

The Efficiency between Azithromycin vs Doxycycline in Patients with Acne Vulgaris

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Abstract

Original Research Article

Background: One of the most prevalent illnesses affecting the pilosebaceous unit is acne vulgaris. In spite of doxycycline's status as a go-to anti-acne drug, alternative options have been explored owing to the drug's negative effects and contraindications. **Objective:** In this study our main goal is to evaluate the efficiency between azithromycin vs. doxycycline in patients with acne vulgaris. **Method:** This cross sectional study carried out at tertiary hospital from January 2021 to January 2022. A total of 200 Patients who met the diagnostic criteria were enrolled in the study if they didn't have a history of taking systemic and topical treatment for their acne during the past four and two weeks respectively and hadn't received oral isotretinoin for the past 6 months. After taking informed consents, patients were enrolled in the study and randomly assigned to two treatment groups: n=100 control group received 100 mg doxycycline daily for three months which considered as group A and n=100 case group received 500 mg azithromycin consecutive three days in a week for three months is considered as group B. All patient received instructions about correct method of taking the drugs. **Results:** During the study, most of the patients belong to 20-30 years age group, 48% and 60% were female. After getting the course, in group A good improvement seen in 46% cases, followed by 38% cases had moderate improvement, 7% had mild improvement, 6% had no improvement. Whereas in group B good improvement seen in 49% cases, followed by 42% cases had moderate improvement, 9% had mild improvement, 3% had no improvement. In addition, gastrointestinal side effects are more frequently seen with doxycycline (12%) than azithromycin (4%). Plus, dermatologic adverse effects of doxycycline (4%) are higher than azithromycin (1.5%). **Conclusion:** Because of its extended half-life and lack of serious side effects, azithromycin is a viable alternative to the standard treatment of inflammatory acne with doxycycline, and it has greater short-term efficacy.

Keywords: Acne vulgaris, azithromycin, doxycycline.

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INTRODUCTION

Acne vulgaris is a pilosebaceous condition that has several potential causes. Acne may manifest clinically in a wide range of severity, from minor comedonal acne to widespread inflammatory illness. Although acne may affect people of any age, it is most often associated with the teenage years [1]. Comedonal, erythematous papules and pustules and nodules and deep pustules or pseudocysts, and sometimes scarring are all features of this condition. It has been shown that boys aged 16–19 are more likely to develop acne than girls aged 14–17 (35%) and females aged 16–17 (45%). Nearly 24% of adolescent girls have acne, and in the mildest forms, it is considered a physiological issue.

Acne is more common in female patients since they reach puberty at a younger age.

Slowly, the condition improves after 20-25 years, albeit 7-17% of patients still have symptoms at this point. Only 1% of men and 5% of women may have persistent acne into their 40s [2].

Acne vulgaris may cause inflammatory lesions, post-inflammatory hyperpigmentation (PIH), inflammatory painful nodules, nodular hypertrophic scars, cystic lesions, and more if left untreated [3]. Exudative or hemorrhagic nodules of highly unattractive form are also possible [4]. In very unusual situations, there may be sinus tracts interspersed among the deep nodules or pustules [5]. Acne vulgaris may

create psychological issues, especially in young women, if the lesions become painful, persistent, and resistant to therapy [6]. Acne may be treated topically with retinoids or antibiotic creams in milder forms. Acne of a moderate or severe severity, acne that is mild in individuals who are depressed or dysphoric, and pyogenic inflammatory disease are all treated with systemic antibiotics like doxycycline [7]. Because of their short half-life, oral broad-spectrum antibiotics like tetracyclines (doxycycline and macrolides, which have been used to treat inflammatory acne for the last three decades, have needed administration of many doses daily for an extended time (at least six months). Additionally, systemic antibiotics may cause a variety of unwanted consequences, including gastrointestinal issues. With a long half-life, Azithromycin is a derivative of erythromycin that allows for less frequent dosing and, according to the research, is safe, effective, and well-tolerated by patients, with a high rate of compliance [8, 12].

Azithromycin was the most effective treatment for acne, with an overall success rate of over 80%, according to research conducted by Fernandez and Obregon in 2001. Other therapeutic agents, such as tetracycline, erythromycin, minocycline, and doxycycline, had success rates averaging 77.1%, with the difference not being statistically significant [9]. Gruber *et al.*, examined the efficacy of azithromycin and minocycline in treating acne vulgaris in 1998. In the end, 75.8% of those treated with azithromycin and 70.5% of those treated with minocycline reported satisfaction with their outcomes. Minor side effects were reported by 10.3% of individuals using azithromycin and 11.7% of people taking minocycline. They determined that azithromycin is at least as effective and well tolerated as minocycline in treating acne [10].

Azithromycin medication was well-liked by patients in a research conducted by Fernandez *et al.*, in 1997; no adverse effects were reported, and by the end of the four-week trial period, 80 percent of patients had shown improvement [11]. The 2004 research by Kapadia and Talib indicated that after four weeks of therapy with azithromycin, more than 82.9% of patients showed substantial improvement. After 12 weeks of therapy, the best results were shown.

Only 11.4% of people had negative symptoms including nausea and heartburn [13]. In 2006, Rafiei and Yaghubi looked at how well doxycycline and azithromycin treat acne. Overall, the findings revealed significant improvement in both groups, with azithromycin slightly outperforming tetracycline in decreasing inflammatory lesions (84.7% vs. 79.8%). Their research led them to the conclusion that azithromycin is an effective treatment option for inflammatory acne [15]. After four weeks of therapy, patients treated with azithromycin showed substantial

improvement in 80% of cases, whereas patients treated with doxycycline showed improvement in only 53% of cases [14].

OBJECTIVE

In this study our main goal is to evaluate the efficiency between azithromycin vs. doxycycline in patients with acne vulgaris.

METHODOLOGY

A total of 200 Patients who met the diagnostic criteria were enrolled in the study if they didn't have a history of taking systemic and topical treatment for their acne during the past four and two weeks respectively and hadn't received oral isotretinoin for the past 6 months. Female patients all required to have a negative pregnancy test and were asked to use a safe contraception method other than OCP during the study period. Exclusion criteria were history of drug sensitivity, medical diseases including endocrine or gastrointestinal, smoking and hyperandrogenism manifestations in girls. After taking informed consents, patients were enrolled in the study and randomly assigned to two treatment groups: n=100 control group received 100 mg doxycycline daily for three months which considered as group A and n=100 case group received 500 mg azithromycin consecutively three days in a week for three months is considered as group B. All patient received instructions about correct method of taking the drugs. All patient received instructions about correct method of taking the drugs. Clinical assessment was made at baseline and at the end of each month and a global score was determined at each visit. The score for each area (Local score) is calculated by multiplying a factor assigned to each area of the body (according to GAGS) in the grade of severity of the lesions (0-4). Global score is the sum of local scores. A score of 0 means no lesions; 1-18 is considered mild acne; 19-30, moderate acne; 31-38, severe acne; and higher than 39 very severe acne. Drug side effects including gastrointestinal, neurologic and dermatologic signs and symptoms were checked and recorded during each visit. Patients were asked to evaluate the treatment at the end of the third month by grading: 0, worse; 1, no change; 2, mild improvement; 3, moderate improvement; 4, considerable improvement.

Data was analyzed using SPSS. Mean global scores were compared using t-test. Qualitative variables were compared using chi-2 test. As shown on the table, gastrointestinal side effects are more frequently seen with doxycycline (11.7%) than azithromycin (3.3%).

RESULTS

Table-1 shows age distribution of the patients where most of the patients belong to 20-30 years age group, 48% followed by 40% belong to <20 years old, 8% belong to 31-40 years age group, 2% belong to >40

years age group. The following table is given below in detail:

Table-1: Age distributions of the patients

Age group, years	%
<20	42%
20-30	48%
31-40	8%
>40	2%

Figure-1 shows gender distribution where 80% were female and 20% were male. The following figure is given below in detail:

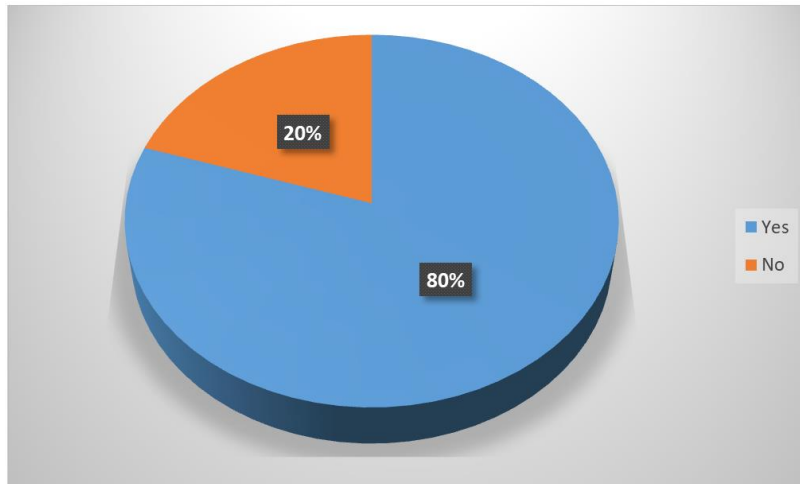


Figure 1: Gender Distribution

In table-2 shows comparison of patients' evaluation about their treatment in the two groups where after getting the course, in group A good improvement seen in 49% cases, followed by 38% cases had moderate improvement, 7% had mild

improvement, 6% had no improvement. Whereas in group B good improvement seen in 49% cases, followed by 42% cases had moderate improvement, 9% had mild improvement, 3% had no improvement.

Table-2: Comparison of patients' evaluation about their treatment

Group	Patients evaluation			
	No improvement	Mild improvement	Moderate improvement	Good improvement
Group A, n=100	6%	7%	38%	46%
Group B, n=100	3%	9%	42%	49%

In table-3 shows mean final score of the patients at the end of first, second and third months of

treatment where among two group mean difference was not significant.

Table-3: Mean final score of the patients

Group	Baseline	First Month s	Second Month	Third Month
Group A, n=100	24.32	16.1	9.78	6.14
Group B, n=100	25.02	18.27	12.60	6.50

Table-4 shows gastrointestinal side effects in the study population where gastrointestinal side effects

are more frequently seen with doxycycline (12%) than azithromycin (4%).

Table-4: Gastrointestinal side effects in the study population

Group	%
Group A, n=100	12%
Group B, n=100	4%

Table-5 shows dermatologic side effects in the study population where dermatologic adverse effects of doxycycline (4%) are higher than azithromycin (1.5%),

however. No patients demonstrated neurologic side effects.

Table-5: Dermatologic side effects in the study population

Group	%
Group A, n=100	4%
Group B, n=100	1.5%

DISCUSSION

Statistical analysis showed no significant difference between the two groups regarding demographic characteristics and mean global score at baseline, therefore comparison of the results between the two groups was more precise. As mentioned, few patients were excluded from the study due to medication side effects or inability to afford azithromycin and were substituted with new cases. Mean GS at the end of each month of treatment was significantly decreased when compared with baseline which indicates the therapeutic efficacy of both drugs. Moreover, statistical analysis showed that at the end of the first and second months, azithromycin was more effective than doxycycline and the difference was found significant for the second month that might reflect the faster and more effective improvement of acne with azithromycin, although the difference wasn't significant at the end of the treatment period. Fernandez and Obregon in 2001 investigated efficacy of azithromycin in acne treatment. In their study a total of 99 inflammatory episodes of acne were treated in 79 patients using several antimicrobial medications including tetracycline, azithromycin, minocycline, and doxycycline. Patients who could not tolerate any of the mentioned drugs were treated using azithromycin. Azithromycin was administered as 500 mg consecutive three days in a week for three months.

Side effects of all drugs were evaluated. It was shown that azithromycin was effective in 85.7% of patients while the other three antibiotics had an average efficacy of 77.1%; however, the difference wasn't statistically significant [9].

Kapadia and Talib in 2004 studied the effect of 250 mg azithromycin daily for 12 weeks on 35 patients with moderate to severe acne and found considerable improvement in 82.9% of them with maximum improvement (more than 80%) being recorded after 12 weeks of treatment. Side effects including nausea and heart burn were only seen in 4 (11.4%) patients. This study reported daily 250 mg azithromycin as a safe therapeutic regimen for acne with minor side effects [13]. Their study period was 3 months similar to ours and they also found maximum improvement after 12 weeks of therapy. They reported gastrointestinal adverse effects of azithromycin in 4 patients while we found one case of abdominal pain and one case of nausea in our study. Yucelten in 2005 compared the efficacy of

azithromycin and doxycycline in acne treatment on 50 patients assigned randomly to two therapy groups: azithromycin group received azithromycin 500 mg/day on 3 consecutive days per week in the first, on 2 consecutive days in the second and on 1 day per week in the third month. The second group took doxycycline twice a day for the first month, and daily for the second and third months. Clinical response to therapy was similar in the two groups and persisted 3 months after discontinuation of the treatment. Three cases of diarrhea were reported in azithromycin group while two patients in doxycycline group developed photosensitivity. This study suggested that azithromycin is at least as effective as doxycycline in treatment of acne [14]. Consistently in our study, gastrointestinal side effects were found in azithromycin group including 2 cases with abdominal pain and nausea, and dermatologic side effects were seen in doxycycline group including two cases of photosensitivity and one case of skin rash. Rafiei and Yaghoobi in 2006 compared tetracycline and azithromycin in treatment of acne on 290 patients for three months. Azithromycin was administered 500 mg/day for 3 consecutive days per week on the first and 250 mg/day every other day for the next two months. The results showed improvements of the lesions in both groups, however, azithromycin was slightly more effective than doxycycline in reducing inflammatory lesions and it was concluded that azithromycin is a safe and effective alternative in treatment of inflammatory acne [15]. Study population in their investigation was larger than ours which is more appropriate statistically. The schedule in their study was 3 consecutive days for azithromycin and every other day for doxycycline, but in our study both drugs were administered daily. Lucky *et al.*, (2008) studied the effect of azithromycin 500 mg/day and doxycycline 100mg/day on 70 patients with acne. Therapeutic effect was 65% and 80% in doxycycline and azithromycin groups, respectively (14). Study population was similar to our study; however, they administered azithromycin 500 mg consecutive three days in a week for three months and doxycycline 100 mg/day for three months. Nevertheless it is interesting that they found azithromycin to be significantly more effective than doxycycline while in our study the efficacy was similar and only in second month of administration was significant. Muron in 2009 studied the effect of azithromycin and doxycycline on acne treatment in 16-18 years old adolescents for a six-month period. Ninety patients received 250 mg azithromycin and ninety other were given 100 mg doxycycline daily. Therapeutic effect of the two drugs

was nearly 79% and similar. Side effects were found in 15% of the patients in doxycycline group including abdominal pain and vomiting and 5% of patients in azithromycin group including nausea [16]. Efficacy of the medications in this study was similar to ours (79%) and also the reported adverse events were almost like our findings in the two groups in terms of type (gastrointestinal and dermatologic). Knaggs *et al.*, in 2011 studied the effect of azithromycin and doxycycline in 40 patients for 2 months. Twenty five patients received 100 mg/day doxycycline and fifteen patients received 250 mg azithromycin every other day. Therapeutic effect in both groups was almost 71%. Patient's satisfaction for treatment was 70% in doxycycline group and 82% in azithromycin group. Side effects in doxycycline group included skin rashes in 10% of the patients while in azithromycin skin rashes were found in 4% [17]. Treatment period was 2 months in this study while it was 3 months for our study. Patient's satisfaction level in our study was 95% for azithromycin and 93.3% for doxycycline. In a study in 2012 Speroff *et al.*, compared azithromycin 500 mg every other day with doxycycline 200 mg daily on 80 patients in two groups of 40 patients each containing 20 male and 20 female patients. Therapeutic effect of the drugs after four months was 81.1% in azithromycin group and 76% in doxycycline group and the difference was not statistically significant. Treatment side effects in doxycycline group included skin rash and photosensitivity in 18% and headache in 5%. In azithromycin group dermatologic (skin rash) and neurologic adverse effects were found in 10% and 2%, respectively [18]. In consistent to our study, patients in this investigation were equally assigned to the two groups and the number of male and female patients in the two groups was similar. Frequency of neurologic side effects was 5% in doxycycline group and 2% in azithromycin group in this study; however, no cases of neurologic complications were seen in our study.

Ellis and Krach in a study compared the effect of 250 mg/day azithromycin and 100 mg/day doxycycline in treatment of acne for a three-month period. Therapeutic response was similar and nearly 78.5% in both groups and persisted for 3 months after treatment discontinuation. Nausea and vomiting was reported in four patients in doxycycline group and two patients in azithromycin group. Photosensitivity was seen in four patients in doxycycline group but not azithromycin group. Patients in this study were 15 to 28 years old [19], while in our study they were 15-31 years old. Therapeutic effect in this study was close to our results (78.5%). Mean improvement of acne in our study according to the global acne grading system was 74% in both study groups highlighting the high efficacy of both of these drugs. Quantitative evaluation of the acne according to GAGS scale was performed at the end of each month of treatment and showed higher efficacy of azithromycin in comparison to doxycycline during the first two months in acne treatment, although

at the end of the three-month period the effect of the both drugs was almost similar. Subjective evaluation of the two treatment regimens asked from patients showed that nearly 94% assessed therapeutic effect moderate to good reflecting their satisfaction. Therefore, azithromycin is a long acting drug with minor side effects and high patient compliance. On the other hand, it costs more than older antibiotics which is a compliance limiting factor in patients from lower economic levels. Results of the presents study and previous investigations demonstrated that azithromycin, a long acting macrolide, can be an acceptable alternative for the classic doxycycline in treatment of inflammatory acne and given the long half-life and low complications, it has higher patient compliance while its short-term effects are better than doxycycline.

CONCLUSION

Because of its extended half-life and lack of serious side effects, azithromycin is a viable alternative to the standard treatment of inflammatory acne with doxycycline, and it has greater short-term efficacy.

REFERENCES

1. Andrea, L. Z. (2008). Acne vulgaris. In: Jean L Bologna, Joseph L Jorizzo, Ronald P Rapini. *Dermatology*, Mosby, *Second Edition*, 495-508.
2. Simpson, N. B., & Cunliffe, W. J. (2004). Disorders of the sebaceous glands. In: *Rook, Wilkinson, Ebling: textbook of Dermatology*. *Champion. Black well science*, 43, 1-75.
3. Gloor, M., & Hubscher, H. L. (1994). Untersuchungen zur externen Behandlung der Acne vulgaris mit tetracycline und estrogen. *Haut arzt*, 25, 391-4.
4. WALTON, S., Wyatt, E. H., & Cunliffe, W. J. (1988). Genetic control of sebum excretion and acne—a twin study. *British Journal of Dermatology*, 118(3), 393-396.
5. Goulden, V., Clark, S. M., & Cunliffe, W. J. (1997). Post-adolescent acne: a review of clinical features. *British journal of dermatology*, 136(1), 66-70.
6. Voorhees, J. J., Wilkins, J. W., Hayes, E., & Harrell, E. R. (1972). Nodulocystic acne as a phenotypic feature of the XYY genotype: report of five cases, review of all known XYY subjects with severe acne, and discussion of XYY cytodiagnosis. *Archives of Dermatology*, 105(6), 913-919.
7. Goodfellow, A., Alaghband-Zadeh, J., Carter, G., Cream, J. J., Holland, S., Scully, J., & Wise, P. (1984). Oral spironolactone improves acne vulgaris and reduces sebum excretion. *British Journal of Dermatology*, 111(2), 209-214.
8. Zouboulis, C. C., & Piquero-Martin, J. (2003). Update and future of systemic acne treatment. *Dermatology*, 206(1), 37-53.

9. Fernandez-Obregon, A. C. (2000). Azithromycin for the treatment of acne. *International journal of dermatology*, 39(1), 45-50.
10. Gruber, F., Grubisic – Greblo, H., kastelam, M., Brajac, I., Lenkovic, M., & Famolo, G. (1998). Azithromycin compared with minocycline in treatment of acne. *Come donica and papulopustulosa. J chemother*, 10(6), 469-73.
11. Fernandez-Obregon, A. C. (2000). Azithromycin for the treatment of acne. *International journal of dermatology*, 39(1), 45-50.
12. Parsad, D., Pandhi, R., Nagpal, R., & Negi, K. S. (2001). Azithromycin monthly pulse vs daily doxycycline in the treatment of acne vulgaris. *The Journal of dermatology*, 28(1), 1-4.
13. Kapadia, N., & Talib, A. (2004). Acne treated successfully with azithromycin. *International journal of dermatology*, 43(10), 766-767. Kus, S., Yucelten, D., & Aytug, A. (2005). Comparison of efficacy of azithromycin vs. doxycycline in the treatment of acne vulgaris. *Clinical and Experimental Dermatology: Clinical dermatology*, 30(3), 215-220.
14. Rafiei, R., & Yaghoobi, R. (2006). Azithromycin versus tetracycline in the treatment of acne vulgaris. *Journal of dermatological treatment*, 17(4), 217-221.
15. Munro-Ashman, D. (1963). Acne vulgaris in a public school. *Transactions of the St. John's Hospital Dermatological Society*, 49, 144-148.
16. Knaggs He- Holland, D. B., & Morrisc. (2011). Autoantification of cellular proliferation in using the monoclonal antibody Ki-67-J sac invests. *Dermatol*, 102, 89-92.
17. Speroff, L., & Decherney, A. (2012). Evaluation of azithromycin and doxycyclin in acne. *Obstet Gynecol*, 91, 1030-41.
18. Ellis, C., & Krach, M. (2012). Uses and complication of doxycyclin in acne vulgaris. *J Cutan Med*, 12, 32-5.