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Research Article

Clinical Efficacy of Plasma Exchange Therapy for Treatment of Autoimmune Bullous Skin Disease

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Abstract: Objective: To investigate the clinical efficacy of plasma exchange therapy for autoimmune bullous skin disease. **Methods:** Fifty patients with autoimmune bullous skin disease enrolled in our hospital from January 2018 to January 2019 were selected. The patients were grouped by treatment method: 25 control group patients were given conventional hormone therapy, while 25 experimental group patients were treated with plasma exchange therapy; efficacy of treatment was compared between two groups of patients. **Results:** Initial dose, maximum dose, and cumulative dose of glucocorticoids were lower in experimental group patients than those in control group (P<0.05). Incidence of complication was lower in experimental group patients than those in control group (P<0.05); the difference was significant. There was no significant difference in short-term efficacy between the two groups (P>0.05). Conclusion: The application of plasma exchange therapy was effective for treatment of autoimmune bullous skin disease. It could reduce dosage amount of glucocorticoids and incidence of complications; its application can be promoted.

Keywords: *plasma exchange therapy; autoimmune; bullous; skin disease*

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1 Introduction

Autoimmune bullous skin disease is a chronic recurrent skin disease. Its main clinical features include erythema of skin mucosa, bullae, blister, erosion and etc. Common symptoms are pemphigus and bullous pemphigoid. At present, clinical treatment of this disease mainly bases on suppression of body's immune response using glucocorticoids and immunosuppressive agent therapy, to prevent formation of autoantibodies and thereby achieve therapeutic goals[1]. However, this method has certain limitations, it has high incidence of complication and treatment effect is not ideal. The use of plasma exchange therapy can rapidly eliminate large amount of circulating autoantibodies within a short period of time, this can alleviate clinical symptoms of patients and thus improve the therapeutic effect. Therefore, this study selected 50 autoimmune bullous skin disease patients from our hospital and carried out comparison between groups, and investigated the efficacy of plasma exchange therapy.

2 Materials and methods

2.1 Clinical data

Fifty cases of autoimmune bullous skin disease patients admitted to our hospital from January 2018 to January 2019 were selected as subjects. The subjects were divided into groups by treatment method: there were 25 patients in experimental group and control group respectively. In control group, there were 14 males and 11 females; age ranged between 25 to 76 years, mean age (56.25±4.64) years old; weight 57-78kg, average body weight (69.52±2.95)kg; course of disease 2-18 months, average course of disease (11.62±1.84) months; there were 7 cases of pemphigus vulgaris, 8 cases of erythematous blister and 10 cases of bullous pemphigoid. In experimental group, there were 14 males and 11 females; age ranged from 25 to 76 years, mean age (57.69±5.39) years old; weight 55-80kg, average body weight (67.63±3.59)kg; course of disease

3-19 months, mean course of disease (12.66±1.76) months; there were 9 cases of pemphigus vulgaris, 7 cases of erythematous blister, and 9 cases of bullous pemphigoid. Comparison of data showed no statistical difference between the two groups (P>0.05).

2.2 Method

Control group patients were given treatment with glucocorticoids and immunosuppressive agent; the selected immunosuppressive agent was cyclophosphamide. Experimental group patients were given treatment with plasma exchange therapy in addition to the treatment basis of control group. Exact method was as follows: double filtration plasma exchange was used, replacement solution was 5.7% albumin, blood flow volume was 80-100ml/min, replacement volume was 2-3L each time, replacement time was 2-3h each time, 1-2times/week.

2.3 Observation of indicators

Initial dose, maximum dose, time to dose reduction, cumulative dose before dose reduction of glucocorticoid, and time to no new blister formation of the two groups of patients were observed and recorded. Conditions of skin infection, oral infection by *Candida albicans*, steroid diabetes and other complications were observed.

2.4 Criteria of efficacy judgment

Healed: complete subside of rash in patients after treatment, with residual pigmentation spots. Improved: no new blister after early treatment, rash regression more than 70%. Unhealed: obvious erosion exudation and new blister still present after treatment. Effective rate=rate of healed case+rate of improved case[2].

2.5 Statistical processing

SPSS20.0 software was used for data processing. Quantitative data was tested by t value and described by ($\bar{x} \pm s$). Qualitative data was tested by χ^2 value and described by (n, %). P value <0.0 indicated statistical difference.

3 Results

3.1 Comparison of short-term efficacy between two groups of patients

Effective rate of experimental group and control group patients was 96% and 92% respectively. There was no significant difference in short-term efficacy between the two groups, P>0.05.

Table 1 Comparison of short-term efficacy (n, %) between two groups

Group	Case	Clinically healed	Improved	Unhealed	Effective rate
Control	25	10(40%)	13(52%)	2(8%)	23(92%)
Experimental	25	14(56%)	10(40%)	1(4%)	24(96%)
X^2					0.3456
P					>0.05

3.2 Comparison of dose and time between two groups

Initial dose, maximum dose, and cumulative dose of glucocorticoids were significantly lower in the experimental group than in the control group, the difference was significant, P<0.05. There was no significant difference in time to no new blister formation and time to dose reduction between the two groups, P>0.05.

Table 2 Comparison ($\bar{x} \pm s$) of hormone dose and time between two groups

Group	Case	Initial dose mg/(kg·d)	Maximum dose mg/(kg·d)	Cumulative dose before dose reduction (mg/kg)	Time to dose reduction(d)	Time to no new blister formation(d)
Control	25	1.14±0.07	1.23±0.08	28.64±1.67	22.81±1.92	12.35±1.51
Experimental	25	0.78±0.08	0.94±0.09	16.94±1.29	22.63±2.15	12.63±1.23
t		16.9329	12.0415	27.7223	0.3122	0.7188
P		<0.05	<0.05	<0.05	>0.05	>0.05

3.3 Comparison of incidence of complication between two groups

Incidence of complication was 12% and 40% in the experimental group and control group respectively. The difference of incidence of complication between the two groups was significant (P<0.05).

Table 3 Comparison of incidence of complication (n, %) between two groups

Group	Case	Skin infection	Oral infection by *Candida albicans*	Steroid diabetes	Incidence
Control	25	2(8%)	3(12%)	5(20%)	10(40%)
Experimental	25	1(4%)	1(4%)	1(4%)	3(12%)
X^2					5.0936
P					<0.05

4 Discussions

Pemphigus and bullous pemphigoid are autoimmune bullous skin diseases. They are mainly characterized by skin and mucosal blisters, and circulating autoantibodies. At present, these diseases are often clinically treated with glucocorticoids and immunosuppressive agents. Although clinical use of the drugs greatly reduces mortality rate of this disease, usage of immunosuppressive agent and glucocorticoids is closely related with cause of death in these diseases; in addition, mortality rate is positively correlated with drug dose[3]. Autoimmune bullous skin disease is more common in elderly. Of which, many patients have hypertension, diabetes and other chronic diseases; high doses of glucocorticoids and immunosuppressive agent will result in several complications, and some patients will also show side effects such as intolerance to glucocorticoids and conventional immunosuppressive agents or failed treatment. Therefore, adjuvant treatment approach can be used in treatment of severe autoimmune bullous skin diseases to reduce the usage of glucocorticoids and immunosuppressive agent, and thus to improve therapeutic effect. Of which, application of plasma exchange therapy can effectively demonstrate its adjuvant role in clinical treatment, and effectively reduce the side effects of the drugs. Plasma exchange therapy is a type of corticosteroid reduction agent[4].

Anti-desmocollin antibodies can be detected in sera of patients with autoimmune blistering skin disease. These antibodies are organ-specific pathogenic antibodies and are closely related to disease activity. Results of clinical investigation[5] showed that anti-basal membrane antibodies were detected in sera of 10-80% of patients with autoimmune bullous skin disease. Clinical studies have found that application of plasma exchange therapy can effectively eliminate autoantibodies, inflammatory factors and immune complexes in patients with autoimmune bullous skin disease, and greatly reduce concentration of inflammatory mediators in their blood. Thereby, it allows recovery of complements, regulates body's immune functions, and improves the function of coagulation factors and regulatory factors[6]. Application of plasma exchange therapy can also greatly enhance the clearance function of reticuloendothelial system, and further supplement the substances required by body, thereby greatly reduce immune inflammatory responses and allow rapid and effective control of disease condition.

Based on the results of this study, comparison showed no significant difference in effective rate between control group with treatment of glucocorticoid and immunosuppressive agents and experimental group with combined plasma exchange therapy, $P>0.05$. Initial dose of glucocorticoids hormone, maximum dose of hormone, and cumulative dose of hormone before dose reduction were significantly lower in the experimental group patients than those of the control group; the difference was significant ($P<0.05$). Results suggested that combined application of plasma exchange therapy could effectively reduce initial dose of glucocorticoids, reduce maximum dose of hormone, and reduce cumulative dose of hormones in body, when compared with application of glucocorticoids hormone and immunosuppressive therapy alone[7]. In our study, incidence of complication in the experimental group was lower than that in the control group ($P<0.05$). Analysis of results showed that plasma exchange therapy could reduce skin infection, oral infection by *Candida albicans* and steroid diabetes by reducing dosage amount of glucocorticoids. Results showed that application of plasma exchange therapy could ensure therapeutic effect, and at the same time reduce dosage amount of glucocorticoids and reduce accumulation of hormones, thereby effectively reduce the incidence of related side effect caused by glucocorticoids.

Based on the above findings and clinical studies, plasma exchange therapy can effectively eliminate a large amount of autoantibodies in patients. However, this will activate and accelerate the proliferation of pathogenic B lymphocytes via a negative feedback regulation mechanism, and result in production of more autoantibodies[8]. In addition, level of antibody will

be significantly higher than the level before plasma exchange therapy. Therefore, immediate application of immunosuppressive agent therapy before and after plasma exchange can effectively reduce the activity of self-produced B lymphocytes, and effectively prevent the rebound phenomenon. Due to the high cost of plasma exchange therapy, comprehensive evaluation should be carried out with consideration of patient's age, disease condition, comorbidities, hormonal contraindications, medication response and others before clinical treatment, to improve therapeutic effect and reduce the economic burden of patients. Contraindications and indications of this treatment method should be understood to ensure the ultimate therapeutic effect. Indications for plasmaex change therapy includes severe conditions, high circulating antibody titers, long-term high-dose hormonal intolerance, and insensitive to conventional immunosuppressive agents and glucocorticoids.

In summary, efficacy of plasma exchange therapy was significant for autoimmune bullous skin disease. It could effectively reduce the dosage amount of glucocorticoids and reduce incidence of related complications. Its application can be promoted in clinic settings.

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