CORRESPONDENCE

Covid-19 in Immune-Mediated Inflammatory Diseases — Case Series from New York

TO THE EDITOR: Data on Covid-19 in patients with immune-mediated inflammatory disease who have received anticytokine biologics, other immunomodulatory therapies, or both on a long-term basis are scarce. Trials to assess the efficacy of antirheumatic therapies such as hydroxychloroquine[1] and anticytokine therapies such as interleukin-6 inhibitors[2] to improve outcomes in patients with Covid-19 are ongoing. The rationale for their use is that worse outcomes (i.e., hospitalization, ventilation, or death) may be related to a proinflammatory cytokine storm.[3,4]

Here, we report a prospective case series involving patients with known immune-mediated inflammatory disease (rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, psoriasis, inflammatory bowel disease, or related conditions) who were receiving anticytokine biologics, other immunomodulatory therapies, or both when confirmed or highly suspected symptomatic Covid-19 developed. Established patients at New York University Langone Health in New York City who had immune-mediated inflammatory disease were assessed during the period from March 3 through April 3, 2020 (average follow-up, 16 days from symptom onset). We analyzed the demographic and clinical data on patients who had immune-mediated inflammatory disease with symptomatic Covid-19 and compared the patients for whom hospitalization was warranted (hospitalized patients) with those for whom it was not (ambulatory patients).

We identified 86 patients with immune-mediated inflammatory disease who had either confirmed (59 patients) or highly suspected (27 patients) symptomatic Covid-19 infection (Table 1, and Table S1 in the Supplementary Appendix, available with the full text of this letter at NEJM .org). Of these patients, 62 of 86 (72%) were receiving biologics or Janus kinase (JAK) inhibitors, and the overall incidence of hospitalization was 16% (14 of 86 patients). The hospitalized patients were older than the ambulatory patients. Although the distribution of diagnoses of immune-mediated inflammatory diseases was similar in the ambulatory group and the hospitalized group, a higher percentage of admitted patients had rheumatoid arthritis. As compared with the ambulatory patients, more of the patients for whom hospitalization was warranted had coexisting hypertension, diabetes, or chronic obstructive pulmonary disease.

The percentage of patients who were receiving biologics or JAK inhibitors at baseline was higher among the ambulatory patients than among the hospitalized patients (55 of 72 patients [76%] and 7 of 14 patients [50%], respectively) (Table 1 and Table S2), and the overall incidence of hospitalization among patients who had received these medications on a long-term basis was 11% (7 of 62 patients). However, even after multivariate analysis, the use of oral glucocorticoids (in 4 of 14 hospitalized patients [29%] and in 4 of 72 ambulatory patients [6%]), hydroxychloroquine (in 3 of 14 patients [21%] and 5 of 72 patients [7%], respectively), and methotrexate (in 6 of 14 patients [43%] and 11 of 72 patients [15%], respectively) was higher among patients with immune-mediated inflammatory disease for whom hospitalization was warranted (Table S2). These observations were consistent when the analysis was restricted to patients with confirmed SARS-Cov-2 infection on polymerase-chain-reaction testing (Table S3).

Of the 14 patients with immune-mediated inflammatory disease who were hospitalized, 79% (11 of 14) were discharged (mean stay, 5.6 days), and 2 remain hospitalized as of April 3. Of the 2 patients with more severe disease, 1 had elevated interleukin-6 levels and received mechanical ventilation for acute respiratory distress syndrome, and the other died in the emergency department; neither patient was receiving biologic therapies on a long-term basis (Table S4). Additional data are provided in Tables S5 through S8.

Table 1. Baseline Characteristics of the Patients in Whom Covid-19 Was Confirmed or Highly Suspected.*

Characteristic	All Patients (N = 86)	Ambulatory Patients (N = 72)	Hospitalized Patients (N = 14)
Mean age (range) — yr	46 (22–74)	46 (22–74)	50 (25–73)
Female sex — no. (%)	49 (57)	42 (58)	7 (50)
Diagnosis of Covid-19 — no. (%)			
Positive	59 (69)	45 (62)	14 (100)
Suspected	27 (31)	27 (38)	0
Primary IMID diagnosis — no. (%)†			
Psoriasis	14 (16)	13 (18)	1 (7)
Psoriatic arthritis	21 (24)	18 (25)	3 (21)
Rheumatoid arthritis	20 (23)	14 (19)	6 (43)
Ulcerative colitis	17 (20)	14 (19)	3 (21)
Crohn's disease	20 (23)	19 (26)	1 (7)
Ankylosing spondylitis	9 (10)	9 (12)	0
BMI‡	27.4±6	26.7±5	30.8±8
Coexisting conditions — no. (%)			
History of organ transplantation	1 (1)	1 (1)	0
Congestive heart failure	1 (1)	1 (1)	0
Hypertension	11 (13)	6 (8)	5 (36)
Diabetes	5 (6)	3 (4)	2 (14)
Chronic obstructive pulmonary disease	4 (5)	3 (4)	1 (7)
Asthma	15 (17)	15 (21)	0
Currently pregnant	2 (2)	1 (1)	1 (7)
Long-term medications — no. (%)			
ACE inhibitor or ARB	13 (15)	8 (11)	5 (36)
Any medication for primary IMID diagnosis	75 (87)	62 (86)	13 (93)
Methotrexate	17 (20)	11 (15)	6 (43)
Hydroxychloroquine	8 (9)	5 (7)	3 (21)
Oral glucocorticoids	8 (9)	4 (6)	4 (29)
Any biologic or JAK inhibitor	62 (72)	55 (76)	7 (50)
Tumor necrosis factor inhibitor	38 (44)	35 (49)	3 (21)
Interleukin-17 blocker	6 (7)	5 (7)	1 (7)
Interleukin-23 blocker	3 (3)	3 (4)	0
Interleukin-12/23 blocker	6 (7)	6 (8)	0
JAK inhibitor	6 (7)	5 (7)	1 (7)
Covid-19 symptoms — no. (%)			
Fever	72 (84)	60 (83)	12 (86)
Cough	36 (42)	24 (33)	12 (86)
Shortness of breath	35 (41)	22 (31)	13 (93)
Rhinorrhea	5 (6)	4 (6)	1 (7)
Sore throat	9 (10)	9 (12)	0
Diarrhea	13 (15)	9 (12)	4 (29)

Table 1. (Continued.)

Characteristic	All Patients (N = 86)	Ambulatory Patients (N = 72)	Hospitalized Patients (N = 14)
Anosmia	10 (12)	6 (8)	4 (29)
Ageusia	10 (12)	6 (8)	4 (29)
Hospitalization			
Days from first symptom to hospitalization			5.8±4
Regular floor — no. (%)			12 (86)
Use of supplementary oxygen — no. (%)			7 (50)
ICU-level care, mechanical ventilation, or both — no. (%)			1 (7)
Death — no. (%)			1 (7)

* Plus–minus values are means ±SD. A patient in whom Covid-19 was highly suspected was defined as any patient with new fever (temperature >99°F) or a known contact with Covid-19 plus one or more respiratory symptoms (dry cough, anosmia, sore throat, or shortness of breath) in whom Covid-19 could not be confirmed given the limited availability in New York of polymerase-chain-reaction testing to detect SARS-Cov-2. ACE denotes angiotensin-converting–enzyme, ARB angiotensin II–receptor blocker, ICU intensive care unit, and JAK Janus kinase.
† Patients may have more than one immune-mediated inflammatory disease (IMID).
‡ Body-mass index (BMI) is the weight in kilograms divided by the square of the height in meters.

A better understanding of the implications of Covid-19 in patients with immune-mediated inflammatory disease and the effects of anticytokine and other immunosuppressive therapies is urgently needed to guide clinicians in the care of patients with psoriasis, rheumatoid arthritis, psoriatic arthritis, inflammatory bowel disease, and related conditions. Although our analysis was limited in sample size, our data reveal an incidence of hospitalization among patients with immune-mediated inflammatory disease that was consistent with that among patients with Covid-19 in the general population in New York City reported by the New York City Department of Health and Mental Hygiene[5] (35,746 of 134,874 patients [26%]) (Table S5). These findings suggest that the baseline use of biologics is not associated with worse Covid-19 outcomes.

Rebecca Haberman, M.D.
Jordan Axelrad, M.D., M.P.H.
New York University Langone Health
New York, NY
Alan Chen, M.S.
New York University Grossman School of Medicine
New York, NY
Rochelle Castillo, M.D.
Di Yan, M.D.
Peter Izmirly, M.D.
Andrea Neimann, M.D.
New York University Langone Health
New York, NY
Samrachana Adhikari, Ph.D.
New York University Grossman School of Medicine
New York, NY
David Hudesman, M.D.
Jose U. Scher, M.D.
New York University Langone Health
New York, NY
jose.scher@nyulangone.org

Dr. Haberman, Dr. Axelrad, and Mr. Chen, and Drs. Hudesman and Scher contributed equally to this letter.

Disclosure forms provided by the authors are available with the full text of this letter at NEJM.org.

This letter was published on April 29, 2020, at NEJM.org.

1. Gautret P, Lagier J-C, 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 March 20 (Epub ahead of print).
2. ClinicalTrials.gov. Evaluation of the efficacy and safety of sarilumab in hospitalized patients with COVID-19. 2020 (https://clinicaltrials.gov/ct2/show/NCT04315298).
3. Wang D, Hu B, Hu C, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. JAMA 2020 February 7 (Epub ahead of print).
4. Guan W, Ni Z, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med 2020;382:1708-20.
5. NYC Department of Health and Mental Hygiene. COVID-19: data. 2020 (https://www1.nyc.gov/site/doh/covid/covid-19-data.page).

DOI: 10.1056/NEJMc2009567