Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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CONCLUSION In this elderly population with coronary artery disease, revascularization before the pandemic, an increase in cardiovascular and general morbidity as well as in total mortality was observed during the outbreak and confinement. Incidence of COVID-19 was higher than in the general population. Mortality among COVID-19 patients was very high.

BACKGROUND The novel coronavirus disease-2019 (COVID-19) caused by the severe acute respiratory syndrome coronavirus-2 (SARS CoV-2) has been a major cause of morbidity and mortality around the world. Thirteen million cases have been diagnosed with approximately 570,000 deaths worldwide. COVID-19 is associated with ischemia, myocarditis and eventual resulting arrhythmia. Cases may present as acute thrombotic occlusion, stress cardiomyopathy, or coronary spasm. Hydroxychloroquine (HCQ) was temporarily approved by FDA for COVID-19 treatment. In this study, we planned to characterize the risk and degree of QTc prolongation in largely African American population in central Brooklyn, who were hospitalized with COVID-19 infection in association with inpatient administration of HCQ and azithromycin. One of the major adverse drug effects of HCQ and chloroquine is the potential prolongation of corrected QT interval (QTc).

METHODS In our retrospective study, we included patients, both males and females, 18 years of age and older who were admitted at SUNY Downstate Medical Center, Brooklyn, New York, for COVID-19 infection and were treated with hydroxychloroquine. Native baseline RR, QRS, and QT intervals were measured before administering the first dose of hydroxychloroquine and within 24 h of administration. The RR interval was measured as a distance between the peak of the R-wave and the peak of the previous R-wave in the same lead in milliseconds and converted to a heart rate by equation, 60,000/RR. For correction of the QT, we used common formulas; QTc = QT /RR [Bazett formula], QTc = QT / RR [Friderecia formula], QTc = QT + 0.154 (1-RR) [Framingham formula], QTc = QT + 1.75 (heart rate-60) [Hodges formula]. QTc interval prolongation was defined based on the following rules: Male Rules: 1) Baseline >450 ms, and post HCQ >450 ms; 2) 5% increase over baseline post HCQ; and 3) baseline >450 ms and <500 ms, and post is >500 ms; Female Rules: 1) Baseline >470 ms, and post HCQ >470 ms; 2) >15% increase over baseline post HCQ; and 3) baseline >470ms and <500 ms, and post is >500 ms. Statistics: Means were compared using independent sample t-tests; paired sample t-tests and proportions were compared using Chi square method. Of all patients included in the study 125 (63.5%) were male and females, 18 years of age and older who were admitted at SUNY Downstate Medical Center, Brooklyn, New York, for COVID-19 infection and were treated with hydroxychloroquine. Native baseline RR, QRS, and QT intervals were measured before administering the first dose of hydroxychloroquine and within 24 h of administration. The RR interval was measured as a distance between the peak of the R-wave and the peak of the previous R-wave in the same lead in milliseconds and converted to a heart rate by equation, 60,000/RR. For correction of the QT, we used common formulas; QTc = QT /RR [Bazett formula], QTc = QT / RR [Friderecia formula], QTc = QT + 0.154 (1-RR) [Framingham formula], QTc = QT + 1.75 (heart rate-60) [Hodges formula]. QTc interval prolongation was defined based on the following rules: Male Rules: 1) Baseline >450 ms, and post HCQ >450 ms; 2) 5% increase over baseline post HCQ; and 3) baseline >450 ms and <500 ms, and post is >500 ms; Female Rules: 1) Baseline >470 ms, and post HCQ >470 ms; 2) >15% increase over baseline post HCQ; and 3) baseline >470ms and <500 ms, and post is >500 ms. Statistics: Means were compared using independent sample t-tests; paired sample t-tests and proportions were compared using Chi square method. Of all patients included in the study 125 (63.5%) were male and females, 18 years of age and older who were admitted at SUNY Downstate Medical Center, Brooklyn, New York, for COVID-19 infection and were treated with hydroxychloroquine. Native baseline RR, QRS, and QT intervals were measured before administering the first dose of hydroxychloroquine and within 24 h of administration. The RR interval was measured as a distance between the peak of the R-wave and the peak of the previous R-wave in the same lead in milliseconds and converted to a heart rate by equation, 60,000/RR. For correction of the QT, we used common formulas; QTc = QT /RR [Bazett formula], QTc = QT / RR [Friderecia formula], QTc = QT + 0.154 (1-RR) [Framingham formula], QTc = QT + 1.75 (heart rate-60) [Hodges formula]. QTc interval prolongation was defined based on the following rules: Male Rules: 1) Baseline >450 ms, and post HCQ >450 ms; 2) 5% increase over baseline post HCQ; and 3) baseline >450 ms and <500 ms, and post is >500 ms; Female Rules: 1) Baseline >470 ms, and post HCQ >470 ms; 2) >15% increase over baseline post HCQ; and 3) baseline >470ms and <500 ms, and post is >500 ms. Statistics: Means were compared using independent sample t-tests; paired sample t-tests and proportions were compared using Chi square method.
Table 5. Number of Patients With Prolongation on HCQ: Description of QTc Prolongation Using Different Equations

| QTc Formula | Male | | | | Female | | | | Total | | |
|-------------|------|------|------|------|------|------|------|------|------|------|------|
| >450 Post HCQ | | | | | | | | | | | |
| Bazett | 29 | 23.2 | 18 | 25 | 47 | 23.9 | | | | | |
| Hodges | 17 | 13.6 | 7 | 9.7 | 24 | 12.2 | | | | | |
| Frederic | 17 | 13.6 | 7 | 9.7 | 24 | 12.2 | | | | | |
| Framingham | 17 | 13.6 | 6 | 8.3 | 23 | 11.7 | | | | | |
| >50% Increase Post HCQ | | | | | | | | | | | |
| Bazett | 17 | 13.6 | 6 | 8.3 | 23 | 11.7 | | | | | |
| Hodges | 12 | 9.6 | 4 | 5.6 | 16 | 8.1 | | | | | |
| Frederic | 16 | 12.8 | 7 | 9.7 | 23 | 11.7 | | | | | |
| Framingham | 15 | 12 | 2 | 2.8 | 17 | 8.6 | | | | | |
| >500 Post HCQ (w/ baseline >450 Males/ >470 Females) | | | | | | | | | | | |
| Bazett | 14 | 11.2 | 3 | 4.2 | 17 | 8.6 | | | | | |
| Hodges | 4 | 3.2 | 0 | 0 | 4 | 2.0 | | | | | |
| Frederic | 3 | 2.4 | 0 | 0 | 3 | 1.5 | | | | | |
| Framingham | 3 | 2.4 | 0 | 0 | 3 | 1.5 | | | | | |
| Total Meeting Prolongation Criteria | | | | | | | | | | | |
| Bazett | 49 | 39.2 | 21 | 29.2 | 70 | 35.5 | | | | | |
| Hodges | 25 | 20 | 9 | 12.5 | 34 | 17.3 | | | | | |
| Frederic | 25 | 20 | 13 | 18.1 | 38 | 19.3 | | | | | |
| Framingham | 23 | 18.4 | 8 | 11.1 | 31 | 15.7 | | | | | |

Table 6. Hodges Correction and Univariate Predictors of QT Prolongation

| predictors | Beta | 95% CI Lower | 95% CI Upper | p Value |
|------------|------|--------------|--------------|---------|
| Age | 1.012 | 0.992 | 1.032 | 0.116 |
| BMI | 0.930 | 0.921 | 1.004 | 0.782 |
| DM | 0.987 | 0.469 | 2.078 | 0.972 |
| HTN | 0.724 | 0.294 | 1.782 | 0.482 |
| HLD | 0.832 | 0.392 | 1.758 | 0.633 |
| CCB | 0.414 | 0.176 | 0.975 | 0.044 |
| CHF | 0.245 | 0.099 | 0.608 | 0.002 |
| TIA | 0.545 | 0.182 | 1.630 | 0.218 |
| PE/DVT | 1.261 | 0.147 | 10.827 | 0.832 |
| AFIB | 0.382 | 0.091 | 1.613 | 0.190 |
| COPD | 3.945 | 0.427 | 26.218 | 0.250 |
| Asthma | 0.760 | 0.236 | 2.481 | 0.646 |
| ESBD | 0.479 | 0.182 | 1.357 | 0.116 |
| PE/DVT | 0.299 | 0.091 | 0.982 | 0.046 |
| Azithromycin | 1.538 | 0.469 | 5.043 | 0.477 |
| Beta-Blockers | 1.301 | 0.164 | 10.484 | 0.693 |
| ACE/ARB/ARNI | 0.955 | 0.264 | 3.215 | 0.662 |
| CCB | 0.773 | 0.348 | 1.716 | 0.527 |

Table 7. Frederica Correction and Univariate Predictors of QT Prolongation

| predictors | Beta | 95% CI Lower | 95% CI Upper | p Value |
|------------|------|--------------|--------------|---------|
| Age | 1.013 | 0.985 | 1.041 | 0.359 |
| BMI | 1.093 | 0.964 | 1.101 | 0.241 |
| DM | 1.181 | 0.571 | 2.382 | 0.681 |
| HTN | 0.743 | 0.316 | 1.748 | 0.496 |
| HLD | 1.197 | 0.570 | 2.155 | 0.635 |
| CAD | 0.415 | 0.181 | 0.951 | 0.018 |
| CHF | 0.729 | 0.270 | 1.792 | 0.534 |
| TIA | 0.637 | 0.214 | 1.893 | 0.417 |
| PE/DVT | 1 | 0.000 | - | 0.999 |
| AFIB | 0.461 | 0.110 | 1.932 | 0.289 |
| COPD | 1 | 0.000 | - | 0.998 |
| Asthma | 0.637 | 0.214 | 1.893 | 0.417 |
| ESBD | 0.585 | 0.237 | 1.470 | 0.242 |
| PE/DVT | 0.783 | 0.265 | 2.995 | 0.721 |
| Azithromycin | 0.888 | 0.242 | 3.259 | 0.858 |
| Beta-Blockers | 1.566 | 0.691 | 3.548 | 0.283 |
| ACE/ARB/ARNI | 1.775 | 0.501 | 6.292 | 0.374 |
| CCB | 0.939 | 0.429 | 2.054 | 0.875 |

Table 8. Framingham Correction and Univariate Predictors of QT Prolongation

| predictors | Beta | 95% CI Lower | 95% CI Upper | p Value |
|------------|------|--------------|--------------|---------|
| Age | 1.019 | 0.989 | 1.051 | 0.218 |
| BMI | 1.008 | 0.941 | 1.078 | 0.813 |
| DM | 0.888 | 0.409 | 1.331 | 0.765 |
| HTN | 0.517 | 0.187 | 1.425 | 0.203 |
| HLD | 0.687 | 0.317 | 1.492 | 0.343 |
| CAD | 0.355 | 0.149 | 0.846 | 0.019 |
| CHF | 0.262 | 0.103 | 0.666 | 0.005 |
| TIA | 0.671 | 0.207 | 2.175 | 0.506 |
| PE/DVT | 1 | 0.000 | - | 0.999 |
| AFIB | 0.505 | 0.182 | 1.582 | 0.359 |
| COPD | 1 | 0.000 | - | 0.998 |
| Asthma | 0.395 | 0.272 | 1.644 | 0.095 |
| ESBD | 0.539 | 0.196 | 1.480 | 0.230 |
| PE/DVT | 0.387 | 0.111 | 1.246 | 0.035 |
| Azithromycin | 1.613 | 0.374 | 4.313 | 0.821 |
| Beta-Blockers | 1.348 | 0.566 | 3.213 | 0.500 |
| ACE/ARB/ARNI | 1.352 | 0.377 | 4.840 | 0.643 |
| CCB | 0.554 | 0.248 | 1.234 | 0.148 |
CONCLUSION It was notable that the longest QTc prolongation seen in this study was only 14.48 ms, using the Bazett formula. With other formulas, this prolongation was significantly smaller and so was the proportion of patients meeting QTc prolongation criteria. Not surprisingly, the Bazett formula again overestimated extent of QT prolongation. We can only speculate that the differences are perhaps a factor in QT prolongation, including drug-induced QT prolongation. In the African-American ethnic subgroup, Ser1103Tyr-SCN5A is not a predictor of mortality in our population. Reassuringly, the presence of QT prolongation on our population was nearly exclusively African American. Common channel variation has been well documented to be a factor in QT prolongation, including drug-induced QT prolongation. In the African-American ethnic subgroup, Ser1103Tyr-SCN5A is seen in approximately 8% of population and can certainly explain our findings. In the African-American ethnic subgroup, Ser1103Tyr-SCN5A is not a predictor of mortality in our population. Reassuringly, the presence of QT prolongation was not found to be a predictor of mortality in our cohort.

CATEGORIES OTHER COVID-19 Lectures

TCT CONNECT-218

Transcatheter Therapies For COVID-19
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BACKGROUND Current strategies for COVID-19 therapy involve the systemic administration of drugs. While pharmaceutical treatments continue to be evaluated, device-based therapies have yet to be explored. We propose several transcatheter-based approaches for the treatment of COVID-19.

RESULTS First is local, catheter-directed delivery of therapeutics directly to the lungs. A localized delivery of therapeutics could increase the bioavailability of drug(s) at the site of action, in comparison to systemic delivery alone. A second approach is light-based therapy. Considering the antiviral, anti-inflammatory, antimicrobial, and vasculoprotective characteristics of visible light energy (380 to 750 nm), a localized, light-based catheter therapeutic approach could prove to be effective. Given the distinct features of COVID-19 disease progression and its attack on hemoglobin and porphyrins, we suggest the infusion of porphyrin-based photosensitizers (PS). COVID-19 has an affinity for PS and would attach to these molecules, which would reduce hypoxic symptoms and allow for their deactivation through the photosensitizer-activation or sonoactivation of PS molecules. A third approach considers that several studies have demonstrated that viruses hold electrical charges. Neutralizing the charge of the virus within an electrical field is feasible to reduce the viral load using pacing wires and catheters placed near lungs. A final approach is the neuromodulation of the host inflammatory response. In a small preclinical study, the release of proinflammatory cytokines was reduced following transcatheter low intensity focused ultrasound treatment of the spleen.

CONCLUSION Several catheter-based therapies for COVID-19 were discussed. It should be noted that in all approaches, the combination of a catheter-based therapy with systemic pharmaceutical therapy is recommended. Robust clinical trials with clinically meaningful and relevant endpoints will be needed to assess the feasibility and safety of these approaches.

CATEGORIES OTHER COVID-19

TCT CONNECT-219

Psychosocial impact of COVID-19: Insights From a Cohort of Health Care Workers in the Cardiac Intensive Care Unit of a Tertiary Care Hospital in India
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BACKGROUND COVID-19 has been the catalyst for a quantum shift in our professional and personal lives, literally and figuratively within the blink of an eyelash. Healthcare workers (HCWs) have been profoundly impacted by this disruption at all levels, especially those working in high-stress specialties, such as cardiology, in resource-deprived and population-dense areas in developing countries, such as India. We studied the impact of COVID-19 on a cohort of HCWs working in a high-stress, high-turnover cardiac intensive care unit (CICU) of a tertiary care center in India. Questionnaires, results, and conclusions detailed in this presentation. Considering the fact that India has not even reached the peak of the pandemic, the negative psychosocial impact of COVID-19 on HCWs of the cardiovascular community is highly concerning and disheartening. Simplistic, sustainable long-term action plans are the need of the hour. We must use the cataclysm wrought by COVID-19 to plug our broken healthcare systems. For that, our frontline warriors should be in the best state of physical, mental, and emotional well-being to face up to this challenge. The time to take action is NOW!!

METHODS Evaluate the psychosocial impact of COVID-19 on HCWs working in a highly-stressed environment with high patient burden and turnover rates (45 bedded CICU including 15 step-down beds, average occupancy 90% to 100%). Understand perceived psychological burden and risk of post-traumatic stress disorder (PTSD) in these HCWs.

| HCW Cohort | Cardiologists | Intensivists | Fellows-in-training | Resident Physicians | Medical Transcriptionists | Nurses | Technicians |
|------------|--------------|--------------|---------------------|---------------------|--------------------------|--------|-------------|
|            | 100          | 10           | 04                  | 3                   | 5                        | 2      | 74          |
|            |              |              |                     |                     |                          |        | 02          |