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Original Article

A comparison of efficacy and safety of topical 0.1% adapalene and 4% benzoyl peroxide in the treatment of mild to moderate acne vulgaris

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Abstract

Background Acne is an extremely common disease in the adolescent age group in Pakistan.

Objectives To compare the efficacy and safety of topical 0.1% adapalene and 4% benzoyl peroxide in mild to moderate acne vulgaris.

Patients and methods A total of 200 evaluable patients of more than 13 years of age with either sex were enrolled. One hundred patients were treated with topical 0.1% adapalene and 100 with 4% benzoyl peroxide for 12 weeks. Patients were followed up fortnightly.

Results Both treatments were generally well tolerated leading to non-compliance in only 10 patients due to side effects. Efficacy was almost 80% in both groups.

Conclusions Both treatments are equally effective and safe over 24 week period. Benzoyl peroxide is more effective in the treatment of inflammatory acne whereas adapalene is beneficial for the maintenance of comedonal acne.

Key words
Acne vulgaris, benzoyl peroxide, adapalene, comedones

Introduction

Acne is a chronic inflammatory disease of the pilosebaceous units, characterized by seborrhea, comedones, erythematous papules, pustules, nodules, pseudocysts and, in some cases, scarring.[1] It is due to an increased sebum production, hypercornification of the pilosebaceous unit, colonization with *Propionibacterium acnes* and inflammation. It is the most common dermatological disorder affecting approximately 85% of individuals between the ages of 12 and 24.[2] While acne does not affect the health overall, its impact on emotional well-being and function can be critical and is associated with depression, anxiety and higher-than-average unemployment rates.[3,4]

Current treatments include topical and oral medications that counteract microcomedone formation, sebum production, *P. acnes* and inflammation. These include various topical and oral preparations. The topical compounds are benzoyl peroxide, antibiotics and retinoids while tetracyclines, isotretinoin, cyproterone acetate and oral contraceptives are commonly used oral compounds.[5] Adapalene, a derivative of naphthoic acid, has comedolytic, antiproliferative, anti-inflammatory and receptor selective properties, is safe and well tolerated.[8] Benzoyl peroxide has been a "workhorse" of

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acne therapy.[9] The benefits include reduction in *P. acnes* with decrease in inflammatory lesions. As the effect of benzoyl peroxide on *P. acnes* is a direct toxic one rather than a "true" antibiotic, resistance has never been reported. No study has yet been conducted to compare the new drug adapalene with benzoyl peroxide in our setup, therefore, the present study was planned to compare the efficacy and safety of topical adapalene with the traditional approach of using benzoyl peroxide in our community.

Patients and methods

This was an open clinical trial (interventional quasi-experimental study) carried out at the Department of Dermatology, Unit-I, King Edward Medical University/ Mayo Hospital, Lahore during the period from January, 2007 to June, 2007. A complete medical history and clinical assessment with informed consent was taken. Two hundred patients of either gender, more than 13 years of age, with mild to moderate acne (comedones, papulopustules and few nodules with no scarring) and free of inter-current illness, were enrolled.

Those patients were excluded from the study who had been on any other topical medication for acne during the last 2 weeks or oral medications during the last 4 weeks. The pregnant and lactating female patients were also excluded from the study. Those patients who fulfilled the inclusion and exclusion criteria were randomly divided into two groups by using random number tables. In group A, one hundred patients received topical 0.1% adapalene whereas in group B, one hundred patients received topical 4% benzoyl peroxide. Both medicines were at night daily.

Efficacy of each drug was assessed according to the protocol, excellent if there was clearance of 60-80% of lesions, good if there was clearance of 40-60% of lesions and poor if there was clearance of less than 40% of lesions. Patients were followed up for a period of 24 weeks after enrolment. All the data was entered into SPSS version 11 statistical package. The outcome variables under study were age, gender, duration, symptoms, signs and side effects. The two groups were compared for outcome variables using the t test, as the data was quantitative in nature. A *p* value equal to or less than 0.05 was considered statistically significant.

Results

A total of 220 patients were enrolled in the study, out of which 200 patients completed the study. There were 10 delayed exclusions while 10 patients were lost to follow-up. There were 100 in each group. The age range noted in both groups was 13-32 years with (mean age, 20.35+4.40 years) in group A and (mean age, 21.44+4.20 years) in group B. The difference between these mean ages was statistically insignificant ($p>0.05$). The majority of patients belonged to 14-20 years of age in both group. Male to female ratio in group A was 1: 1.8 and 1: 2.1 in group B. Majority of patients had their disease for the last 2 weeks to 1 year (92% and 85%), 1 to 2 years in (6% and 12%) and 2 to 4 years in (2% and 3%) in each group respectively. Most of the patients were students (68%), followed by housewives 20%, doctors (5%), nurses (3%), teachers 2%, tailors 1% and shopkeepers 1%.

Adapalene showed an excellent result in 78% of the patients, with a good response in 17% and poor in 5% of the patients **(Figure 1)**. Benzoyl peroxide revealed an excellent response in 76% of the patients, good in 18% and a poor response in 6% **(Figure 1)**. Comparison of efficacy of the two drugs showed a similar profile with no

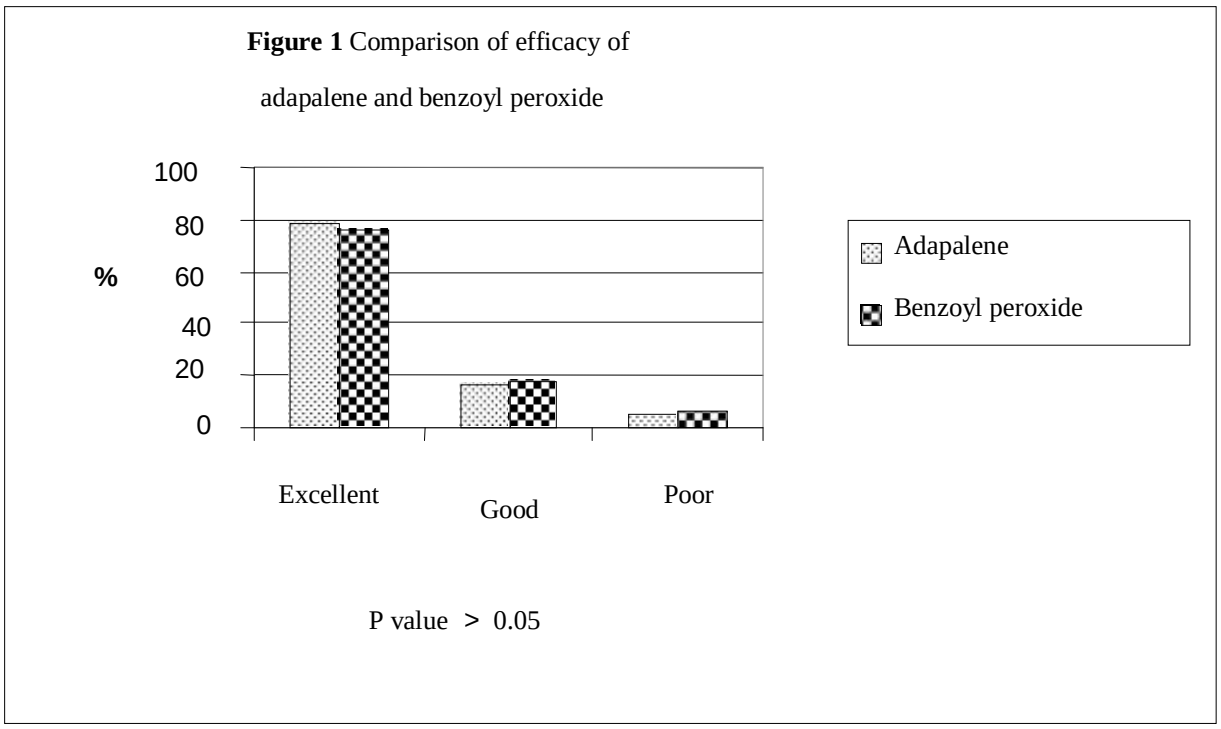

Figure 1 Comparison of efficacy of adapalene and benzoyl peroxide

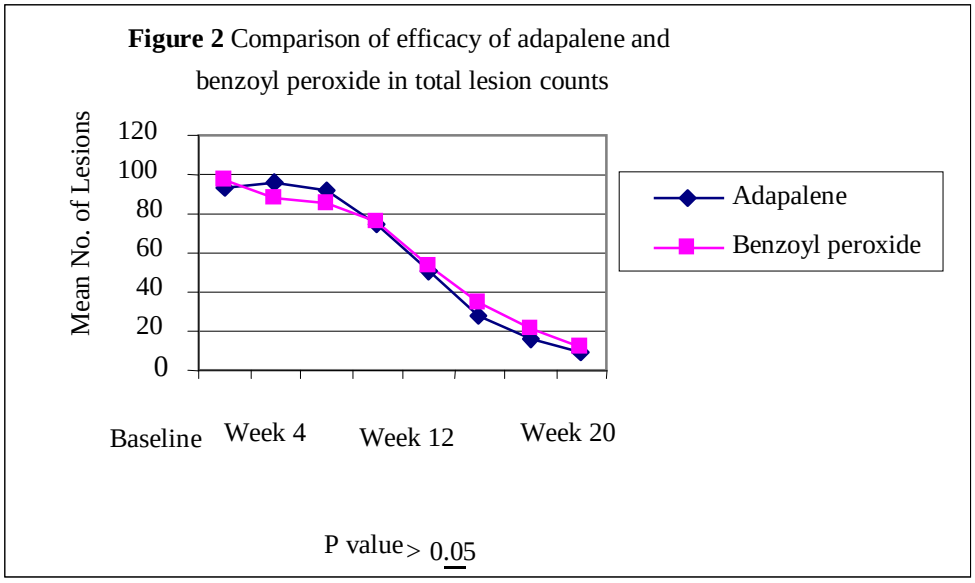

Figure 2 Comparison of efficacy of adapalene and benzoyl peroxide in total lesion counts

Table 1 Adverse effects in both groups (n=200)

Signs & symptoms	*Group A n=100)*	*Group B (n=100)*
Erythema	22%	24%
Burning	66%	68%
Dryness	55%	53%

significant difference ($p \geq 0.05$). Comparison of the total lesion count over a 24 week period showed both drugs to be equally effective with a insignificant difference ($p \geq 0.05$) [**Figure 2**]. Benzoyl peroxide, however, seemed to be more effective in the reduction of inflammatory lesions at week 2 and 4 while adapalene, on the

other hand, was more effective in the rapid reduction of non-inflammatory lesions at week 16 and 20.

Adverse events (**Table 1)** noted were few but mild in intensity and reversible in nature in each group.

Discussion

The study was designed to evaluate the efficacy and safety of a new drug adapalene, a third generation retinoid, and the traditional drug benzoyl peroxide. The rationale of using topical drugs like benzoyl peroxide and retinoids over a prolonged period is their safety as compared to other treatment modalities like oral antibiotics and retinoids, which are associated with side effects like bacterial resistance and other adverse reactions due to their absorption in the systemic circulation.

The results of our study confirm the efficacy of 0.1% adapalene and 4% benzoyl peroxide in mild to moderate acne vulgaris. Both the drugs brought about rapid clinical cure and proved equal in terms of efficacy and tolerability. Most of the patients were in the 14-20 years age group, similar to the trend seen worldwide.[10] This is probably due to the fact that hormones at adolescence are at their peak in this age group. A greater preponderance of females was observed as compared to males. This is again similar to an international study[10] and can be attributed to the fact that females are more conscious of their cosmetic disfigurement and tend to present earlier than males.

Adapalene showed an excellent efficacy in 78% of the patients. Although, it is effective in both inflammatory and non-inflammatory lesions, the non-inflammatory lesions showed a more rapid reduction, proving the superiority of adapalene in the treatment and maintenance of reduction of comedonal acne. A similar trend is observed in other studies.[11,12,13] Benzoyl peroxide was effective in 76% of the patients, similar to the local and international studies.[11,14] In the early follow-up period (weeks 2 and 4), benzoyl peroxide showed a rapid reduction of inflammatory lesions similar to other studies.[9,15] In comparison of the efficacy profile of adapalene and benzoyl peroxide, both were effective in the reduction of lesions at week 24 with no significant difference ($p \geq 0.05$). This correlates with other international studies where comparison of the two drugs alone and in combination showed no significant difference in their efficacy and side effects.[16,17,18]

Safety profile of adapalene revealed that dryness was the major side effect (in 68% of patients), followed by burning (53%) and erythema (22%), correlating with other studies.[19,20] The dryness and erythema due to this drug subsequently reduced after repeated use. This "period of sensitization" has been mentioned in other studies[11,21] as well and the side effects considerably diminished after 12 weeks of usage. The side effects noted with benzoyl peroxide were burning and dryness which can be attributed to the keratolytic nature of the drug.[22] But, the major adverse effect with this drug was noted to be erythema. Similar side effects have been mentioned in other studies as well.[23] The comparison of the safety profile of adapalene and benzoyl peroxide also yielded similar results as shown in other studies[16,18,24] with one drug failing to show superiority over the other.

Conclusion

The preset study showed o.1% adapalene as effective and safe as the traditional drug 4% benzoyl peroxide. Benzoyl peroxide is, however, effective in the early reduction of inflammatory

lesions (papules and pustules) while adapalene is more effective in the reduction of non-inflammatory (comedonal) lesions and in the maintenance therapy.

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