J Skin Stem Cell. 2014 December; 1(3): e23330. DOI: 10.17795/jssc23330

Published online 2014 December 20. **Research Article**

Treatment of Acne Vulgaris Using the Combination of Topical Erythromycin and Miconazole

Farahnaz Fatemi [1]; Jamshid Najafian [2]; Saeid Savabi Nasab [3]; Mohammad Ali Nilforoushzadeh [4,*]

[1]Skin Diseases and Leishmaniasis Research Center, Department of Dermatology, Isfahan University of Medical Sciences, Isfahan, Iran
[2]Isfahan Cardiovascular Research Center, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran
[3]School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran
[4]Skin and Stem Cell Research Center, Tehran University of Medical Sciences, Tehran, Iran

*Corresponding author: Mohammad Ali Nilforoushzadeh, Skin and Stem Cell Research Center, Tehran University of Medical Sciences, Tehran, Iran. Tel:+98-3133373736, E-mail: Sdlrc@mui.ac.ir

Received: September 6, 2014; **Accepted:** September 9, 2014

Background: Acne vulgaris is a multifactorial disease of the pilosebaceous unit. Malassezia furfur is one of the causative agents of the disease.It provides a proper environment for Propionibacterium to grow. Miconazole inhibits the Propionibacterium growth by its fungicidal activity.

Objectives: The aim of this study was to evaluate the treatment of Acne vulgaris using the combination of topical erythromycin and miconazole.

Patients and Methods: In a single-blinded randomized clinical trial, 60 patients who were referred to the dermatology clinics of Isfahan University of Medical Sciences with mild to moderate acne vulgaris were selected by simple random sampling method. The patients were randomly allocated to two groups. One group was treated with 2% erythromycin alcoholic solution and the other group was treated with 2% erythromycin and 2% miconazole alcoholic solution. Patients were followed up each month for three months. The efficacy of treatment was evaluated by the Acne Severity Index (ASI) and the data were analyzed by the SPSS.

Results: In the second and the third months of treatment, ASI and inflammatory acne lesions significantly reduced in the erythromycin plus miconazole group in comparison to the erythromycin group ($P < 0.05$). Efficacy of erythromycin plus miconazole in reduction of acne lesions was moderate and excellent in the second and third months of treatment, respectively. Both treatment methods were highly effective in reducing the inflammatory lesions (papules and pustules) and were least effective in noninflammatory lesions (comedones).

Conclusions: This study showed that erythromycin plus miconazole alcoholic solution is effective in treating the mild to moderate acne lesions as an adjuvant therapy.

Keywords: Acne Vulgaris; Treatment; Miconazole

1. Background

Acne vulgaris is the sebaceous glands multifactorial disease and Propionibacterium acnes is one of the etiologic factors of acne vulgaris (1-3). Malassezia furfur provides an appropriate environment for the growth of P. acnes. Miconazole is an antifungal drug that inhibits P. acnes growth by eradicating M. furfur. Therefore, it can be used in patients with mild to moderate acne as an adjuvant therapy. The efficacy of miconazole plus benzoyl peroxide in treatment of the acne vulgaris has been reported in the previous studies (4-9). Benzoyl peroxide is expensive and also a strong irritant in darker skin types. Dark skin types of our population make it more prone to be more susceptible to cutaneous irritation while treating with this formulation.

2. Objectives

Therefore, we evaluated the efficacy of erythromycin plus miconazole alcoholic solution in treatment of mild to moderate acne lesions. This formulation is cheap and available and its efficacy had not been studied previously.

3. Patients and Methods

In a single-blinded randomized clinical trial, 60 patients who were referred to dermatologic clinics of Isfahan University of Medical Sciences with mild and moderate acne were recruited by simple random sampling method. Pregnant or lactating mothers with any internal or endocrine disease, and those who used any medication for the treatment of acne in the preceding month were excluded. Informed consents were obtained from the participants. Patients were randomly allocated to two groups to receive treatment with 2% erythromycin alcoholic solution and 2% erythromycin plus 2% miconazole alcoholic solution. Patients were instructed to apply the solution on the acnes every night and to wash it next morning. The patients were assessed at the beginning

Table 1. Mean Improvements of Acne Lesions in Two study Groups [a]

Treatment Group	Acne Lesions at the Baseline Visit	Improvement at Follow-p		
		The First Visit	The Second Visit	The Third Visit
Erythromycin Plus Miconazole	100	27.9	53.7	81.5
Erythromycin	100	29.12	42.6	70.95
P Value	0	0.002	0.001	0.001

[a] Data are presented as %.

and at the first, second, and the third month in follow-up visits. Reduction of acne lesions and relevant side effects were recorded in a questionnaire during monthly clinical visits. The efficacy of treatment was evaluated by absolute lesion count for each type of acne lesion and Acne Severity Index (ASI). ASI was calculated as follows:

ASI = (pustules × 2) + papules + (1.4 × comedones)

At the first visit, the total number of lesions was assumed to be 100% and any reduction in severity of lesions was calculated as above mentioned and was considered as percent improvement. The mean improvement percentage was calculated in both treatment groups. The effectiveness of treatment was graded as follow: the improvement < 20%, low; 20% to 60%, moderate; and > 60%, excellent. Student t-test was used to analyze the data using the SPSS (version 13, SPSS Inc., Chicago, IL, USA).

4. Results

Out of 60 patients, 56 patients (94%) were female and four patients (6%) were male. The mean age of patients was 17.63 years. Although at the first month of treatment, the improvement percentage was higher in the group treated with erythromycin solution than in the group treated with erythromycin plus miconazole solution ($P < 0.05$), erythromycin plus miconazole alcoholic solution showed an increased improvement in the second and the third months of treatment comparing to the other group ($P < 0.05$) (Table 1). Both treatment methods were highly effective in resolving inflammatory acne lesions (papules and pustules) and were least effective in reducing noninflammatory lesions (comedones). Although the efficacy of erythromycin plus miconazole solution in reducing ASI was graded as mild during the first month of treatment, it was graded as excellent in the second and the third months of therapy. The patients were relatively highly satisfied with both of the therapeutic methods. Erythema was the most common side effect in erythromycin plus miconazole group. It was more intensive early in the course of treatment and gradually relieved. The most common side effect in erythromycin plus miconazole solution group was moderate itching that decreased during the treatment and there was no need to stop .

5. Discussion

Propionibacterium acnes is one of the most important causative agents of acne vulgaris. Malassezia furfur is one of the leading acne factors by providing an appropriate environment for growth of this bacterium. Some studies have recently shown the role of M. furfur in inducing acne lesions and miconazole as an effective topical drug in acne treatment. To the best of our knowledge, up to this date, no previous study on the efficacy of miconazole and the formulations used for treatment of various types of acne lesions has been published. In 1980, one study demonstrated that combination of miconazole and retinoic acid could mitigate superficial acne lesions (10). Several studies have reported the efficacy of miconazole plus benzoyl peroxide in acne treatment (4-9). More recently, Petit et al. showed that overnight application of a paste containing 15% zinc oxide and 0.025% miconazole nitrate reduces the inflammatory acne lesions. They recommended a single overnight premenstrual application of a paste containing miconazole nitrate to prevent premenstrual acne flare-ups (11). In addition to efficacy, the price and side effects are the other important factors that should be considered while choosing a drug (12). Erythromycin plus miconazole alcoholic solution is a cheap, available, and well-tolerated drug that has not been studied previously.

The results showed that erythromycin plus miconazole alcoholic solution were more effective than erythromycin solution in acne treatment, especially in treating inflammatory acne lesions. The efficacy of erythromycin plus miconazole alcoholic solution ASI reduction changed from mild in the first month of treatment to excellent in the third month of treatment. In conclusion, this study showed that erythromycin plus miconazole alcoholic solution is an effective therapeutic method for treatment of mild to moderate acne lesions.

References

1. Simpson NB, Cunliffe WJ. Disorders of the sebaceous glands. In: Burns T, Breathnach S, Cox N, Griffiths G editors. *Rook's Textbook of Dermatology.* 7th ed. Massachusetts: Black well Science; 2004.
2. Masson N, Willam C, Maxwell PH, Pugh CW, Ratcliffe PJ. Independent function of two destruction domains in hypoxia-inducible factor-alpha chains activated by prolyl hydroxylation. *EMBO J.* 2001;**20**(18):5197–206.
3. Strauss S, Thiboutot DM. Diseases of the sebaceous glands. In: Freedberg IM, Eisen A, Wolf K editors. *Fitzpatrick's Dermatology in General Medicine*.. New York: Mc Graw-Hill; 1999. p. 769.
4. Vanden Bossche H, Cornelissen F, van Cutsem J. Synergism of the antimicrobial agents miconazole and benzoylperoxide. *Br J Dermatol.* 1982;**107**(3):343–8.
5. Spagnoli U, Sirna R, Amerighi F. [Experience with a new combined preparation (benzoylperoxide plus miconazole ni-

trate) in the topical therapy of acne]. *G Ital Dermatol Venereol.* 1983;**118**(5):XLVII–L.
6. Fanta D, Scholz N. [Miconazole-benzoyl peroxide: a new combination for extending the topical therapy of acne]. *Z Hautkr.* 1984;**59**(13):873–81.
7. Van Neste D, Tennstedt D, Decroix J. Imidazoles and benzoyl peroxide: a comparative trial of two treatment schedules. *Dermatologica.* 1986;**172**(2):108–12.
8. Fluckiger R, Furrer HJ, Rufli T. Efficacy and tolerance of a miconazole-benzoyl peroxide cream combination versus a benzoyl peroxide gel in the topical treatment of acne vulgaris. *Dermatologica.* 1988;**177**(2):109–14.
9. Mesquita-Guimaraes J, Ramos S, Tavares MR, Carvalho MR. A double-blind clinical trial with a lotion containing 5% benzoyl peroxide and 2% miconazole in patients with acne vulgaris. *Clin Exp Dermatol.* 1989;**14**(5):357–60.
10. Marron Gasca J, Cubero Yuste JL, Sanchez Hernandez M. [Trial of a retinoic acid-miconazole combination in the treatment of superficial acne]. *Actas Dermosifiliogr.* 1980;**71**(11-12):471–80.
11. Petit L, Pierard- Franchimont C, Uhoda E, Vroome V, Cauwenbergh G, Pierard GE. Coping with mild inflammatory catamenial acne: a clinical and bioinstrumental split-face assessment. *Skin Res Technol.* 2004;**10**(4):278–82.
12. Ozolins M, Eady EA, Avery A, Cunliffe WJ, O'Neill C, Simpson NB, et al. Randomised controlled multiple treatment comparison to provide a cost-effectiveness rationale for the selection of antimicrobial therapy in acne. *Health Technol Assess.* 2005; **9**(1):iii–212.