



# Early Ambulatory Multidrug Therapy Reduces Hospitalization and Death in High-Risk Patients with SARS-CoV-2 (COVID-19)

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Received 04 March 2021;

Accepted 10 March 2021;

Published 17 March 2021

## Abstract

**Background:** There is an emergency need for early ambulatory treatment of COVID-19 in acutely ill patients in an attempt to reduce disease progression and the risks of hospitalization and death. **Methods and Results:** We recently reported results on 320 high-risk (age > 50 with ≥ 1 comorbidity) COVID-19 cases and have updated our results with 549 additional cases in the period ending December 16, 2020. Our protocol utilizes at least two agents with antiviral activity against SARS-CoV-2 (zinc, hydroxychloroquine, ivermectin) and one antibiotic (azithromycin, doxycycline, ceftriaxone) along with inhaled budesonide and/or intramuscular dexamethasone. Albuterol nebulizer, inhaled budesonide, intravenous volume expansion with supplemental parenteral thiamine 500 mg, magnesium sulfate 4 grams, folic acid 1 gram, vitamin B12 1 mg, are administered to severely ill patients who either present or return to the clinic with severe symptoms. In period 1 (April-September, 2020) 6/320 (1.9%) and 1/320 (0.3%) patients were hospitalized and died, respectively. In period 2, (September-December, 2020) 14/549 (2.6%) and 1/549 (0.18%) were hospitalized and died, respectively. For comparison, we used the Cleveland Clinic COVID-19 hospitalization calculator and based on average age and comorbidities the expected rate of hospitalization for both periods was 18.5%. The cumulative mortality among confirmed and suspected COVID-19 in Collin, Dallas, Denton, and Tarrant counties was 0.76, 1.04, 0.90, and 0.97. As a result, our early ambulatory treatment regimen was associated with estimated 87.6% and 74.9% reductions in hospitalization and death respectively,  $p < 0.0001$ . **Conclusions:** We conclude that early ambulatory, multidrug therapy is associated with substantial reductions in hospitalization and death compared to available rates in the community. Prompt ambulatory treatment should be offered to high-risk patients with COVID-19 instead of watchful watching and late-stage hospitalization for salvage therapies.

**Keywords:** SARS-CoV-2; COVID-19; multidrug; hospitalization; mortality; ambulatory; antiviral; zinc; hydroxychloroquine; ivermectin; doxycycline; azithromycin; vitamin; corticosteroid

## Introduction

The epidemic viral outbreak of SARS-CoV-2 infection (COVID-19) is advancing across the United States unabated as mass vaccination is attempted too late in the pandemic [1]. There are currently no approved drugs or drug combinations in the U.S. indicated for the ambulatory treatment of COVID-19 or its complications. Unfortunately, there are no potentially conclusive randomized trials of multidrug therapy underway at this time. As with all serious medical conditions, there is a role for empiric treatment in an attempt to reduce fatalities [2]. This brief report gives an update on real-world data and the clinical outcomes

associated with an empiric multidrug regimen for confirmed COVID-19 patients who present to a single ambulatory clinic in McKinney, which is located in Collin County, Texas, U.S.

## Methods

We have previously reported on the methods undertaken by primary care providers consisting of a lead physician (BCP) and four advanced practice practitioners (CR, VP, ES, CH) in their care of acutely ill patients with suspected SARS-CoV-2 infection [3]. In brief, all patients underwent contemporary real-time polymerase chain reaction (PCR) assay tests from anterior nasal swab samples. Risk stratification and advised nutraceuticals were in line with

previously published guidance as shown in Figure 1 [4]. All patients received empiric treatment on the first day of presentation in most cases before COVID-19 test results and treatment was continued for those with confirmed COVID-19. Our protocol utilized at least two agents with antiviral activity against SARS-CoV-2 (zinc, hydroxychloroquine, ivermectin) and one antibiotic (azithromycin, doxycycline, ceftriaxone) along with inhaled budesonide and/or intramuscular dexamethasone. Albuterol nebulizer, inhaled budesonide, intravenous volume expansion with supplemental

parenteral thiamine 500 mg, magnesium sulfate 4 grams, folic acid 1 gram, vitamin B12 1 mg, were administered to severely ill patients who either present or return to the clinic with severe symptoms [5]. Additionally, for the severely ill population dexamethasone, 8 mg, and ceftriaxone 1 gram was administered intramuscularly. All patients had in-person or telemedicine follow-up at 48 hours and as need depending on the duration and intensity of symptoms [6]. Hospitalization and death data were collected on follow-up telemedicine visits or calls to family members.

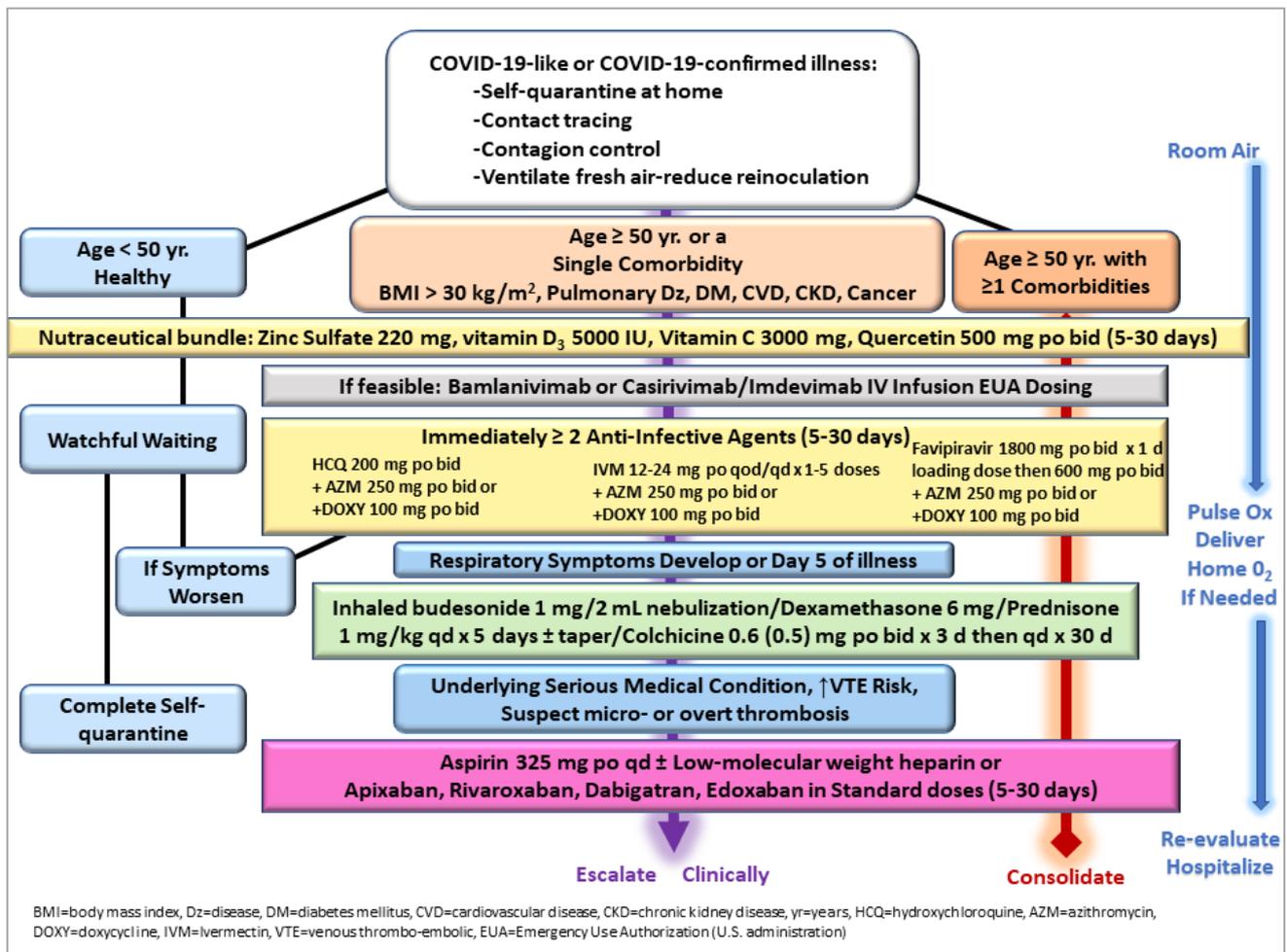


Figure 1: Early sequential multidrug therapy utilizing risk stratification and available nutraceuticals, appropriately prescribed approved drugs, and U.S. Food and Drug Administration Emergency Use Authorization agents (reproduced with permission from reference)4

## Results

In period 1 (April-September, 2020) 6/320 (1.9%) and 1/320 (0.3%) patients were hospitalized and died, respectively. In period 2, (September-December, 2020) 14/549 (2.6%) and 1/549 (0.18%) were hospitalized and died, respectively. For comparison, we used the Cleveland Clinic COVID-19 hospitalization calculator and based on average age and comorbidities the expected rate of hospitalization for both periods was 18.5% [7,8]. The cumulative mortality among confirmed and suspected COVID-19 in Collin, Dallas, Denton, and Tarrant counties was 0.76, 1.04, 0.90, and 0.97 [9]. As a result, our early ambulatory treatment regimen was associated with estimated 87.6% and 74.9% reductions in hospitalization and death respectively, p<0.0001 (Figure 2).

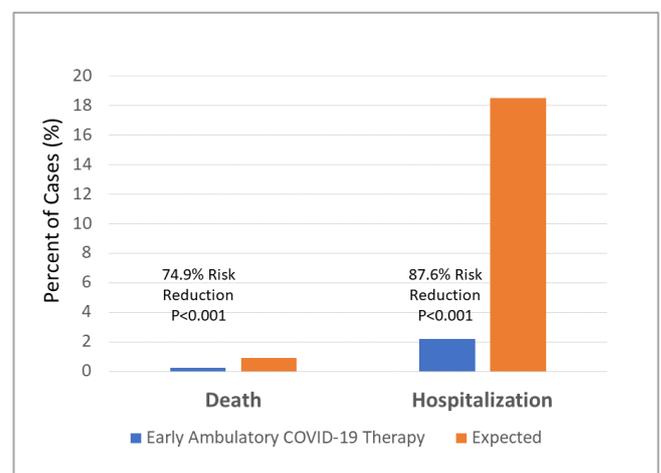


Figure 2: Comparative results for COVID-19 hospitalizations and death from for early ambulatory treatment of COVID-19 compared with an estimated risk of hospitalization and death

from the Cleveland Clinic COVID-19 Hospitalization Risk Calculator and the average case fatality rate in the four-county surrounding region of the clinic.<sup>[7,8,9]</sup>

## Discussion

Our results are consistent with those of Zelenko and colleagues who demonstrated that early treatment of COVID-19 in the surge of acute cases in New York City was associated with 84% and 80% reductions in hospitalizations and death respectively <sup>[10]</sup>. We anticipate that the widespread use of therapeutic antibodies directed against the spike protein of SARS-CoV-2 administered at the site of diagnosis (emergency room, urgent care clinic, nursing home) in addition to the use of anticoagulants in high-risk patients will greatly bolster the ambulatory treatment of COVID-19 and have a substantial impact on the rate of hospitalization <sup>[4]</sup>. Given the novelty of early ambulatory treatment and the lack of guidelines for outpatient treatment of COVID-19, we infer the majority of current hospitalizations and deaths in our region and likely the entire country receives no treatment before hospitalization where salvage treatments are undertaken <sup>[11]</sup>. Thus, it is important for media and public health messaging to feature early ambulatory treatment as an option for those acutely ill with COVID-19 <sup>[12]</sup>.

In conclusion, our data suggest more than three-quarters of hospitalizations and death are avoidable with early ambulatory treatment by primary care teams. Supported by our durable results, we believe early multidrug, ambulatory treatment should be offered as an emergency measure in acutely ill, high-risk COVID-19 as a strategy to reduce hospitalization and death. In our opinion, ambulatory treatment is preferable to hospitalization for salvage therapies that are applied too late and associated with complications and in-hospital death.

## Funding source(s):

None related

## Conflict of interest statement for author:

Nothing to disclose

## Acknowledgment

None

## References

- [1] McCullough PA, Eidt J, Rangaswami J, Lerma E, Tumlin J, Wheelan K, Katz N, Lepor NE, Vijay K, Soman S, Singh B, McCullough SP, McCullough HB, Palazzuoli A, Ruocco GM, Ronco C. Urgent need for individual mobile phone and institutional reporting of at home, hospitalized, and intensive care unit cases of SARS-CoV-2 (COVID-19) infection. *Rev Cardiovasc Med.* 2020 Mar 30;21(1):1-7. doi: 10.31083/j.rcm.2020.01.42. PMID: 32259899.
- [2] McCullough PA, Oskoui R. Early multidrug regimens in new potentially fatal medical problems[J]. *Reviews in Cardiovascular Medicine*, 2020. 21(4): 507-508
- [3] Procter BC, Ross C, Pickard V, Smith E, Hanson C, McCullough PA. Clinical outcomes after early ambulatory multidrug therapy for high-risk SARS-CoV-2 (COVID-19) infection. *Reviews in Cardiovascular Medicine*, 2020, 21(4): 611-614.
- [4] McCullough, P. (2020). Innovative Early Sequenced Multidrug Therapy for Sars-Cov-2 (Covid-19) Infection to Reduce Hospitalization and Death. *International Journal of Medical Science and Clinical Invention*, 7(12), 5139-5150. <https://doi.org/10.18535/ijmsci/v7i12.02>
- [5] Flannery AH, Adkins DA, Cook AM. Unpeeling the Evidence for the Banana Bag: Evidence-Based Recommendations for the Management of Alcohol-Associated Vitamin and Electrolyte Deficiencies in the ICU. *Crit Care Med.* 2016 Aug;44(8):1545-52. doi: 10.1097/CCM.0000000000001659. PMID: 27002274.
- [6] Colbert GB, Venegas-Vera AV, Lerma EV. Utility of telemedicine in the COVID-19 era. *Reviews in Cardiovascular Medicine*, 2020, 21(4): 583-587.
- [7] Jehi, L., Ji, X., Milinovich, A., Erzurum, S., Merlino, A., Gordon, S., Young, J. B., & Kattan, M. W. (2020). Development and validation of a model for individualized prediction of hospitalization risk in 4,536 patients with COVID-19. *PloS one*, 15(8), e0237419.
- [8] <https://riskcalc.org/COVID19Hospitalization/> (accessed January 2, 2021)
- [9] <https://txdshs.maps.arcgis.com/> (data cutoff December 16, 2020)
- [10] Derwand R, Scholz M, Zelenko V. COVID-19 outpatients: early risk-stratified treatment with zinc plus low-dose hydroxychloroquine and azithromycin: a retrospective case series study. *Int J Antimicrob Agents.* 2020 Dec;56 (6):106214. doi: 10.1016/j.ijantimicag.2020.106214. Epub 2020 Oct 26. PMID: 33122096; PMCID: PMC7587171.
- [11] Hayek SS, Brenner SK, Azam TU, Shadid HR, Anderson E, Berlin H, Pan M, Meloche C, Feroz R, O'Hayer P, Kaakati R, Bitar A, Padalia K, Perry D, Blakely P, Gupta S, Shaefi S, Srivastava A, Charytan DM, Bansal A, Mallappallil M, Melamed ML, Shehata AM, Sunderram J, Mathews KS, Sutherland AK, Nallamotheu BK, Leaf DE; STOP-COVID Investigators. In-hospital cardiac arrest in critically ill patients with covid-19: multicenter cohort study. *BMJ.* 2020 Sep 30;371:m3513. doi: 10.1136/bmj.m3513. PMID: 32998872; PMCID: PMC7525342.
- [12] Venegas-Vera AV, Colbert GB, Lerma EV. Positive and negative impact of social media in the COVID-19 era. *Reviews in Cardiovascular Medicine*, 2020. 21(4): 561-564