

ORIGINAL ARTICLE

COMPARISON OF EFFICACY OF TOPICAL ADAPALENE PLUS ORAL AZITHROMYCIN AND TOPICAL ADAPALENE PLUS ORAL DOXYCYCLINE IN TREATMENT OF ACNE VULGARIS

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Background: Acne vulgaris is a commonly diagnosed dermatological condition characterised by pilosebaceous unit blockage or inflammation. It may manifest as inflammatory, non-inflammatory, or a combination of the two. The acne vulgaris mostly the face of individual and chest and back of individual is also affected sometime. The aim of my research is to compare the effectiveness of topical adapalene plus oral azithromycin versus topical adapalene plus oral doxycycline in treating acne. Acne is one of most common reason compelling a patient to see dermatological advice. Our goal is to find the most effective antibiotic to produce the best outcomes with the fewest possible unwanted effect (side effects) and a maximum level of patient satisfaction. **Methods:** From May 1 to October 31, 2019, a randomised control trial was performed at Dermatology department MTI Lady Reading Hospital Peshawar. Using the lottery form, all of the patients were split into 2 groups. For 12 weeks, patients in Group A were given oral doxycycline 100 mg once daily and topical adapalene, while patients in Group B were given oral azithromycin 250 mg on alternating days and topical adapalene. All patients were followed at the end of 12 weeks after start of therapy to determine the efficacy in term of clearance of at least 60% of the number of lesions from baseline. **Results:** In Group A, 22 (59.45%) patients expressed positive results whereas in Group B, only 9 (24.32%) patients expressed positive results. *p*-value (0.0021.) **Conclusion:** My data suggest that oral doxycycline 100mg in combination with adapalene gave better results as compared to oral azithromycin which was also found well-tolerated option for treatment of acne on face.

Keywords: Azithromycin; Doxycycline; Adapalene; Acne vulgaris

Citation: Ghafoorullah, Ali F, Paracha MM, Noor SM, Naeem J. Comparison of efficacy of topical adapalene plus oral azithromycin and topical adapalene plus oral doxycycline in treatment of acne vulgaris. J Ayub Med Coll Abbottabad 2022;34(4):782–5.

DOI: 10.55519/JAMC-04-9568

INTRODUCTION

Acnes vulgaris is a dermatological related common condition characterised by the obstruction or inflammation of pilosebaceous units. It may manifest as inflammatory, non-inflammatory, or a mixture of the two. It's mostly affected the patient face region and also affects sometimes the back and chest of individuals.¹

It is seen in approximately 85 percent of individuals among 12 and 24 years of age. The disease course is found in 8 percent of adults age among 25–34 years and in 3 percent age between 35–44 years.²

The pathophysiology that results in the development of acne are pilosebaceous unit hyperplasia with increased sebum production, disturbed desquamation of sebaceous follicle, increased colonization of the follicle with bacteria e.g., Propionibacterium acnes and inflammatory as well immune reactions.³

Acne lesions are classified into two categories: non-inflammatory and inflammatory. Inflammatory lesions appear as papules and pustules. Pustules are papules contain purulent material and have a head with a white or yellow base. Papules are swollen, inflamed, tender bumps that vary in size from 2–5 mm in diameter and have no head. Depending on the number of pustules and papules, papulopustular acnes is graded from moderate to severe acne.^{4,5}

In the management of moderate-to-severe acne, oral medications, especially antibiotics, are recommended.^{6,7} Tetracycline and its derivatives are the most commonly used antibiotics. Second-line acne treatments include co-trimoxazole, trimethoprim, and macrolides.⁸

Azithromycin is an antibiotic that works against both Gram positive and Gram-negative bacteria. It is administered orally and enters the cellular compartments quickly after oral administration, with a half-life of 68 hours. It stays in tissues for a long time, typically 2–4 days, and at a concentration higher than the minimum inhibitory

concentration for most normal microorganisms.⁹ Ullah G et al found that azithromycin had a 22.8 percent efficacy and doxycycline had a 55.4 percent efficacy.¹⁰

The rationale of my research was to justify the topical adapalene plus oral azithromycin versus oral doxycycline plus topical adapalene comparative efficacy used in acne vulgaris. One of the most common reasons for a patient seeking dermatological advice is acne. Trying to find the most adequate antibiotic is our objective to achieve the desired result with least adverse effect and elevated level of patient satisfaction.

Patients were diagnosed on clinical examination, presenting with comedones (white head or black head), papules and pustules, and nodules (raised bumps with obvious inflammation) in a sebaceous distribution.

The duration of illness with more than 3 months were included in study. Severity of acne was graded as.¹¹ Grade 1: comedones, <20 papules (mild). Grade 2: comedones, >20 papules, <10 pustules (moderate). Grade 3: > 20 pustules, ≤2 nodules, ≤ 1 abscesses (severe). Grade 4: >20 Pustules, >2 nodules, ≥1 abscesses, widespread scarring (cystic).

The treatment was considered effective if there is reduction (>60%) in the number of lesions from the baseline after 12 weeks. (Measured on the basis of clinical assessment).

The hypothesis of study was that combination of oral doxycycline plus topical adapalene is more effective than oral azithromycin plus topical adapalene in the treatment of acne vulgaris.

MATERIAL AND METHODS

It was conducted in Dermatology Department Lady Reading Hospital, from 1st May, 2019 to 31 Oct, 2019. It was Randomized controlled trial.

There were 74 patients in total (37 in each group), with a P1 population proportion of 22.8% and a P2 population proportion of 55.4%. The test has a 90% power and a 95% confidence interval. The sample size was calculated using the WHO formula.

The sampling technique was non-probability consecutive sampling. Patients presenting with mild to moderate acne vulgaris with history of no medication in the last three months age ranging between 12 -24 years either Male or Female. Patients with a concomitant systemic disorder, such as cardiac, renal, or hepatic disease, pregnant or lactating mother and hypersensitivity history of tetracycline and azithromycin were excluded from study.

From May 1 to October 31, 2019, the randomised control trial was performed at the Department of Dermatology, MTI-LRH, Peshawar, after receiving approval from the hospital ethical

committee. The research enrolled all patients who presented to the OPD and met the inclusion criteria. The patients signed written informed consent forms. Using the lottery form, all of the patients were split into 2 groups. For 12 weeks, patients in Group A were given oral doxycycline 100 mg once daily, while patients in Group B were given oral azithromycin 250 mg on alternate days. Adapalene in both groups was applied as thin layer over the affected areas once at night. All patients were followed at the end of 12 weeks after start of therapy to determine the efficacy in term of clearance of at least 60% of the number of lesions from baseline.

Each of these data, including age, gender, length of illness, and number of lesions at baseline, was entered into a pre-design proforma. To avoid bias in the study findings, strict exclusion criteria were observed. SPSS 23 was used to analyse all of the results. The effectiveness of the two groups was compared using the chi square test, with a *p*-value of less than or equal to 0.05 considered as significant. Tables and graphs were used to show the findings.

RESULTS

This research study was carried out in department of dermatology, MTI-LRH, Peshawar. The results are as under: -

In Group A, 20 (54.05%) patients were recorded in 12–16 years age group while only 17 (45.94%) patients were recorded in 17–24 years age group. In Group B, 20 (54.05%) patients were recorded in 12–16 years age group while only 17 (45.94%) patients were recorded in 17–24 years age group. (Table-2)

In Group A, 22 (59.45%) patients were male patients and 15 (40.54%) patients were females. In Group B, 15 (40.54%) patients were male patients and 22 (59.45%) patients were females.

In Group A, mean and SDs for age was 15.5years±4.55. Mean and SDs for number of lesions was 2±0.58. Mean and SDs for size of lesions was 2 cm±0.62. Mean and SDs for duration of illness was 5 months±1.34. In Group B, mean and SDs for age was 15.5 year±4.50. Mean and SDs for number of lesions was 2±0.80. Mean and SDs for size of lesions was 2 mm ±0.62. Mean and SDs duration of illness was 5 months±2.02. (Table-2)

In Group A, 22 (59.45%) patients expressed effective results (improvement in lesions) whereas in Group B, only 9 (24.32%) patients expressed effective results (improvement in lesions). *P*-value=0.0021. (Table-1) Age, Gender, Number of Lesions, Size of Lesions, Duration of illness were controlled through stratification and have been enumerated at Table-2

Table-1: Frequencies and percentages for efficacy (n=74)

Efficacy	Group A (n-37)	Group B (n-37)	Total (n-74)	p value
Yes	22 (59.45%)	09 (24.32%)	31 (41.89%)	0.0021
No	15 (40.54%)	28 (75.67%)	43 (58.10%)	
Total	37 (100%)	37 (100%)	74 (100%)	

Table-2: Stratification of efficacy (n=74)

Age		Efficacy	Group A (n-37)	Group B (n-37)	p value
Age	12–16 Years	Yes	14 (37.83%)	04 (10.81%)	0.001
		No	06 (16.21%)	16 (43.24%)	
	17–24 Years	Yes	08 (21.62%)	05 (13.51%)	0.289
		No	09 (24.32%)	12 (32.43%)	
Gender	Male	Yes	15 (40.54%)	03 (8.10%)	0.003
		No	07 (18.91%)	12 (32.43%)	
	Female	Yes	07 (18.91%)	06 (16.21%)	0.225
		No	08 (21.62%)	16 (43.24%)	
No of lesions	< 2	Yes	08 (21.62%)	06 (16.21%)	0.005
		No	03 (8.10%)	19 (51.35%)	
	> 2	Yes	14 (37.83%)	03 (8.10%)	0.096
		No	12 (32.43%)	09 (24.32%)	
Size of lesions (in cm)	< 2	Yes	19 (51.35%)	08 (21.62%)	0.004
		No	12 (32.43%)	23 (62.16%)	
	> 2	Yes	03 (8.10%)	01 (2.70%)	0.022
		No	03 (8.10%)	05 (13.51%)	
Duration of lesions	< 5 Weeks	Yes	14 (37.83%)	07 (18.91%)	0.077
		No	12 (32.43%)	17 (45.94%)	
	> 5 Weeks	Yes	08 (21.62%)	02 (5.40%)	0.004
		No	03 (8.10%)	11 (29.72%)	

DISCUSSION

Acne vulgaris is a common problem of teenage patients presenting to dermatology OPD. The pilo sebaceous units are blocked or inflamed in this condition. It may manifest as inflammatory, non-inflammatory, or a mixture of the two types of lesions. It often affects the face, but it can also affect the chest and back.^{1,12}

It is seen in approximately 85 percent of individuals among 12 and 24 yrs of age. The disease course is found in 8 percent of adults age among 25–34 years and in 3 percent age between 35 to 44 years.² which as compared to this study. Also, efficacy in this study as consistent to our study which gives, 22 (59.45%) patients expressed effective results in Group A whereas only 9 (24.32%) patients expressed effective results in Group B. (Table-1). p-value 0.0021.

In this study, in Group A, 20 (54.05%) patients were recorded in 12-16 years age group while only 17 (45.94%) patients were recorded in 17–24 years age group. (Table-2). In Group B, 20 (54.05%) patients were recorded in 12–16 years age group while only 17 (45.94%) patients were recorded in 17-24 years age group. (Table-2). In Group A, 22 (59.45%) patients were male patients and 15 (40.54%) patients were females. In Group B, 22 (59.45%) patients were female patients and 15 (40.54%) patients were male (Table-2). In Group A,

mean and SDs for age was 15.5±4.55. Mean and SDs for number of lesions was 2±0.58. Mean and SDs for size of lesions was 2±0.62. Mean and SDs for duration of illness was 5±1.34.

In Group B, mean and SDs for age was 15.5±4.50. Mean and SDs for number of lesions was 2±0.80. Mean and SDs for size of lesions was 2±0.62. Mean and SDs duration of illness was 5±2.02. In Group A, 22 (59.45%) patients expressed positive results whereas in Group B, only 9 (24.32%) patients expressed positive results. (Table-1). p-value 0.0021.

Acne's inflammatory lesions are classified into two categories. Pustules and papules, as well as non-inflammatory lesions, are concerned with less serious cases of acne. Papules are inflamed, red, tender bumps that vary in size from 2–5 mm in diameter and have no head. Pustules are papules with a head and a white or yellow centre that are superficial and contain grossly purulent material. Papulopustular acne can be classified as mild, moderate, or extreme depending on the number of papules and pustules present.^{4,5,17}

Oral antibiotics are used to treat inflammatory acne that is mild to serious.^{6,7,18} Tetracycline and its derivatives are still the preferred antibiotics. Other acne treatments include macrolides, co-trimoxazole, and trimethoprim.⁸

Azithromycin is an antibiotic that works against both Gram positive and Gram-negative bacteria. It is administered orally and enters the

cellular compartments quickly after oral administration, with a half-life of 68 hours. It stays in tissues for a long time, usually 2–4 days, at concentrations higher than the minimum inhibitory concentration for most typical microorganisms.^{9,19–21} Ullah G *et al* found that azithromycin had a 22.8 percent efficacy and doxycycline had a 55.4 percent efficacy.^{10,20} which as compared to this study, where in Group A, 22 (59.45%) patients expressed positive results whereas in Group B, only 9 (24.32%) patients expressed positive results. (Table-1). *p*-value 0.0021.

CONCLUSION

My data suggest that oral doxycycline 100mg in combination to adapalene gave better results as compared to oral azithromycin plus topical adapalene which was also found good option for management of acne vulgaris.

AUTHORS' CONTRIBUTION

MM: Conceived Idea, collected data. FA: Collected data and compiled data. Ghafoorullah: Compiled data. JN: Helped in collection of data. MN: Supervised the whole process

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22.

Submitted: May 5, 2021

Revised: June 20, 2022

Accepted: June 20, 2022

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