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Original Article

Efficacy and side effects estimation of 5% dapsone gel in the treatment of mild to moderate acne vulgaris

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Abstract

Background Acne vulgaris is a common dermatosis characterized by inflammation of the pilosebaceous unit, and clinically manifests as comedones, papules, pustules, nodules or cystic lesions. These may either present alone or in combination and affect predominantly the face and upper trunk. 5% dapsone gel has been approved to treat acne vulgaris.

Methods An interventional study was conducted during a 6 month period in the Dermatology Outpatient Department of Akhtar Saeed Medical and Dental College, Lahore. All patients fulfilling the inclusion criteria were enrolled and were advised to 5% dapsone gel twice daily on their face for 3 months. They were followed up at weeks 2, 4, 8 and 12. Response to treatment was evaluated using the Investigator Global Acne Severity Assessment Scale (IGA). Drug efficacy was also evaluated by calculating mean percent reduction of lesions. Side effects estimation like burning, stinging, erythema and dryness was noted.

Results At the end of 12 weeks, 5% dapsone gel was found to be effective in reducing both inflammatory and noninflammatory lesions by 59.2% and 40.8% respectively. The drug was also tolerable and had minimal side effects.

Conclusion 5% dapsone gel was well tolerated and efficacious in the treatment of mild to moderate acne vulgaris.

Key words
Acne vulgaris; 5% Dapsone gel.

Introduction

Acne vulgaris is a commonly seen inflammatory disorder of pilosebaceous unit. It is a chronic disorder characterized by comedones, papules, pustules, nodules, cystic lesions and in some cases scars, mainly affecting face and upper trunk.[1] Acne vulgaris has a worldwide prevalence of approximately 9.4%, and is most frequently seen in the adolescent population.[2] In Pakistan, the prevalence rate was found to be 5%.[3]

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The pathogenesis is multifactorial. Besides genetic predisposition, environmental factors play an important role.[4] Factors known to contribute to the pathogenesis of acne include follicular hyperkeratinization, colonization by propionibacterium acnes, increased sebum production and inflammation.[5] Few studies have shown that subclinical inflammation is present in the normal skin of acne patients, even prior to microcomedone formation.[6] Another factor in the pathogenesis of acne is diet. Dietary habits affect the levels for certain biochemical markers

which are known to be linked to the transcription of certain genes with consequent increased sebaceous gland activity, inflammation, P. acnes proliferation and increased disease activity.[7]

Topical 5% dapsone gel is approved to treat acne vulgaris.[8] It has anti inflammatory and anti bacterial properties.[9] Other topical therapeutic options that are available for treatment of acne vulgaris include benzyl peroxide, antibiotics and retinoids either alone or in various combinations.[10]

In Pakistan, topical 5% dapsone gel is a relatively, newer and cheaper treatment option. The aim of this study was to evaluate the efficacy of 5% dapsone gel in the treatment of mild to moderate acne vulgaris as the burden of disease is high and treatment resistance is frequent with the currently available treatment options.

Methods

This open labeled, single center interventional study was performed with an aim to evaluate efficacy and to estimate the side effects of 5% dapsone gel in the treatment of mild to moderate acne vulgaris.

Study was conducted in the Outpatient Dermatology Department, Akhtar Saeed Medical and Dental College, Lahore during a 6 month period from October 22 to March 23. Patients of acne vulgaris both male and female between ages of 13 to 40 years were enrolled into the study. Patients that scored a grade of 2, 3 or 4 on the Investigator Global Acne Severity Assessment Scale were included in the study. All study patients were not on any topical or systemic antiacne treatment for 2 weeks prior to inclusion.

Patients scoring grade 5 on the IGA acne scale, patients of acne conglobata, acne fulminans, secondary acne, pregnant and lactating females or patients with other medical conditions or on other systemic medications were excluded from the study.

After taking a written informed consent, patients fulfilling the inclusion criteria were enrolled in the study. All study patients were advised an application of 5% dapsone gel twice daily for 12 weeks. They were the followed up at week 2, 4, 8 and 12 to evaluate efficacy and estimate side effects.

Efficacy endpoints included a percentage reduction in lesion counts (inflammatory, non inflammatory and total). Successfully treated patients included those with a reduction in the IGA acne score to 0 (clear) or 1 (almost clear). Assessment of therapeutic efficacy included evaluation for complete resolution, marked improvement, moderate improvement and no improvement

Side effects estimation was assessed at each follow up visit with a questionnaire evaluating side effects including stinging/ burning sensation, erythema and scaling on a four point scale. Side effect severity was graded as 0-absent, 1-mild, 2-moderate and 3-evere.

Results

We enrolled 350 patients in this study of which included 180 female patients and 170 male patients. The average age of all patients was 23 years. Patient evaluated at the end of week 12 had a maximum success rate of 28.75%. From baseline to the end of week 12, there was a mean percent reduction in total lesions by 53.5% with a mean reduction of 59.5% in inflammatory lesions and 40.8% in noninflammatory lesions. There was a greater reduction on inflammatory

lesions with topical dapsone treatment compared to non inflammatory lesions.

5% dapsone gel showed a good response on assessment of therapeutic efficacy. 23.6% of patients scoring Grade 2 on the IGA acne scale had complete resolution, 34.5% had marked improvement and 29% had a moderate improvement in acne lesions at the end of 12 weeks. Grade 3 IGA acne scale patients showed complete resolution in 22.1%, marked improvement in 35.7% and moderate improvement in 27.8% at the end of week 12. Patients scoring Grade 4 on the IGA acne scale had marked and moderate improvement in acne lesions by 18% and 15% respectively. 21.5% of all patients in the study responded to 5% dapsone gel with complete resolution of lesions. A 35.4% of patients showed marked improvement and 28.5% showed moderate improvement at 12 weeks.

Dapsone gel was well tolerated. 47 patients experienced mild, transient burning sensation immediately after applying gel. Erythema and dryness were not observed in any patient.

Table 1 Patients demographics at baseline.

IGA grading of acne	*Male*	*Female*	*Total*
2	58	52	110
3	92	98	190
4	20	30	50

Discussion

Acne vulgaris is associated with psychological disturbance due to its chronicity.[11] Investigations into the pathogenesis of acne and to find its possible etiology has led to the development of new therapies and paved the way for availability of numerous systemic and topical medications aimed at targeting different grades of acne.[12] Nowadays, resistance to the available topical anti inflammatory and antimicrobial drugs is a big challenge. New, cost effective treatment options, to overcome above problem is the need of the hour. Dapsone is a synthetic sulfone used for over 60 years to treatment many dermatological problems.[8] It is commercially available as an oral formulation, an inhaled preparation, and 5% or 7.5% cream/gel.[13] It exerts its antimicrobial, bacteriostatic effect by competing with para-aminobenzoic acid and subsequently inhibiting production of dihydrofolic acid, an important component in bacterial replication. Dapsone inhibits the production of reactive oxygen species and down regulates neutrophil mediated inflammatory responses.[14]

5% dapsone gel is approved by the FDA for use in the treatment of acne.[15] No baseline laboratory test is needed before treatment as topical Dapsone is not associated with haemolysis. Long term use of 5% dapsone gel has not been found to result in increased plasma concentration of the drug.[16]

In this study, the reduction in total number of lesions was 53.5%, with a reduction in inflammatory lesions and non inflammatory lesions by 59.2% and 40.8% respectively. Similar results were seen in research by Jawad and Singh in which total lesion reduction was 57%, non inflammatory lesion reduction was 52% and inflammatory lesion reduction was 63% after of topical 5% dapsone gel.[1]

Table 2 Patients evaluation of 5 % Dapsone gel after 12 weeks treatment.

IGA grading of acne	*Grade 2*	*Grade 3*	*Grade 4*	*total*
Completely resolved	26(23.6%)	42(22.1%)	7(14%)	75(21.4%)
Marked improvement	38(34.5%)	68(35.7%)	18(36%)	124(35.4%)
Moderate improvement	32(29.0%)	53(27.8%)	15(30%)	100(28.5%)
Poor	14 (12.7%)	27(14.2%)	10(20%)	51(14.5%)

In a systematic review carried out by Melissa A.*et al*., topical 5% dapsone gel showed a 40.1%- 69.4%success rate compared to a 29.8 - 47.0% success rate with use of 7.5% dapsone gel after a 12 to 16 week application.[16]

Other studies including a two similarly designed phase 3 double-blind randomized controlled trials on topical dapsone monotherapy had results showing a 41% success rate. Similarly significant reductions in total, inflammatory and non inflammatory lesions seen were 48%, 39% and 32% respectively.[17] In a study carried out by Andrew F Alexis, the reduction in mean total lesions were 52% whereas in our study the percent reduction in total lesions were 53.5%.[18]

In a randomized study of 5% dapsone gel in combination with tazarotene cream for 12 weeks by Emil Tanghetti *et al*. showed the reduction of non inflammatory 59.7%, total 63.3% and success rate was 42.2%.[19] Greater mean percent reduction in lesions was seen when topical Dapsone was combined with topical tazoretene cream than tazoretene cream monotherapy.

A cohort study on the treatment of mild to moderate inflammatory acne with 5% dapsone gel in women by Charles Lynde *et al*. found a the success rate of 69.4% at 12 weeks.[20]

This study correlates with previous studies and demonstrates that 5% dapsone gel has a major role in treating the inflammatory stage of acne vulgaris and thus it is an important alternative treatment option for mild to moderate acne vulgaris.

Conclusion

Topical 5% dapsone gel is a both safe and effective treatment for acne vulgaris. Efficacy is greater for inflammatory compared to non inflammatory lesions.

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