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Clinical effect of Secuchiumab in the Treatment of Psoriasis

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Abstract

Psoriasis is a chronic and recurrent skin condition triggered by the immune system, with a relatively high prevalence. The primary clinical manifestation of this condition is the appearance of red and swollen patches of skin covered with silvery scales, often accompanied by itching and a feeling of tightness. In addition to skin symptoms, psoriasis patients frequently experience systemic conditions such as arthritis and heart disease. Recent research has shown a strong link between psoriasis and metabolic syndrome. The main symptoms of metabolic syndrome include hypertension, high blood sugar, elevated cholesterol levels, and abdominal obesity. These issues not only increase the risk of cardiovascular diseases but may also exacerbate the severity of psoriasis. Traditional treatments for psoriasis have included topical medications, phototherapy, and symptomatic relief therapies, with methotrexate being a common drug. While these conventional methods can partially improve the skin condition of psoriasis patients with metabolic syndrome, they are not effective at modulating immune system function or correcting metabolic imbalances. As our understanding of the pathophysiology of psoriasis deepens, biologic therapies have increasingly become a research focus. Secukinumab, a monoclonal antibody targeting interleukin-23, inhibits specific inflammatory pathways and offers a new, potentially more effective treatment option for psoriasis patients with metabolic syndrome.

Keywords

Secukinumab, psoriasis treatment, Clinical Treatment, effect observation

1. Introduction

Psoriasis, a chronic systemic inflammatory disease influenced by both genetic and environmental factors, is characterized by its tendency to relapse. Medically, it is classified into four main types: plaque psoriasis, pustular psoriasis, psoriatic arthritis, and erythrodermic psoriasis. Its causes and mechanisms are complex, involving numerous immune-inflammatory cells and a variety of cytokines they secrete, forming a complex network of interactions. Within this network, IL-17 plays a crucial role (Wang, Zheng, Han et al., 2023). The pathogenesis of psoriasis is intricately linked to the patient's

genetic background. Various factors, such as infections and mental stress, activate the immune system, leading to the abnormal activation of T cells. This process accelerates the growth of epidermal cells, causing hyperproliferation of keratinocytes. Clinically, patients typically exhibit symptoms such as erythema and scaling. In addition, when the patient's skin is locally damaged, they may experience itching, stinging, or pain. Psoriasis is also known for being difficult to cure and prone to relapse (Wang & Gong, 2024). For moderate to severe plaque psoriasis patients, the disease not only affects their physical health but can also lead to an accumulation of negative emotions, increasing the risk of psychological disorders. In current treatment practices, clobetasol propionate is commonly used. This drug contains all-trans retinoic acid, which regulates epithelial cell differentiation and promotes epidermal renewal by accelerating the growth of epithelial cells and the production of epidermal cell DNA. Clobetasol propionate, a corticosteroid, reduces inflammation and allergic reactions when applied to damaged skin, relieving local inflammation and preventing prolonged irritation from inflammatory factors. This helps to halt the excessive proliferation of T cells and keratinocytes, effectively alleviating discomfort such as redness, heat, and itching. However, when used alone for treating moderate to severe plaque psoriasis, this drug has certain limitations, as patients may require a long time for their skin lesions and discomfort to improve. The world's first fully human IL-17A inhibitor, secukinumab, specifically binds to IL-17A, effectively blocking its interaction with receptors and thus inhibiting the release of inflammation-related cytokines and chemokines. The drug was approved in 2015 by both the United States and the European Union for the treatment of moderate to severe plaque psoriasis. In 2019, secukinumab was successfully launched in China, receiving official approval for the treatment of adult plaque psoriasis. Subsequently, it was included in the 2021 edition of China's psoriasis biologic therapy guidelines as one of the recommended treatments (Raut, Prabhu, & Patravale, 2013).

2. Materials and Methods

2.1 Clinical Data

From June 2022 to October 2023, the dermatology department of our hospital received 100 patients with moderate to severe plaque psoriasis accompanied by metabolic syndrome. This study was approved by our hospital's ethics committee, and all participants provided informed consent. In the observation group, there were 23 male and 22 female patients, aged between 23 and 60, with an average age of 45.61 ± 3.51 years. The duration of illness ranged from 1 to 3 months, with an average disease duration of 2.06 ± 0.44 months. In the control group, there were 24 male and 21 female patients, aged between 22 and 60, with an average age of 44.91 ± 3.87 years, and an average disease duration of 2.18 ± 0.25 months. There were no significant differences between the two groups in terms of baseline characteristics ($P > 0.05$). This study received formal approval from the hospital's ethics committee (Armstrong & Read, 2020).

The inclusion criteria were: being at least 18 years old, having a confirmed diagnosis of psoriasis, and

meeting the diagnostic criteria for metabolic syndrome according to the standards published by the International Diabetes Federation (IDF) in 2005. Exclusion criteria included: pustular or erythrodermic psoriasis; use of topical treatments within the past two weeks; or having received systemic therapies such as acitretin or phototherapy within the past two months. Patients with viral, bacterial, or fungal infections; hematopoietic, liver, or kidney dysfunction; a history of malignant tumors within the past five years; those who were pregnant or breastfeeding; or those who had previously used biologics or taken medication for metabolic syndrome within the past six months were also excluded. All participants were required to undergo routine blood tests, liver and kidney function tests, chest CT scans, and infectious disease marker screenings for hepatitis B, hepatitis C, HIV, syphilis, and tuberculosis, as well as tumor marker tests. Participants were fully informed of the risks and potential adverse reactions during treatment and were required to sign an informed consent form (Socha, Pietrzak, Grywalska et al., 2019).

2.2 Methods

All patients received physical rehabilitation therapy and underwent UVA irradiation (320-400 nm) after applying psoralen orally and topically. In the control group, patients were additionally prescribed methotrexate (approval number: H22022674, produced by Tonghua Maoxiang Pharmaceutical Co., Ltd., containing 2.5 mg per tablet, with 100 tablets in total). The initial dose was 5-15 mg per week, and if the treatment was ineffective, the dose was increased by 2.5 mg every two weeks, with the treatment lasting for one month. In the observation group, patients were treated with secukinumab (approval number: SJ20190023, concentration of 150 mg/ml, produced by Beijing Novartis Pharmaceutical Co., Ltd.) via subcutaneous injection, with a dose of 300 mg per injection, administered once a week for one month (Gottlieb, Krueger, Wittkowski et al., 2002).

2.3 Observation Indicators

Efficacy assessment: Significant improvement was defined as a reduction in PASI score by more than 75%, with fasting blood glucose and glycated hemoglobin levels returning to normal. Effective improvement was defined as a reduction in PASI score between 50% and 75%, with fasting blood glucose and glycated hemoglobin improving by more than 30% from baseline. Ineffective was defined as a PASI score reduction of less than 50% and less than 30% improvement in blood glucose and glycated hemoglobin levels. The total effectiveness rate was calculated by adding the number of significantly and effectively improved cases, dividing by the total number of cases, and multiplying by 100%.

2.4 Statistical Methods

The data from this study were processed and analyzed using SPSS 21.0 software. Measurement data were expressed as ($x \pm s$) and t-tests were used. Count data were expressed as percentages (%) and analyzed using the χ^2 test. A P-value of <0.05 was considered statistically significant (Menter, Augustin, Signorovitch et al., 2010).

3. Results

3.1 Comparison of Skin Barrier Function Before and After Treatment in Both Groups

The skin barrier function of patients before and after treatment was compared between the two groups, and the observation group showed better results than the control group. The difference was statistically significant (P<0.05). The detailed results are shown in Table 1.

Table 1. Comparison of Skin Barrier Function Before and After Treatment Between the Two Groups (x±s)

Group	Cases	TEWL [g/(cm²·d)]		Stratum Corneum Hydration (%)		Skin pH		Lesion Area	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
OObservation group	50	195.43±21.43	214.12±23.43	9.46±1.53	10.26±1.91	6.46±0.53	6.36±0.91	2.46±0.53	1.23±0.25
CControl group	50	196.54±19.52	353.53±12.32	9.36±1.26	15.08±1.32	6.36±0.23	6.08±0.32	2.49±0.53	0.91±0.12
t		0.2708	37.2390	0.3568	14.6797	1.2239	2.0525	0.2830	8.1597
P		0.7871	0.0000	0.7220	0.0000	0.2239	0.0428	0.7778	0.0000

3.2 Comparison of PASI Scores Between the Two Groups

The PASI scores of the two groups were compared, with the observation group performing better than the control group. The difference was statistically significant (P<0.05). The detailed results are shown in Table 2.

Table 2. Comparison of PASI Scores Between the Two Groups (x±s)

Group	Cases	PASI Score	
		Before treatment	After treatment
Observation group	50	17.13±2.31	14.41±0.43
Control group	50	17.23±2.42	5.32±1.35
t		0.2114	45.3662
P		0.8330	0.0000

3.3 Comparison of Treatment Effectiveness Between the Two Groups

The effectiveness of the treatment was compared between the two groups, with the observation group showing a higher effectiveness rate than the control group. The difference was statistically significant (P<0.05), as shown in Table 3.

Table 3. Comparison of Treatment Effectiveness Between the Two Groups (n, %)

Group	Cases	Significant Improvement	Effective	Ineffective	Effectiveness Rate
Observation group	50	35	14	1	49（98.00%）
Control group	50	32	8	10	40（80.00%）
χ^2					8.2737
P					0.0040

3.4 Comparison of Quality of Life Scores Between the Two Groups

The quality of life scores of patients in the observation group were better than those in the control group. The difference was statistically significant (P<0.05). The detailed results are shown in Table 4.

Table 4. Comparison of Quality of Life Scores Between the Two Groups (x±s)

Group	Cases	Physical Health		Mental Health		Material Life		Social Function	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Observation group	50	74.32±7.21	80.75±7.91	73.24±7.81	70.38±6.91	73.35±8.21	79.43±8.34	69.35±7.13	75.34±7.43
Control group	50	74.65±7.54	89.43±8.02	73.41±8.12	84.53±7.32	72.95±7.98	88.14±9.37	69.45±7.61	85.43±8.04

t	0.2237	5.4487	0.1067	9.9397	0.2470	4.9098	0.0678	6.5172
P	0.8235	0.0000	0.9152	0.0000	0.8054	0.0000	0.9461	0.0000

4. Discussion

Psoriasis is a chronic inflammatory skin disease that is complex to cure and cannot be resolved quickly. According to an epidemiological survey conducted in 2008 across six major cities in China, the incidence rate of this disease is approximately 0.47%. To date, the exact cause of psoriasis has not been fully uncovered by the medical community. However, based on clinical observations, its onset may be related to multiple factors, including genetic predisposition, immune system abnormalities, pathogen infections, medication use, and personal lifestyle habits. When patients develop psoriasis, they often experience damage to the skin, mucous membranes, and nails, which further complicates treatment. Additionally, psoriasis patients are more prone to developing metabolic syndrome compared to the general population, adding further challenges to treatment. Psoriasis treatment needs to be personalized based on each patient's condition, requiring a comprehensive assessment of disease severity, complications, and prior treatment outcomes to devise the most suitable treatment plan[8]. Conventional treatment methods involve topical medications, phototherapy, and pharmacotherapy, with methotrexate being a common drug used. While some patients achieve good therapeutic results with these methods, for those with moderate to severe psoriasis or those with comorbidities such as metabolic syndrome, the efficacy of these treatments is often less than ideal (Myers, Gottlieb, & Mease, 2006).

Secukinumab, a biologic drug for the treatment of moderate to severe plaque psoriasis and other inflammatory diseases, is classified as a fully human monoclonal antibody. This drug specifically targets and blocks the action of interleukin-23 (IL-23), which plays a central role in immune and inflammatory responses. IL-23 is indispensable in the pathogenesis of many autoimmune and inflammatory diseases, including psoriasis. It promotes the proliferation and activation of Th17 cells, leading to various inflammatory skin conditions, including psoriasis. By precisely targeting the p19 subunit of IL-23, secukinumab effectively prevents p19 from binding to IL-23 receptors on cell surfaces, thereby inhibiting the activity of IL-23. This, in turn, reduces the inflammatory response mediated by Th17 cells[10]. In the field of psoriasis treatment, secukinumab has demonstrated significant efficacy and safety. The use of this fully human monoclonal antibody represents a major advancement in understanding the disease's pathogenesis, particularly in the role of Th17 cells and IL-23.

The data from this study indicate that the overall treatment efficacy in the experimental group receiving secukinumab was significantly better than that of the control group (Mease & Armstrong, 2014). After treatment, patients in the experimental group showed notable improvements in PASI scores, TEWL index, and stratum corneum hydration levels compared to the control group ($P < 0.05$). This indicates that secukinumab has a clear therapeutic effect on psoriasis patients with comorbid metabolic syndrome.

The efficacy of secukinumab is primarily due to its precise targeting and inhibition of IL-23, effectively interrupting key inflammatory pathways and alleviating the symptoms of psoriasis. Further research has also shown that secukinumab can effectively alleviate the skin symptoms of moderate to severe plaque psoriasis patients, specifically by reducing lesion areas and severity. For psoriasis patients with metabolic syndrome, effectively controlling inflammation not only improves skin condition but also has positive effects on metabolic indicators such as blood sugar and lipids, reducing the risk of cardiovascular disease. This is particularly crucial for psoriasis patients, as they are more prone to metabolic syndrome and its related complications (Takeshita, Wang, Shin et al., 2015).

Secukinumab, being highly selective for IL-23, reduces inflammation and suppresses immune system overactivation without interfering with other critical immune pathways. Its long half-life and sustained effect reduce the frequency of administration, with patients typically needing only one dose per week, which greatly improves treatment adherence. Numerous clinical trials have shown that after several weeks of secukinumab therapy, patients generally experience significant improvement, with an efficacy rate exceeding 80%. Additionally, secukinumab demonstrates long-lasting effectiveness, with many patients maintaining good skin condition even after one year of treatment (Yang, Lin, Li et al., 2016). For psoriasis patients with metabolic syndrome, the treatment strategy with secukinumab can be flexibly adjusted based on individual patient conditions to achieve personalized and precise treatment, thereby improving overall treatment outcomes (Fleming, Bai, Pratt et al., 2017). In summary, secukinumab demonstrates remarkable efficacy in treating psoriasis combined with metabolic syndrome, significantly improving patients' skin barrier function and alleviating disease symptoms, making it suitable for routine psoriasis treatment. Furthermore, secukinumab's safety profile is also noteworthy, and further research is expected to confirm its safety in the future (Kang, Wu, Gupta et al., 2018). To conclude, secukinumab shows excellent therapeutic efficacy in treating psoriasis patients with metabolic syndrome, significantly enhancing skin protection and effectively alleviating the disease, making it highly valuable for widespread use.

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