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Original Research Article

Comparison of adalimumab and secukinumab with respect to short-term efficacy and recurrence in moderate-to-severe psoriasis patients

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Abstract

Purpose: *To compare the short-term efficacy and recurrence of moderate-to-severe psoriasis patients through adalimumab and secukinumab.*
Methods: *A total of 180 patients treated in 970 Hospital of the PLA Joint Logistics Support Force from April 2019 to November 2021 were enrolled in this study. They were assigned to groups A (100 cases treated with secukinumab) and B (80 patients treated with adalimumab). Before and after treatment, the IL-23, TNF-α and 25 (OH) D levels, psoriasis area and severity index (PASI), physician global assessment (PGA), dermatology life quality index (DLQI), compliance with treatment, treatment effectiveness, incidence of adverse reactions, and short-term recurrence were assessed.*
Results: *After treatment, the TNF-α and IL-23 levels decreased in group A, while the 25 (OH) D level increased ($p < 0.05$). In comparison to group B, PASI, PGA and DLQI scores in group A were lower ($p < 0.05$). Compliance in group A was lower ($p = 0.002$), while total treatment effectiveness was higher ($p < 0.001$). The incidence of adverse reactions ($p = 0.004$) and frequency of short-term recurrence ($p = 0.005$) in group A were lower.*
Conclusion: *The short-term efficacy of secukinumab in moderate-to-severe psoriasis patients is higher than that of adalimumab, while recurrence is lower. Thus, secukinumab shows greater benefits than adalimumab for the treatment psoriasis.*

Keywords: *Adalimumab, Secukinumab, Psoriasis, Psoriasis Area and Severity Index, Physician global assessment, Dermatology life quality index*

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INTRODUCTION

Psoriasis, a chronic inflammatory skin disease, is marked as well-defined red patches with white scales, as well as scaly skin structure and induration [1]. Histologically, psoriasis has three main characteristics *viz* epidermal hyperplasia, dermal expansion, and prominent blood vessels/inflammatory infiltration of white blood cells [2]. Psoriasis is linked to genetic susceptibility, autoimmune diseases, psychiatry and mental health, as well as environmental factors such as infection, stress and trauma [3]. Once infected, the immune cells release large

amounts of pro-inflammatory factors. This leads to uncontrolled activation of innate and acquired immune systems such as differentiation of nuclear factor-κB (NF-kB) signaling pathway and T helper (Th) cells into Th1 and/or Th17 cells [4]. The situation is exacerbated by smoking, drinking and obesity, with effects on serum levels of related factors.

Adalimumab, one of the inhibitors of tumor necrosis factor, is amongst the best-selling drugs worldwide. It has been widely used since its precursor was developed in 2002 [5]. The drug is usually used for diseases such as plaque psoriasis and psoriatic arthritis, with good effect on targets [6]. However, it has been reported that many patients did not respond to this drug after an initial improvement, and were prone to adverse events which impeded treatment due to drug clearance, increase in neutralization and hypersensitivity [7]. Secukinumab, an inhibitor of interleukin-like factors, is frequently used for treating plaque psoriasis and psoriatic arthritis [8]. There are limited studies as to which of the two drugs is better for patients.

This research was to compare the effects of the two drugs through short-term efficacy and potential for recurrence.

METHODS

General patient profile

A retrospective analysis was carried out on 180 moderate-to-severe plaque psoriasis patients. They were enrolled into groups A (n = 100) and B (n = 80). The general profiles were comparable. They all knew about the research purpose and protocols. Informed consent forms were obtained. It was approved by the ethics committee of 970 Hospital of the Joint Logistics Support Unit 970 of the Chinese People's Liberation Army, with ethics batch number: 201904A (Review) 071, and followed international guidelines for human studies.

Inclusion criteria

Patients were in line with the 2017 British Association of Dermatologists issued guidelines for psoriasis biotherapy diagnosis [9]. The included patients were those aged > 18 years, with definite plaque psoriasis diagnosis in at least 6 months; Patients with Psoriasis Area and Severity Index (PASI) scores ≥12; Those with area of plaque lesions ≥ 10 %; Patients who tolerated the biological agents used for treatment.

Exclusion criteria

Patients in the following categories were excluded: breastfeeding or pregnant patients, and those with history of family planning; patients with abnormal test results for tuberculosis (purified protein derivative and T cell spot test for tuberculosis infection), hepatitis B virus, hepatitis C virus and human immunodeficiency virus; those who had impaired liver and kidney functions; those with malignancies and severe infections.

Treatments

In group A patients, 300 mg or 150 mg of secukinumab was subcutaneously injected every week from the beginning of treatment, for 4 weeks. Thereafter, it was injected once every 4th week until the 12th week. In group B patients, adalimumab was injected subcutaneously every week. At the beginning, the adalimumab dose used was 80 mg. After the first week, 40 mg of adalimumab was given every other week up to the 12th week. Routine fasting blood tests were performed on all patients, and PASI scores of skin lesions were determined by two doctors with adequate clinical experience.

Evaluation of outcomes/indices

Inflammatory factors and 25 (OH) D

The levels of inflammatory factors and 25 (OH) D before and after treatment were assessed. The test-related indicators, i.e., IL-23, TNF-α, 25 (OH) D, were assayed with ELISA.

Psoriasis area and severity index (PASI)

All of them were followed up after treatment, and the PASI scores were compared [10], the higher the score, the more serious the situation.

PGA scores

Patients were followed up after treatment, and the PGA scores were compared [11], the higher the score, the more serious the situation.

Dermatology life quality index

Patients were followed up after treatment. The DLQI scores were compared [12]; Higher scores indicated more serious conditions.

Treatment compliance

Treatment compliance of patients was compared. Full compliance implied that the patient actively

and strictly followed doctor's advice, actively cooperated with clinical examination and nursing, and consciously insisted on long-term standardized treatment. Partial compliance meant that the patient occasionally showed irregular compliance behavior during the treatment period, but followed doctor's advice after being reminded or after explanations. Non-compliance was indicated if the patient did not follow doctor's advice for a long time, or if the patient refused or interrupted the treatment midway during the treatment period.

Treatment effectiveness

The clinical nursing of patients was monitored. Treatment was regarded as *markedly effective* if the operation was successful, without adverse events; or *effective* if the operation was basically successful, but with slight adverse reactions, or *ineffective*, if the operation was unsuccessful, with many adverse events at the same time. Total treatment effectiveness was calculated as in Eq 1.

$$T (\%) = [(M+E)/P] \times 100 \quad \ldots\ldots\ldots\ldots (1)$$

where T = total effective rate; M = markedly effective; E = effective; and P = total number of patients in the group.

Incidence of adverse reactions

Adverse reactions such as nasopharyngitis, oral herpes, diarrhea and urticaria were assessed.

Short-term recurrence

Recurrence of patients within one month and two months after cure was compared. Recurrence was deemed to have occurred if after treatment, a new rash appeared in patients who were cured, or the area of the original rash in patients who were basically cured became enlarged, with color turned to red, and number of scales increased.

Statistical analysis

SPSS22.0 (EASYBIO, China) was applied to data analysis. The counting data were assessed using chi square (χ^2) test. The measurement data were marked by mean ± standard deviation (SD) and assessed via independent-sample *t*-test. GraphPad Prism 8 software was applied to graphics. $P < 0.05$ indicate statistically significant differences.

RESULTS

Patient profile

General profile such as gender, age and employment revealed no marked difference ($p > 0.05$, Table 1).

Levels of inflammatory factors and 25 (OH) D

After treatment, the TNF-α and IL-23 levels decreased in group A, while the 25 (OH) D level increased ($p < 0.05$; Figure 1).

Scores for PASI, PGA, DLQI

Compared with group B, the PASI, PGA and DLQI scores decreased in group A ($p < 0.05$, Figure 2).

Compliance

The compliance in group A was lower ($p < 0.05$; Table 2).

Table 1: General profile of patients

Parameter	Group A (n=100)	Group B (n=80)	t/χ^2	*P*-value
Gender			0.29	0.593
Male	51 (51.00)	44 (55.00)		
Female	49 (49.00)	36 (45.00)		
Age (years)	55.67±8.56	56.01±8.07	0.27	0.786
BMI	22.34±4.61	22.56±3.99	0.34	0.736
Employment			0.30	0.581
Laid-off/retired	61 (61.00)	52 (65.00)		
Working	39 (39.00)	28 (35.00)		
Place of residence			0.09	0.769
Cities and towns	72 (72.00)	56 (70.00)		
Villages	28 (28.00)	24 (30.00)		
Smoking			0.76	0.383
Yes	80 (80.00)	68 (85.00)		
No	20 (20.00)	12 (15.00)		
Drinking			0.03	0.861
Yes	79 (79.00)	60 (75.00)		
No	21 (21.00)	20 (25.00)		

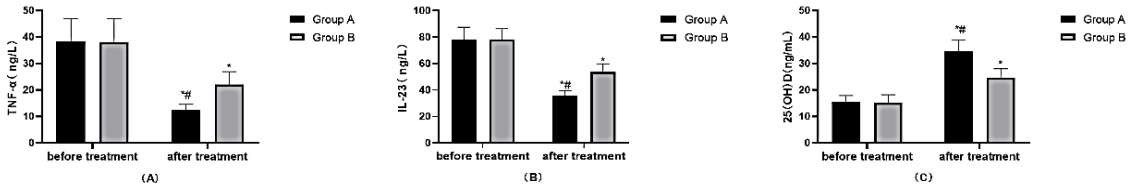

Figure 1: Levels of inflammatory factors and 25 (OH) D before and after treatment (A) The TNF-α level in group A was lower. (B) The IL-23 level in group A was lower. (C) The 25 (OH) D level in group A was higher. *P < 0.05 compared with value before treatment; #p < 0.05 compared with group B after treatment

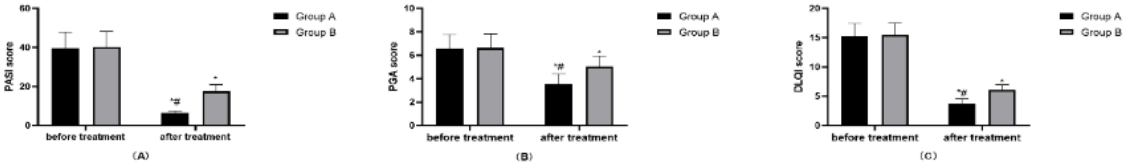

Figure 2: PASI, PGA and DLQI scores of patients (A) PASI scores of patients in group A were lower after treatment. (B) PGA scores in group A were lower after treatment. (C) DLQI scores in group A were lower after treatment. *P < 0.05 compared with value before treatment; #p < 0.05 compared with group B after treatment

Table 2: Compliance

Classification	Group A (n=100)	Group B (n=80)	χ^2	*P*-value
Full Compliance	67 (70.00)	44 (55.00)	-	-
Partial compliance	25 (25.00)	16 (20.00)		
Non-compliance	8 (8.00)	20 (25.00)	-	-
Total effectiveness (%)	92 (92.00)	60 (60.00)	9.78	0.002

Table 3: Total treatment effectiveness

Classification	Group A (n=100)	Group B (n=80)	χ^2	*P*-value
Markedly effective	70 (70.00)	48 (60.00)	-	-
Effective	28 (28.00)	18 (22.50)		
Ineffective	2 (2.00)	14 (18.50)	-	-
Total treatment effectiveness (%)	98 (98.00)	66 (82.50)	13.18	<0.001

Table 4: Incidence of adverse reactions

Adverse reaction	Group A (n=100)	Group B (n=80)	χ^2	*P*-value
Nasopharyngitis	0 (0.00)	4 (5.00)	-	-
Oral herpes	0 (0.00)	2 (2.50)	-	-
Diarrhea	2 (2.00)	2 (2.50)		
Urticaria	1 (1.00)	4 (5.00)	-	-
Incidence of adverse reactions (%)	3 (3.00)	12 (15.00)	8.38	0.004

Treatment effectiveness

The total treatment effectiveness was higher in group A (p < 0.05; Table 3).

Incidence of adverse reactions

The incidence of adverse reactions in group A was lower (p < 0.05; Table 4).

Degree of short-term recurrence

The frequency of short-term recurrence in group A was lower (p < 0.05; Table 5).

DISCUSSION

Psoriasis, a chronic inflammatory skin disease, has strong genetic susceptibility and autoimmune pathogenic characteristics involving complex pathogenic interactions between innate immune system and adaptive immune system [13]. Therefore, it is crucial to evaluate the clinical treatment strategy of the disease, and its effect. In this respect, the results obtained in this study will be discussed with regard to the therapeutic effects of both monoclonal antibodies on moderate-to-severe psoriasis.

Table 5: Frequency of short-term recurrence

Period	Group A (n=100)	Group B (n=80)	χ^2	*P*-value
One month after treatment	1 (1.00)	4 (5.00)	-	-
Two months after treatment	1 (1.00)	4 (5.00)	-	-
Short-term recurrence (%)	2 (2.00)	8 (10.00)	7.88	0.005

The total treatment effectiveness in group A given secukinumab was higher, while the short-term recurrence was lower. The PASI, PGA and DLQI scores in group A were lower. It is known that PASI and DLQI are essential indicators of psoriasis area severity and dermatosis patients' quality of life. The decreases in PASI and DLQI imply reduction in severity of disease and improvement of quality of life [14]. Physician global assessment (PGA), another frequently used measure of severity, is similar to PASI and other standards. It is a vital index for evaluating the overall severity of psoriasis, the higher the score, the more serious the overall severity of the disease [15]. Moreover, group A had higher PASI, PGA and DLQI scores than group B. Thus, the treatment effectiveness was higher in group A. Due to better reductions of psoriasis area and overall severity, relapse was more difficult in group A. Therefore, psoriasis area was better covered in group A, because of its higher total treatment effectiveness and lower overall severity of psoriasis. Hence, recurrence was lower in group A.

The expression of inflammatory factors i.e., TNF-α and IL-23 in group A were lower, while 25 (OH) D level was higher. This may also effectively explain, at the molecular level, why patients in group A had better treatment effectiveness. Adalimumab, an anti-tumor necrosis factor drug, effectively reduces TNF-α level [16]. It is also a familiar drug for treating psoriasis due to its effect on various inflammatory factors in patients [17]. In this study, TNF-α level was decreased in both groups after treatment. Secukinumab has a good effect on the key pathogenic factor of psoriasis, i.e., interleukin. Research has shown that secukinumab produces good treatment efficacy in psoriasis patients [18]. There were better improvements in the TNF-α and IL-23 levels in group A, and adverse reactions in patients after treatment were also lower. This fully demonstrates the effectiveness and safety of secukinumab.

Limitations of the study

There are some limitations in this study. Due to some constraints, we did not measure the levels of related immune cells. Moreover, patients' satisfaction after treatment and their psychological state before and after treatment, were not evaluated. These lapses will be addressed in future studies.

CONCLUSION

This study has shown that short-term efficacy of secukinumab in moderate-to-severe psoriasis patients was higher than that of adalimumab, while recurrence was lower with secukinumab.

DECLARATIONS

Conflict of Interest

No conflict of interest associated with this work.

Contribution of Authors

The authors declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by them.

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