Original Article

A Comparative Study on Efficacy of Oral Azithromycin and Oral Minocycline for the Treatment of Acne Vulgaris

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ABSTRACT

Acne vulgaris is a prevalent skin condition that mostly affects teenagers and young adults. Because the treatment involves long-term antibiotic therapy, an agent with a long half-life can be highly effective in improving compliance. A prospective, randomized, open-label, comparative study was conducted to evaluate the efficacy of a pulse dose of azithromycin and compare it with daily dose of minocycline for the treatment of acne vulgaris. Our study included 100 patients with moderate-to-moderately severe acne vulgaris (Grade II and III). We examined the patients (first visit). Patients were randomized to one of two therapy groups: Group A received 50mg minocycline orally once a day, while Group B were given 500mg azithromycin orally once a day for three days in a week. Both groups were instructed to apply 2.5% topical benzoyl peroxide gel at night as well. The treatment lasted three weeks in total. After three weeks, all of the patients were examined (second visit). Among 100 diagnosed patients, 36 were male and 64 were female. They aged between 15 and 25 years. Group A (minocycline group) had 20 males and 30 females, while the group B (azithromycin group) had 16 males and 34 females. Group A had a mean age of 19.33 years, while group B had a mean age of 19.47 years. In group A, lesional count was reduced by 66.7% for inflammatory papules and 39.1% for non-inflammatory papules. In group B, lesional count got reduced by 53.8% for inflammatory papules and 37.5% for non-inflammatory papules. Reduction in both inflammatory and non-inflammatory lesions was statistically significant in both therapy groups, as indicated by the first and second (follow-up) visits ($P<0.001$). However, when we compared between group A and group B, the difference was not statistically significant ($P>0.05$). No adverse reactions were reported by the patients. Both minocycline and azithromycin were equally effective and safe for the treatment of acne vulgaris.

Keywords: *Acne vulgaris, azithromycin, minocycline*

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INTRODUCTION

Acne vulgaris is a persistent inflammatory condition of the pilosebaceous unit that primarily affects teenagers and young adults[1]. It typically manifests as non-inflammatory lesions, inflammatory lesions, or a combination of the two, primarily affecting the face but occasionally includes the back and chest. Closed and open comedones make up a non-inflammatory lesion. The majority of inflammatory lesions appear as erythematous macules, papules, and pustules[2].

Acne vulgaris affects nearly everyone at some point in their lives. Small non-inflammatory acne lesions may be insignificant; but, in those suffering from severe forms of inflammatory nodular acne, pain, social disruptions, and physical and psychological scars can have a significant impact on quality of life[3].

Acne forms in the pilosebaceous unit, which is made up of epidermal cells that line the hair follicle and the sebaceous gland[5]. Acne is the obstruction and irritation of sebaceous follicles, which are a form of pilosebaceous unit[6].

Propionibacterium acnes (*P. acnes*) is the most frequent anaerobic bacteria that causes acne vulgaris. The anaerobic bacterium P. acnes can invade the skin and hair follicles. Several investigations have found that specific strains of P. acnes are frequently linked to acne vulgaris. P. acnes colonizes the pores and feeds on the sebum produced by the sebaceous glands[7].

Antibiotic treatment has traditionally been used to treat moderate-to-severe acne vulgaris. The mechanisms of action include inhibiting PA development, lowering the production of inflammatory mediators, and modulating the immunological system. Tetracycline, doxycycline, minocycline, lymecycline, and erythromycin are some of the most commonly prescribed antibiotics. Azithromycin is one of the antibiotics prescribed for acne therapy that is at least as effective as doxycycline and minocycline[8].

Previous studies compared azithromycin to tetracyclines such as doxycycline. Minocycline has also been explored and tried as an individual acne treatment. It has been found to be a good and effective antibiotic for acne. However, a thorough examination of the literature revealed that very few research comparing azithromycin to minocycline have been conducted. Therefore, this study aims to evaluate the efficacy of azithromycin and minocycline in the treatment of acne vulgaris Grade II and III.

METHODS

A prospective, randomized, open-label comparative study was conducted in a tertiary care hospital. A total of 100 newly diagnosed acne Grade II and III patients aged 15-25 years and of both genders were enrolled in the study. A thorough history was taken, including the start, duration, and progression of the problem, a history of comparable symptoms in the past, and a history of any other underlying illness. Patients with underlying hormonal imbalances that cause acne (such as polycystic ovary syndrome), drug-induced acne, contraindications to oral azithromycin or minocycline, and those currently on therapy were excluded from the trial. The first patient was randomly assigned to one of the groups, and the remaining patients were assigned to one of two groups: group A received oral minocycline 50 mg daily for three weeks, while group B received oral azithromycin 500 mg three times per week for three weeks. At night, both groups were advised to administer topical 2.5% benzoyl peroxide (BPO) gel. A thorough clinical examination was performed (first visit), which included counting the acne lesions on the face dividing the face into four quadrants. Non-inflammatory papules (which included open, closed comedones, and skin-colored papules) were separated from inflammatory papules (which included erythematous papules and pustules). The key end point assessment was the percentage reduction in lesional count at the end of 3 weeks. The treatment was known to both the patients and the investigators.

Collected data were screened manually through coding and final verification was done. Minimum lesion count, i.e., the number of lesions counted in a patient of that group, maximum lesion count, i.e., the number of lesions counted in a patient of that group, and median lesion count were computed for the above tests. P value <0.05 was considered statistically significant. The Wilcoxon signed-rank test was used to obtain the P value within each group (intragroup), while the Mann-Whitney U-test was used to compare the two groups (intergroup). All the analyses were done using the SPSS version 26.0 for Windows (SPSS Inc., Chicago, IL, USA). The results were presented in tables.

The study was approved by the Ethical Review Committee of International Medical College Hospital, Gazipur, Bangladesh.

RESULTS

Our study included 100 diagnosed individuals; among them, 36 were male and 64 were female with acne Grade II and III. They aged between 15 and 25 years. Group A (minocycline group) had 20 males and 30 females, while the group B (azithromycin group) had 16 males and 34 females. Group A had a mean age of 19.33 years, while group B had a mean age of 19.47 years. In group A, lesional count was reduced by 66.7% for inflammatory papules and

39.1% for non-inflammatory papules. In group B, lesional count got reduced by 53.8% for inflammatory papules and 37.5% for non-inflammatory papules. Significant improvement was observed in both groups of patients (Table-I). Reduction in both inflammatory and non-inflammatory lesions was statistically significant in both therapy groups, as indicated by the first and second visits (P<0.001) (Table-II & III). However, when we compared between group A and group B, the difference was not statistically significant (P>0.05) (Table-IV). No adverse reactions were reported by the patients during any of the visits.

Table-I: *Reduction in lesion count in both treatment groups*

Lesions	Group A Minocycline Reduction in percentage	Group B Azithromycin Reduction in percentage
Inflammatory papule	66.7	53.8
Non-inflammatory papule	39.1	37.5

Table-II: *Reduction in lesional count in group A (Minocycline group)*

Lesions	Inflammatory lesion		Non-inflammatory lesion	
	First visit	Second visit	First visit	Second visit
Minimum	10	1	3	3
Maximum	36	40	110	86
Median	22	9	53	35
P value	<0.001		<0.001	

P value reached through Wilcoxon signed-rank test.

Table-III: *Reduction in lesional count in group B (Azithromycin group)*

Lesions	Inflammatory papule		Non-inflammatory papule	
	First visit	Second visit	First visit	Second visit
Minimum	1	0	2	6
Maximum	59	45	142	67
Median	17.5	8.5	42	27
P value	<0.001		<0.001	

P value reached through Wilcoxon signed-rank test.

Table-IV : *Comparison of reduction in lesional count between two groups*

	Inflammatory lesion		Non-inflammatory lesion	
	First visit	Second visit	First visit	Second visit
P value	0.29	0.49	0.561	0.34

P value reached from Mann-Whitney U-test

DISCUSSION

We examined the efficacy and safety of azithromycin and minocycline in treating Grade II and III acne vulgaris over a three-week period. Over the course of the trial, both treatments in combination with topical 2.5% benzoyl peroxide (BPO) gel were helpful in diminishing and improving inflammatory and non-inflammatory lesions.

Gruber et al. previously compared azithromycin to minocycline in the treatment of acne comedonica and papulopustulosa. Azithromycin was given as a single oral dose (500 mg/day) for four days in four cycles every ten days, while minocycline was given 100 mg daily for six weeks. In terms of reducing the number of lesions, there were no significant differences between these two acne therapies[13]. Sardesai et al. conducted a study in which they compared azithromycin to minocycline in the treatment of acne. In terms of reducing the number of lesions, there were no significant differences between these two acne therapies[14].

Our study's limitations include the lack of blinding and the length of treatment and follow-up. The treatment period should have been extended to six weeks. However, in order to assure thorough follow-up and avoid dropouts, the study's duration was limited to three weeks.

CONCLUSION

Our data suggests that for the treatment of mild to moderately severe acne vulgaris, azithromycin is as effective and well tolerated as minocycline. However, multicentre trials with larger samples and longer duration are recommended.

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