

## Research Article

# Comparison of Efficacy of Oral Azithromycin Pulse versus Doxycycline Daily in Treatment of Moderate Acne Vulgaris

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### Abstract:

**Background:** Acne is a very common skin disease in our setup. Azithromycin is a new treatment while Doxycycline has been routinely used for this disorder.

**Objective:** To assess the effectiveness of azithromycin oral pulse versus doxycycline daily in treating acne vulgaris.

**Methods:** A randomized control trail with 304 patients of moderate acne vulgaris were enrolled. The patients were divided into two groups: Group-A (n=152) received azithromycin, 500 mg daily for 3 days in 10 days' cycle with 7 days free of drug, for 3 months, while Group B (n=152) received doxycycline 100 mg daily for 3 months. They were followed at monthly intervals. Difference between numbers of lesions before and after treatment was calculated. Outcome was analysed as healing of acne lesions in terms of percentages as: Excellent (>80%), Good (51–80%), Poor (31–50%) and No response (<30%) at the end of 3 months.

**Results:** In group-A, 35(23.0%) patients had excellent outcome, 37(24.3%) had good, 33(21.7%) had poor and 47(31%) had no response. In group-B, 74(48.7%) patients had excellent response, 42(27.6%) had good, 34(22.4%) had poor and 2(1.3%) had no response with a p-value 0.000001, which was statistically significant.

**Conclusion:** Doxycycline is more effective oral treatment for acne vulgaris.

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### Introduction:

Acne is a disorder of pilosebaceous units of the skin. It is one of the most common skin disorders. The major factors causing acne are obstruction of follicles due to increased sebum secretion by androgen sensitive sebaceous glands and superadded inflammation induced by microbial colonization with *Propionibacterium acnes*.<sup>1</sup> Recently role of gut microbes has also been highlighted in pathogenesis of acne.<sup>2</sup> Although acne might affect all age groups, it is primarily considered an adolescence disease.<sup>3</sup> Clinically, acne presents as non-inflammatory (open and close comedones) and inflammatory (papules, pustules,

nodules and cysts.<sup>4</sup> Post-inflammatory pigmentation and scarring have significant psychosocial impact on patients.<sup>5</sup> There is lack of a universally accepted grading system for acne.<sup>4</sup> From simple lesion counting<sup>6</sup> to advanced grading systems<sup>7</sup> have been in use around the world. Hayashi et al<sup>6</sup> classified acne using simple lesion counting by using standard photographs. The inflammatory lesions on half of face were counted to classify acne as mild= 0-5, moderate=6-20, severe= 21-50 and very severe= more than 50.

Timely and adequate treatment is of utmost importance in preventing scarring and post-inflammatory sequelae of acne. Topical and systemic antibiotics are used all

over the world to treat acne vulgaris. Topical agents like Benzoyl peroxide, Tretinoin and Azelaic acid are usually enough to treat mild acne. Systemic antibiotics are needed for moderate to severe acne.<sup>8</sup> Azithromycin is a relatively newer drug in the management of acne and is a macrolide.<sup>9</sup> Doxycycline is first-line antibiotic used in Acne. However, it has been reported to have adverse reactions such as teeth discoloration, gastrointestinal side effects, photosensitive reactions and effects on central nervous system.<sup>10</sup> Since acne is common in our population and its treatment and complications are problematic for both the patients and healthcare system, we conducted this study to find the best possible oral treatment of acne with better patient compliance.

### Methods:

After approval from Ethical Review Committee, Randomized Controlled Trial of 304 patients suffering from moderate acne (classified clinically by lesion counting method 6) was carried out in Department of Dermatology, Services Hospital, Lahore, from July 10, 2019 to January 10, 2020. Patients of both genders and ages between 18 and 35 years were included after taking written informed consent.

Patients using systemic antibiotics one month before the study, topical treatment in last 2 weeks, oral Isotretinoin within past 6 months were excluded from the study. Pregnant and lactating females, history of hypersensitivity to these drugs and any co-morbidity or chronic ailment of liver, kidneys or endocrinological issues, etc. were also excluded. Associated diseases were ruled out by history and complete physical examination.

The patients were randomly divided by lottery method into two treatment groups as follows. Group-A (n=152) was given azithromycin 500 mg daily for 3 days consecutively in 10 days' cycle with 7 days free of drug, for 3 months, while Group B (n=152) was prescribed doxycycline 100 mg once a day for 3 months. The response of each drug was analysed at 4 weekly intervals for three months.

Patients were assessed by the same physician throughout the treatment period. Patients were told not to use anything topically for acne. Difference between number of lesions before and after treatment was

calculated. Effectiveness was defined as more than 50% reduction in number of inflammatory lesions of acne (pustules, papules and nodules) in terms of percentages as: Excellent >80%, Good 51–80%, Poor 31–50%, No response <30% at the end of 3 months. Photographs were taken before and after treatment. (Figure 1)

### Results:

This randomized controlled therapeutic trial was carried out with the aim of comparing effectiveness of azithromycin from doxycycline in patients of Acne. In group-A (azithromycin), 48(31.6%) patients were male and 104(68.4%) were female and in group-B (doxycycline), 40(26.3%) were male and 112(73.7%) were female. The mean age of patients in group-A was  $22.5 \pm 3.3$  years while in group-B it was  $21.7 \pm 3.2$  year. In group-A, 105(69.1%) patients had ages between 18-25 years and 47(31%) between 26-35 years. In group-B, 83(54.6%) patients had ages between 18-25 years and 69(45.4%) between 26-35 years.

In group-A, 98(64.5%) patients were single and 54(35.5%) were married and in group-B, 92(60.5%) were single and 60(39.5%) were married. In group-A, 19(12.5%) patients were underweight, 116(76.3%) were normal, 15(9.9%) were overweight and 2(1.3%) were obese and in group-B, 19(12.5%) were underweight, 114(75.0%) were normal, 11(7.2%) were overweight and 8(5.3%) were obese.

**Table 1:** Comparison of outcome between groups

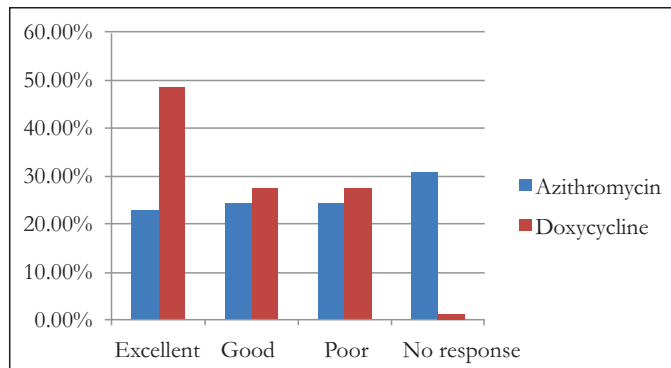
Outcome	Groups		Total	p-value
	Group-A (Azithromycin)	Group-B (Doxycycline)		
Excellent	35	74	109	0.00001
>80%	23.0%	48.7%	35.9%	
Good	37	42	79	
51-80%	24.3%	27.6%	26.0%	
Poor	33	34	67	
31-50%	21.7%	22.4%	22.0%	
No Response	47	2	49	
(< 30%)	31%	1.3%	16.1%	
<b>Total</b>	<b>152</b>	<b>152</b>	<b>304</b>	
	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	

Table 1 and Figure 2 represent the comparison of results between the two groups. In group-A, 35(23.0%)

patients had excellent response, 37(24.3%) had good, 33(21.7%) had poor and 47(31%) had no response. In group-B, 74(48.7%) had excellent, 42(27.6%) had good, 34(22.4%) had poor and 2(1.3%) had no response. Using chi-square test, this difference of efficacy was analysed to be statistically significant (p-value 0.000001).



**Figure 1:** Photographs of Patients Before and After Treatment with Azithromycin and Doxycycline



**Figure 2:** Efficacy of Azithromycin versus Doxycycline

## Discussion:

Acne vulgaris has a distressing psychosocial impact on patients. Multiple treatment modalities have been tried and tested worldwide with variable outcome. The commonest systemic antibiotics used and tested over time include azithromycin and doxycycline.<sup>4</sup> The present study showed that in azithromycin group, the response was excellent in 23%, good in 24.3%, poor in 21.7%, and no improvement was observed in 31% while in group B, improvement was excellent in 48.7%, good improvement in 27.6%, poor improvement in 22.4% and no improvement was observed in 1.3% patients. So, there was better response with doxycycline.

Most of patients in our study were in the 18-25 years' age group which is in accordance with a local study by Sultan N et al.<sup>11</sup> However, they found azithromycin to be more efficacious in getting faster relief, which was contrary to our observation. In our study, a greater

preponderance of female patients was seen as compared to male patients similar to most of studies.<sup>11,12</sup> This can be due to the fact that females are more conscious of their looks and seek advice from doctors earlier.<sup>13</sup>

In a local study conducted in Lady Reading Hospital Peshawar, patients treated with azithromycin pulse therapy showed poor response in comparison to patients treated with doxycycline. In Azithromycin group, improvement noted was excellent in 3.1%, good improvement in 22.8%, moderate improvement in 59.6%, mild improvement in 11.4% and no improvement was observed in 3.1% patients. In group B, excellent improvement was noted in 11.4%, good improvement in 55.4%, moderate improvement in 26.4%, mild improvement in 6.2% and no improvement was observed in 0.5%.<sup>14</sup> These results were comparable to our findings.

A comparative study, conducted in India, between pulse dosing of azithromycin and doxycycline (100mg) once daily, showed that azithromycin was more effective compared to doxycycline but the sample size was small.<sup>15</sup> Kim JE assessed 906 patients (as part of six studies) of moderate to severe acne vulgaris, the efficacy of both drugs showed comparable results.<sup>10</sup> In another Indian study, no statistically significant difference in efficacy was noted between both drugs after one month of therapy. Both drugs were effective in reducing the severity of the disease when compared separately.<sup>8</sup> These results were contrary to our observations.

In another study in Tehran, with Azithromycin, 26.7% patients showed excellent improvement, good in 53.3%, moderate in 15%, mild in 5%. With Doxycycline, response was excellent in 20%, good in 53.3%, moderate improvement in 16.7% and mild improvement in 10%.<sup>16</sup> Here also azithromycin was slightly more effective than doxycycline, contrary to our results.

Our results concluded doxycycline to be more effective than Azithromycin. However, the patients' compliance to the treatment was hampered in doxycycline due to somewhat delayed clinical response, which might weaken his/her confidence in the therapy and the treating dermatologist. Moreover, lesion counting

method we used is a primitive way of acne grading which might have led to observer-based bias. Further large scale studies are required to confirm our results and to study safety profile of both drugs which we couldn't address.

Since cosmetic and psychosocial wellbeing go hand in hand in our part of the world, this study addressed a very common issue of adolescents. Since there is a dearth of recent local studies on the topic, this study may contribute to management of acne specially in cases resistant to other

### Conclusion:

This study concluded that doxycycline appears to be more successful and cost-effective treatment for moderate inflammatory acne vulgaris in comparison with azithromycin pulse therapy. Azithromycin may be used as an alternative treatment in cases not responding to doxycycline.

**Ethical Approval:** Given

**Conflict of Interest:** The authors declare no conflict of interest.

**Funding Source:** None

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