A COMPARATIVE STUDY ON THE EFFICACY AND SAFETY OF ORAL AZITHROMYCIN PULSE VERSUS DOXYCYCLINE DAILY IN THE TREATMENT OF ACNE VULGARIS

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ABSTRACT

BACKGROUND

Azithromycin and doxycycline drugs are used orally in the treatment of acne vulgaris.

The aim of this study is to know the drug which is more efficacious and safe among orally administered azithromycin given in pulse dose and orally administered doxycycline given in daily dose in the treatment of patients having acne vulgaris.

MATERIALS AND METHODS

In this non-randomised controlled clinical study, 80 outpatients attending the Dermatology OPD, Government General Hospital, Anantapur, were taken to study the comparative efficacy and safety of oral azithromycin in pulse dose against the oral doxycycline in daily dose in the treatment of inflammatory acne vulgaris. The group A containing 44 patients suffering with inflammatory acne vulgaris were administered oral azithromycin 500 mg before meals for three consecutive days in a 10-day cycle with the remaining 7 days as drug-free days in each cycle. The group B containing 36 patients suffering with inflammatory acne vulgaris were administered oral doxycycline 100 mg daily after meals. Topical erythromycin was given to all the patients in both the groups. Clinical assessment of acne vulgaris lesions was done at 10-day intervals for both the groups of patients up to three months. Severity index described by Michaelsson was used to assess the outcome results in this study.

RESULTS

Group A patients, i.e. azithromycin treated group shows 81.01% improvement of acne vulgaris lesions, whereas group B patients, i.e. doxycycline treated group shows only 66.24% improvement of acne vulgaris lesions. Statistically significant reduction in the severity of acne vulgaris lesions in the azithromycin treated group of patients was noted in this study.

CONCLUSION

Combination of oral azithromycin in pulse dose along with topical erythromycin was significantly better than the oral doxycycline in daily dose along with topical erythromycin in the treatment of acne vulgaris. The incidence and severity of side effects are minimum in the azithromycin treated group as compared to doxycycline treated group in this study.

KEYWORDS

Azithromycin, Doxycycline, Acne Vulgaris.

HOW TO CITE THIS ARTICLE: Kishore Kumar V. A comparative study on the efficacy and safety of oral azithromycin pulse versus doxycycline daily in the treatment of acne vulgaris. J. Evid. Based Med. Healthc. 2017; 4(90), 5410-5413. DOI: 10.18410/jebmh/2017/1082

BACKGROUND

Acne vulgaris is the most common skin disease adversely affecting the psychosocial well-being of adolescents and young adults.[1] It is true that no person passes through the adolescent age without having few acne lesions like papules and comedones, etc.[2] Since the past few decades, systemic antibiotics like tetracyclines and erythromycin are usually administered for the treatment of acne vulgaris patients having inflammatory lesions like papules, pustules and cysts. These drugs require frequent doses of administration in a day and also associated with lot of adverse side effects, thereby reducing the compliance of the patients taking the treatment for the acne vulgaris.[3] So, this study was undertaken to know the efficacy and safety of oral azithromycin in pulse dose along with topical erythromycin in comparison with the oral doxycycline given in daily dose along with topical erythromycin.

Azithromycin is a macrolide like erythromycin to which it is closely related in structure and belongs to the azalide group of antibiotics.[4] Compared to erythromycin, azithromycin penetrates well into the tissues, more stable and has higher half-life.[5] Azithromycin is usually preferred for the treatment of bacterial skin infections and streptococcal throat infections, etc.

MATERIALS AND METHODS

A total number of 80 patients attending the Dermatology OPD, Government General Hospital, Anantapur, Andhra Pradesh during the period from June 2015 to December 2015 participated in this study. In accordance to the proposal by the Consensus Conference for the Classification of Acne,[6] those patients having moderate-to-severe acne

Financial or Other, Competing Interest: None.
Submission 06-11-2017, Peer Review 13-11-2017,
Acceptance 18-11-2017, Published 20-11-2017.
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DOI: 10.18410/jebmh/2017/1082

with lesions like papules, pustules, nodules and cysts and not responding to the conventional treatment were included in this study. Patients suffering from liver diseases, patients taking antibiotics for any other illness and pregnant woman were excluded from this study. In 45 patients of this study, acne lesions were present over the chest and back along with facial lesions. Most of the patients in this study had acne lesions for the past 1 year and a few had for 2 years.

In all the patients who participated in this study with acne vulgaris, the acne lesions were graded according to the severity index described by Michaelsson et al[7] by counting the number of open comedones, closed comedones, papules, pustules, infiltrated lesions and cystic lesions. The acne lesions severity index grading was done as 0.5 for comedones, 1 for papules, 2 for pustules, 3 for infiltrated lesions and 4 for cystic lesions. Total severity score of acne vulgaris was calculated by multiplying the number of each type of acne lesion present in that particular patient with its severity index and then adding them all together. Patients participated in this study were divided into two groups. The group A patients (44 in number) were administered oral azithromycin 500 mg before meals daily for 3 consecutive days in a 10-day cycle with remaining 7-day period as drug-free days. The group B patients (36 in number) were administered oral doxycycline 100 mg after meals daily for 10 days. For all the patients in both the groups, topical application of erythromycin twice daily was prescribed. Each and every patient in both the groups was clinically assessed at 10-day intervals for a period of 3 months. At each time of clinical assessment of the patient, severity score of acne vulgaris was calculated and recorded by two dermatologists, then the average of their two noted scores was taken for the assessment purpose. The clinical photographs of the patients were also taken. At the end of the third month of this study, final clinical assessment of all the patients was done by calculating and recording the severity score of the acne vulgaris lesions.

RESULTS

Total 80 patients participated in this study, out of which, 50 patients are females and 30 patients are males. Oral doxycycline was administered in 36 patients and oral azithromycin was administered in 44 patients. Eight patients (six patients in doxycycline taking group and two from azithromycin taking group) did not turn for follow up. Treatment with doxycycline was withdrawn in two doxycycline taking group of patients because of the development of serious side effects like development of oesophageal ulceration in one patient and photoonycholysis in another. A total number of 70 patients successfully completed this study (Table 1). The mean severity score of acne lesions in the azithromycin treated group was reduced from 263.55 (range from 151.5-452.55) of pretreatment to 50.07 (range 14 to 272) after treatment for 3 months, an improvement of 81.01% was noted (Table 1). 23 patients (54.76%) of azithromycin-treated group showed >80% improvement, 15 patients (35.72%) showed 40%-80% improvement and only 4 patients (9.52%) showed <40% improvement in their acne lesions (Table 2). An average of 12% improvement in acne lesions after the first cycle, about 50% improvement after the 4 cycles, 75% improvement after 8 cycles and 81.01% improvement at the end of the three months study period was noted. Four patients complained about slight gastric upset, but the azithromycin did not need to be discontinued in them.

For the doxycycline treated group of patients in this study, mean severity score of acne lesions was reduced from 244.55 (range 182-375.5) of pretreatment to 82.56 (range 34 to 246) of after treatment, i.e. up to three months, an improvement in acne lesions of about 66.24% was noted (Table 1). 5 patients (17.86%) showed >80% improvement, 17 patients (60.72%) showed 40%-80% and 6 patients (21.42%) showed <40% improvement in their acne lesions (Table 2). An improvement of 8% occurred in the severity score of acne lesions after the first cycle, about 30% improvement after 4 cycles, 60% improvement after 8 cycles and 66.24% improvement at the end of three months study period was noted. Four patients had diarrhoea, four patients had gastric upset, one patient had oesophageal ulceration and one patient had photoonycholysis during treatment with oral doxycycline.

Acne vulgaris lesions severity score reduction was compared with both drugs (oral azithromycin and oral doxycycline) and then it was tested with t-test for the difference between the means and this also showed significant difference in the reduction of number of acne lesions between these two drugs. The mean severity score of acne lesions during pretreatment with azithromycin was 263.55 ± 70.89 and with doxycycline was 244.55 ± 50.46. After treatment, mean severity score of acne lesions was reduced to 50.07 ± 56.67 in azithromycin treated group and 82.56 ± 64.48 in doxycycline treated group of patients.

These results show significant difference between the severity score reduction on comparing the effects of azithromycin and doxycycline in acne vulgaris patients ($p < 0.01$, Table 2). On comparison of proportion of improvement in acne lesions in both these groups at the end of three months period in this study showed that the azithromycin drug treated group had 81.01% reduction in number of acne lesions, which is a notable significant change and $p < 0.05$ (Table 1).

Patients	Mean Severity Score		Percentage Decrease
	Initial	After 3 Months	
Azithromycin (42)	263.55 (151.5-452.55)	50.07 (14-272)	81.01%
Doxycycline (28)	244.55 (182-375.5)	82.56 (34-246)	66.24%

Table 1. Mean Severity Score of Acne Lesions in Group A and Group B Patients Before and After Treatment with Azithromycin and Doxycycline Respectively

P <0.05.

Severity Reduction %	Azithromycin	Doxycycline	Total
<40%	4 (9.52%)	6 (21.42%)	10 (14.28%)
40%-80%	15 (35.72%)	17 (60.72%)	32 (45.72%)
>80%	23 (54.76%)	5 (17.86%)	28 (40%)
Total	**42**	**28**	**70**

Table 2. Comparison of Severity Reduction Percentage of Acne Lesions by Azithromycin and Doxycycline

P <0.01.

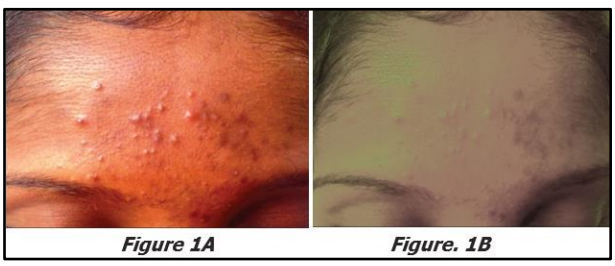

Figure 1A *Figure. 1B*

Figure 1A and 1B. Shows Before and After Treatment with Azithromycin Respectively

Figure 2A *Figure 2B*

Figure 2A and 2B Shows Before and After Treatment with Doxycycline Respectively

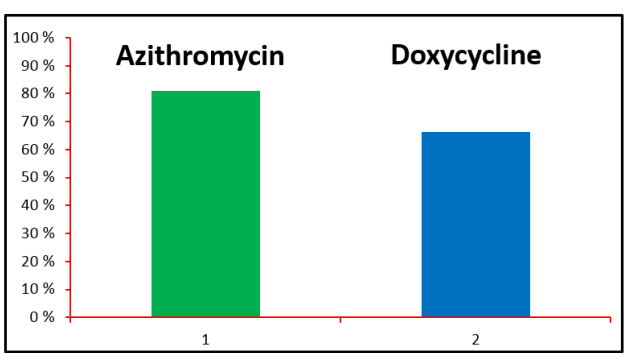

Figure 3. Shows the Percentage of Reduction of Acne Lesions by Azithromycin and Doxycycline

DISCUSSION

Results of this study indicates that the combination of oral azithromycin and topical erythromycin was significantly better than oral doxycycline and topical erythromycin for the treatment of inflammatory acne vulgaris lesions. More than 80% improvement in acne lesions was seen in 23 patients (54.76%) in the azithromycin group, but only in 5 patients (17.86%) in the doxycycline group. In total, this study results showed that 81.01% improvement in acne lesions was observed in azithromycin group in comparison to the 66.24% observed in the doxycycline group and this difference was statistically significant.

Similar results are seen in the study conducted by Fernandez et al[8] who gave azithromycin 250 mg per day for 3 days in a week, after 4 weeks he observed 85% reduction of acne lesions compared with 77.1% reduction of acne lesions when administered with other antibiotics like doxycycline, tetracycline and minocycline. In another study by Prasad D et al,[9] it was observed that doxycycline 100 mg daily was equally effective as azithromycin 500 mg for 4 days in a month. The effect of azithromycin lasts for 10 days, so a 10-day cycle in the treatment regimen of this study was tried. In a study conducted by Kapida et al,[10] azithromycin 500 mg given thrice weekly showed good improvement in acne lesions similar to the results seen in this study. In another study, Plewig et al[11] observed that 33% of patients had good to excellent response (50%-75%) to doxycycline in acne vulgaris, which is comparable to the results obtained in this study, which showed 40% of patients had more than 50% improvement in acne lesions. In another study, Gruber et al[12] compared the efficacy of azithromycin with minocycline and observed a satisfactory clinical response (70%-75%) with both these drugs. According to the observations made in this study and in various other studies, it became evident that azithromycin is the better alternative than doxycycline in moderate-to-severe grade acne patients as it is also not having serious side effects.

CONCLUSION

Combination of oral azithromycin in pulse dose along with topical erythromycin was significantly better than the oral doxycycline daily dose along with topical erythromycin in the treatment of acne vulgaris. The incidence and severity of the side effects are also noted minimum in the azithromycin treated group as compared to doxycycline treated group in this study. Azithromycin administered in pulse dose is more convenient to the patients as it is more efficacious, safe and treatment compliance in comparison to the doxycycline daily administered dose.

Acknowledgment

I express my sincere thanks to my colleague dermatologist working in the DVL Department in Government General Hospital, Anantapur, who helped me for successful completion of this study.

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