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Effect of compound glycyrrhizin combined with NB−UVB on T lymphocyte subsets and related cytokines in patients with psoriasis vulgaris

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ABSTRACT

Objective: To explore the effect of compound glycyrrhizin in combined with narrow band ultraviolet B (NB-UVB) on T lymphocyte subsets and related cytokines in patients with psoriasis vulgaris. **Methods:** A total of 70 patients with psoriasis vulgaris who were admitted in our hospital from March, 2015 to March, 2016 were included in the study and randomized into the study group and the control group. The patients in the control group were given NB-UVB for whole body irradiation, with an initial dose of 0.3 J/cm^2, 0.2-0.3 J/cm^2 increased every time, 3 times a week. On this basis, the patients in the study group were intravenously injected with compound glycyrrhizin (80 mg) + 5% glucose (250 mL), 1 time a day. Four-week treatment was regarded as one course. ELISA was used to detect the serum IL-17 and IL-22 levels. FCM was used to detect the levels of peripheral blood T lymphocytes (CD4$^+$, CD8$^+$, CD4$^+$/CD8$^+$). PASI score before and after treatment was evaluated. **Results:** The levels of IL-17 and IL-22 after treatment in the two groups were significantly reduced when compared with before treatment (P<0.05), and the reduced degree in the study group was significantly superior to that in the control group (P<0.05). The levels of CD4$^+$ and CD4$^+$/CD8$^+$ after treatment in the two groups were significantly elevated, but CD8$^+$ was significantly reduced when compared with before treatment (P<0.05), and those in the study group were significantly superior to those in the control group (P<0.05). PASI score after treatment in the two groups was significantly reduced when compared with before treatment (P<0.05), and the reduced degree in the study group was significantly superior to that in the control group (P<0.05). **Conclusions:** Compound glycyrrhizin in combined with NB-UVB in the treatment of psoriasis vulgaris can effectively down regulate the cytokine level, recover T cell immune function, and improve PASI score; therefore, it deserves to be widely recommended in the clinic.

1. Introduction

Psoriasis vulgaris is a common chronic and inflammatory skin disease characterized by skin over-proliferation, parakeratosis, dermal lymphocyte infiltration, and its pathogenesis is not yet clear. In recent years, the immunological theory with T lymphocyte as the core has been the research focus. It is argued that psoriasis is an immunological disease with T lymphocyte abnormality stimulated by various pathogenic factors, in which T cell is activated to synthetize and secrete more lymphokines, stimulate proliferative cells to release a large amount of cytokines, and strengthen the activated T cell, resulting in vicious cycle mediated by T cell[1,2]. Some researches demonstrate that compound glycyrrhizin in combined with NB-UVB in the treatment of psoriasis vulgaris has a significant efficacy[3], in that compound glycyrrhizin has a significant immunoregulation and anti-inflammation effect, while NB-UVB can induce a large amount of T cell apoptosis in the dermis and reduce the infiltrative T cell number so that to enhance the therapeutic effect[4,5]. The study is aimed to explore the effect of compound glycyrrhizin in combined with NB-UVB on T lymphocyte subsets and related cytokines in patients with psoriasis vulgaris.

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2. Materials and methods

2.1. General data

A total of 70 patients with psoriasis vulgaris who were admitted in our hospital from March, 2015 to March, 2016 were included in the study. Inclusion criteria: (1) those who were in accordance with the diagnostic criteria of psoriasis vulgaris[6]; (2) those who had no heart, liver, and kidney dysfunction, infectious diseases, diabetes, endocrine diseases, and tumors; (3) those who had not taken glucocorticoids in recent 1 month; (4) those who were not allergic to related drugs; (5) those who had signed the informed consent. Those who were pregnant women or lactating women were excluded from the study. The patients were randomized into the study group and the control group. In the study group, there were 35 cases, among which 16 were male, and 19 were female; aged from 23 to 64 years old, with an average age of (43.7±6.2) years old; course from 1 to 15 years, with an average course of (8.5±2.1) years. In the control group, there were 35 cases, among which 17 were male, and 18 were female; aged from 24 to 64 years old, with an average age of (42.7±6.6) years old; course from 1 to 15 years, with an average course of (8.4±2.2) years. The comparison of age and gender between the two groups was not statistically significant (P>0.05).

2.2. Methods

The patients in the control group were given NB-UVB for whole body irradiation, with a wavelength peak of 311 nm, an initial dose of 0.3 J/cm^2, 0.2-0.3 J/cm^2 increased every time. If no erythema occurred, the irradiation dose was gradually increased, 20% increased every time. If erythema or blister occurred, the irradiation should be ceased. Until the skin recovered normal, the dosage was reduced for continuous irradiation, 3 times a week. The patients in the study group were intravenously injected with compound glycyrrhizin (produced by Xian Lijun Pharmaceutical Co. Ltd., Approval No. H20057478, 80 mg) + 5% glucose (250 mL), 1 time a day. Four-week treatment was regarded as one course.

2.3. Observation of indicators

A volume of 5 mL morning fasting venous blood before and after treatment was collected. ELISA was used to detect the serum IL-17 and IL-22 levels. FCM was used to detect the levels of peripheral blood T lymphocytes (CD4$^+$, CD8$^+$, CD4$^+$/CD8$^+$). PASI score before and after treatment was evaluated.

2.4. Statistical analysis

SPSS 19.0 software was used for the statistical analysis. The measurement data were expressed as mean±SD, and t test was used. Chi-square test was used for the enumeration data. P<0.05 was regarded as statistically significant difference.

3. Results

3.1. Comparison of IL-17 and IL-22 levels before and after treatment between two groups

The levels of IL-17 and IL-22 after treatment in the two groups were significantly reduced when compared with before treatment (P<0.05), and the reduced degree in the study group was significantly superior to that in the control group (P<0.05) (Table 1).

Table 1
Comparison of IL-17 and IL-22 levels before and after treatment between two groups (pg/mL, mean±SD).

Groups	n	Time	IL-17	IL-22
Study group	35	Before treatment	225.47±31.75	26.41±8.32
		After treatment	134.75±15.15$^{*\#}$	12.18±6.25$^{*\#}$
Control group	35	Before treatment	223.68±34.18	26.62±7.81
		After treatment	176.55±35.66*	16.17±7.48

$^{*}P$<0.05, when compared with before treatment; $^{\#}P$<0.05, when compared with the control group.

3.2. Comparison of peripheral blood T lymphocyte subsets before and after treatment between two groups

The levels of CD4$^+$ and CD4$^+$/CD8$^+$ after treatment in the two groups were significantly elevated, but CD8$^+$ was significantly reduced when compared with before treatment (P<0.05), and those in the study group were significantly superior to those in the control group (P<0.05) (Table 2).

3.3. Comparison of PASI scores before and after treatment between two groups

PASI score after treatment in the two groups was significantly reduced when compared with before treatment (P<0.05), and the reduced degree in the study group was significantly superior to that in the control group (P<0.05) (Table 3).

Table 3
Comparison of PASI scores before and after treatment between two groups (mean±SD).

Groups	n	Before treatment	After treatment
Study group	35	16.35±4.63	4.67±3.72$^{*\#}$
Control group	35	16.41±3.58	8.85±4.19*

$^{*}P$<0.05, when compared with before treatment; $^{\#}P$<0.05, when compared with the control group.

4. Discussion

Psoriasis is a kind of chronic skin disease with unknown papules

Table 2
Comparison of peripheral blood T lymphocyte subsets before and after treatment between two groups (mean±SD).

Groups	n	Time	CD4$^+$ (%)	CD8$^+$ (%)	CD4$^+$/CD8$^+$
Study group	35	Before treatment	26.93±4.17	31.15±3.12	0.85±0.21
		After treatment	41.55±4.58$^{*\#}$	21.37±3.24$^{*\#}$	1.89±0.32$^{*\#}$
Control group	35	Before treatment	26.76+4.43	30.87±4.16	0.85±0.30
		After treatment	32.28±3.74*	25.52±3.53*	1.33±0.37*

$^{*}P$<0.05, when compared with before treatment; $^{\#}P$<0.05, when compared with the control group.

and scales, whose pathogenesis is associated with the immunity, environment, and heredity. Currently, it is argued that psoriasis is a kind of immunological disease mediated by T cell, among which the abnormal immunity is the key link of the pathogenesis, in that T cell can alter the stability of epidermal growth, so that to induce the excessively abnormal differentiation and proliferation of keratinocytes[1].

Th17 is a newtype $CD4^+$ responsive T lymphocyte discovered in recent years, and plays a role in the autoimmune diseases by secreting the pre-inflammatory cytokines (IL-17 and IL-22). Some researches demonstrate that Th17 plays an important role in the pathogenesis of psoriasis. IL-23 can promote Th17 to induce the skin lesions, while IL-17 and IL-22 are involved in the inflammatory response[8]. IL-17 is an intense stimulation factor to promote the keratinocytes to produce inflammatory molecules, and can combine with the receptors on the surface of keratinocytes to produce the inflammatory cytokines, which can aggravate the chronic inflammatory reaction in the skin lesion sites. IL-17, as a main effector molecule produced by Th17, is closely associated with psoriasis[9]. IL-22 can phosphorylate the keratinocytes to promote its over-proliferation, down regulate the expression of genes related with keratinocyte differentiation, and inhibit the normal differentiation, resulting in the pathological manifestations of hyperkeratosis accompanied by parakeratosis[10].

$CD4^+$ and $CD8^+$ can play a leading role among T lymphocytes. $CD4^+$, a representative T assistant lymphocyte, can assist and induce the formation of cytotoxic T cell, promote B cell to synthetize and secrete the antibody, and regulate the activity of immune defense reaction. $CD8^+$, a representative T inhibitory lymphocyte, can obviously inhibit the physiological functions of $CD4^+$ and B cell, and play a negative regulation and cytotoxicity damage in the immune defense system[11]. $CD4^+$ and $CD8^+$ are mutually induced and restricted to form a specific T lymphocyte network system, and can regulate and maintain the immune defense. If the balance is destroyed, some diseases can be induced[12]. Some researches demonstrate that[13] during the pathogenic process of psoriasis, $CD4^+$ plays a key role, while $CD8^+$ can directly inhibit B cell to increase $CD4^+$ and reduce $CD8^+$ during the skin lesion fading process.

The comprehensive therapy is often involved in the treatment of psoriasis vulgaris in the clinic in order to control the condition, alleviate the local symptoms, delay the disease progression, and enhance the living quality. NB-UVB, with a strong penetrating power, can reach the deep layer of the epidermis to play a therapeutic effect by inhibiting the synthesis of skin lesion epidermal cell DNA to reduce its proliferation, inducing T lymphocyte apoptosis, regulating and controlling the synthesis and secretion of inflammatory cytokines, restraining NK proliferation, and decrease the antigen presentation function of Langerhans cell in order to reduce the immune defense reaction[14,15]. The compound glycyrrhizin can maintain the stability of cell membrane, inhibit the inflammatory reaction induced by cytokines, effectively regulate T lymphocyte activation, activate NK cell, promote extra-thymic T lymphocyte differentiation, restrain the activity of phosphatidase A2 and the synthesis of prostaglandin E_2, play anti-inflammatory and anti-allergic effects, and exert a therapeutic effect by controlling the immunological factors and inflammatory cytokines[3, 16].

The results in the study showed that the levels of IL-17 and IL-22 after treatment in the two groups were significantly reduced when compared with before treatment (P<0.05), and the reduced degree in the study group was significantly superior to that in the control group (P<0.05); the levels of $CD4^+$ and $CD4^+/CD8^+$ after treatment in the two groups were significantly elevated, but $CD8^+$ was significantly reduced when compared with before treatment (P<0.05), and those in the study group were significantly superior to those in the control group (P<0.05); PASI score after treatment in the two groups was significantly reduced when compared with before treatment (P<0.05), and the reduced degree in the study group was significantly superior to that in the control group (P<0.05), suggesting that compound glycyrrhizin in combined with NB-UVB in the treatment of psoriasis vulgaris can effectively down regulate the cytokine level, recover T cell immune function, and improve PASI score; therefore, it deserves to be widely recommended in the clinic.

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