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### **“ECG Analysis of Patients Presenting with COVID-19”**

**Background:** SARS-CoV-2 is a novel coronavirus which emerged in late 2019. Within months, it quickly became a pandemic, overwhelming medical facilities, halting the global economy, and claiming the lives of hundreds of thousands. COVID-19 patients can present with acute, mild, or no symptoms. Currently, it is difficult to predict the disease course and level of care a patient will require. However, it is known that hypertension and other underlying cardiac conditions are significant risk factors related to mortality, and, additionally, patients hospitalized in the ICU have a worse prognosis compared to those at the non-ICU level. We wished to determine if electrocardiograms (ECGs) showed significant differences in cardiac electrical activity parameters in ICU versus non-ICU patients.

**Methods:** We retrospectively analyzed the records of 108 consecutive patients who were confirmed COVID positive by RT-PCR and admitted to University Medical Center in New Orleans during June and July 2020. Of 108 patients, 24 patients were hospitalized in the ICU while 84 were hospitalized in non-ICU. Patients admitted to the ICU for trauma with incidentally diagnosed COVID-19 were excluded. We extracted demographic data (age and sex) and ECG parameters (heart rate, PR, QRS, QT, QTc intervals, rhythm characteristics, conduction abnormalities, presence of AV block, presence of LVH and prior infarct) from the electronic health record. The first ECG recorded during the associated hospitalization was analyzed. All ECGs had been previously interpreted by 1 of 3 core readers at University Medical Center. Statistical analysis was performed using SOFA Statistics software. We used Student's t-test to analyze continuous variables and chi-squared for categorical variables.

**Results:** There were no significant differences between those who were hospitalized in the ICU compared to those at the non-ICU level with regards to QRS duration, QT and QTc intervals, presence of sinus rhythm or atrial fibrillation, presence of advanced AV block (2<sup>nd</sup> or 3<sup>rd</sup> degree), or presence of infarct pattern (see Table). Patients in the ICU had a higher mean heart rate than those in non-ICU group ( $101.8 \pm 21.8$  vs  $89.5 \pm 19.6$ ,  $p=0.01$ ). A higher percentage of patients in the ICU group was found to have 1<sup>st</sup> degree AV block compared to the non-ICU group (9.1 vs. 1.2%, respectively,  $p=0.05$ ).

**Conclusion:** In this small study, there was no significant difference in most analyzed ECG parameters between patients admitted to ICU vs. non-ICU setting. The significant difference in heart rate and percentage of patients with 1<sup>st</sup> degree AV block are relatively non-specific findings due to the multifactorial etiologies. Limitations of this study include a relatively small cohort, particularly for patients admitted to the ICU and unaccounted underlying medical conditions. While it remains possible that ECG is an insensitive modality to distinguish level of illness in patients diagnosed with COVID-19, further studies should be conducted with larger sample size and account for underlying conditions. In addition, it is possible that the ECGs were conducted before cardiac pathology manifested. Emerging studies suggest COVID-19 has long-term pathological cardiac involvement even in those who were asymptomatic and have since recovered from the virus. Further studies should aim to determine if ECGs detect pathological changes in patients as the disease progresses and after they have overcome it.