ORIGINAL ARTICLE
EFFICACY OF ORAL AZITHROMYCIN AND ORAL DOXYCYCLINE IN PATIENTS WITH ACNE VULGARIS

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Background: Acne vulgaris is a long-term skin disease characterized by blackheads or whiteheads, pimples, oily skin, and possible scarring. Systemic antibiotics have long been used as a treatment option in patients with acne. The aim of this study was to compare the efficacy of oral doxycycline *vs* azithromycin in patients with acne vulgaris. **Method:** It was a randomized controlled trial conducted in the Department of Dermatology, Lady Reading Hospital, Peshawar from 1st February to 30th July 2021. A total of 60 patients were enrolled in the study. Patients were randomized into 2 groups with Group A receiving azithromycin and Group B receiving doxycycline. Patients' number of lesions was counted and followed for 4 months. A reduction in 80% of lesions was considered effective. **Results:** The mean age of the patients was 21.24±3.84 years. There were 16 female and 14 male patients in group A and 17 female and 13 male patients in group B. The majority of patients in both groups were found to have responded to the treatment showing good efficacy. **Conclusion:** Oral doxycycline and azithromycin were highly effective in patients with acne vulgaris. Efficacy of both drugs was similar to each other.
Keywords: Acne vulgaris, Azithromycin, Doxycycline, Efficacy

INTRODUCTION

Acne vulgaris (AV) is a common dermatological disorder resulting from clogging of the hair follicles with dead keratinocytes and sebum from the sebaceous glands.[1] It is characterized by blackheads or whiteheads, pimples, oily skin, and possible scarring.[2,3] Face, upper chest, back and those areas of the skin that are rich in sebaceous glands are primarily affected. Since it commonly involves the face in the young population, it is usually associated with low self-esteem, depression, and in extreme cases, thoughts of suicide.[4]

Acne vulgaris is a global health problem, affecting almost 630 million people worldwide in 2015 alone.[5,6] In the United States, it is considered to affect 80% of the population any time in their life.[7]

The most common age of onset is between 13 and 20 years, and it is estimated that 80–90% of the patients affected in the West are adolescents.[8,9] The disease continues to affect nearly half of these patients even in adult life in their twenties, with a smaller proportion of patients continuing to have the disease even in the middle ages.[3]

Acne vulgaris presents as whitehead or blackhead comedones, papules, pustules and nodules primarily affecting the face. Comedone is differentiated from the rest of the lesions based on the absence of inflammation in their lesions. Pustules are raised lesions that are characterized by the presence of pus, while papules do not have pus in their lesions. In addition to these lesions, patients may complain of pain, tenderness, and redness, and may develop scars on their face.[10,11]

Numerous pharmacological and non-pharmacological measures have been described in the literature that helps manage AV. Reducing daily sugar intake may reduce the overall burden of the disease.[12] Local application of azelaic acid, benzoyl peroxide, salicylic acid and retinoids are reported to have a significant effect in improving AV. Oral treatments which include antibiotics and retinoids also have proven efficacy in multiple trials in AV especially in moderate to severe inflammatory AV.[13] Among the systemic antibiotics, the commonly prescribed medications are tetracyclines including doxycycline and minocycline.[14] Macrolides, especially oral azithromycin are also used.[15]

Multiple studies have been performed worldwide to compare the efficacy of azithromycin with oral doxycycline in the treatment of acne. In one study conducted in Pakistan, the efficacy of azithromycin was found to be 22.8% compared to 55.4% in patients receiving oral doxycycline.[16] Multiple dosing regimens have been applied to treat acne vulgaris in different areas. The aim of this study was to compare the efficacy of daily oral doxycycline 100 mg with oral azithromycin 250 mg once a day for 120 days in patients with active acne vulgaris.

MATERIAL AND METHODS

It was a randomized control trial conducted in the Department of Dermatology, Lady Reading Hospital, Peshawar from 1st February to 30th July 2021 after approval from the Ethical Review Board vide Ref No. 50/LRH/MTI).

The sample size was calculated using WHO software with the following assumptions: significance level=5%, statistical power=80%, anticipated population treated with oral doxycycline=55.4%[16], and anticipated population treated with oral azithromycin=22.8%.[16] Patients' data were collected after informed consent from all patients with acne vulgaris presenting in the Outpatient Department of Dermatology Lady Reading Hospital Peshawar. Non-probability consecutive sampling technique was used and a total of 60 patients (30 each in Group A and Group B) were enrolled. All patients with acne vulgaris, aged 13–40 years, and both genders were included. Patients previously treated with oral doxycycline, oral retinoids, steroids, or taking antibiotics for other purposes, patients with folliculitis of the face, with acne fulminans, and sebaceous hyperplasia were excluded.

Patients were considered to have acne vulgaris if they had open and/or closed comedones, papules, pustules, nodules and cysts on their faces. Doxycycline was given orally as a 100 mg once daily medication for 4 months while azithromycin was also given orally for 4 months in a dose of 250 mg once daily. The efficacy of the drug was calculated by counting the number of lesions. An 80% reduction in the number of lesions was considered to be effective.

A detailed history was taken from the patients or their attendants and a complete physical examination was performed including examination of the face, and the number of lesions was counted. The patients were divided into 2 groups using blocked randomization. Oral doxycycline 100 mg once daily was given to patients in Group A, and Group B patients were put on oral azithromycin 250 mg once daily. All patients were followed for 4 months for efficacy, with the number of lesions on the face being counted at the end of each month. Data was recorded on a proforma.

Data was analysed using SPSS-20. Quantitative variables like age were described as Mean±SD. Categorical variables like gender and efficacy were described as frequencies and percentages. Stratified analyses were done on the basis of age and gender. Chi-square test was done for differences in groups, and $p \leq 0.05$ was taken as significant.

RESULTS

This study enrolled 60 patients presenting to Department of Dermatology, Lady Reading Hospital, Peshawar. Thirty-three (55%) of these patients were female, and 27 (45%) were male. The mean age of the study cohort was 21.24±3.84 years (Range: 14–31 years). There were 16 female and 14 male patients in group A and 17 female and 13 male patients in group B. (Table-1).

Out of 30 patients in each group, 25 patients in Group A, and 26 patients in Group B responded to the treatment showing good efficacy. (Table-2, 3).

Table-1: Age distribution of the study groups (n=60)

| Group | N | Age (Years) | | Mean±SD |
		Minimum	Maximum	
A	30	16	30	21.43±3.03
B	30	14	31	21.40±4.42
Total	60	14	31	21.24±3.84

Table-2: Correlation of efficacy of oral azithromycin and doxycycline

| Effective | Group A | | Group B | | P |
	N	%	N	%	
Yes	25	83.3	26	86.7	0.001*
No	5	16.7	4	13.3	

*Significant

Table-3: Frequency of % reduction in lesions

| % Reduction | Group A | | Group B | |
	N	%	N	%
≥80	25	83.3	26	86.7
50–79	1	3.3	0	0
20–49	4	13.2	4	13.2

DISCUSSION

Acne vulgaris is a chronic dermatological disease with a propensity to affect the face. The disease is so common that almost every individual develops at least some comedones and/or papules on their face in their life.[17,18] Since it has the tendency to cause facial scars which may have a significant cosmetic and psychological impact on the patient, it is very essential to have effective timely treatment. Oral retinoids and antibiotics have been observed to be effective in managing AV.[19]

Our study found that the efficacy of azithromycin is similar to that of doxycycline in the management of acne vulgaris. It was observed that contrary to popular belief, the disease is equally common in males, and the results of the drugs are not affected by gender.

Maleszka et al[20] compared the efficacy of 2 drugs in 2011. They administered azithromycin 500 mg for 3 day for the 1st week followed by 500 m weekly to one group and 100 mg doxycycline to the other group. They reported similar efficacy with azithromycin and doxycycline treatment in both groups which is inline with our study.

Our study results are in agreement with Parsad D et al[21] who observed that oral doxycycline daily was as effective as oral azithromycin used only for 4 days in a month. Their dosing regimen was different from ours. Singhi MK et al[22] observed that oral azithromycin was superior to oral doxycycline in patients with AV. Their findings are in contrast to our results. One reason for this may be because they used higher doses of azithromycin compared to us. Moreover, they added topical erythromycin to all patients which may have some added effect in the oral azithromycin group compared to the doxycycline group. The results of daily oral doxycycline and azithromycin were superior to the

results shown in above mentioned studies which might be due to the prolonged duration and once daily dosing regimen compared to other studies.

Our findings were similar to Gruber *et al*[23] who reported that azithromycin was not inferior to tetracycline. They studied minocycline instead of doxycycline. Their dosing strategy was also different. Instead of following the daily dose routine, They gave azithromycin in cycles, with 10 days drug free intervals. Such regimens need to be evaluated further for efficacy.

LIMITATIONS

The sample was small and side-effects profiles of the prescribed drugs were not taken into account. Though these drugs are generally safe with little side-effects, it is recommended to keep track of any side-effects.

CONCLUSION

Both oral doxycycline and azithromycin are effective in the treatment of acne vulgaris, and have similar efficacy.

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Contribution of Authors
FI: Conceptualization, data collection, draft writing
MAA: Draft writing, data analysis, proofreading
MT: Critical review and final approval
MQ: Draft writing, proofreading
MA: Literature search, draft writing
SHM: Proofreading, Literature search