

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.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

The Reply



Drs. Shamy and Dewar take exception to one out of the 4-6 drugs we utilize for the early ambulatory treatment of SARS-CoV-2 infection (COVID-19) illness.¹ Hydroxychloroquine (HCQ) is one of five intracellular anti-infectives positioned in sequenced, multi-drug therapy for high-risk, early outpatient treatment.^{2,3} Each physician can use their individual judgment on the choice of drugs within the boxes. We expect that Shamy and Dewar would choose away from HCQ based on their viewpoint and utilize either ivermectin or favipiravir combined with azithromycin or doxycycline for that step. It is important to understand that anti-infectives play a partial role in treatment, and that the regimen additionally calls for nutraceuticals, corticosteroids, and anticoagulants. We have updated the algorithm since the time of the original publication in the Journal to include bamlanivimab, casirivimab and imdevimab, and ivermectin.⁴ In the last several months, colchicine is now better supported by the Colchicine Coronavirus SARS-CoV2 Trial (COLCORONA) and inhaled budesonide has a stronger signal of benefit as shown in the STerOids in COVID-19 Study (STOIC) trial.^{5,6} Similar to cancer or other fatal illnesses where combination chemotherapy is deployed, we encourage and support Drs. Shamy and Dewar to find the multidrug treatment program that is best aligned with their clinical judgement and take immediate action to treat highrisk patients with COVID-19 in their community to reduce the risks of hospitalization and death. Real-world data suggest that $\sim\!85\%$ of COVID-19 hospitalizations and deaths are avoidable and thus the merits of early treatment far outweigh academic arguments concerning one drug in the regimen.^{7,8,9}

Peter A. McCullough, MD, MPH

Texas A & M University College of Medicine, Department of Internal Medicine, Division of Cardiology, Dallas

https://doi.org/10.1016/j.amjmed.2021.02.024

Funding: none related

Author had access to the data and wrote the manuscript

E-mail address: peteramccullough@gmail.com

References

- McCullough PA, Kelly RJ, Ruocco G, Lerma E, Tumlin J, Wheelan KR, Katz N, Lepor NE, Vijay K, Carter H, Singh B, McCullough SP, Bhambi BK, Palazzuoli A, De Ferrari GM, Milligan GP, Safder T, Tecson KM, Wang DD, McKinnon JE, O'Neill WW, Zervos M, Risch HA. Pathophysiological Basis and Rationale for Early Outpatient Treatment of SARS-CoV-2 (COVID-19) Infection. *Am J Med* 2021 Jan;134 (1):16–22. https://doi.org/10.1016/j.amjmed.2020.07.003 [Epub 2020 Aug 7. PMID:32771461PMCID: PMC7410805.
- Prodromos C, Rumschlag T. Hydroxychloroquine is effective, and consistently so when provided early, for COVID-19: a systematic review. *New Microbes New Infect* 2020 Nov;38:100776. https://doi.org/ 10.1016/j.nmni.2020.100776 [Epub 2020 Oct 5. PMID:33042552PM-CID: PMC7534595.
- Ladapo J, McKinnon JE, McCullough PA, Risch H. Randomized Controlled Trials of Early Ambulatory Hydroxychloroquine in the Prevention of COVID-19 Infection, Hospitalization, and Death: Meta-Analysis doi: https://doi.org/10.1101/2020.09.30.202 04693
- 4. McCullough PA, Alexander PE, Armstrong R, Arvinte C, Bain AF, Bartlett RP, Berkowitz RL, Berry AC, Borody TJ, Brewer JH, Brufsky AM, Clarke T, Derwand R, Eck A, Eck J, Eisner RA, Fareed GC, Farella A, Fonseca SNS, Geyer CE Jr, Gonnering RS, Graves KE, Gross KBV, Hazan S, Held KS, Hight HT, Immanuel S, Jacobs MM, Ladapo JA, Lee LH, Littell J, Lozano I, Mangat HS, Marble B, McKinnon JE, Merritt LD, Orient JM, Oskoui R, Pompan DC, Procter BC, Prodromos C, Rajter JC, Rajter JJ, Ram CVS, Rios SS, Risch HA, Robb MJA, Rutherford M, Scholz M, Singleton MM, Tumlin JA, Tyson BM, Urso RG, Victory K, Vliet EL, Wax CM, Wolkoff AG, Wooll V, Zelenko V. Multifaceted highly targeted sequential multidrug treatment of early ambulatory high-risk SARS-CoV-2 infection (COVID-19). *Rev Cardiovasc Med* 2020 Dec 30;21(4):517–30. https://doi.org/10.31083/j. rcm.2020.04.264 [PMID:33387997.
- 5. Efficacy of Colchicine in Non-Hospitalized Patients with COVID-19. Tardif JC, Bouabdallaoui N, L'Allier PL, Gaudet D, Shah B, Pillinger MH, Lopez-Sendon J, da Luz P, Verret L, Audet S, Dupuis J, Denault J, Pelletier M, Tessier PA, Samson S, Fortin D, Tardif JD, Busseuil D, Goulet E, Lacoste C, Dubois A, Joshi AY, Waters DD, Hsue P, Lepor NE, Lesage F, Sainturet N, Roy-Clavel E, Bassevitch, Orfanos A, Grégoire JC, Busque L, Lavallée C, Hétu PO, Paquette JS, Levesque S, Cossette M, Nozza A, Chabot-Blanchet M, Dubé MP, Guertin MC, Boivin G, for the COLCOR-ONA Investigators medRxiv 2021.01.26.21250494; doi: https://doi. org/10.1101/2021.01.26.21250494
- 6. Ramakrishnan S, Nicolau DV Jr., Langford B, Mahdi B, Jeffers H, Mwasuku C, Krassowska K, Fox R, Binnian I, Glover V, Bright S, Butler C, Cane JL, Halner A, Matthews PC, Donnelly LE, Simpson JL, Baker JR, Fadai NT, Peterson S, Bengtsson T, Barnes PJ, Russell REK, Bafadhel M. Inhaled budesonide in the treatment of early COVID-19 illness: a randomised controlled trial. medRxiv 2021.02.04.21251134; doi: https://doi.org/10.1101/2021.02.04.21251134
- 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. https://doi.org/10.1016/ j.ijantimicag.2020.106214 [Epub 2020 Oct 26. PMID:33122096PM-CID: PMC7587171.

Conflict of Interest: Nothing to disclose

Requests for reprints should be addressed to Peter A. McCullough, MD, MPH, Texas A & M College of Medicine, Department of Internal Medicine, Division of Cardiology, 3409 Worth Street, Suite 500, Dallas TX 75246

- 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. *Rev Cardiovasc Med* 2020 Dec 30;21(4):611–4. https://doi.org/10.31083/j.rcm.2020.04. 260 [PMID:33388006.
- Procter BC, Ross C, Pickard V, Smith E, Hanson C, McCullough PA. Early Ambulatory Multidrug Therapy Reduces Hospitalization and Death in High-Risk Patients with SARS-CoV-2 (COVID-19). *Authorea* January 07, 2021. https://doi.org/10.22541/au.161000355. 54720791/v1.