Original Article

Journal of Brahmanbaria Medical College
Volume 2 Issue 2 July 2020 ; 33-37

Efficacy of Dapsone 5% Gel in Mild to Moderate Acne Vulgaris

Himangshu Shekar Das[1*] Arif Uddin Ahmed[2] Md. Tawhidul Islam Imdad[3]
Lovely Rani Dhar[4] Tahur Abdullah Chowdhury[5] Nazmin Haque[6]

ABSTRACT

Background: Acne Vulgaris (AV) is a chronic inflammatory, common dermatological disorder. Topical therapies remain the most common treatment option for mild to moderate AV. To determine the efficacy & safety of Depson 5% Gel in mild to moderate AV.

Materials and methods: Its an open lebel clinical trial. Study period was January to December 2020. Total 100 patient were enrolled in this study. But only 89 completed the 8 wks treatment.

Results: The mean non inflammatory & inflammatory lesion count were significantly reduced at 8 wks of treatment ($p<0.001$) with % reduction was 81.26% & 76.67% respectively. Good response was observed at 29.2%, moderate at 70.8% & adverse effects at 16.9% patients.

Conclusion: Depson 5% gel is effective & safe topical therapy for mild to moderate acne vulgaris.

KEY WORDS

Acne Vulgaris; Dapsone gel; Topical therap.

INTRODUCTION

Acne vulgaris is a chronic inflammatory disease of pilosebaceous follicles characterized by comedones, papules, pustules and nodules. It is a common dermatological disorder in individuals aged 13-35 years which mostly involves face and trunk and lesions may vary in number during the natural course of the disease and also affecting 79%-95% of the adolescent population and virtually every one at some point in their lives.[1-3] Because of the involvement of face and associated cosmetic problems, acne patients are at increased risk of anxiety and depression which affects their quality of life.[4]

1. Assistant Professor of Dermatology & Venereology
Sylhet Women's Medical College, Sylhet.
2. Associate Professor of Dermatology & Venereology
Brahmanbaria Medical College, Brahmanbaria.
3. Associate Professor of Dermatology & Venereology
Jalalabad Ragib Rabeya Medical College, Sylhet.
4. Lecturer of Pharmacology & Therapeutics
Sylhet MAG Osmani Medical College, Sylhet.
5. Professor of Dermatology & Venerology
Sylhet Women's Medical College, Sylhet
6. Associate Professor of Biochemistry
Sylhet Women's Medical College, Sylhet.

*Correspondence : Dr. Himangshu Shekar Das
Email: drhimangshudas@gmail.com
Cell : +88 01711 36 61 89

Date of Submitted : 31.03.2020
Date of Accepted : 30.04.2020

Acne has multifactorial pathogenesis. It occurs due to alteration in the pattern of keratinization within the sebaceous follicles, level of circulating sex hormones, especially androgens, quantity and quality of sebum secretion, colonization by follicular microbial flora, immunological factors and environmental factors.[5] Therefore acne has both inflammatory and bacterial components, until recently, the inflammatory events were considered secondary occurrences in the sequence of lesion development.[6,7] Newer data now suggest that inflammatory events occur before, and possibly initiate, the hyperproliferation observed in acne lesions. These findings support the classification of acne vulgaris as an inflammatory skin disease as opposed to a keratinocyte/ hyperproliferative disorder.[8] Proinflammatory cytokines play a role in the formation of acne lesions, and it has recently been suggested that the bacterium Propionibacterium acnes, one of the key pathogenic factors linked to the development of acne, releases proinflammatory cytokines.[9,10]

Topical antimicrobial agents are commonly used as first-line agents for the management of mild to moderate acne vulgaris. Topical treatment of acne vulgaris has changed over the years, with the most commonly used topical agents are the retinoids, benzoyl peroxide, azelaic acid, and topical antibiotics.[11]

Oral dapsone is effective in the treatment of severe, nodulocystic inflamed acne but haematological and other complications limits its use on routinely healthy acne patients. Topical dapsone is an alternative and showed good safety profile even in Glucose 6-Phosphate Deficiency patients.[12]

Journal of Brahmanbaria Medical College
Volume 2 Issue 2 July 2020 ; 33-37

Dapsone's utility is attributable to its anti-inflammatory and antimicrobial properties that improve both inflammatory and non-inflammatory acne, with more prominent effects occurring in inflammatory lesions. Dapsone has both anti-inflammatory and antimicrobial properties. A combination of these activities may account for its efficacy in acne. Anti-inflammatory effects include inhibition of neutrophil myeloperoxidase and eosinophil peroxidase activity, suppression of hypochlorous acid production, scavenging of reactive oxygen species, suppression of neutrophil activity and inhibition of chemoattractant-induced signal transduction. Antimicrobial activity is by inhibition of bacterial dihydropterase synthase in the folic acid metabolic pathway. This mechanism is effective against microorganisms synthesizing their own folic acid.[13]

Effectiveness of topical formulation of dapsone 5% gel was found in several studies with good safety profile.[14,15]

This clinical trial is designed to evaluate the efficacy and safety of dapsone 5% gel in mild to moderate facial acne vulgaris.

MATERIALS AND METHODS

This is an open label clinical trial conducted in the Department of Dermatology and Venereology, Sylhet Women's Medical College Hospital, Sylhet during the period from January to December 2020. One hundred patients with mild to moderate facial acne of either sex aged 12 to 30 years were included in the study. Patients with severe acne, acne conglobata, acne fulminans and secondary acne or with underlying disease, receiving topical anti-acne therapy for last 2 weeks or systemic antibiotic for 4 weeks or systemic retinoids for 6 months and patients who were known to be allergic to dapsone were excluded from the study.

Before enrollment informed written consent was obtained from the patients or guardians after full explanation of the purpose of the study. A proper diagnostic work up of acne vulgaris was made by taking detail history and clinical examination. All patients were thoroughly examined and the extent and severity of disease. The diagnosis of acne was made by dermatologists.

The number of inflammatory lesions (Red papules and pustules) on the face was counted at the initiation of the study. Lesion counting involved recording the number of each type of acne lesion and overall severity was determined. Lesion counting categorized acne into four groups based on the number of inflammatory lesion on one half of the face.[16]

- Mild: lesion count 0-5 inflammatory lesions on one side of the face.
- Moderate: Between 6-20 inflammatory lesions on one side of the face.
- Severe: Between 21-50 inflammatory lesions on one side of the face.
- Very severe: More than 50 inflammatory lesions on one side of the face.[16]

At enrollment (Baseline visit) informed consent was taken. Demographic data including age and sex was collected. The patients were educated to apply a thin layer of dapsone 5% gel to the entire facial area once daily at bedtime for 8 weeks. The patients were additionally instructed to avoid exposure to the sun and use of cosmetics other than eye and lip makeup (For women) and after shave products or colognes (For men).

Patients were scheduled for two follow up visits at 4 and at 8th week. At each visit patients were assessed for treatment response and for side effects.

The number of inflammatory lesions (red papules and pustules) on the face was counted at every follow up visits and changes in inflammatory lesion counts were observed and recorded.

The percentage reduction of inflammatory lesion counts was calculated by comparing the count of one side of face at each observation time versus base-line levels.

Global response of inflammatory lesions was determined from the percentage reduction of inflammatory lesion counts: a reduction of 80% or more was labeled as good, 50–79% as moderate, 20–49% as poor, and a reduction less than 20% as no response.[17]

The safety assessment at each visit was done by noting erythema, dryness, burning and pruritus at baseline and at follow up. Any other adverse effect encountered during treatment was noted. Ethical clearance was obtained from Etical Review Committee of Sylthe Women's Medical College.

RESULTS

A total of 100 patients were enrolled in the study, among which 89 patients completed the schedule follow up of 8 weeks and were analysed. The age of the patients ranged from 17 to 32 years with the mean age of 21.72±3.94 years and 71(79.8%) patients within the age group of 16 to 24 years; 37(41.6%) were male and 52(58.4%) were female with a ratio of 1:1.4. Severity of acne was mild in 13(14.6%) and moderate in 76(85.4%) cases (Table-I).

Journal of Brahmanbaria Medical College
Volume 2 Issue 2 July 2020 ; 33-37

Table I Baseline characteristics

Baseline characteristics	Frequency	Percentage
Age		
16-19 Years	31	34.8
20-24 Years	40	44.9
25-29 Years	14	15.7
30-32 Years	4	4.5
Gender		
Male	37	41.6
Female	52	58.4
Severity		
Mild	13	14.6%
Moderate	76	85.4%

The mean non-inflammatory lesion count was 15.28 ± 10.28 at baseline which decreased to 15.26±6.85 at 4th week and 5.30±3.4 at 8th week of treatment. Reduction of l non-inflammatory lesion count was significant compared to baseline (F=170.362, df=2, p<0.001) (Figure-1).

The mean inflammatory lesion count was 14.50±4.96 at baseline which decreased to 8.60±2.63 at 4th week and 3.22±1.09 at 8th week of treatment. Reduction of inflammatory lesion count in was significant compared to baseline (F=125.589, df=2, p<0.001).

The mean total lesion count was 42.72±13.53 at baseline which decreased to 23.85±8.40 at 4th week and 8.53±3.86 at 8th week of treatment. Reduction of total lesion count compared to baseline was significant (F=69.132, df=2; p<0.001) (Figure-1).

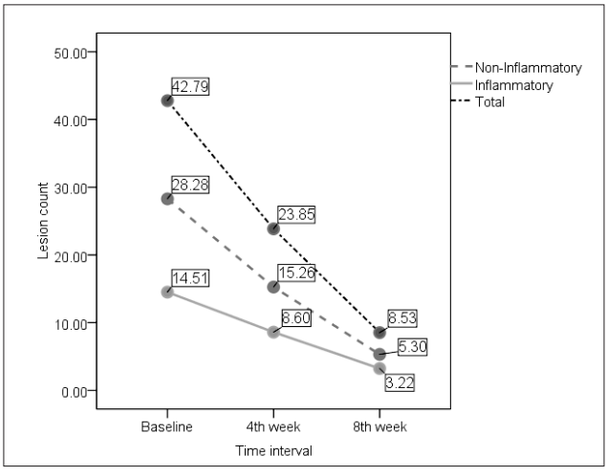

Figure 1 Change of lesion count at different follow up

The reduction of non-inflammatory lesion count was 45.45% at 4th week and 81.26% at 8th week. The reduction inflammatory lesion count was 38.98% at 4th week and 76.67% at 8th week. The reduction total lesion count was 43.89% at 4th week and 79.917% at 8th week (Figure 2).

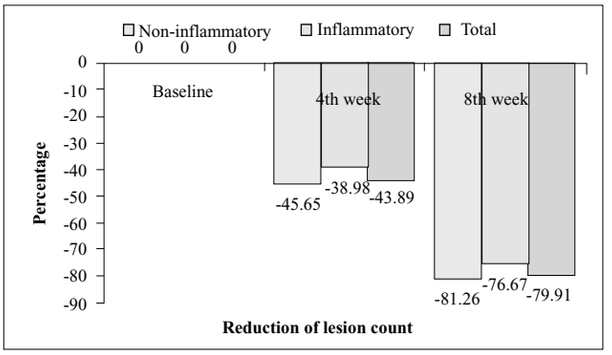

Figure 2 Percent reduction of lesion count at different follow up

Regarding global response to treatment of inflammatory lesions, good response was in 26 (29.2%) patients and moderate response was in 63 (70.8%) patients.

Reported adverse effects were dryness and burning in 15 (16.9%) patients. Adverse effects experienced were mild, occurred especially during early stage of treatment and no discontinuation was reported because of adverse events.

DISCUSSION

Acne vulgaris is a chronic inflammatory disorder of pilosebaceous unit resulting from increased sebum production, altered keratinization, inflammation and bacterial colonization of hair follicles by P. acnes.[18] As far as treatment is concerned topical therapy is the standard treatment for mild to moderate acne vulgaris.[19] Today, different topical therapies are available for patients with acne vulgaris, including comedolytic agents, anti-inflammatory medications, antibiotics, systemic retinoid and even herbal preparations. Antibiotics play a pivotal role in treatment.[20]

Oral dapsone has demonstrated efficacy in acne, but was associated with severe side-effects such as anemia, which was particularly serious in patients with Glucose-6-Phosphate Dehydrogenase (G6PD) deficiency. Topical dapsone was developed to overcome the severe side-effects such as anemia in Glucose-6-Phosphate Dehydrogenase (G6PD) deficient. A unique property of dapsone is that it has dual therapeutic activity and demonstrates antimicrobial and anti-inflammatory properties.[21] Dapsone 5% gel was developed to treat acne vulgaris and today has Food and Drug Administration (FDA) approval.[22] This study was undertaken to see the efficacy and safety of dapsone 5% gel for the topical treatment of mild to moderate acne vulgaris.

The mean age of the patients with acne was 21.72±3.94 years. This result was in agreement with the study of several other studies.[23-25]

Journal of Brahmanbaria Medical College
Volume 2 Issue 2 July 2020 ; 33-37

In this study both sexes were affected with acne with greater number in females. This result was consistent with other studies.[23-26]

In this study the mean non-inflammatory and inflammatory lesion count were significantly reduced at the end of treatment period ($p<0.001$ both). All types of lesion count decreased significantly in other studies.[15,27-29]

In this study, reduction in non-inflammatory, inflammatory lesions and total lesion were 81.26%, 76.67% and 79.917% respectively at 8 week of treatment. Nearly similar results were seen in several studies.[15,27-29]

In the present study global response to treatment of inflammatory lesions was good response 29.2% of patients and moderate response 70.8% of patients. Several studies supported these results.[15,29]

Reported adverse effects, 16.9% of patients reported dryness and burning. This adverse effects experienced were mild, occurred especially during early stage of treatment and no discontinuation was reported because of adverse events.[15,29]

LIMITATIONS

The limitations of the study were :-

- Single centre study
- Open clinical trial of single arm and
- Limited sample size
- Only 89% were responsive.

CONCLUSIONS

The finding of this study concludes that the use of 5.0% dapsone gel is effective in mild to moderate acne and is well tolerated. However a multicentric, double-blind clinical trial comparing 5.0% dapsone gel with other topical agents could further reinforce the scientific evidence.

RECOMMENDATIONS

As Depson 5% gel was moderately effective for AV, so Dermatologists can apply this gel as topical therapy for mild to moderate AV.

DISCLOSURE

All the authors declared no competing interest.

REFERENCES

1. Kapadia N, Talib A. Acne treated successfully with azithromycin. International Journal of Dermatology. 2004; 43: 766-767.

2. Adityan B, Kumari R, Thappa DM. Scoring systems in acne vulgaris. Indian J Dermatol Venereol Leprol. 2009; 75 (3): 323-326.

3. Riddle RC, Amin K, Schweiger ES. A Review of Azithromycin for the Treatment of Acne Vulgaris. Cosmetic Dermatol. 2007; 20 (5): 299-302.

4. Ghoshal L, Banerjee S, Ghosh SK, Gangopadhyay DN, Jana N. Comparative evaluation of effectiveness of adapalene and azithromycin, alone or in combination, in acne vulgaris. Indian J Dermatol. 2007; 52 (4): 179-183.

5. Kaur J, Sehgal VK, Gupta AK, Singh SP. A comparative study to evaluate the efficacy and safety of combination topical preparations in acne vulgaris. Int J App Basic Med Res. 2015; 5: 106-110.

6. Harper JC, Thiboutot DM. Pathogenesis of acne: Recent research advances. Adv Dermatol. 2003; 19: 1-10.

7. Cunliffe WJ, Holland DB, Clark SM, Stables GI. Comedogenesis: Some new aetiological, clinical and therapeutic strategies. Br J Dermato.l 2000; 142: 1084-1091.

8. Jeremy AHT, Holland DB, Roberts SG, Thomson KF, Cunliffe WJ. Inflammatory events are involved in acne lesion initiation. J Invest Dermatol. 2003; 121: 20-27.

9. Jappe U. Pathological mechanisms of acne with special emphasis on Propioni bacterium acnes and related therapy. Acta Derm Venereol. 2003; 83: 241-247.

10. Pawin H, Beylot C, Chivot M et al. Physiopathology of acne vulgaris: Recent data, new understanding of the treatments. Eur J Dermatol. 2004; 14: 4-12.

11. Stotland M, Shalita AR, Kissling RF. Dapsone 7.5% gel: A review of its efficacy and safety in the treatment of acne vulgaris. Am J Clin Dermatol. 2014; 10: 221-227.

12. Nilfroushzadeh MA, Siadat AH, Baradaran EH, Moradi S. Clindamycin lotion alone versus combination lotion of clindamycin phosphate plus tretinoin versus combination lotion of clindamycin phosphate plus salicylic acid in the topical treatment of mild to moderate acne vulgaris: A randomized control trial. Ind J Dermatol Venereol Leprol. 2009; 75: 279-282.

13. Tan J. Dapsone 5% Gel: A New Option in Topical Therapy for Acne. Skin Therapy Letter. 2012; 17 (8): 668.

14. Lynde CW, Andriessen A. Cohort study on the treatment with dapsone 5% gel of mild to moderate inflammatory acne of the face in women. Skinmed. 2014; 12: 15-21.

15. Ibrahim SA, Ghonemy S, Sabry H. A Study of the Efficacy of 5% Dapsone Gel as a Topical Therapy for Acne Vulgaris. J Clin Exp Dermatol Res. 2017; 8: 430.

16. Hayashi N, Akamatsu H, Kawashima M. Acne Study Group. Establishment of grading criteria for acne severity. J Dermatol. 2008; 35: 255-260.

17. Kus S, Yucelten D, Aytug A. Comparison of efficacy of azithromycin vs. doxycycline in the treatment of acne vulgaris. Clin Exp Dermatol. 2005; 30: 215-220.

Journal of Brahmanbaria Medical College
Volume 2 Issue 2 July 2020 ; 33-37

18. Golnick H, Cunliffe W, Berson D, Dreno B, Finlay A, Leyden JJ et al. Global Alliance to Improve Outcomes in Acne. Management of acne: A report from a Global Alliance to Improve Outcomes in Acne. J Am Acad Dermatol. 2003; 49: 1-38.

19. Rathi SK. Acne vulgaris treatment: The current scenario. Indian J Dermatol. 2011; 56: 7-13.

20. Dhir R, Gehi NP, Agarwal R, More YE. Oral isotretinoin is as effective as a combination of oral isotretinoin and topical anti-acne agents in nodulocystic acne. Indian J Dermatol Venereol Leprol. 2008; 74: 187.

21. Faghihi G, Rakhshanpour M, Abtahi-Naeini B, Nilforoushzadeh MA. The ef cacy of 5% dapsone gel plus oral isotretinoin versus oral isotretinoin alone in acne vulgaris: A randomized double-blind study. Adv Biomed Res. 2014; 3: 177.

22. Paniker U, Levine N. Dapsone and sulfapyridine. Dermatol Clin. 2001; 19: 79-86.

23. Khatun M, Kamal SMB, Khondker L. Efficacy and safety of benzoyl peroxide 2.5% gel and isotretinoin 0.05% gel in the treatment of acne vulgaris. Bangladesh J Dermatol Venereol Leprol. 2014; 31 (2): 43-48.

24. Ahmed N, Kamal SMB, Mohammad C, Parvez MZ, Haque R, Sikdar TK. Efficacy and Safety of Adapalene 0.1% Cream and Tretinoin A 0.025% Cream in the Treatment of Acne Vulgaris. Jalalabad Med J. 2010; 7 (1): 17-20.

25. Rahman MM, Abdullah M, Hossain MM, Siddique MA, Nessa M, Rahman MM, et al. Topical isotretinoin in acne vulgaris. Bangladesh J Dermatol Venereol Leprol. 2014; 31 (2): 53-56.

26. Rallis E, Verros C, Katoulis A, Katsarou A. Topical 5% Benzoyl Peroxide and 3% Erythromycin Gel: Experience with 191 Patients with Papulopustular Acne. Acta Dermatovenerol Croat. 2013; 21 (3): 160-167.

27. Draelos ZD, Carter E, Maloney JM, Elewski B, Poulin Y, Lynde C et al. Two randomized studies demonstrate the efficacy and safety of dapsone gel, 5% for the treatment of acne vulgaris. J Am Acad Dermatol. 2007; 56 (3): 439.

28. Lucky AW, Maloney JM, Roberts J, Taylor S, Jones T, Ling M et al. Dapsone gel 5% for the treatment of acne vulgaris; safety and efficacy of long term (1 year) treatment. J Drugs Dermatol. 2007; 6 (10): 981-987.

29. Jawade SA, Singh A. Efficacy of Dapsone 5% gel in treatment of Acne vulgaris. Int J Res Dermatol. 2016; 2 (4): 77-81.