

Introduction

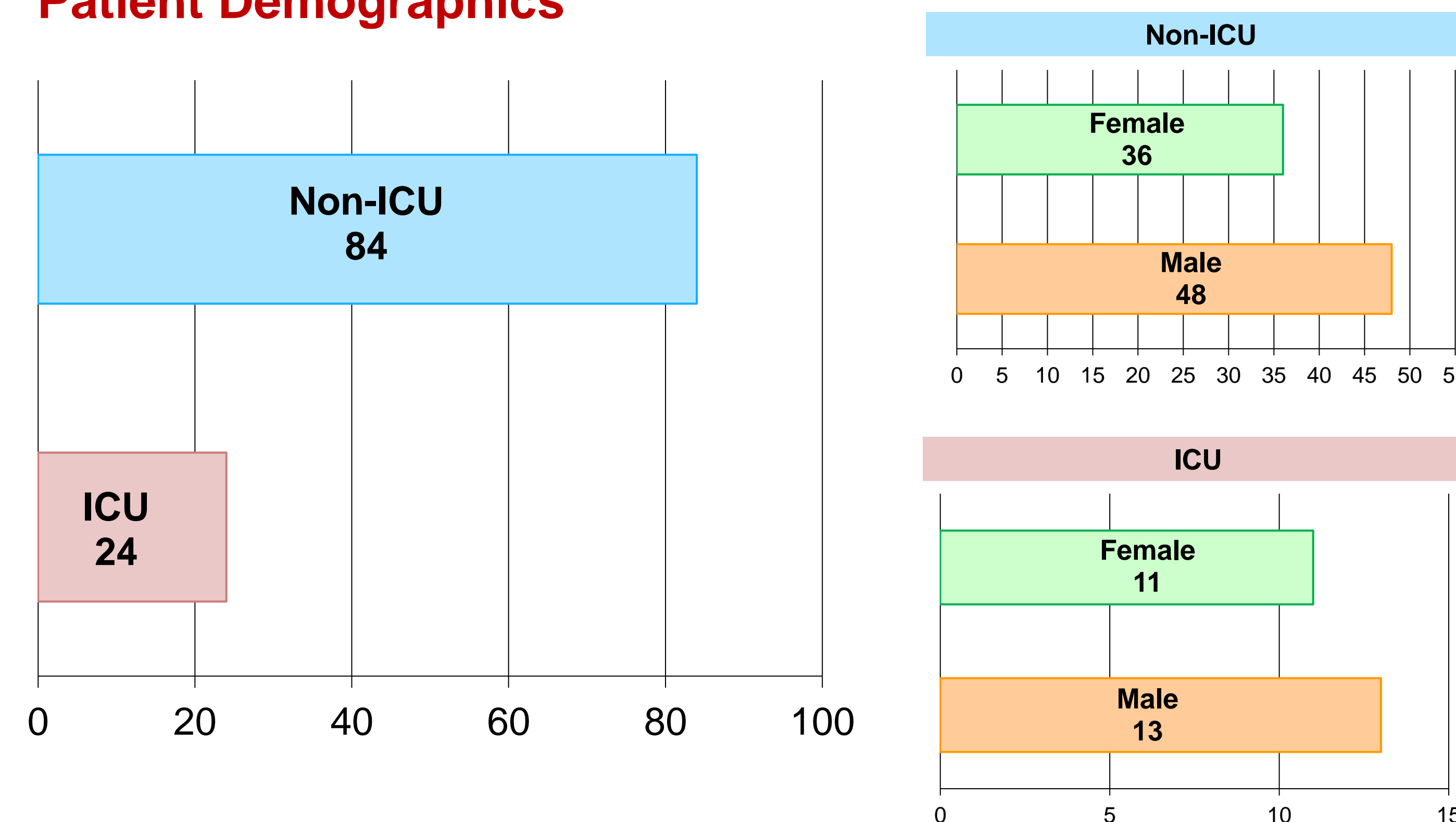
- SARS-CoV-2 is a novel coronavirus which emerged in late 2019 and has become a pandemic.
- COVID-19 patients can present with acute, mild, or no symptoms. Currently, it is difficult to predict the disease course and level of care a patient will require.
- Hypertension and other underlying heart conditions are significant risk factors related to mortality.
- Patients hospitalized in the ICU have a worse prognosis compared to those at the non-ICU level.
- We wished to determine if electrocardiograms (ECGs) performed near admission 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+ by RT-PCR and admitted to University Medical Center in New Orleans during June and July 2020.
- 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.
- We extracted demographic data (age and sex) and ECG parameters (heart rate, PR, QRS, QT, QTc intervals, rhythm characteristics, conduction abnormalities, presence of AV blocks, QRS/ST/T wave changes)
- Patient admitted to the ICU for trauma, with incidentally diagnosed COVID-19 were excluded.
- Statistical analysis was performed using SOFA Statistics software. We used Student's t-test to analyze continuous variable and chi-squared for categorical.

Results

Patient Demographics



ECG Parameters

	ICU	Non-ICU	p value
Age (years)	54.1 ± 15.0 (25-86)	54 ± 16.4 (22-94)	0.91
Heart Rate (bpm)	101.8 ± 21.8 (50-155)	89.5 ± 19.6 (46-138)	0.01
Intervals			
PR (msec)	148 (130-194)	142.5 (100-222)	0.16
QRS	84 (66-138)	86 (64-150)	0.40
QT	357.0 (290-436)	360 (292-506)	0.28
QTc	422.8 (383-498)	418 (370-504)	0.16
Rhythm			
Sinus Rhythm	22 (92%)	81 (97%)	0.33
Atrial Fibrillation/Flutter	2 (8.3%)	1 (1.1%)	0.06
AV Block			
1st Degree	2 (9.1%)	1 (1.2%)	0.05
Advanced*	0	0	N/A
Intraventricular Conduction Delay**			
QRSd > 100 (n/%)	3 (12.5%)	13 (15.4%)	0.72
QRSd > 110 (n/%)	2 (8.3%)	6 (7.1%)	0.88
QRSd > 120 (n/%)	2 (8.3%)	4 (4.7%)	0.50
Infarct Pattern			
Left Ventricular Hypertrophy	3 (12.5%)	9 (10.7%)	0.81

* Advanced AV block = 2nd or 3rd degree AV block

** Intraventricular Conduction Delay = RBBB, LBBB or non-specific intraventricular conduction delay

Analysis

- 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 percentage of patients with 1st degree AV block is a relatively non-specific finding due to the multifactorial etiologies for delay in the AV node.
- Limitations of this study include a relatively small cohort, particularly for patients admitted to the ICU and unaccounted underlying medical conditions. Further studies should be conducted with larger sample size and account for underlying conditions.
- 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.

Conclusions

- **There were no significant differences between those who were hospitalized in the ICU vs non-ICU level with regards to heart rate, QRS duration, QT and QTc intervals, presence of sinus rhythm or atrial fibrillation, presence of advanced AV block (2nd or 3rd degree), or presence of infarct pattern.**
- **A higher percentage of patients in the ICU group was found to have 1st degree AV block compared to the non-ICU group (9.1 vs. 1.2%, respectively, p=0.05).**