SKIN

RESEARCH LETTER

Severity of COVID-19 in Patients with Dermatomyositis: A Single Center, Retrospective Observational Cohort Study

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INTRODUCTION

Patients with chronic immune-mediated diseases (IMIDs), especially when taking certain immunomodulatory medications, have been shown to have an increased risk of developing severe COVID-19.[1-3] Although dermatomyositis (DM) patients have been included in large cohorts of patients with IMIDs evaluating for COVID-19 risk and severity, there is little literature specifically evaluating DM patient cohorts.

OTHER

We performed a single-center, retrospective cohort study to evaluate the severity of COVID-19 in DM patients and to assess for risk factors related to severe COVID-19 disease course. Only patients ≥18 years-old with confirmed, positive COVID-19 polymerase-chain reaction (PCR) tests between March 2020 – July 2021 were included. All patients met European League Against Rheumatism (EULAR) criteria for DM diagnosis. [4] Patients must have been seen by a Cleveland Clinic provider for their DM within the last 10 years (January 2011 – July 2021). Hospitalization was defined as ≥1 night in the hospital for COVID-19. Depending on the sample size, the Wilcoxon rank sum test or Fisher's exact test was used to compare the characteristics of the hospitalized versus not hospitalized patients in the DM cohort.

RESULTS

Our cohort included 27 patients with confirmed DM. Detailed characteristics of our DM cohort are included in **Table 1**. Within our cohort, 74.1% were on systemic therapy for their DM at the time of their COVID-19 diagnosis (**Table 2**). Within the DM cohort, 6 (22.2%) were hospitalized for their COVID-19 disease. One individual required ICU care (3.7%), and another died as a result of COVID-19 (3.7%). Despite an underlying increased risk for thromboembolic events, none of the patients in our DM cohort had a thrombotic event during their COVID-19 infection [5]. Additionally, only one of the patients in our cohort had a worsening of their DM symptoms after their COVID-19 infection.

The hospitalized DM patients had a median age of 66 years, compared to 52 years in the non-hospitalized group (**Table 2**). No clinical features significantly differed between the hospitalized and non-hospitalized DM

Table 1. Dermatomyositis cohort demographic factors

Count	27
Female	24 (88%)
Age*	54 (26, 67)
BMI*	27.2 (22.7, 32.1)
DM Subtypes	
Classic	20 (74%)
Amyopathic	1 (4%)
Juvenile	3 (11%)
Malignancy Associated	3 (11%)
Medications at time of COVID-19 Diagnosis	
Corticosteroids	6 (22%)
DMARDS	18 (67%)
Combined Systemic Therapy (Corticosteroids + DMARD or >1 DMARD)	10 (37%)
Any Systemic Therapy	20 (74%)
DM Autoantibody Status	
Positive Myositis Antibodies	12 (44%)
Negative Myositis Antibodies	9 (33%)
N/A	6 (22%)

*Median (Q_1 – Q_3)

Table 2. Hospitalized versus non-hospitalized dermatomyositis patients

	Hospitalized (n = 6)	Not Hospitalized (n = 21)	p-value
Female	6 (100%)	18 (86%)	.99
Age*	56 (40 – 69)	54 (25 – 67)	.58
BMI*	31.9 (27.9, 36.4)	26.5 (22.5, 30.9)	.10
DM Subtypes			
Classic	5 (83%)	15 (71%)	
Amyopathic	0	1 (5%)	
Juvenile	0	3 (14%)	
Malignancy Associated	1 (17%)	2 (10%)	
Medications at time of COVID-19 Diagnosis			
Corticosteroids	3 (50%)	3 (14%)	.10
DMARDS	5 (83%)	13 (62%)	.63
Combined Systemic Therapy (Corticosteroids + DMARD or >1 DMARD)	3 (50%)	7 (33%)	.56
Any Systemic Therapy	6 (100%)	14 (67%)	.15
DM Autoantibody Status			
Positive Myositis Antibodies	3 (50%)	9 (43%)	
Negative Myositis Antibodies	2 (33%)	7 (33%)	
N/A	1 (17%)	5 (24%)	

*Median (Q_1 – Q_3)

patients in our cohort. However, corticosteroid usage was higher in the hospitalized group, with 50% on corticosteroids when infected with COVID-19 compared to 14.3% in the non-hospitalized group. Additionally, body mass index (BMI) was higher in hospitalized patients compared to non-hospitalized patients (31.9 kg/m^2 vs 26.5 kg/m^2). Of those on corticosteroids when hospitalized, 2 were on dosages $\geq$ 10 mg. DMARD use and combined corticosteroid and DMARD use were both slightly higher in the hospitalized group (83.3% vs. 62%, 50% vs. 33%, respectively). Similarly, 100% of DM patients who were hospitalized were on some form of systemic therapy, compared to 67% in the non-hospitalized group.

CONCLUSION

In summary, our results suggest risk factors for severe COVID-19 in DM patients include those previously identified in other cohorts of autoimmune disease patients; namely, advanced age, higher body mass index (BMI) and active treatment with immunosuppressive agents.[1,4] The main limitation of our study is its small sample size, which limited our ability to potentially detect significant differences between clinical characteristics of hospitalized vs. non-hospitalized DM patients. Therefore, we focused on descriptive measures and the clinical importance of observed differences to generate hypotheses in the DM cohort. Alternatively, strengths of our study include an ability to review detailed information about our cohort patients, thus being confident about their DM diagnosis, medication regiment at time of COVID-19 diagnosis, and their COVID-19 disease course. Further characterization in larger cohorts should be conducted to explore these possible associations. Until then, awareness of these potential risks is important for clinicians caring for DM patients in order to optimize their care and protection from a severe COVID-19 disease course.

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