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Original Research Article

Effectiveness and Side Effects Of Benzoyl Peroxide 2.5% Gel and Adapalene 0.1% Gel as Monotherapies and Combination Therapies for Face Acne

Pant Suresh Keshava[1], Hirendra Kumar[2], Dinesh Kumar[3]

[1]Tutor, Department of Pharmacology, Jannayak Karpoori Thakur Medical College and Hospital, Madhepura, Bihar

[2]Tutor, Department of Pharmacology, Jannayak Karpoori Thakur Medical College and Hospital, Madhepura, Bihar

[3]Associate Professor, Department of Pharmacology, Jannayak Karpoori Thakur Medical College and Hospital, Madhepura, Bihar

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Corresponding author: Dr. Hirendra Kumar

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Abstract:

Background: For the once daily treatment of acne vulgaris, a fixed dose combination gel containing adapalene 0.1% and benzoyl peroxide 2.5% has been created. In December 2008, the US FDA authorised this fixed combination. The purpose of this study is to compare topical adapalene 0.1% gel and 2.5% benzoyl peroxide gel (monotherapies) to topical adapalene 0.1% gel and 2.5% benzoyl peroxide gel in treating face acne vulgaris.

Method: This study was conducted at the Department of Pharmacology in collaboration with the Department of Dermatology, JNKTMCH, Madhepura, Bihar. It was a study with open labels. For 12 weeks, the participants either got adapalene 0.1% gel, benzoyl peroxide 2.5% gel, or a combination of adapalene 0.1% and benzoyl peroxide 2.5% gel. A follow-up was conducted after 1, 2, 4, 8 and 12 weeks. Lesion count and negative outcomes were part of the evaluation. Males and females between the ages of 18 and 38 who had grade 2 or 3 facial acne vulgaris on the investigators' global assessment of acne scale were included as participants.

Results: 62 people in total, including 23 men and 39 women, were recruited. Participants who finished the trial were 88.71%. According to the study, a combination of adapalene 0.1% and benzoyl peroxide 2.5% gel was superior than adapalene 0.1% gel and benzoyl peroxide 2.5% gel (topical) monotherapies for treating face acne. Comparable to adapalene 0.1% gel and benzoyl peroxide 2.5% gel monotherapies in terms of safety was the combination of the two medications.

Conclusion: Dryness and stinging/burning were the two negative effects that people undergoing combo therapy reported experiencing the most frequently. Erythema and scaling were also reported as side effects. These adverse effects were more noticeable at the beginning of the treatment and lessened as it went on.

Keywords: Acne, Topical therapy, Benjoyl peroxide, Adapalene.

Introduction

A multifactorial condition of the pilosebaceous unit, acne vulgaris. Although it can manifest in many different ways, acne is typically an adolescent

condition. Unquestionably, acne has a negative psychosocial influence, and those who suffer from it are more likely to experience self-consciousness, social exclusion, sadness, and even suicide thinking. [1] 90% of people will experience acne at some point in their lives, regardless of ethnicity. [2]

Puberty or a few months earlier is when symptoms first appear. Between the ages of 14 and 17 for females and 16 and 19 for males, the incidence and severity reach their peak. Investigations of the pituitary gland, adrenal cortex, and gonads are required if there are sudden, severe outbreaks of acne lesions in people 30 years of age and older. Genetics can have an impact on acne susceptibility.[3] Genetic factors are also responsible for racial predisposition and the similarity of lesions in monozygotic twins.

Early adolescence is when acne typically begins, with inflammatory lesions appearing after mid-facial comedones and increased facial oil production. Before the age of 12, early-onset acne is typically more comedonal than inflammatory. This is perhaps because these people have not yet started to create enough sebum to support a lot of Propionibacterium acnes. [4] For the treatment of mild to moderately severe acne vulgaris, topical treatments are frequently employed. The use of these topical medicines is constrained by factors like long time to response, cosmetic acceptability, and photosensitivity.[5] The three most common topical medications are topical antibiotics, antimicrobials like benzoyl peroxide, and derivatives of vitamin A.

Antibiotics used topically have a sluggish and variable efficacy.[6] By carefully choosing concentrations, their antibacterial, anti-inflammatory, and possibly comedolytic properties are maximised, and their appropriateness is increased by making them accessible in various forms, such as creams, gels, solutions, pledgets, and sachets for different skin types. In the event that no therapeutic improvement is seen after 6 to 8 weeks, topical antibiotics should be stopped.[6]

Material and Methods

This is an open label study conducted in the Department of Pharmacology associated with Department of Dermatology, Jannayak Karpoori Thakur Medical College and Hospital, Madhepura, Bihar from October 2022 to March 2023. Topical adapalene 0.1% gel monotherapy, topical benzoyl peroxide 2.5% gel monotherapy, and topical adapalene 0.1% - benzoyl peroxide 2.5% gel combination therapy were administered to participants in a 1:1:1 ratio. For a period of 12 weeks, participants were told to use their respective therapy on their faces once every night. 62 subjects in total were randomly assigned to receive adapaene gel (0.1% concentration), benzoyl peroxide gel (2.5% concentration), or a combination of 0.1% adapaene and 2.5% benzoyl peroxide gel on 22 of them. At the conclusion of 1, 2, 4, 8, and 12 weeks, efficacy and negative effects were documented.

According to the scientists' global assessment of acne scale, grade 2 or 3 facial acne vulgaris was present in male and female subjects in the age range of 18 to 38 years. The participants in this trial were not allowed to have diabetes mellitus, hypertension, be pregnant or nursing, or have an allergy to adapalene or benzoyl peroxide. Treatment effectiveness was determined by the reduction in the total number of lesions, and side effects (dryness, erythema, stinging or burning, and scaling) were observed. Chi square test and anova were used to analyse the percentage lesion count reduction and unfavourable effects (dryness /erythema/ stinging or burning/scaling). $P<0.05$ was the threshold for significance.

Results

According to the researchers' worldwide assessment of acne scale, 50% of the participants in this study had grade 2 acne and 50% had grade 3 acne. Of the 62 people who started the study, 55 finished it.

Adapalene 0.1% and benzoyl peroxide 2.5% in combination (group BPA) had a dropout rate of 4.54%, compared to 15% in each of the adapalene 0.1% and benzoyl peroxide 2.5% monotherapy groups (group A and group BP).

Table 1: White heads, Black heads and Papules in threegroups studied (at beginning of study

	Group BPA	Group BP	Group A	P value
White Heads	11.76±4.98	16.54±7.74	13.57±6.91	0.150
Black heads	15.00±8.27	14.27±6.08	9.53±5.88	0.065+
Papules	2.85±1.35	3.56±1.46	2.93±1.59	0.310

Table 2: Grade ACNE (at beginning of study)

Grade ACNE	Group BPA	Group BP	Group A	Total
Grade 2	9(40.9%)	8(40%)	14(70%)	31(50%)
Grade 3	13(59.1%)	12(60%)	6(30%)	31(50%)
Total	**22(100%)**	**20(100%)**	**20(100%)**	**62(100%)**

In this study, participants receiving combination therapy experienced a statistically significant decrease in the number of whiteheads, with reductions of 16.49%, 52.46%, 76.11%, 85.78%, and 93.96%, respectively, at the end of weeks 1, 2, 4, 8, and 12. At the end of week 12 of the research, the reduction was 74.2% for people using adapalene 0.1% gel monotherapy and 69.77% for participants using benzoyl peroxide 2.5% gel monotherapy.

Table 3: Assessment of lesion count-whiteheads at follow up

Assessment of lesion count-whiteheads	Group BPA	Group BP	Group A	P value
1st week	9.82±5.53	16.54±7.74	12.50±5.46	0.021*
2nd week	5.59±5.83	12.45±6.65	12.08±6.20	0.007**
4th week	2.81±4.46	9.50±8.64	5.50±6.43	0.046*
8th week	1.67±3.09	7.22±7.12	5.50±6.43	0.049*
12th week	0.71±1.82	5.00±7.07	3.50±6.69	0.162

At the end of weeks 1, 2, 4, 8 and 12, patients receiving combination therapy saw reductions in blackheads of 6.66 percent, 9%, 44.5 percent, 61.2 percent, and 74. percent, respectively. At the end of week 12 of the research, the reduction was 28.33% in the case of people using adapalene 0.1% gel monotherapy and 45.83% in the case of those using benzoyl peroxide 2.5% gel monotherapy.

Table 4: Assessment of lesion count: Black heads at follow up

Black heads	Group BPA	Group BP	Group A	P value
1st week	14.00±7.54	13.40±6.08	9.53±5.88	0.129
2nd week	13.65±7.89	13.85±6.18	9.21±6.18	0.139
4th week	8.32±4.83	11.67±4.44	9.25±7.05	0.255
8th week	5.81±5.28	9.55±5.68	6.83±5.17	0.213
12th week	3.87±4.70	7.73±6.07	6.83±5.17	0.155

Papules were reduced in subjects receiving combination therapy by 3.51%, 7.01%, 25.96%, 48.42%, and 64.91% (p=0.027) at the end of weeks 1, 2, 4, 8 and 12, respectively. The reduction was 26.4% in the case of subjects utilising benzoyl peroxide 2.5% gel monotherapy at the conclusion of research week 12. Adapalene 0.1% gel monotherapy users experienced an increase in papules by 10.92% at the end of week 12 despite early data showing a decrease.

Table 5: Assessment of lesion count: Papules at follow up

Papules	Group BPA	Group BP	Group A	P value
1st week	2.75±1.45	3.56±1.46	2.79±1.76	0.244
2nd week	2.65±1.42	3.47±1.55	2.92±1.80	0.320
4th week	2.11±1.41	2.86±1.56	2.58±1.68	0.369
8th week	1.47±1.33	2.85±2.30	2.58±1.68	0.089+
12th week	1.00±1.26	2.62±2.36	3.25±2.90	0.027*

At the end of the first week of the trial, dryness was observed in 54.5% of the people receiving combination therapy, 45% of the patients receiving adapalene 0.1% gel, and 45% of the participants receiving benzoyl peroxide 2.5% gel. At the end of week 12 of the research, dryness was reported by 4.5% of patients taking combination therapy, but not by participants utilising monotherapies.

Dryness	Group BPA (n=22)	Group BP (n=20)	Group A (n=20)	Total (n=62)
1st week	12(54.5%)	9(45%)	9(45%)	30(48.4%)
2nd week	10(45.5%)	4(20%)	4(20%)	18(29%)
4th week	3(13.6%)	1(5%)	1(5%)	5(8.1%)
8th week	2(9.1%)	0(0%)	1(5%)	3(4.8%)
12th week	1(4.5%)	0(0%)	0(0%)	1(1.6%)

At the end of the first week of the study, 13.4% of participants receiving combination therapy had erythema; in contrast, patients receiving monotherapies had no such side effect.

Erythema	Group BPA(n=22)	Group BP(n=20)	Group A(n=20)	Total (n=62)
1st week	3(13.6%)	0(0%)	0(0%)	3(4.8%)
2nd week	3(13.6%)	0(0%)	0(0%)	3(4.8%)
4th week	0(0%)	0(0%)	0(0%)	0(0%)
8th week	0(0%)	0(0%)	0(0%)	0(0%)
12th week	0(0%)	0(0%)	0(0%)	0(0%)

At the conclusion of the first week of the trial, 45.5% of participants receiving combination therapy, 20% of people receiving benzoyl peroxide 2.5% gel, and 30% of participants receiving adapalene 0.1% gel reported stinging/burning. By the end of the study's 12th week, no such negative effects had been noticed in any of the groups.

Stinging/burning	Group BPA (n=22)	Group BP (n=20)	Group A (n=20)	Total (n=62)
1st week	10(45.5%)	4(20%)	6(30%)	20(32.3%)
2nd week	9(40.9%)	1(5%)	2(10%)	12(19.4%)
4th week	1(4.5%)	1(5%)	1(5%)	3(4.8%)
8th week	1(4.5%)	0(0%)	0(0%)	1(1.6%)
12th week	0(0%)	0(0%)	0(0%)	0(0%)

Scaling was observed in 9.1% of combination therapy individuals, 5% of benzoyl peroxide 2.5% gel participants, and 10% of adapalene 0.1% gel participants. By the end of the study's 12th week, no such negative effects had been noticed in any of the groups.

Scaling	Group BPA(n=22)	Group BP(n=20)	Group A(n=20)	Total (n=62)
1st week	2(9.1%)	1(5%)	2(10%)	5(8.1%)
2nd week	2(9.1%)	0(0%)	0(0%)	2(3.2%)
4th week	0(0%)	1(5%)	0(0%)	1(1.6%)
8th week	0(0%)	0(0%)	0(0%)	0(0%)
12th week	0(0%)	0(0%)	0(0%)	0(0%)

Discussion

To the best of our knowledge, there aren't many research comparing adapalene and benzoyl peroxide together with adapalene and benzoyl peroxide separately for treating acne on Indian skin.

One study examined the effectiveness and safety of 0.1% adapalene and 4% benzoyl peroxide on 178 individuals after 11 weeks of therapy. Nascimento et al[7] at weeks 2 and 5, they discovered that benzoyl peroxide worked better on non-inflammatory and inflammatory lesions than adapalene, and both medications were considered safe.

Topical 5% benzoyl peroxide gel and retinoic acid cream were utilised by Handojo8 in combination and alone, with the combination therapy being more effective.

Adapalene-benzoyl peroxide combination gel for the treatment of acne was studied in North America,[9] and it was found to be more effective than adapalene and benzoyl peroxide monotherapies in a large clinical trial, with an early onset of efficacy and a good safety profile.

In contrast to topical adapalene 0.1% gel or topical benzoyl peroxide 2.5% gel monotherapy, topical adapalene 0.1% gel and benzoyl peroxide 2.5% gel combination therapy was found to be more effective in our study for treating face acne.

Conclusion

Dryness and stinging/burning were the two negative effects that people undergoing combo therapy reported experiencing the most frequently. Erythema and scaling were also reported as side effects. These adverse effects were more noticeable at the beginning of the treatment and lessened as it went on.

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