Cardio Mag

Volume 1|Issue 09|2020

Dear Doctor,
*Greetings from Micro Labs Limited. We are happy to bring you "**Cardio Mag**", which contains latest and interesting news in the field of Cardiology.*

This issue contains

- ***Assessment of QT Intervals Patients COVID-19 Infection Treated With Hydroxychloroquine Alone or in Combination With Azithromycin.***
- ***An unusual cardiac manifestation of Coronavirus disease 2019- HEART BRAKE - A case report***
- ***Electronic stretchable fabric to monitor parameters***

Should you require any specific article or medical information, please feel free to contact us at ***medicalservices@microlabs.in***

Looking forward to your valuable feedback.
Best Regards,
Medical Team, Micro Labs Limited

1. Assessment of QT Intervals Patients COVID-19 Infection Treated With Hydroxychloroquine Alone or in Combination With Azithromycin.

COVID-19 outbreak is an ongoing situation caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Studies have shown that Azithromycin and Hydroxychloroquine is beneficial in the treatment of this infection.[1]

Even though hydroxychloroquine and azithromycin are generally well-tolerated used widely in

clinical practice, both drugs can cause QT prolongation.

Objective of the current study degree of QT prolongation in patients with COVID-19 on treatment with hydroxychloroquine with or without concomitant azithromycin.[2]

Methods:

Single -center, retrospective, observational study evaluating adults with COVID-19 infection.

Regimen used was 400mg of hydroxychloroquine twice on day 1, then 400 mg daily on days 2 through 5.

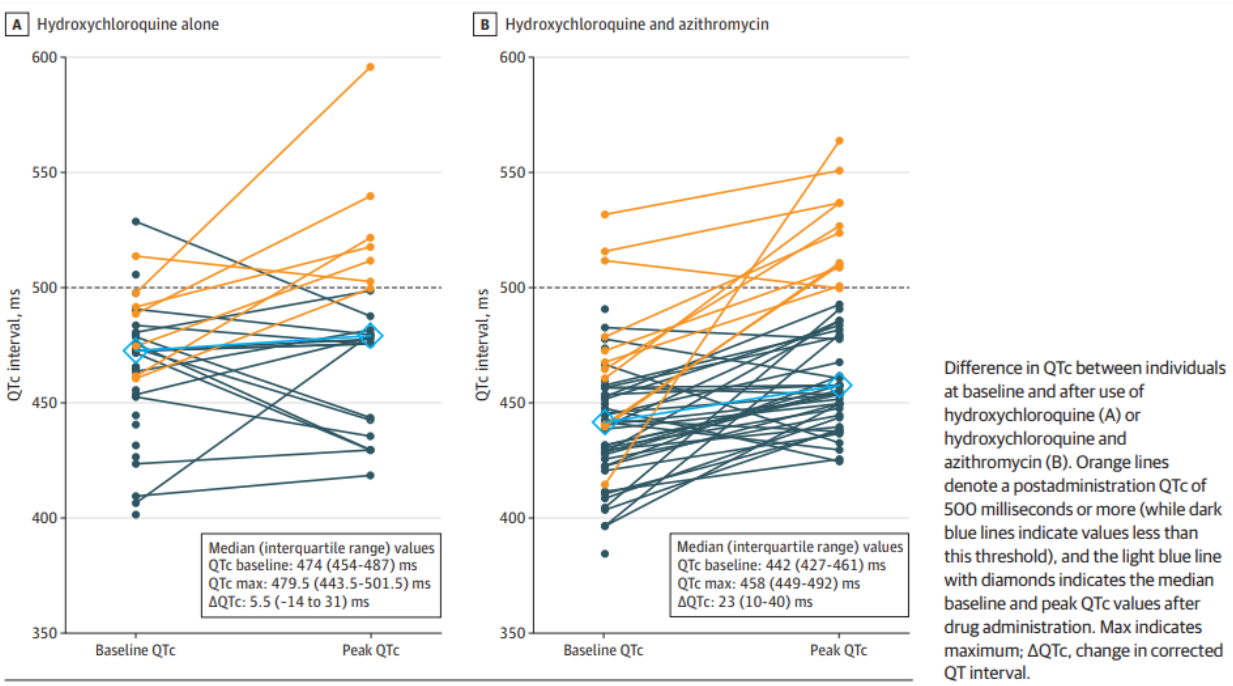
Bazett formula was used to calculate QTc intervals excess correction method for QRS values greater than 120 milliseconds. prognosticate QT prolongation.

Primary outcomes were assessment of groups receiving hydroxychloroquine and hydroxychloroquine plus azithromycin, development of prolonged QTc interval to 500 milliseconds or more, and documented adverse effects.

Results:

80 patients given hydroxychloroquine, 43 of them received concomitant azithromycin; 34 (48.9%) were female, and the mean (SD) body mass index was 31.5.

Hypertension and diabetes mellitus were the most common comorbid conditions.



Difference in QTc between individuals at baseline and after use of hydroxychloroquine (A) or hydroxychloroquine and azithromycin (B). Orange lines denote a postadministration QTc of 500 milliseconds or more (while dark blue lines indicate values less than this threshold), and the light blue line with diamonds indicates the median baseline and peak QTc values after drug administration. Max indicates maximum; ΔQTc, change in corrected QT interval.

Median baseline of QTc was 455 (430-474) milliseconds (hydroxychloroquine, 473 [454-487] milliseconds vs hydroxychloroquine and azithromycin 442 [427-461] milliseconds; P < .001) respectively.

Patients receiving concomitant azithromycin had a greater change in QT interval (23 [10-40] milliseconds)

compared with those receiving hydroxychloroquine alone (5.5 [−15.5 to 34.25] milliseconds; P = .03).
7 patients received hydroxychloroquine monotherapy developed prolonged QTc of 500 milliseconds or more, and 3 patients had a change in QTc of 60 milliseconds or more. Patients with concomitant azithromycin, 21% of patients had prolonged QTc of 500 milliseconds or more and 13 % had a change in QTc of 60 milliseconds or more.
Prolonged QTc was greater in those who received concomitant loop diuretics or had a baseline QTc of 450 milliseconds or more. 10 patients on hydroxychloroquine was discontinued early because of potential adverse drug events, including intractable nausea, hypoglycemia, and 1 case of torsades de pointes.

Discussion:

Hydroxychloroquine and chloroquine has established safety in patients with autoimmune disorders. These drugs when given to patients with COVID 19 patients, present with QTc prolongation with extended half-lives that augment cardiotoxic risks.
Hydroxychloroquine is structurally similar to the class IA antiarrhythmic quinidine, which inhibits voltage-gated sodium and potassium channels, prolonging the QT interval and increasing the risk of torsades de pointes. Azithromycin also has been implicated in QTc prolongation and proarrhythmic events. In current study there were only few patients enrolled in Azithromycin + Hydroxychlorpquine because of anticipated risk of QT prolongation. 4-week observation period, 23% of patients treated with hydroxychloroquine or hydroxychloroquine plus azithromycin had significant QTc prolongation of 60 milliseconds or greater.[2]

Conclusion:

Patient treated with hydroxychloroquine for COVID-19 experienced QTc prolongation, which further increased with co administration with azithromycin.

Reference:

1) *Bessiere F et al. Assessment of QT Intervals in a Case Series of Patients With Coronavirus Disease 2019 (COVID-19) Infection Treated With Hydroxychloroquine Alone or in Combination With Azithromycin in an Intensive Care. JAMA Cardiol. 2020; 1-3.*
2) *Mercuro NJ et al. Risk of QT Interval Prolongation Associated with Use of Hydroxychloroquine With or Without Concomitant Azithromycin Among Hospitalized Patients Testing Positive for Coronavirus Disease 2019 (COVID-19). JAMA Cardiol. 2020; 1-6.*

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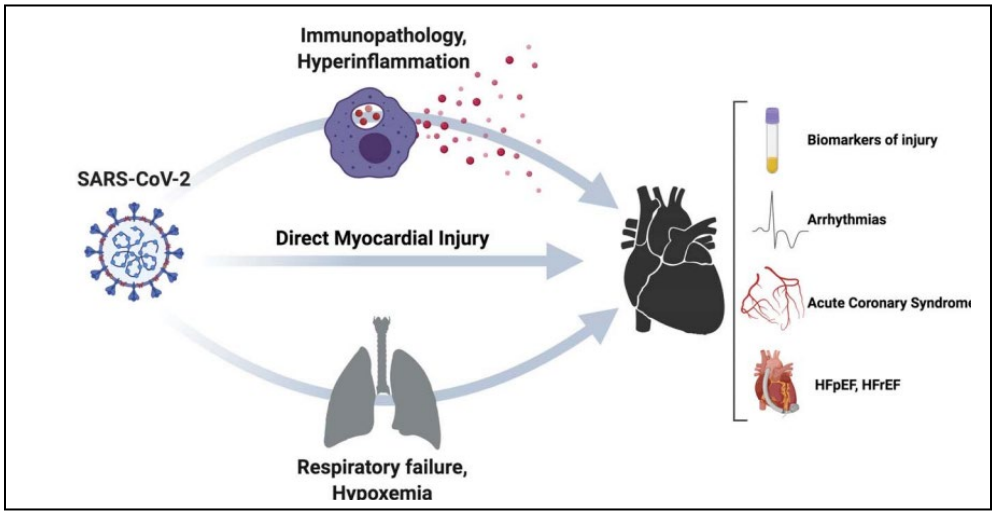
2. An unusual cardiac manifestation of Coronavirus disease 2019- HEART BRAKE - A case report



SARS-CoV infection may downregulate ACE2, which may contribute to myocardial dysfunction. The link between SARS-CoV and ACE2 provides theoretical mechanism for cardiac dysfunction in COVID-19: ACE2 downregulation leads to cardiac dysfunction.[1]

Here is the unique presentation of case of COVID 19.[2]

Case presentation:

A 51-year-old male with acute-onset high-grade fever accompanied with dry cough and shortness of breath, ongoing for a week. No history of nausea/vomiting, diarrhea, sore throat, congestion, or skin rash. he had recently returned from a high-prevalence area for COVID-19 was in self-quarantine. He was self monitoring his symptoms, when his shortness of breath was not improving with asthma medications (albuterol inhaler and cetirizine) taken by him. Past history of moderate intermittent asthma.

Examination revealed temperature of 102.5 degree Fahrenheit, tachypneoa , normotensive at 125/75 mm Hg, heart rate was 75 bpm and he was saturating 98% on room air. Physical examination was remarkable for decreased breath sounds bilaterally.

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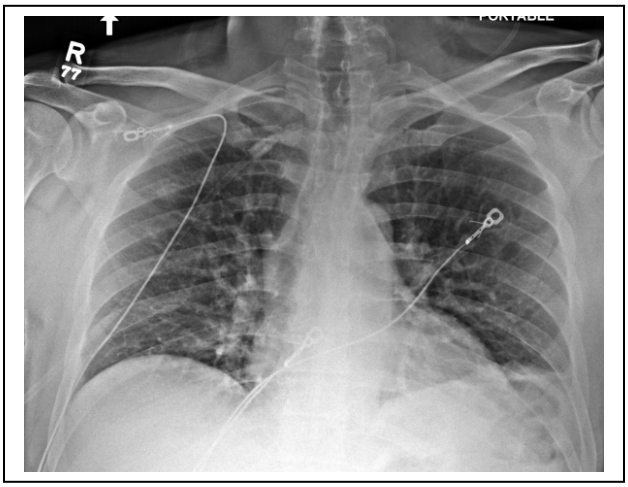
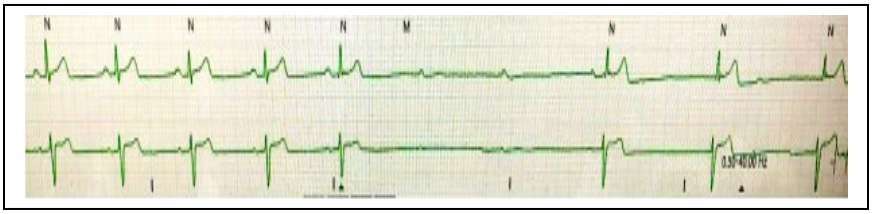
ECG revealed normal sinus rhythm with normal PR (172 ms) and QRS (94 ms) intervals. No acute ST-T wave changes noted. Chest X ray showed blunted costo-phrenic angles bilaterally with right middle lobe.

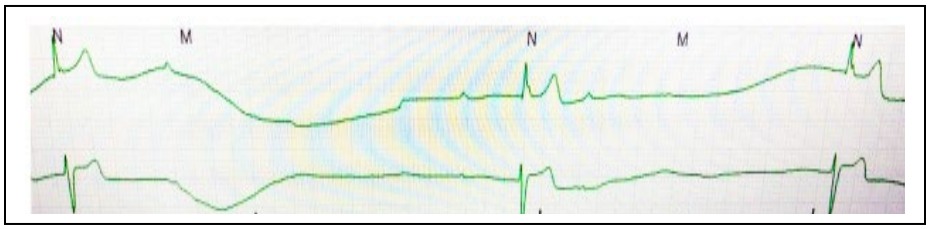


Laboratory tests were remarkable for leukopenia to 3900 cells/uL with lymphopenia (absolute lymphocyte count was reduced at 900 cells/uL). Arterial blood gas revealed acute respiratory alkalosis with pH 7.55, pCO2 of 25, pO2 of 94 and bicarbonate of 22 on room air.

Nasopharyngeal swab for the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) was collected, and was admitted for viral/bacterial pneumonia.



During hospital course, patient was noted to have evidence of bradycardia with intermittent high degree AV block and AV dissociation; ventricular rate was less than 20. Patient was symptomatic with diaphoresis during these episodes, but remained hemodynamically stable. Pacer pads were placed, however, he did not require transcutaneous pacing.



Cardiac biomarkers including troponin I and NT-proBNP were normal. Transthoracic echocardiogram showed normal ejection fraction, normal diastolic function, no wall motion abnormalities, and no significant valvular disease.

C-reactive protein was elevated at 1.2 mg/dL (normal range 0-0.9 mg/dL). Procalcitonin was negative at 0.039 ng/mL (normal range 0-0.080 ng/mL) and thyroid hormone levels were within normal limits. His nasopharyngeal swab tested positive for SARS-COV-2 RNA.

Management:

Patient was started on a course of azithromycin and hydroxychloroquine. He was monitored for worsening hypoxemia for five days. The rest of his hospital course remained uneventful. No further evidence of conduction disease was noted on telemetry and QTc remained normal while on hydroxychloroquine. He continued to improve clinically, was discharged with plan to continue self-quarantine with outpatient follow-up.

Discussion:

SARS-COV-2 virus infects the myocardial cells through the angiotensin converting enzyme 2 (ACE2) receptor present abundantly in the heart.

Patient with moderate COVID-19 infection showed evidence of transient conduction disturbances with high-degree AV block. High-degree AV block is an uncommon presentation of acute myocarditis in adults, more commonly seen in cardiac sarcoidosis and giant-cell myocarditis.

In current case COVID-19 might have caused sub-clinical myocarditis leading to a high-degree AV block. This block may be secondary to direct viral involvement or due to an auto-immune is not known.

And Patient did not have recurrence of conduction disturbances after he was started on supportive treatment with azithromycin and hydroxychloroquine, this may be due to recovery from viral infection or anti-inflammatory effects of the medications or both. [2]

Conclusion:

Patient with COVID 19 presented with transient high-degree AV block (heart brake) likely due to sub-clinical myocarditis or isolated involvement of the AV node and infra-Hisian block.

Reference:

1) *Akhmerov A et al. COVID-19 and the Heart. Circ Res. 2020;126(10): 1-24.*
2) *Kir D et al. HEART BRAKE-An unusual cardiac manifestation of Coronavirus disease 2019 (COVID-19), JACC Case Reports (2020); 1-13.*

3. Electronic stretchable fabric to monitor parameters

Electronic technologies that are stretchable offer potential to monitor the body over extended periods of time in unprecedented ways. Few parameters like the heart's rhythms, flexion of joints, and other biomedical parameters can be tracked with high fidelity and continuously using devices that can conform to the body. one major hurdle to usability has been the lack of aeration of the stretchable substrates into which the electronics are embedded.

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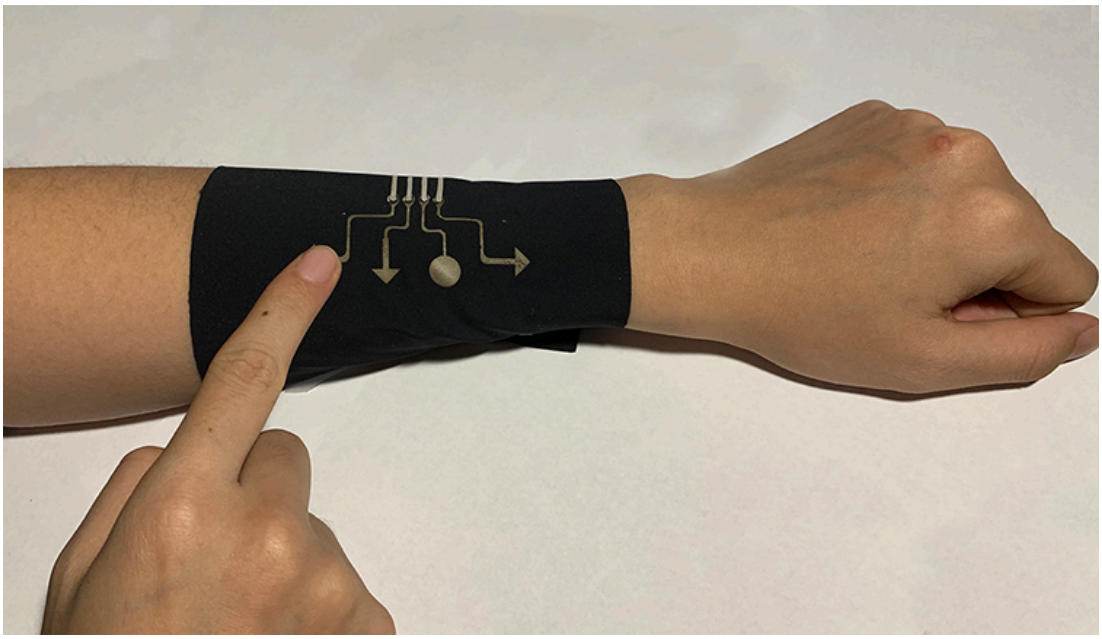

Recently researchers have developed a breathable, stretchy, electronic material that lets gases, such as volatile organic compounds and sweat come through, thereby allowing it to be worn over the skin for many days. This new material is made using a “breath figure method” that permits the creation of tiny holes throughout a polymer film, then film is dipped in a silver nanowire solution and the coating is heat-pressed to stay permanently on the film.

Resulting final film shows an excellent combination of electric conductivity, optical transmittance and water-vapour permeability and because the silver nanowires are embedded just below the surface of the polymer, the material also exhibits excellent stability in the presence of sweat and after long-term wear.

Reference:

Available at: https://www.medgadget.com/2020/05/breathable-stretchable-electronic-fabric-for-new-medical-wearables.html. Accessed on 05-05-2020.