

Original Research Article

Title: Study of ECG changes in Covid 19 patients

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1. INTRODUCTION

In December 2019, An Outbreak of A Lower Respiratory Tract Disease Caused By The Severe Acute Respiratory Syndrome Coronavirus2(SARS-Cov-2)WasFirstReportedInWuhan,China.¹ThisWasSubsequently Termed Coronavirus Disease Of 2019 (COVID-19) By TheWorld Health Organization And Has Been Declared A Global Pandemic,Infecting Millions Worldwide.² While Much Of The Focus Has BeenOn The Respiratory System, COVID-19 Can Also Cause A Variety OfCardiacComplications³⁻⁹AndARangeOfElectrocardiographic Abnormalities.

CoronavirusesMostlyCauseGastrointestinalAndRespiratoryTractInfectionsAndAreInherently CategorizedIntoFourMajorTypes:Gamma Coronavirus, Delta Coronavirus, Beta Coronavirus And AlphaCoronavirus.¹⁰ The First Two Types Mainly Infect Birds, While TheLastTwoMostlyInfectMammals.

TheElectrocardiographic(ECG)ChangesWhichMayOccurDuringHospitalizationFor COVID-19HaveNotYetBeen

ComprehensivelyAssessed. Severe Acute Respiratory Syndrome Coronavirus 2 (SARS- Cov- 2), AlsoKnownasTheNewCoronavirus,InfectsHumansandCausesCoronavirus Disease 2019 (COVID- 19), A Highly Infectious Disease. InAddition to Causing Severe Damage to The Respiratory System, SARS- Cov- 2 Also Causes Acute Myocardial Damage, Resulting in Arrhythmia. It Has Been Suggested That Myocardial Damage Is anImportant Clinical Feature Of COVID- 19 Critically Ill Patients. As One of The Most Used Clinical Examination Methods,Electrocardiogram (ECG) Is an Irreplaceable Important Technique ForRecordingCardiacElectricalActivity.ItisofGreatSignificancetoStudy.TheChangesOfElectrocardiogramInPatientsWithCOVID- 19.Therefore,ToUnderstandtheECGFeaturesofDistinctTypesOfCOVID- 19 Patients, They Dissected the Relationship Between AbnormalChangesInECGAndMyocardialInjury.TheirStudyProvides anElectrocardiographic Basis for The Early Diagnosis and Treatment OfCOVID- 19- Induced MyocardialInjury.

2. MATERIAL AND METHODS

This was an ProspectiveObservationalStudy Carried Out At R. D. GardiMedical College, Ujjain in theDepartmentOfGeneral Medicine. The Patients Attending Covid Facility in RDGARDIMEDICALCOLLEGEWasIncludedInTheStudy.Minimum147Patients Were IncludedInthisStudy.**Inclusion Criteria:** 1. Age>18YearsOld. 2. ConfirmedSARS-Cov-2Infection(PharyngealSwabPositiveForViral RNA). 3. HospitalizationinAHospitalSetting.**Exclusion Criteria:** 1. SARS-Cov-2InfectionNotConfirmedByPharyngealSwabOrClinical-RadiographicCriteria. 2. Absence of ECG tracing performed at the time of Hospitalization.

3. OBSERVATIONS AND RESULT

In the present study mean age of the cases was 51.06 ± 15.35 years, median age 52 years, minimum age 20 years and maximum age was 90 years. Out of 171 cases 101 (59.1%) cases were males and 70 (40.9%) were females.

In our study out of 171 cases majority of 75 (43.9%) had DM, 37 (21.6%) had HTN, 6 (3.5%) had thyroid disease and 1 (0.6%) case had COPD. Present study significant association was found between no. of comorbidities and outcomes of the cases with $p < 0.05$. Hence mortality rate was significantly higher 5 (83.3%) among cases with three comorbidities as compare to cases 12 (54.5%) with two comorbidities, 14 (24.6%) with one comorbidity and 16 (18.6%) with no comorbidities.

We found that out of 171 cases 150 cases had fever, cough and SOB, 9 (5.3%) had fever and cough, 2 (1.2%) had fever, cough, sore throat, 10 (5.8%) had fever and SOB.

Table 1: Association between age groups and mortality

Age Groups	Mortality		Total
	Yes	No	
<= 30 Years	1 4.80%	20 95.20%	21 100.00%
31 - 40 Years	4 13.80%	25 86.20%	29 100.00%
41 - 50 Years	8 26.70%	22 73.30%	30 100.00%
51 - 60 Years	15 32.60%	31 67.40%	46 100.00%
61 - 70 Years	10 33.30%	20 66.70%	30 100.00%
> 70 Years	9 60.00%	6 40.00%	15 100.00%
Total	47 27.50%	124 72.50%	171 100.00%
Chi-Square = 17.25, p = 0.004			

In table 1, we observed significant association between age groups and outcome of the cases with $p < 0.05$. Hence higher age groups was significantly associated to mortality of covid19 cases.

Table 2: Association between comorbidities and mortality

Comorbidities		Mortality				P-Value
		Yes		No		
		Count	Row	Count	Row	
		N	%	N	%	
DM	YES	29	38.70%	46	61.30%	0.004

	NO	18	18.80%	78	81.30%	
HTN	YES	19	51.40%	18	48.60%	0.0001
	NO	28	20.90%	106	79.10%	
Thyroid	YES	5	83.30%	1	16.70%	0.002
	NO	42	25.50%	123	74.50%	
COPD	YES	0	0.00%	1	100.00%	0.537

In table 2, we found significant association was observed between DM, HTN, thyroid and outcome of the cases with $p < 0.05$. Hence percentage mortality of covid19 cases was significantly higher among who had DM, HTN and thyroid disease.

In the present study significant association was observed between ECG finding and outcome of the cases with $p < 0.05$. Hence percentage mortality of covid19 cases was significantly higher 30 (58.8%) among abnormal ECG finding groups. In table 3, Out of 171 cases 51 (29.8%) had abnormal ECG, 39 (22.8%) had Sinus tachycardia, ST changes were seen in 29 (17.0%) cases and QT changes in 33 (19.3%) cases.

Table 3: ECG abnormality among cases

		N	%
ECG	Normal	120	70.20%
	Abnormal	51	29.80%
Sinus tachycardia	Absent	132	77.20%
	Present	39	22.80%
ST changes	Yes	29	17.00%
	No	142	83.00%
QT changes	Yes	33	19.30%
	No	138	80.70%

In the present study significant association was found between ST changes and ECG findings with $p < 0.05$. Hence ST changes were seen significantly higher 19 (37.3%) among cases who had abnormal ECG as compare to 10 (8.3%) cases who had normal ECG.

Table 4: Association between ECG and QT changes.

QT CHANGES	ECG		Total
	Normal	Abnormal	
Yes	8	25	33
	6.70%	49.00%	19.30%
No	112	26	138
	93.30%	51.00%	80.70%
Total	120	51	171
	100.00%	100.00%	100.00%
Chi-square= 41.221, p= 0.000			

In the present study significant association was found between QT changes and ECG findings with $p < 0.05$. Hence QT changes were seen significantly higher 25 (49.0%) among cases who had abnormal ECG as compare to 8 (6.7%) cases who had normal ECG.

In figure 5, significance mean CRP, LDH, ferritin and D dimer difference was observed between ECG findings with $p < 0.05$.

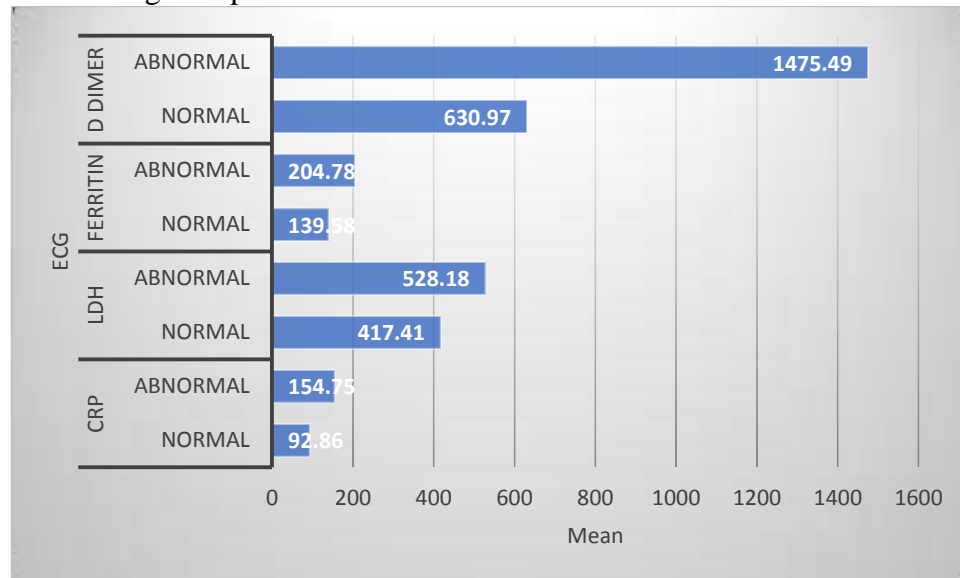


Figure 5: Comparison of mean CRP level, LDH, FERRITIN and D DIMER between ECG findings.

4. DISCUSSION

The Coronavirus Disease 2019 (COVID-19) Caused By Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Cov-2), Emerged In Wuhan China And Has Since Spread To Over 180 Countries.¹ It Was Declared A Pandemic By The World Health Organization (WHO) In March 2020. 147 Cases Which Are Rtpcr.

In The Present Study Maximum Number Of Cases 46 (26.9%) Were In The Age Group 51-60 Year Followed By 41-50 Year Of Age Group In Which Cases Were 30 (17.5%). Out Of 171 Cases In The Present Study, 101 Cases Were Male (59.1%) And 70 Cases Were Female. Avni Thakore Et Al Studied 284 (59%) Female Rtpcr Positive Female And 230 (41%) Male Cases. In The Present Study, Sinus Tachycardia Were Found In 51 Cases (40%) With The Chi-Square Of 31.7 And P Value Of 0.001 6 (0.6%) Cases Had Sinus Bradycardia. Avni Thakore Et Al, In Their Study Had 87 ± 17.5 Cases With Sinus Tachycardia Out Of 614 Cases. With A P Value Of < 0.001 . These Observations Were Identical To Those Obtained In The Present Study.

In The Present Study, PR Prolongation Is Seen In 47 cases (29.7%) Out Of 171 Cases. PR Prolongation Were Mainly Seen In Cases Having Other Comorbidities. Mengshi Yuan Et Al Obtained 88.5 ± 21.6 Cases Having PR Segment Changes With A P Value Of < 0.01 These Observations Were Identical To Those Obtained In The Present Study.

In The Present Study, QT Changes Were Seen In 33 Cases, Out Of Which 23 (84.3%) Cases Had Mortality. Mengshi Yuan Et Al Obtained 408.57 ± 52.7 Cases Having QT Changes With A P Value Of 0.01.

In The Present Study, ST Changes Were Seen In 29 Cases, Out Of Which 17 (76%) Cases Had Mortality.

Mengshi Yuan Et Al Obtained 109.57 ± 52.7 Cases Having QT Changes With AP Value Of 0.22.

5. CONCLUSION

Cardiac Electrophysiologic Changes Seen In COVID-19 Provide an early marker For Subsequent Clinical Course And Death And May Help In Initial Triage Of Infected Patients. SARS-Cov-2 Infection Is Associated With Prolongation In Activation (QRS) And Repolarization (Qtc). The Severity Of Infection (Indexed By Triage Of Patients And Mortality) Is Associated With Prolongation In Activation And Repolarization.

6. REFERENCE

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