical outcomes, such as mortality or length of hospital stay. Hence, future studies should explore whether the presence of ECG changes in COVID-19 patients is associated with alteration in clinical outcomes.Finally, the study did not look for the impact of treatment on ECG changes in COVID-19 patients. Future studies should explore whether specific treatments used in COVID-19 patients, such as antivirals or corticosteroids, have an impact on ECG changes and whether monitoring ECG changes during treatment can improve clinical outcomes.

Conclusions:

The study found that almost 50% of the 100 patients being analyzed had ECG changes, which leads us to the conclusion that COVID-19 patients are at risk of developing cardiac complications whichcanbe promptly detected by doing a baseline ECG. The findings also suggest that ECG monitoring should be considered in COVID-19 patients, particularly in those with pre-existing cardiovascular disease, to facilitate early detection and intervention of cardiac complications.

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