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Efficacy and Safety of 30% Supramolecular Salicylic Acid Peeling Combined with Isotretinoin Erythromycin Gel in the Treatment of Moderate-to-Severe Acne Vulgaris: A Comparative Study

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Abstract

Background: Both 30% supramolecular salicylic acid (SA) and isotretinoin erythromycin gel (IEG) have proven efficacy with good safety profiles in the treatment of acne vulgaris. **Objectives:** This study compared the clinical efficacy and safety of 30% SA peeling and IEG in the treatment of moderate-to-severe acne vulgaris. **Methods:** Patients with moderate-to-severe acne vulgaris were randomized into 3 groups of 30 persons each, and treated with SA peel, or IEG, or SA combine with IEG (SA + IEG group). Evaluation of acne was done by effective rate and individual lesion counts. And the adverse effects and recurrence were recorded. **Results:** The SA + IEG group was better in clinical efficacy and treating noninflammatory and inflammatory lesions than that of single treatment group ($P < 0.05$). No serious adverse effects were recorded. There were no significant differences in adverse effects and recurrence between groups ($P > 0.05$). **Conclusion:** 30% SA combined with IEG had a significant effect in the treatment of moderate-to-severe acne lesions.

Keywords

30% Supramolecular Salicylic Acid, Isotretinoin Erythromycin Gel, Moderate-to-Severe Acne Vulgaris, Efficacy, The Adverse Reactions, Recurrence Rate

1. Introduction

Acne vulgaris is a common chronic inflammatory disease involving follicles and

sebaceous glands [1]. It often occurs in the rich part of sebaceous glands, characterized by comedones, papules, pustules, cysts or nodules [2]. Because acne vulgaris is easy to relapse, patients' compliance is poor, which is easy to cause psychological burdens and social problems [3]. Therefore, seeking effective, safe and easy to be accepted by patients has become the focus of clinical research.

In recent years, our department has adopted a new 30% SA to achieve certain efficacy in the treatment of mild-to-moderate acne. IEG is effective in regulating the keratosis of sebaceous ducts of follicles and controlling microbial infection and inflammatory reaction. At present, the focus of SA technology is on the treatment of mild acne, and the research on the treatment of moderate-to-severe acne is just starting. In this study, 30% SA combined with IEG was used to treat patients with moderate-to-severe acne. The results are reported as follows.

2. Material and Methods

The study was approved by the ethics committee of Zhuji People's Hospital. Written informed consent was obtained from all patients (older than 18 years) in this study.

2.1. Patient Selection

90 patients with acne who came to the author's department from January 2022 to June 2022 were selected as the study population.

Inclusion criteria: the severity of skin lesions was grade II-IV according to the international Pillsbury classification of acne (grade II and III were moderate and grade IV was severe); in the past 2 months, no acne drugs have been used and no chemical peeling has been carried out; good compliance, able to complete treatment, and regular follow-up; the subjects understood the purpose and content of the study and signed the informed consent.

Exclusion criteria: patients with photosensitive history; patients with skin diseases such as eczema or psoriasis on the face; suffering from other serious medical diseases, tumors or mental diseases; pregnant and lactating women; scar constitution; allergic to salicylic acid; there were other factors affecting this study.

2.2. Treatment

The patients were divided into three groups of 30 each, based on a random number method: the first group (SA group) was treated with 30% SA peels (Broda, Shanghai Ruizhi Pharmaceutical Technology Co.) alone once every 2 weeks, a total of 4 times [4] [5]; the second group (IEG group) was treated with IEG (Tongnuo, Sinopharm Group Zhonglian Pharmaceutical Co.) alone twice a day for 8 weeks; the third group (SA + IEG group) was treated with 30% SA peels once every 2 weeks, 4 times in total, and coated with IEG twice a day for 8 weeks. Clinical evaluation was performed every 2 weeks throughout the study period. In the SA group, the end point was when erythema or frosting reaction occurred locally on the skin. After reaching the end point, rinse with cold water,

and ice pack for 15 min.

2.3. Clinical Assessment of Efficacy

At baseline and at each follow-up, clinical photos of the patients were taken including the front, left and right faces. The improvement of lesions was evaluated: counted the number of noninflammatory lesions (comedones) and inflammatory lesions (papules and pustules), and calculated the efficacy index according to the reduction in mean lesions between baseline and 8 weeks. Judgment standard of efficacy index was cure (≥90%), significant effect (60% - 89%), effective (20% - 59%), invalid (<20%). Effective rate = cure + significant effect.

2.4. Assessment of Adverse Effects

The adverse reactions of patients during treatment and follow-up were recorded, such as erythema, edema, pain, pruritus and the total number of cases.

2.5. Assessment of Recrudescence

One month after the end of treatment, we followed up the patients by telephone to see if they had new lesions. If the number increased by more than 10%, it was considered as recurrence.

2.6. Statistical Analysis

The Statistical Package for Social Sciences (SPSS) for Microsoft Windows 20th version was used for statistical analysis. For the comparison of nominal or continuous data such as age distribution, individual lesion count between the groups, variance test was used. Categorical data, *i.e.*, sex of the patients, improvement in acne, adverse effects, recrudescence in each group, were compared using the chi-squared test. The tests were performed at a 5% level of significance and an association was found to be significant if the P value was <0.05.

3. Results

A total of 90 patients were randomly treated with 30% SA or/and IEG. There was no statistically significant difference between the three groups in age distribution, gender, and the average noninflammatory lesions and inflammatory lesion counts at baseline, which was comparable (**Table 1**).

3.1. Evaluation of Clinical Efficacy

After 8 weeks of treatment, the patients in the three groups all achieved good efficacy. Lesions in the three groups were effectively controlled. The effective rate of SA + IEG group (76.7%) was significantly higher than that of SA group (43.3%) and IEG group (40.0%), indicating that the efficacy of SA + IEG group was better than that of SA group and IEG group. The difference between the groups was statistically significant ($P < 0.05$) (**Table 2**). Typical case was shown in **Figure 1**.

Table 1. Baseline characteristics of the 90 patients with acne vulgaris.

	SA group (n = 30)	IEG group (n = 30)	SA + IEG group (n = 30)	P*	P#
Age (years), mean (SD)	24.6 (4.8)	24.7 (4.0)	24.4 (4.6)	0.95	0.81
Sex, n				0.43	0.57
Male	13	8	10		
Female	17	22	20		
Noninflammatory lesions, mean (SD)	38.27 (7.94)	37.49 (6.32)	38.12 (7.30)	1.00	0.13
Inflammatory lesions, mean (SD)	33.82 (9.73)	33.05 (9.10)	33.11 (9.07)	0.28	1.00

SA = salicylic acid; IEG = isotretinoin erythromycin gel; SD = standard deviation; P* = SA group vs SA + IEG group; P# = IEG group vs SA + IEG group.

Table 2. Clinical efficacy of acne patients after 8 weeks of treatment.

Group	Cure, n (%)	Significant effect, n	Effective, n (%)	Invalid, n (%)	Effective rate (%)
SA group (n = 30)	1 (3.3)	12 (40.0)	15 (50.0)	2 (6.7)	43.3
IEG group (n = 30)	0 (0.0)	12 (40.0)	13 (43.3)	5(16.7)	40.0
SA + IEG group (n = 30)	4 (13.3)	19 (63.3)	7 (23.3)	0 (0.0)	76.7
P*					<0.05
P#					<0.05

P* = SA group vs SA + IEG group; P# = IEG group vs SA + IEG group.

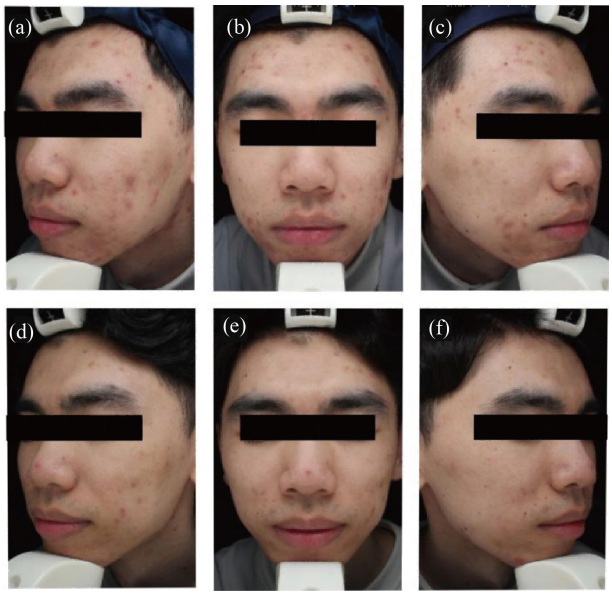

Figure 1. Images (a) (b) (c) and (d) (e) (f) show the baseline and 8-week results with SA + IEG combination therapy.

Regarding the comparison of the number of lesions in the three groups before and after treatment, there was no significant difference in the number of noninflammatory lesions and inflammatory lesions in the three groups before treatment ($P > 0.05$). After 8 weeks of treatment, the number of acne lesions in the three groups decreased. The comparison between groups showed that the number of noninflammatory lesions and inflammatory lesions in SA + IEG group after 8 weeks of treatment was significantly lower than that before treatment ($P < 0.05$). This indicated that the combination of SA and IEG was better than that of SA and IEG alone (Table 3).

3.2. Adverse Effects

During the treatment and follow-up, the adverse reactions were mainly erythema after peeling, local tingling, itching and dryness. The number of cases in the combined group (n = 4) was less than that in SA group (n = 6) and IEG group (n = 5), but the difference was not statistically significant ($P > 0.05$). Local strengthening cold compress external application of moisturizing agent could relieve discomfort.

3.3. Recrudescence

One month after the end of treatment, 3 patients in SA + IEG group recurred, with a recurrence rate of 10.00%, 5 patients in SA group recurred, with a recurrence rate of 16.67%, 8 patients in IEG group recurred, with a recurrence rate of 26.67%. The recurrence rates of the three groups were low. There was no statistical difference between the combined group and the other two groups ($P > 0.05$).

4. Discussion

Excessive sebum secretion, abnormal keratosis of sebaceous ducts in follicles, infection of microorganisms (especially Propionibacterium acnes) and inflammatory reaction are all important factors that cause the occurrence and development of acne vulgaris. In general, lipid suppression, keratinization regulation

Table 3. Comparison of the difference in the number of lesions in acne patients before and after treatment.

Group	Difference in the number of noninflammatory lesions, mean (SD)	Difference in the number of inflammatory lesions, mean (SD)
SA group (n = 30)	23.50 (7.84)	24.02 (9.30)
IEG group (n = 30)	23.16 (7.99)	18.92 (8.77)
SA + IEG group (n = 30)	30.76 (9.31)	24.19 (10.04)
P*	<0.05	<0.05
P#	<0.05	<0.05

P* = SA group vs SA + IEG group; P# = IEG group vs SA + IEG group.

and anti-infection can play a therapeutic role [6]. However, compared with traditional oral antibiotics, retinoic acid and other drugs, external treatment can eliminate patients' concerns about oral medication [7] [8].

30% SA peeling is a kind of surface peeling treatment for acne, which tends to mature [9]. Its efficacy has been confirmed by some studies [10] [11] [12]. SA preferentially acts on the sebaceous gland unit and has strong anti-inflammatory, antibacterial and keratinization regulating properties [13]. IEG has the functions of reducing sebum secretion, inhibiting keratinocyte proliferation, preventing keratin embolism, reducing pathogenic bacteria related to the etiology of acne, reducing the inflammatory reaction at the lesion site and so on, so as to make acne lesions disappear [14].

Our study included 90 patients with moderate-to-severe acne vulgaris. Objective evaluation of acne treatment by effective rate and individual lesion count showed that after 8 weeks, the effective rate of combined treatment group was significantly higher than that of single treatment group, and the number of noninflammatory lesions and inflammatory skin lesions decreased significantly better than that of single treatment group, suggesting that SA has the characteristics of anti-inflammatory, anti-bacterial, dissolving fat thrombus and reducing oil secretion. The application of IEG, which could further improve the aggravation of pustules during SA treatment, reduce irritation and reduce adverse effects, and could be used for maintenance treatment during chemical peeling [15].

5. Conclusion

To sum up, 30% SA combined with IEG had a significant effect in the treatment of moderate-to-severe acne lesions. This experiment had not caused serious adverse reactions had high safety and low recurrence rate. It is a good treatment method and is worthy of clinical promotion.

6. Limitations

The sample size was small, keeping in mind the patient compliance because of the multiple peeling sessions required in the study.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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