

Evaluation of COVID-19 Incidence in Psoriatic Patients Receiving Adalimumab

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ABSTRACT

Background and Aim: Adalimumab is a highly human monoclonal antibody that binds to tumor necrosis factor, a key proinflammatory cytokine pathogenic in psoriasis. It is considered as an influential factor in controlling moderate to severe psoriasis. This study aimed to evaluate the impact of Adalimumab on COVID-19 incidence in patients with psoriasis.

Materials and Methods: This cross-sectional study was performed at Baqiyatallah Hospital in 2021. Eighty patients with psoriasis who referred to Baqiyatallah Hospital were included in the study. Patients were divided into two groups, one group was treated with Adalimumab, and the other group received the control treatment. The incidence of the disease was assessed by the history of COVID-19 signs and symptoms, positive RT-PCR testing and graphing, and physician diagnosis.

Results: The mean age of patients was 39.5 (± 7.9 S.D.). 36(45%) patients were infected with COVID-19, and 44 (55%) patients were not infected, and there was no significant difference between the two groups in the infection with COVID-19 (P value = 0.36). There was a significant relationship between infection with COVID-19 and the severity of psoriasis (P value=0.01). Although, in the severe psoriasis group, which was significantly more affected by COVID-19, there was no statistically significant relationship between Adalimumab consumption and COVID-19 affection (P value = 0.19).

Conclusion: Psoriasis patients treated with Adalimumab are not more prone to COVID-19 infection. However, patients with severe psoriasis are more likely to develop COVID-19; this matter is not related to the use of Adalimumab, and it is not necessary to discontinue or change Adalimumab.

Keywords: Psoriasis, Sars-CoV-2, COVID-19, Biologics, Adalimumab

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1. Introduction

Coronaviruses range (as a large family of viruses) from the common cold virus to the cause of more severe diseases like SARS, MERS, and COVID-19 (1-3).

The COVID-19 virus is an emerging type of the Coronaviridae family that can damage body tissues, particularly the lungs, as it can cause acute respiratory syndrome (4). The mechanism of virus entry into the cell depends on surface proteases, which are primarily human airway trypsin-like protease (HAT) or transmembrane protease serine2 (TMPRSS2) (5).

Although the virus needs an angiotensin-converting enzyme (ACE2) receptor as a critical receptor (6), studies indicated that widespread serum disorders and cytokine storm altering inflammatory markers like ESR, CRP, LDH, and Ferritin (7-9). In various studies, we have observed an increase in liver enzymes, inflammatory factors, D dimer, and a decrease in platelets of affected patients (10). Increasing inflammatory cytokines are associated with the disease severity, particularly severe pneumonia (11).

Psoriasis is a chronic autoimmune disease that causes the rapid proliferation of skin cells (12). Defects in the natural cycle of epidermal growth leads to epidermal proliferation, altered skin maturation, inflammation, and vascular changes (13). Adalimumab is a human monoclonal antibody that binds to tumor necrosis factor (TNF), a key proinflammatory cytokine in the pathogenesis of psoriasis. Adalimumab is considered as an effective biologic drug in controlling moderate to severe psoriasis (14, 15). Despite its action mechanism, there are debates about using it in patients with psoriasis during the COVID-19 pandemic.

Some studies have shown that the hospitalization rate in psoriatic patients with COVID-19, who had previously used biological drugs, was significantly lower than in those who had not previously used these drugs (16, 17). However, in other studies, no significant differences were reported in the two psoriatic groups with and without receiving Adalimumab (18, 19). This study aims to evaluate the impact of Adalimumab on COVID-19 incidence in patients with psoriasis.

2. Materials and Methods

This cross-sectional study was performed at Baqiyatallah Hospital in Tehran, Iran in 2021. The participants were psoriatic patients who had a definitive diagnosis of psoriasis. Eighty patients were studied using Cochran's sample size formula. Patients were divided into two groups, one group who received treatment with Adalimumab and the other group who

received control treatment. Inclusion criteria were psoriasis in any age group with a definite diagnosis by a dermatologist and satisfaction to participate in the study. Exclusion criteria were patient dissatisfaction and shortage of patient information. The study checklist was designed, which included two sections, the first section consisted of demographic information (age, sex, etc.), psoriasis disease grade, type of treatment, underlying diseases information, and the second section consist of COVID-19 information. The incidence of the disease was assessed by the history of COVID-19 signs and symptoms, positive RT-PCR testing and graphing, and physician diagnosis. The Psoriasis Area and Severity Index (PASI) was used for assessing the severity of psoriasis (20). SPSS (V.22) statistical software was used for data analysis. Numerical data were indicated as mean \pm standard deviation, and the qualitative data were described as frequency and percentage. The T-test or Mann-Whitney test was used to compare quantitative variables, while Chi-square or Fisher's exact test was used to compare qualitative variables. P values less than 0.05 were considered statistically significant.

3. Results

Eighty patients were enrolled in the study, with 40 patients received Adalimumab and 40 in the control group. The gender of patients was 57 (71.2%) male and 32 (28.8%) female. The mean age of the patients was 39.5 (± 7.9 S.D.). The demographic and descriptive characteristics of patients are indicated in [Tables 1](#) and [2](#).

Table 1. Demographic characteristics of psoriasis patients with and without receiving Adalimumab

		Frequency	Percent
Gender	Male	57	71.2
	Female	32	28.8
Age (Mean)		39.5	± 7.9 S.D.
Education	Less than licentiate	43	53.7%
	Licentiate	25	31.2
	Master's degree	9	11.2
	Doctorate degree	2	2.5
BMI(Kg/m ²)(Mean)		24.48	± 3.6 S.D.
Smoking		12	15

Table 2. Descriptive characteristics of psoriasis patients with and without receiving Adalimumab

		Adalimumab group	Control group	P value
Gender	Male	32(80%)	25(62.5%)	0.08
	Female	8(20%)	15(37.5%)	

	Adalimumab group	Control group	P value
Age (Mean)	39.4(±7.8 S.D.)	39.7(±8.1 S.D.)	0.9
Diabetes	6(50%)	6(50%)	1
Hypertension	4(22.2%)	14(78.8%)	0.007*
Hyperlipidemia	13.1(35%)	24(64.9%)	0.01*
Smoking	7(58%)	5(42%)	0.2

* Significant at the 0.05 level

The COVID-19 tests were positive in 36 (45%) patients, and the rest (55%) were negative for the tests. In the Adalimumab group, 16 (40%) patients, and in the control group, 20 (50%) patients were positive in COVID-19 tests. All patients were treated on outpatient medications, and none were hospitalized in either group. The difference in the incidence of COVID-19 in two groups was investigated. There was no significant difference between the two groups in the incidence of COVID-19 (P value = 0.36).

The relationship between the severity of psoriasis and the incidence COVID-19 was investigated. In patients with severe psoriasis, 30 (54%) patients had positive tests for COVID-19. In patients with moderate psoriasis, 6 (24%) patients had positive tests. There was a significant relationship between the severity of psoriasis and COVID-19 prevalence (P value=0.01). Thus, patients with severe psoriasis become infected more with COVID-19. However, there was no statistically significant relationship between Adalimumab consumption and COVID-19 incidence in sever psoriasis (P value = 0.19).

4. Discussion

The pathophysiology of the new Coronavirus 2019 (COVID-19) is associated with hyperinflammatory reactions. It is diagnosed with exaggerated serum cytokines and proinflammatory chemokines, which leads to cytokine release syndrome or cytokine storm (21, 22). Anti-rheumatic drugs (such as monoclonal antibodies) like Adalimumab have been supposed in COVID-19 treatment to decrease the excessive inflammatory response and subsequent cytokine storm (23, 24).

The critical question is if patients with psoriasis can continue to take immunosuppressive medications. Although, subsequent studies did have not conclusively confirm the effectiveness of immunomodulatory drugs in severe COVID-19 patients (25), in the present study, taking Adalimumab in patients with psoriasis had no impact on the incidence of COVID-19. However, patients with severe psoriasis are more likely to develop COVID-19. Therefore, psoriasis patients benefit more from

controlling the disease with Adalimumab treatment than stopping the drug and subsequent disease exacerbation.

Some studies have reported the impact of Adalimumab on the consequences of COVID-19 (17, 18). Bonek et al. demonstrated that the use of biological drugs (Adalimumab) in the treatment of rheumatoid arthritis patients with COVID-19 concluded that the use of Adalimumab decreases the virus titer in the COVID-19 course and significant reduction in mortality and morbidity occurred in comparison with the other patients treated with other drugs (26). Toursi et al. concluded that immunosuppressive drugs like Adalimumab could decrease mortality and morbidity in the COVID-19 patients and positively impact the rapid recovery of lung lesions (27).

Polat et al. showed that the hospitalization rate of psoriasis patients were infected with COVID-19 did not have any relationship to receiving biological drugs (28). In the present study, we concluded that Adalimumab had no impact on the incidence of COVID-19 too.

Mahil at the University of London indicated that the hospitalization rate in psoriasis patients with COVID-19, who had previously used biological drugs, was significantly lower than those who had not previously used biological drugs (16).

This study showed that severe psoriasis led to more COVID-19 incidence. However, there was no statistically significant relationship between Adalimumab consumption and COVID-19 infection in the group of severe psoriasis with significantly more infection. This suggests that there are probably other reasons for more incidence of COVID-19 in patients with severe psoriasis.

Paolo Gisondi et al. investigated patients with moderate to severe psoriasis and the relationship between biologics drugs and COVID-19 severity. The study found that patients with moderate to severe psoriasis who received systemic and biological drug treatments were not at higher risk for COVID-19 incidence, hospitalization, or death (29), which was inconsistent with the present study results.

It is still difficult to explain why taking Adalimumab in psoriasis patients has no impact on the rate of COVID-19 infection because many variables may confound the relationship. For example, psoriatic patients may take social distancing or personal protection more seriously. What is certain is that preventive discontinuation of biologic drugs for psoriasis to decrease the risk of COVID-19 must be avoided.

5. Conclusion

Psoriatic patients treated with Adalimumab are as prone to COVID-19 infection. However, patients with severe psoriasis are more likely to develop COVID-19; this matter is not related to the use of Adalimumab. In future studies, it is recommended that more types of drugs be considered in studying psoriasis patients affected by the pandemic.

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Ethics approval

Approved by Research Ethics Committees of Baqiyatallah University of Medical Sciences: IR.BMSU.REC.1399.293 AVAILABILITY OF DATA AND MATERIALS.

Conflict of Interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

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