# Comparison of Clinical Outcomes Among Hydroxychloroquine-based Combination Therapies Used to Treat COVID-19 Patients in Detroit

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## Introduction

- Hydroxychloroquine (HCQ) was frequently used for treatment of COVID-19. Its benefit in well-controlled clinical trials remains unclear. In addition, little is known about how other therapies may affect patient outcomes.
- We evaluated the impact of medications combined with hydroxychloroquine (HCQ) on end organ function for hospitalized patients with COVID-19.

## Methods

- **Design:** Multicenter observational cohort study.
- **Inclusion:** All adult patients admitted to the Ascension St. John Hospital and Detroit Medical Center with COVID-19 between January - May 2020 in Detroit, Michigan who received 2 doses of HCQ.
- **Exclusion:** Pediatric patients, COVID negative, received fewer than 2 doses of HCQ treatment.
- **Primary Outcome:** Change in Sequential Organ Failure Assessment (SOFA score) from initiation of HCQ therapy to five days post initiation.
- **Secondary Outcome:** Composite of in-hospital, all-cause mortality and discharge to hospice.
- **Data collection:**
  - Demographics (age, gender, race, height, weight)
  - Length of hospital stay
  - Sequential Organ Failure Assessment (SOFA) score
  - Charlson Comorbidity Index (CCI)
  - Laboratory data (CBC, BMP, coagulation)
  - Baseline QTc and subsequent follow-up QTc
  - Ventilator status
  - COVID-19 directed therapies

## Statistical Methods

- Descriptive statistics used to characterize the study population.
- Continuous variables described as the mean ± SD or median with range.
- Categorical variables described as frequency distributions.
- Multiple linear regressions performed to control for potential confounders between different therapies and change in SOFA score

The project was approved by Ascension St. John Hospital, Detroit Medical Center, and Wayne State University's Institutional Review Board

## Results

Figure 1. **Study Subjects**

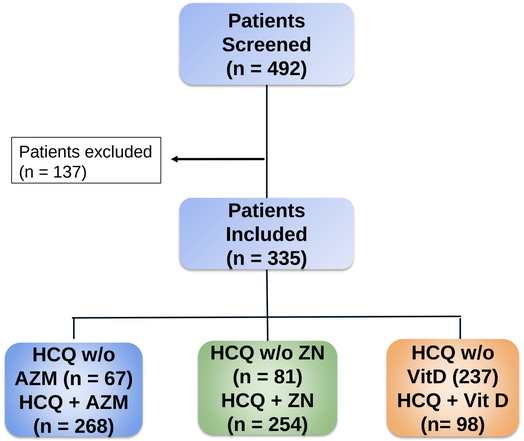



Table 1. **Patient Characteristics***

| | HCQ w/o AZM | HCQ + AZM | HCQ w/o ZN | HCQ + ZN | HCQ w/o Vit D | HCQ + Vit D |
|---|---|---|---|---|---|---|
| Mean Age ± SD | 66 ±14 | 61 ±15 | 64 ±13 | 61 ±15 | 63 ±15 | 60 ±15 |
| Mean Weight (kg) ± SD | 96 ±33 | 100 ±27 | 95 ±30 | 100 ±28 | 97 ±29 | 104 ±29 |
| Mean CCI ± SD | 2.5 ±2.1 | 1.5 ±1.8 | 2.3 ±2.3 | 1.5 ±1.8 | 1.73 ±2 | 1.54 ±1.8 |
| Mean D-dimer ± SD | 7,577 ± 11,000 | 4,321 ±7,050 | 7,112 ± 10,616 | 4,954 ± 8,082 | 6,875 ± 10,064 | 2,062 ± 2,060 |

*No statistically significant differences between groups, except with D-dimer for Vitamin D.

## Results (Cont'd)

Figure 2. **Adjunctive Therapies**

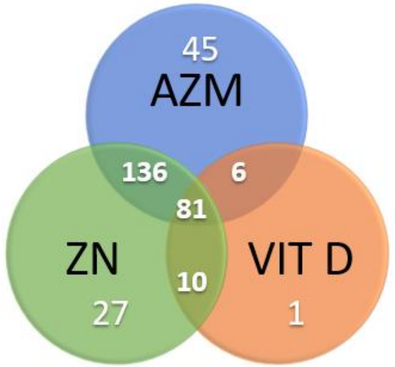
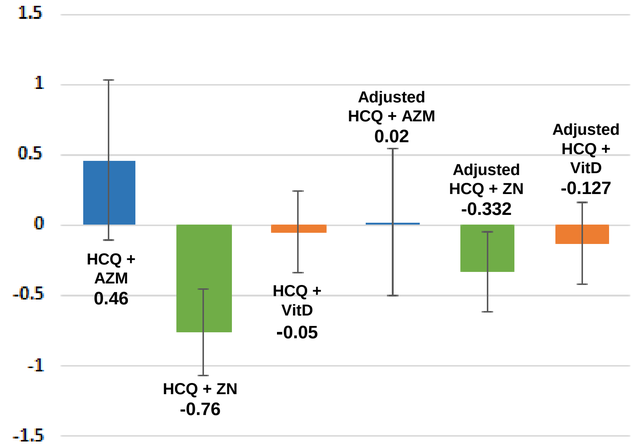



Figure 3. **Unadjusted (Left) and Adjusted (Right) Changes in SOFA Scores**




Azithromycin and zinc were adjusted for location (ICU vs non-ICU), while Vit D was adjusted for patient weight.

Table 2. **Mortality Rate**

| | HCQ w/o AZM | HCQ + AZM | p-value | HCQ w/o ZN | HCQ + ZN | p-value | HCQ w/o Vit D | HCQ + Vit D | p-value |
|---|---|---|---|---|---|---|---|---|---|
| Death/Hospice (%) | 32.8 | 35.6 | 0.677 | 34.6 | 35.2 | 0.915 | 36.5 | 31.6 | 0.399 |

## Conclusions

- No benefit in end-organ damage or mortality was observed with the addition of azithromycin, zinc, or vitamin D to HCQ after adjustment for confounders.
- Our preliminary analysis demonstrates no benefit with the addition of AZM, ZN, or VitD to HCQ for the treatment of COVID-19..
- Further studies are needed to determine the true effect of these interventions.

## Limitations

- Retrospective chart review
- Treatment adaptations over the time course of the pandemic may have altered outcomes
- Only preliminary data

## References

1. Lotfi M, Hamblin MR, Rezaei N. COVID-19: Transmission, prevention, and potential therapeutic opportunities. *Clin Chim Acta*. 2020;508:254-266.
2. Gautret P, Lagier JC, Parola P, et al. Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial. *Int J Antimicrob Agents*. 2020;56(1):105949.