Does Chronic Immunosuppressive Therapy Lower the Risk of Developing Severe Disease when Infected with COVID-19?

Kiana Vakil-Gilani DO, MPH; Kenneth O'Rourke MD
Internal Medicine Residency, Maine Medical Center, Portland, ME

Background and Purpose

- Individuals susceptible to COVID-19 represent heterogeneous populations.
- Risk stratification is critical to target screening, therapeutic interventions, and resource allocation.
- It is unclear whether rheumatic disease patients on immunosuppressants are at higher risk of developing severe COVID-19 disease.
- Current recommendations are to stop therapy if infected with COVID-19, except hydroxychloroquine (HCQ) and tocilizumab in select circumstances.
- Limited and conflicting data warrant surveillance of patients on chronic immunosuppressive therapy.
- We aim to assess correlation between various rheumatic diseases, their therapies, and severity of COVID-19 illness.
- Hypothesis: Pre-COVID19 immunosuppression with a direct anticytokine therapy will correlate with milder COVID-19 disease severity.

Methods

Descriptive analysis of 3 adult rheumatology patients on chronic immunosuppressive therapy in a single rheumatology practice who were diagnosed with COVID-19 by nasopharyngeal swab between March and May of 2020. We retrospectively collected data presented in Table 1.

Table 1. Demographics, clinical characteristics, treatment, and outcomes

Demographics	Patient 1	Patient	Patient 3
Age	75	78	88
Sex	M	M	F
Race	Caucasian	Caucasian	Caucasian
BMI (kg/m2)	26	26.08	19.4
Hx of tobacco use	Yes	No	Yes
Co-Morbidities			
Hypertension	Yes	No	Yes
Hyperlipidemia	Yes	Yes	No
CAD	No	No	Yes
Chronic Kidney Disease	No	No	No
Diabetes	No	No	No
Chronic pulmonary ds.	No	No	No
Home Medications			
Anti-coagulation	No	No	Yes
Anti-platelet therapy	No	No	No
ACE-I/ARB	Yes	No	No
Rheumatologic Data			
Baseline Disease	PsA	PMR, Seronegative Inflammatory Arthritis	PMR, Sarcoidosis
Disease Activity	Remission	Active	Remission
Immunosuppressive therapy +dose	ADA: 40mg q2wks MTX: 20mg/wk	MTX: 20mg/wk Pred: 2mg/d	HCQ: 300mg/d
Length of therapy	ADA: 13yrs MTX: 27yrs	MTX: Unknown Pred: 10yrs	HCQ: 7 months
Was therapy held for COVID-19?	Yes	MTX: Yes Pred: No	No

Treatment and Outcomes	Patient 1	Patient 2	Patient 3
Treatment	HCQ, Ceftriaxone, Azithromycin, Cefepime, Furosemide	Acetaminophen	None
ARDS diagnosis	Yes	No	No
COVID-19 ds. severity based on CURB65 score	Severe (CURB-65:4)	Mild	Mild
ICU stay	Yes	No	No
Mechanical Ventilation	Yes	No	No
ECMO	No	No	No
Length of ventilation (d)	3	N/A	N/A
Length of ICU stay (d)	6	N/A	N/A
Length of hospital stay (d)	19	0	1
Length of symptomatic ds. (d)	24	21	8
Full Recovery	Yes	Yes	Yes

Abbreviations
ADA: adalimumab; CXR: chest xray; HCQ: hydroxychloroquine; MTX: methotrexate; N/A: not applicable; ND: not done; PMR: polymyalgia rheumatica; Pred: prednisone; PsA: psoriatic arthritis; UNK: unknown

Results

- Demographics: 75-88 yrs, Caucasian, similar co-morbidity profile including hx of HTN, HLD, and absence of baseline obesity, pulmonary disease or diabetes.
- Patient 1, a 75 y.o. male with PsA on Adalimumab and Methotrexate developed severe COVID-19 as defined by a CURB-65 score of 4. He was intubated, treated with HCQ, antibiotics, diuresis, and achieved full recovery after 19 days of hospitalization.
- Patient 2, a 78 y.o. male with polymyalgia rheumatica and seronegative inflammatory arthritis on Prednisone and Methotrexate presented with mild symptoms without known pulmonary manifestations. He was not hospitalized and achieved full recovery after 21 days.
- Patient 3, an 88 y.o. female with polymyalgia rheumatica and sarcoidosis on HCQ developed mild symptoms of COVID-19 without pulmonary manifestations. She was hospitalized for one day and achieved full recovery after 8 days.

Conclusion

- Patient 1 with long term monoclonal antibody and DMARD use, developed the most severe COVID-19 disease
- Patient 1 was also the only subject on an ACE-I.
- Patients 2 and 3 who were on a DMARD developed mild COVID-19 symptoms despite presence of sarcoidosis in patient 2.

Discussion

Given limited data, a meaningful statement cannot be made regarding blunting of COVID-19 disease severity with immunosuppressive therapy. We plan to conduct a year long retrospective chart review of new COVID-19 patients with rheumatologic conditions in the state of Maine. In addition to the data in table 1, we will ask our rheumatologists to assess the development of post-COVID neutralizing antibodies with the knowledge that some DMARDs can interfere with post-vaccination development of protective antibodies. We will then use a multi-variate analysis to extrapolate which immunosuppressive therapies were associated with the best outcomes. We aim to develop a secure data-base where Maine rheumatologists can upload de-identified data and facilitate data collection.

Reference

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