Risk for COVID-19 Infection in Patients With Vitiligo

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PRACTICE **POINTS**

- The underlying autoimmune process in vitiligo can result in various changes to the immune system.
- A diagnosis of vitiligo may alter the body's immune response to COVID-19 infection.

To the Editor:

Vitiligo is a depigmentation disorder that results from the loss of melanocytes in the epidermis.[1] The most widely accepted pathophysiology for melanocyte destruction in vitiligo is an autoimmune process involving dysregulated cytokine production and autoreactive T-cell activation.[1] Individuals with cutaneous autoinflammatory conditions currently are vital patient populations warranting research, as their susceptibility to COVID-19 infection may differ from the general population. We previously found a small increased risk for COVID-19 infection in patients with psoriasis,[2] which suggests that other dermatologic conditions also may impact COVID-19 risk. The risk for COVID-19 infection in patients with vitiligo remains largely unknown. In this retrospective cohort study, we investigated the risk for COVID-19 infection in patients with vitiligo compared with those without vitiligo utilizing claims data from the COVID-19 Research Database (https://covid19researchdatabase.org/).

Claims were evaluated for patients aged 3 years and older with a vitiligo diagnosis (*International Classification of Diseases, Tenth Revision* [*ICD-10*] code L80) that was made between January 1, 2016, and January 1, 2020. Individuals without a vitiligo diagnosis during the same period were placed (4:1 ratio) in the control group and were matched with study group patients for age and sex. All comorbidity variables and vitiligo diagnoses were extracted from *ICD-10* codes that were given prior to a diagnosis of COVID-19. We then constructed multivariable logistic regression models adjusting for measured confounders to evaluate if vitiligo was associated with higher risk for COVID-19 infection after January 1, 2020.

The vitiligo and nonvitiligo cohorts included 40,363 and 161,452 patients, respectively (Table 1). Logistic regression analysis with adjustment for confounding variables, including high comorbid risk factors (Table 2) revealed that patients with a diagnosis of vitiligo had significantly increased odds of COVID-19 infection compared

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Brandon Smith, Shahin Shahsavari, Aislyn Oulee, and Priya Engel report no conflict of interest. Dr. Egeberg has received research funding from AbbVie, Boehringer Ingelheim, Bristol-Myers Squibb, the Danish National Psoriasis Foundation, Eli Lilly and Company, Janssen Pharmaceuticals, the Kgl Hofbundtmager Aage Bangs Foundation, Novartis, Pfizer, and the Simon Spies Foundation. He also is a consultant and/or speaker for or is/has been an employee of AbbVie, Almirall, Boehringer Ingelheim, Bristol-Myers Squibb, Dermavant, Eli Lilly and Company, Galápagos NV, Galderma, Horizon Therapeutics, Janssen Pharmaceuticals, LEO Pharma, McNeil Consumer Healthcare, Mylan, Novartis, Pfizer, Samsung Bioepis Co Ltd, Sun Pharmaceuticals, UCB, Union Therapeutics, and Zuellig Pharma Ltd. Dr. Wu is or has been a consultant, investigator, or speaker for AbbVie, Almirall, Amgen, Arcutis, Aristea Therapeutics, Bausch Health, Boehringer Ingelheim, Bristol-Myers Squibb, Codex Labs, Dermavant, DermTech, Dr. Reddy's Laboratories, Eli Lilly and Company, EPI Health, Galderma, Incyte, Janssen, LEO Pharma, Mindera, Novartis, Pfizer, Regeneron, Samsung Bioepis, Sanofi Genzyme, Solius, Sun Pharmaceuticals, UCB, and Zerigo Health.

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Cutis. 2024 April;113(4):E30-E32. doi:10.12788/cutis.1006

TABLE 1. Characteristics of Patients With Vitiligo vs Without Vitiligo

Characteristic	Vitiligo (n=40,363)	Without vitiligo (n=161,452)	*P* value	Standard effect size (Cohen *d*)
Sex, n (%)			N/A	N/A
Female	21,839 (54.1)	87,356 (54.1)		
Male	18,524 (45.9)	74,096 (45.9)		
Mean age (SD)	45.36 (22.98)	45.36 (22.98)	N/A	N/A
COVID-19 infection,[a] n (%)	1188 (2.9)	3050 (1.9)	<.0001	0.1

Abbreviation: N/A, not applicable.
[a]*ICD-10, International Classification of Diseases, Tenth Revision (ICD-10)* code U07.1.

with patients without vitiligo (adjusted odds ratio [AOR], 1.47; 95% CI, 1.37-1.57; *P*<.001)(Table 3). Additionally, subgroup logistic analyses for sex, age, and exclusion of patients who were HIV positive revealed that females with vitiligo had higher odds of contracting COVID-19 than males with vitiligo (Table 3).

Our results showed that patients with vitiligo had a higher relative risk for contracting COVID-19 than individuals without vitiligo. It has been reported that the prevalence of COVID-19 is higher among patients with autoimmune diseases compared to the general population.[3] Additionally, a handful of vitiligo patients are managed with immunosuppressive agents that may further weaken their immune response.[1] Moreover, survey results from dermatologists managing vitiligo patients revealed that physicians were fairly comfortable prescribing immunosuppressants and encouraging in-office phototherapy during the COVID-19 pandemic.[4] As a result, more patients may have been attending in-office visits for their phototherapy, which may have increased their risk for COVID-19. Although these factors play a role in COVID-19 infection rates, the underlying immune dysregulation in vitiligo in relation to COVID-19 remains unknown and should be further explored.

Our findings are limited by the use of *ICD-10* codes, the inability to control for all potential confounding variables, the lack of data regarding the stage of vitiligo, and the absence of data for undiagnosed COVID-19 infections. In addition, patients with vitiligo may be more likely to seek care, potentially increasing their rates of COVID-19 testing. The inability to identify the stage of vitiligo during enrollment in the database may have altered our results, as individuals with active disease have increased levels of IFN-γ. Increased secretion of IFN-γ also potentially

TABLE 2. High Comorbid Risk Factors for COVID-19

Comorbidity (*ICD-10* code)	Study cohort, n (%)		*P* value	Standard effect size (Cohen *d*)
	Vitiligo (n=40,363)	Without vitiligo (n=161,452)		
Asthma (J45)	3211 (8.0)	11,960 (7.4)	<.001	0.02
Allergic rhinitis (J30)	5559 (13.8)	9540 (5.9)	<.0001	0.2
Congestive heart failure (I50)	900 (2.2)	3785 (2.3)	.18	0.01
Type 1 diabetes mellitus (E10)	585 (1.4)	1111 (0.7)	<.0001	0.2
Type 2 diabetes mellitus (E11)	5374 (13.3)	16,625 (10.3)	<.0001	0.07
Obesity (E66)	7260 (18.0)	25,542 (15.8)	<.0001	0.04
COPD (J44)	1174 (2.9)	4481 (2.8)	.15	0.01
Essential hypertension (I10)	9586 (23.7)	33,274 (20.6)	<.0001	0.04
Chronic ischemic heart disease (I25)	1562 (3.9)	5205 (3.2)	<.0001	0.04
HIV (B20)	95 (0.2)	293 (0.2)	.03	0.06
Chronic kidney disease (N18)	1900 (4.7)	7082 (4.4)	.005	0.02

Abbreviatiosn: COPD, chronic obstructive pulmonary disease; *ICD-10, International Classification of Diseases, Tenth Revision.*

TABLE 3. Multivariable Logistic Regression for Odds of Contracting COVID-19 in Patients With Vitiligo vs Without Vitiligo

Factor	OR (95% CI)	*P* value	AOR[a] (95% CI)	*P* value
Vitiligo vs without vitiligo	1.57 (1.47-1.69)	<.001	1.47 (1.37-1.57)	<.001
Vitiligo vs without vitiligo excluding patients with HIV	1.57 (1.47-1.69)	<.001	1.47 (1.37-1.57)	<.001
Age, y				
3–19 y	1.52 (1.23-1.88)	<.001	1.43 (1.16-1.78)	.001
20–40 y	1.47 (1.25-1.73)	<.001	1.32 (1.12-1.56)	.001
≥41 y	1.61 (1.49-1.75)	<.001	1.50 (1.39-1.63)	<.001
Sex				
Male	1.39 (1.25-1.54)	<.001	1.30 (1.17-1.45)	<.001
Female	1.74 (1.59-1.90)	<.001	1.61 (1.47-1.76)	<.001

Abbreviations: AOR, adjusted odds ratio; OR, odds ratio.
[a]Models adjusted for various comorbidities including asthma, allergic rhinitis, congestive heart failure, type 1 diabetes mellitus, type 2 diabetes mellitus, obesity, chronic obstructive pulmonary disease, hypertension, chronic ischemic heart disease, HIV, and chronic kidney disease.

helps in the clearance of COVID-19 infection.[1] Future studies should investigate this relationship via planned COVID-19 testing, identification of vitiligo stage, and controlling for other associated comorbidities.

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