Journal of Crohn's and Colitis, 2020, 1–2
doi:10.1093/ecco-jcc/jjaa105
Advance Access publication May 30, 2020
Letter to the Editor

Letter to the Editor

Potential Inhibition of COVID-19-driven Pneumonia by Immunosuppressive Therapy and anti-TNFα Antibodies: A Case Report

Reiko Kunisaki,[a†] Jun Tsukiji,[b†] Makoto Kudo[c]

[a]Inflammatory Bowel Disease Centre, Yokohama City University Medical Centre, Yokohama, Japan [b]Department of Infection Prevention and Control, Yokohama City University Medical Centre, Yokohama, Japan [c]Respiratory Disease Centre, Yokohama City University Medical Centre, Yokohama, Japan

[†]These authors contributed equally to this work.

Corresponding author: Reiko Kunisaki, MD, PhD, Inflammatory Bowel Disease Centre, Yokohama City University Medical Centre, 4–57 Urafune-cho, Minami-ku, Yokohama 232-0024, Japan. Tel.: +81 45 2615 656; fax: +81 45 253 9954; email: reikok@yokohama-cu.ac.jp

Coronavirus disease 2019 [COVID-19], caused by infection with severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2], is rapidly spreading as a global pandemic. Because the severe pneumonia induced by COVID-19 has a high fatality rate, there is an urgent need to develop efficacious treatments. It is suggested that severe COVID-19 is induced via cytokine storms, and some cytokine blockers may prevent COVID-19-driven pneumonia.[1]

Tursi *et al.* reported a Crohn's disease patient who developed only mild COVID-19-driven pneumonia under treatment with adalimumab.[2] Here, we report a similar development in an older, more intensively immunosuppressed patient, who was infected with SARS-CoV-2 but did not develop pneumonia despite anti-tumour necrosis factor alpha [TNF-α] antibody treatment.

A man in his late 60s embarked on a cruise ship with his wife and mother-in-law. He had been treated with infliximab [5 mg/kg/8-weekly] together with azathioprine and high-dose oral mesalazine for refractory ulcerative colitis. He had been well for several years and received his latest infusion of infliximab 4 days before boarding.

On the cruise ship, he developed cough and high fever, and polymerase chain reaction [PCR] analysis confirmed SARS-CoV-2 positivity. He was soon transported to our hospital for suspected COVID-19-driven pneumonia, but no findings of pneumonia were observed on chest computed tomography [CT]. His symptoms resolved within a few days without special treatment.

His wife and mother-in-law, who were sharing the same cabin space, also became infected with SARS-CoV-2. His mother-in-law, who was in her late 80s and was taking angina pectoris treatment and methotrexate for rheumatoid arthritis, did not develop pneumonia. However, his wife, who was the youngest family member and was undergoing angina pectoris treatment but was not receiving immunosuppressive medication, developed COVID-19-driven pneumonia.

It would seem that patients with inflammatory bowel disease [IBD] could be at high risk of COVID-19, because the inflamed gut represents an optimal route of entry for SARS-CoV-2, based on its enhanced expression of angiotensin-converting enzyme 2 [ACE2], the binding receptor for SARS-CoV-2.[3] However, despite many patients receiving immunosuppressive therapies, there is no evidence that IBD patients have an increased risk of COVID-19 or of developing severe disease.[4] Interleukin [IL]-2R, IL-6, and TNFα are highly expressed in severe COVID-19 patients, and Feldmann *et al.* proposed the need for clinical trials of anti-TNFα therapy for COVID-19.[5] Notably, there have been recent reports of paediatric patients who developed Kawasaki disease following COVID-19, and infliximab among biologics has a therapeutic effect on Kawasaki disease. Tursi *et al.* and Allocca *et al.* also suggested the potential preventative effect of anti-TNFα antibodies on COVID-19-driven pneumonia. Taken together with our elderly cases, we speculate that anti-TNFα antibodies may inhibit COVID-19-driven pneumonia, although this hypothesis must be confirmed by large epidemiological studies and the currently ongoing clinical trials.

Funding

None.

Conflict of Interest

RK reports personal fees [speaking, manuscript, board, expert testimony, development of educational presentations] from: AbbVie GK; Astellas Pharm; EA Pharma; Janssen Pharmaceutical K.K.; Kissei Pharmaceutical; Kyorin Pharmaceutical; Kyowa Hakko Kirin; Nippon Kayaku; Mitsubishi Tanabe Pharma; Takeda Pharma; Zeria Pharmaceutical; and grants, scholarships, funded research/collaborative research from AbbVie GK; Ajinomoto; EA Pharma; Janssen Pharmaceutical K.K.; Kissei Pharmaceutical; Mitsubishi Tanabe Pharma; Takeda Pharma; Zeria Pharmaceutical; Eli Lilly; and Pfizer;

outside the scope of the submitted work. All other authors declare no competing interests.

Acknowledgements

We are extremely grateful to our COVID-19 team members Ryoko Higa, MD, Hideaki Kimura, MD, PhD, Professor Ichiro Takeuchi, MD, PhD, and Professor Takahisa Goto MD, PhD, for their support of the patients, their critiques, and helpful feedback in drafting the manuscript. We thank Katie Oakley, PhD, and Gillian Campbell, PhD, from Edanz Group [https://en-author-services.edanzgroup.com/] for editing a draft of this manuscript.

Author Contributions

RK and J.: literature search, data collection and interpretation, and manuscript writing. MK: interpretation and critical revision of the manuscript. All authors have read and agreed to the published version of the manuscript.

References

1. Mehta P, McAuley DF, Brown M, Sanchez E, Tattersall RS, Manson JJ. COVID-19: consider cytokine storm syndromes and immunosuppression. *Lancet* 2020;**395**:1033–4.
2. Tursi A, Angarano G, Monno L, *et al*. Covid-19 infection in Crohn's disease under treatment with adalimumab. *Gut* 2020, April 20. Doi: 10.1136/gutjnl-2020–321240. [Epub ahead of print.]
3. Garg M, Royce SG, Tikellis C, *et al*. Imbalance of the renin-angiotensin system may contribute to inflammation and fibrosis in IBD: a novel therapeutic target? *Gut* 2020;**69**:841–51.
4. Allocca M, Fiorino G, Zallot C, *et al*. Incidence and patterns of COVID-19 among inflammatory bowel disease patients from the Nancy and Milan cohorts. *Clin Gastroenterol Hepatol* 2020, April 30. doi: 10.1016/j.cgh.2020.04.071. [Epub ahead of print.]
5. Feldmann M, Maini RN, Woody JN, *et al*. Trials of anti-tumour necrosis factor therapy for COVID-19 are urgently needed. *Lancet* 2020;**395**:1407–9.