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Atopic Dermatitis with Type 2 Inflammation Comorbidity, Negative Emotional Issues and Solutions

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Abstract: This study aimed to explore the effects of comprehensive interventions on inflammation, negative emotions, and skin lesions in patients with atopic dermatitis (AD) and type 2 inflammation. A total of 120 patients with mild to moderate atopic dermatitis were selected and randomly divided into the observation group and the control group, with 60 cases in each group. The observation group received psychological intervention, emotional regulation training, dietary control, and exercise intervention in addition to conventional treatment. The control group received only conventional treatment. Before and after the treatment, inflammation markers (IL-4, IL-5, IL-13), negative emotions (HAM-D, SAS), and skin lesions (SCORAD) were assessed. In the observation group, after treatment, IL-4 decreased from 350.2 pg/mL to 210.5 pg/mL ($P < 0.05$), IL-5 decreased from 45.1 pg/mL to 30.2 pg/mL ($P < 0.05$), and IL-13 decreased from 75.3 pg/mL to 55.0 pg/mL ($P < 0.05$). Negative emotions improved, with HAM-D scores decreasing from 18.6 to 12.3 and SAS scores decreasing from 61.3 to 51.4 ($P < 0.05$). Skin lesions improved, with SCORAD scores decreasing from 26.4 to 18.2 ($P < 0.05$). No significant changes were observed in the control group. Comprehensive interventions effectively improve inflammation, negative emotions, and skin lesions in patients with atopic dermatitis, showing promising clinical application prospects.

1. Introduction

AD is a common chronic inflammatory skin condition characterized by type 2 inflammatory responses. Patients often experience comorbid negative emotional issues such as anxiety and depression. These negative emotions not only affect the patients' mental health but may also exacerbate immune responses, leading to disease deterioration. This article aims to explore the effects of comprehensive interventions (including pharmacological treatment, psychological intervention, and emotional regulation) on inflammation, negative emotions, and skin lesions in patients with atopic dermatitis, offering new treatment pathways for clinical practice.

2. Materials and Methods

2.1 General Information

All study participants were patients diagnosed with mild to moderate atopic dermatitis by dermatologists, and simultaneously had type 2 inflammation and negative emotional issues (such as anxiety, depression, etc.). A total of 120 patients admitted to our hospital from January 2023 to January 2024 were enrolled and randomly divided into the observation group and the control group, with 60 patients in each group.

Inclusion criteria: Patients were aged 18 to 60 years; both male and female; symptoms met the diagnostic criteria for atopic dermatitis; SCORAD score was less than or equal to 50.

Exclusion Criteria: Severe systemic diseases (e.g., diabetes, cancer, etc.); Comorbidities with other immune system diseases; Pregnant or breastfeeding women; Patients recently undergoing other clinical trials or intervention treatments.

The general information of the patients is shown in Table 1, and there were no significant statistical differences.

Table 1: General Information of Patients

Item	Observation Group	Control Group
Gender	Male 30 cases	Male 28 cases
	Female 30 cases	Female 32 cases
Average Age	35.4 years	34.8 years
Duration of Illness	2.5 years	2.7 years

2.2 Methods

2.2.1 Control Group

The control group received conventional drug treatment, primarily including the topical application of fluticasone cream, applied twice daily to the affected areas for a duration of 6 weeks. During treatment, patients were advised to maintain routine skin care, avoid excessive scratching, and keep the skin moisturized.

2.2.2 Observation Group

The observation group received comprehensive interventions in addition to conventional drug treatment, including:

Psychological Intervention: Cognitive Behavioral Therapy (CBT), once a week for 40 minutes, for 6 weeks, to alleviate negative emotions and improve anxiety and depression.

Emotional Regulation Training: Meditation and relaxation exercises twice a week for 6 weeks.

Dietary Control: Guidance to increase intake of Omega-3 fatty acid-rich foods and reduce high-sugar, high-fat foods for 6 weeks.

Exercise Intervention: Light exercises (e.g., walking, yoga) three times a week for 30 minutes, for 6 weeks.

The observation group also received routine skin care treatment, with emotional management strategies adjusted based on individual needs.

2.3 Observation Indicators

2.3.1 Inflammatory Factor Levels

The study focused on type 2 inflammatory factors, including IL-4, IL-5, and IL-13, which play key roles in the immune response of atopic dermatitis. These factors were measured in patient serum using Enzyme-Linked Immunosorbent Assay (ELISA) before and after intervention to analyze changes in levels.

2.3.2 Negative Emotion Levels

The Hamilton Depression Rating Scale (HAM-D) and the Self-Rating Anxiety Scale (SAS) were used to assess depression and anxiety symptoms. HAM-D: 0-7 normal, 8-17 mild depression, >18 severe depression. SAS: <50 normal, 50-59 mild anxiety, >60 severe anxiety.

2.3.3 Severity of Skin Lesions

The severity of skin lesions was quantified using the SCORAD scoring system. The score ranges from 0 to 103, with higher scores indicating more severe lesions. The scores are categorized as mild (0-24), moderate (25-50), and severe (above 51).

2.4 Statistical Analysis

Data analysis was performed using SPSS 24.0. T-tests were used to compare differences between groups, and chi-square tests were used for categorical variables. A significance level of $P< 0.05$ was set.

3. Results

3.1 Changes in Inflammatory Factor Levels

In the observation group, the levels of IL-4, IL-5, and IL-13 significantly decreased after treatment ($P < 0.05$), while no significant changes were observed in the control group ($P > 0.05$). The differences were statistically significant, as shown in Table 2.

Table 2: Changes in Inflammatory Factor Levels in Each Group

Group		N	IL-4(pg/mL)	IL-5(pg/mL)	IL-13(pg/mL)
Observation Group	Pre-treatment	30	350.2	45.1	75.3
	Post-treatment		210.5	30.2	55.0
Control Group	Pre-treatment	30	340.6	43.0	74.5
	Post-treatment		330.1	42.7	74.0
Pre-treatment t			0.28	0.53	0.14
Pre-treatment P			> 0.05	> 0.05	> 0.05
Post-treatment t			3.22	2.80	2.30
Post-treatment P			< 0.05	< 0.05	< 0.05

3.2 Changes in Negative Emotion Levels

In the observation group, negative emotions significantly improved after treatment, with both HAM-D and SAS scores decreasing significantly ($P < 0.05$). No significant changes were observed

in the control group ($P > 0.05$). The differences were statistically significant, as shown in Table 3.

Table 3: Changes in Negative Emotion Levels

Group		N	HAM-D Score	SAS Score
Observation Group	Pre-treatment	30	18.6	61.3
	Post-treatment		12.3	51.4
Control Group	Pre-treatment	30	18.4	60.8
	Post-treatment		17.5	59.6
Pre-treatment t			0.10	0.29
Pre-treatment P			> 0.05	> 0.05
Post-treatment t			2.12	2.04
Post-treatment P			< 0.05	< 0.05

3.3 Changes in Severity of Skin Lesions

The SCORAD score significantly decreased in the observation group ($P < 0.05$), while no significant changes were observed in the control group ($P > 0.05$), as shown in Table 4.

Table 4: Changes in Severity of Skin Lesions

Group	N	SCORAD Score
Observation Group	30	Pre-treatment: 26.4
		Post-treatment: 18.2
Control Group	30	Pre-treatment: 25.9
		Post-treatment: 24.8
Pre-treatment t		0.25
Pre-treatment P		> 0.05
Post-treatment t		2.52
Post-treatment P		< 0.05

4. Discussion

This study examined the effects of comprehensive interventions on inflammation, negative emotions, and skin lesions in patients with atopic dermatitis and type 2 inflammation. The results showed that in the observation group, IL-4, IL-5, and IL-13 levels significantly decreased after treatment ($P < 0.05$), while no significant changes were observed in the control group. This suggests that the interventions effectively reduce the immune response and inhibit type 2 inflammation, aligning with previous research showing the involvement of IL-4, IL-5, and IL-13 in the immune mechanisms of atopic dermatitis [1].

Regarding negative emotions, the observation group showed significant improvements in both HAM-D and SAS scores ($P < 0.05$), indicating that the interventions not only enhance mental health but may also alleviate immune responses through improved emotional states, thereby enhancing treatment outcomes. Patients with skin diseases often experience anxiety and depression, which can worsen immune responses and disease progression [2-3]. Cognitive Behavioral Therapy (CBT) has been shown to significantly reduce these emotional issues and improve overall health [4].

Although the observation group showed a significant decrease in SCORAD scores ($P < 0.05$), the clinical significance of this improvement requires further investigation. The improvement in skin lesions could be related not only to the reduction in inflammatory factors but also to the effects

of topical treatments and emotional regulation interventions [5-6]. Therefore, the improvement in skin lesions is closely influenced by multiple interventions, and further studies are needed to clarify the mechanisms behind these effects.

The study demonstrates that comprehensive interventions can effectively improve inflammation, negative emotions, and skin lesions in atopic dermatitis, especially in modulating immune responses and addressing negative emotions, which significantly enhance treatment outcomes. While the improvement in skin lesions is noteworthy, its clinical significance requires further discussion. Future research should explore the complex relationship between immune responses, emotional regulation, and skin lesions, providing more comprehensive and personalized treatment options for atopic dermatitis.

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