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Original Research Article

A Comparative Study of Azithromycin Pulse Therapy with Minocycline in Acne Vulgaris

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Abstract

Background: Acne vulgaris is a common dermatological problem. Acne is most commonly found in adolescents, caused by increased androgens in both sexes. It is usually caused due to Propionibacterium acnes. Minocycline is a newly introduced drug in treating acne vulgaris. On the other hand, it is assumed that azithromycin having a long half-life like can be very effective with better compliance in treating acne vulgaris. But we have not enough research-based comparative data regarding this issue. ***Objective:*** The objective of this study was to compare the efficacy and safety of azithromycin pulse therapy with minocycline in treating acne vulgaris. ***Methods:*** This was a prospective, comparative study and was conducted in Department of Dermatology, Naogaon Medical College, Naogaon, Bangladesh, during the period from January 2021 to December 2021. In total 80 patients with moderate-to-moderately severe (Grade II and III), acne vulgaris were included in the study population. Patients were randomly assigned to two treatment groups of group A & group B respectively. In group A, there were 25 patients received 500 mg azithromycin once a day for 3 days per week as pulse therapy along with 0.05% topical tretinoin for 3 months whereas in group B, there were another 25 patients received 50 mg minocycline twice a day along with 0.05% topical tretinoin for 3 months. All data were processed, analyzed, and disseminated by SPSS version 23.0 and MS Office program. ***Results:*** In this study, group A (Azithromycin) between baseline and final score distribution we found a significant correlation (P=0.023). On the other hand, in group B we did not find any significant correlation (P=0.073). In analyzing the changes in severity score of acne from baseline to the final assessment of both groups we observed, in group A at baseline 15%, 38%, and 48% of participants had the score points 2, 3, and 4 respectively whereas in the final stage 63%, 30%, and 8% participants had the score point 1, 2 and 3 respectively. So, in group A between baseline and final score distribution, we found a significant correlation (P=0.023). On the other hand, in group B at baseline 10%, 40%, and 50% of participants had the scored points 2, 3, and 4 respectively whereas in the final stage 65%, 28%, and 8% of participants had the score point 1, 2 and 3 respectively. In group B between baseline and final score distribution we found P value 0.073. ***Conclusion:*** In this study, the efficacy of both azithromycin pulse therapy and minocycline was found satisfactory. But as per the findings regarding the safety profiles, we can conclude that minocycline is safer than azithromycin pulse therapy in treating acne vulgaris.

Keywords: Acne vulgaris, Azithromycin, Pulse therapy, Minocycline, Efficacy, Safety.

INTRODUCTION

In the treatment arena of acne, minocycline is a newly introduced drug in treating acne vulgaris. On the other hand, it is assumed that azithromycin having a long half-life like can be very effective with better compliance in treating acne vulgaris. Acne vulgaris may have an adverse effect on psychosocial as well as emotional impact in an individual and that may lead to social phobias and clinical depression [1]. Among patients with acne non- inflammatory lesions consists of closed comedones and open comedones. On the other hand, inflammatory lesions present in the form of erythematous macules, papules, and pustules in the majority of cases [2]. Acne vulgaris develops in the pilosebaceous unit, composed of epidermal cells lining

the hair follicle as well as the sebaceous gland [3]. It represents obstruction and inflammation of the sebaceous follicles which is a subtype of pilosebaceous units [4]. For the management of acne, worldwide antibiotic therapies have been considered as an important part for the past 40 years, but acne vulgaris is not an infection in the classic sense [5]. The antibacterial effect of Azithromycin has been attributed to reversible binding to the 50S ribosomal subunit within the bacterial cell, with consequent inhibition of protein synthesis [6]. On the other hand, minocycline which is a semi-synthetic second-generation tetracycline has a better pharmacokinetic profile, and it is not phototoxic compared with doxycycline [7]. Being lipophilic, minocycline achieves greater tissue concentration and is considered to be more effective than doxycycline in treating acne [8].

METHODOLOGY & MATERIALS

This was a prospective, comparative study and was conducted in the Department of Dermatology, Naogaon Medical College, Naogaon, Bangladesh, during the period from January 2021 to December 2021. In total 80 patients with moderate-to-moderately severe (Grade II and III), acne vulgaris were included in the study population. Patients were randomly assigned to two treatment groups. In Group A, there were 40 patients received 500 mg azithromycin once a day for 3 days per week as pulse therapy along with 0.05% topical tretinoin for 3 months whereas in Group B, there were another 40 patients received 50 mg minocycline twice a day along with 0.05% topical tretinoin for 3 months. In this study, the study population was included from both gender and the age range of the participants was 15 to 30 years. As per the exclusion criteria of this study, pregnant or lactating mothers, cases taking topical treatment in the last 2 weeks or in using systemic antibiotics during the last 3 weeks or using hormonal contraceptives, patients with chronic underlying diseases, and cases with known hypersensitivity to the study drug were excluded. Proper written consent was taken from all the participants before data collection. A pre-designed questionnaire was used to collect all the necessary data. The parameters including age, sex, relation to the menstrual cycle, duration of the lesion, site of lesion, etc. were recorded. Acne vulgaris was graded using a simple grading system taking into account the predominant lesion to grade acne, as mentioned by Adityan (2009) [9]. On that grading system, Grade 1 included comedones and occasional small cysts confined to the face, Grade 2 included comedones with occasional pustules and small cysts confined to the face, Grade 3 included many comedones and small and large inflammatory papules and pustules, more extensive but confined to the face and Grade 4 included many comedones and deep lesions tending to coalesce and canalize, and involving the face and the upper aspects of the trunk. Besides these, in this study, 'Grade Zero' was used at the end of treatment and during the follow-up and defined as nonexistence of the lesions. All data were collected, processed, analyzed and disseminated by SPSS version 23.0 and MS Office program as per need.

RESULTS

In this study, analyzing the gender of the participants, we observed in group A, 40% of participants were male and 60% were female whereas in group B, 43% of participants were male and 58% were female. So, in both the group's females were dominating in number. In group A, the highest number of patients was found from 21-25 year's age group which was 50%. Then 33% were from 14-20 years age group and the rest 18% were from 26-32 years age group. On the other hand, in group B, the highest number of patients was also found from 21-25 year's age group also and it was 48%. Then 38% were from the 14-20 years age group and the rest 15% were from 26-32 years age group. In group A 38%, 25%, 18%, 13%, and 8% of participants were students, housewives, service holders, and laborers, es of severity score of acne from baseline to final assessment stages among the participants of both groups we observed, in group A at baseline 15%, 38%, and 48% participants had the score point 2, 3 and 4 respectively whereas in final stage 63%, 30%, and 8% participants had the score point 1, 2 and 3 respectively. In group A between baseline and final score distribution, we found a significant correlation where the P value was 0.023. On the other hand, in group B at baseline 10%, 40%, and 50% of participants had the score points 2, 3, and 4 respectively whereas in the final stage 65%, 28%, and 8% of participants had the score point 1, 2 and 3 respectively. In group B between baseline and final score distribution, the P value was found 0.073. In this study, in severity score comparison between the groups in the evaluation stage we observed, in group A at 63%, 30%, and 8% participants had the score point 1, 2, and 3 respectively whereas in group B 65%, 28%, and 8% participants had the score point 1, 2 and 3 respectively. In this final assessment, we found a significant correlation between the groups (P=0.002). In analyzing the adverse event during the treatment tenure, we found in group A among 24%, 8% cases of diarrhea and nausea had been found respectively. In this group, we observed not any case with epigastric pain which was found in another group. However, in group B among 28%, 16%, and 8% cases of diarrhea, nausea, and epigastric pain had been found respectively. Regarding the adverse events between both the groups, we found a significant correlation where the P value was 0.048.

Table 1: Demographic characteristics of the study population (N=80)

Variables	Group A		Group B	
	n	%	n	%
Age in a year				
14-20 yrs.	13	33%	15	38%
21-25 yrs.	20	50%	19	48%
26-32 yrs.	7	18%	6	15%
Sex				
Male	16	40%	17	43%
Female	24	60%	23	58%
Occupation				
Student	15	38%	14	35%
Housewives	10	25%	11	28%
Service	7	18%	6	15%
Laborer	5	13%	4	10%
Others	3	8%	5	13%

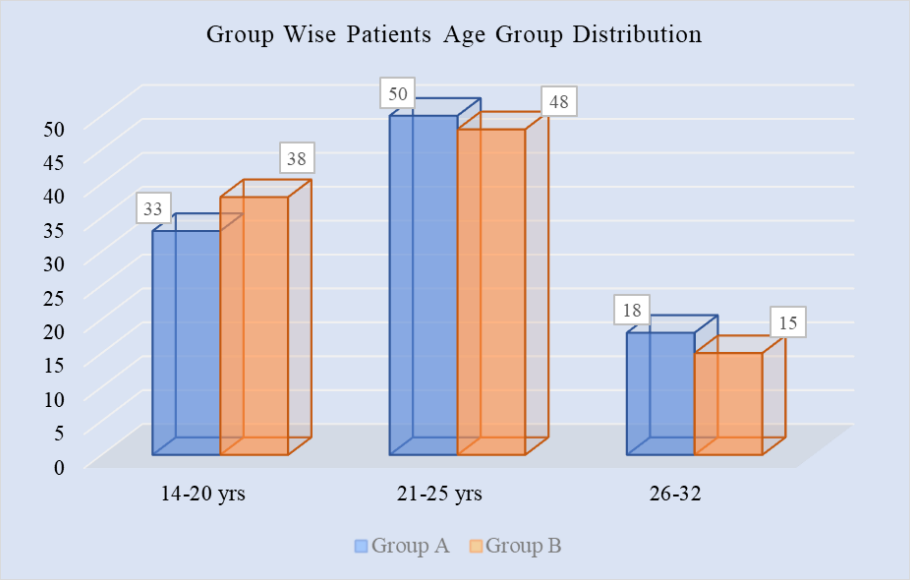

Figure I: Bar chart showed Patients group wise Age distribution (N=80)

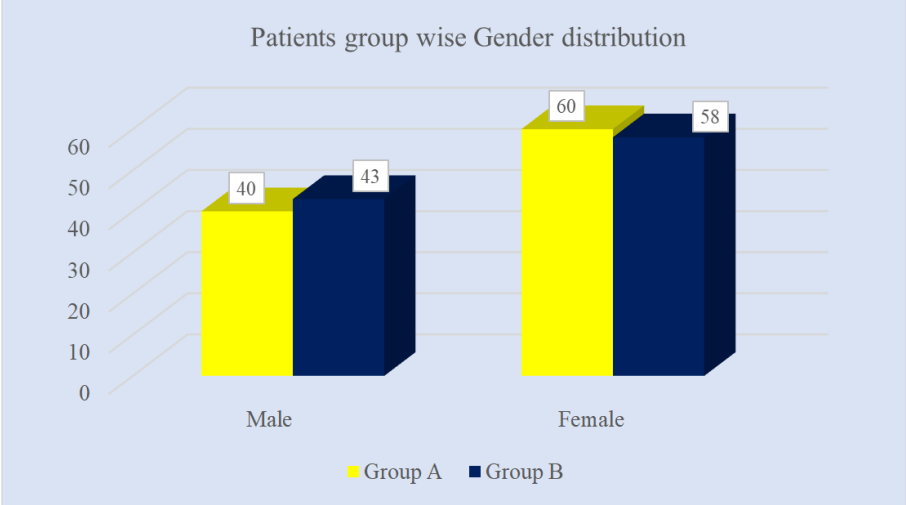

Figure II: Bar chart showed Patients group-wise sex distribution (N=80)

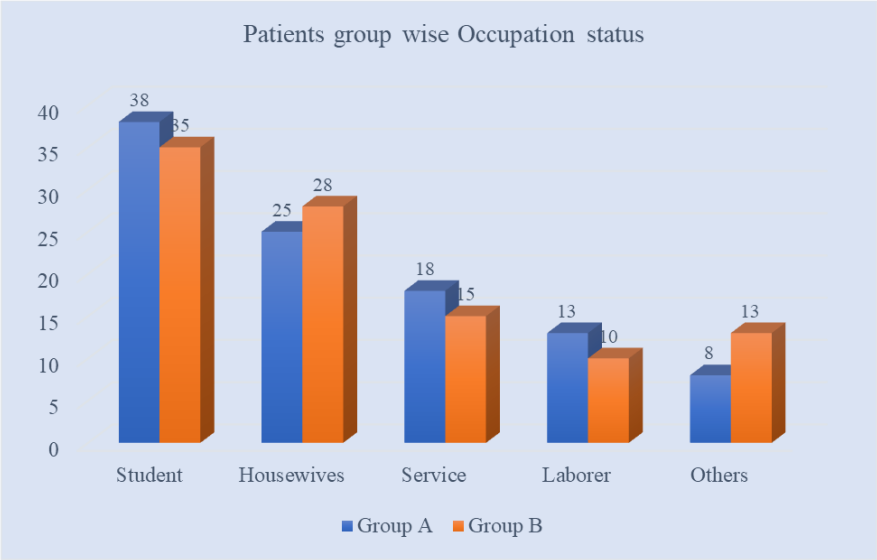

Figure III: Bar chart showed Patients group wise Occupation status (N=80)

Table 2: Severity score distribution between baseline and final assessment (N=80)

Score	Group A				Group B			
	Baseline		Final		Baseline		Final	
	n	%	n	%	n	%	n	%
1	0	0%	25	63%	0	0%	26	65%
2	6	15%	12	30%	4	10%	11	28%
3	15	38%	3	8%	16	40%	3	8%
4	19	48%	0	0%	20	50%	0	0%
P value	**0.023**				**0.073**			

Table 3: Severity score comparison between the groups in the evaluation stage (N=80)

Score	Group A		Group B	
	Final		Final	
	n	%	n	%
1	25	63%	26	65%
2	12	30%	11	28%
3	3	7%	3	7%
4	0	0%	0	0%
P value	**0.002**			

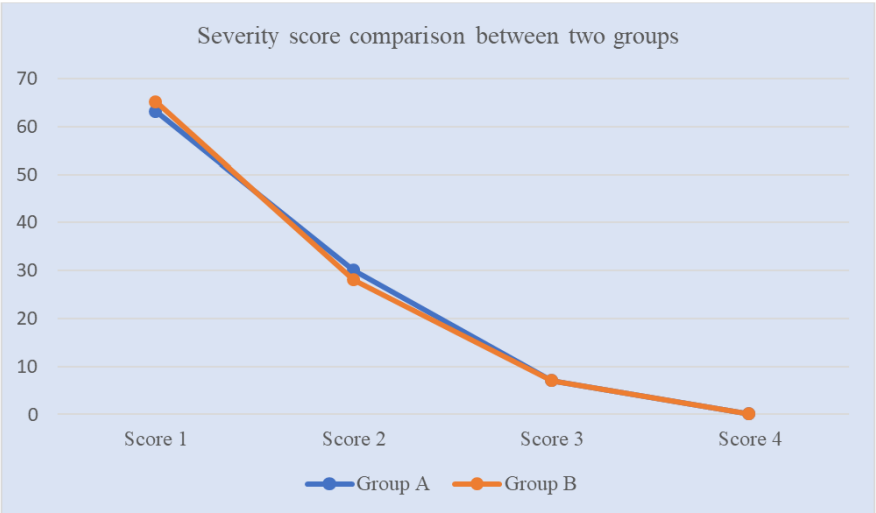

Figure IV: Line chart showed Patients group wise Severity Score (N=80)

Table 4: Distribution of adverse events among patients of both groups (N=80)

Adverse event	Group A		Group B		P value
	n	%	n	%	
Nausea	10	25%	6	15%	0.322
Diarrhoea	4	10%	4	10%	
Epigastric pain	3	8%	1	3%	

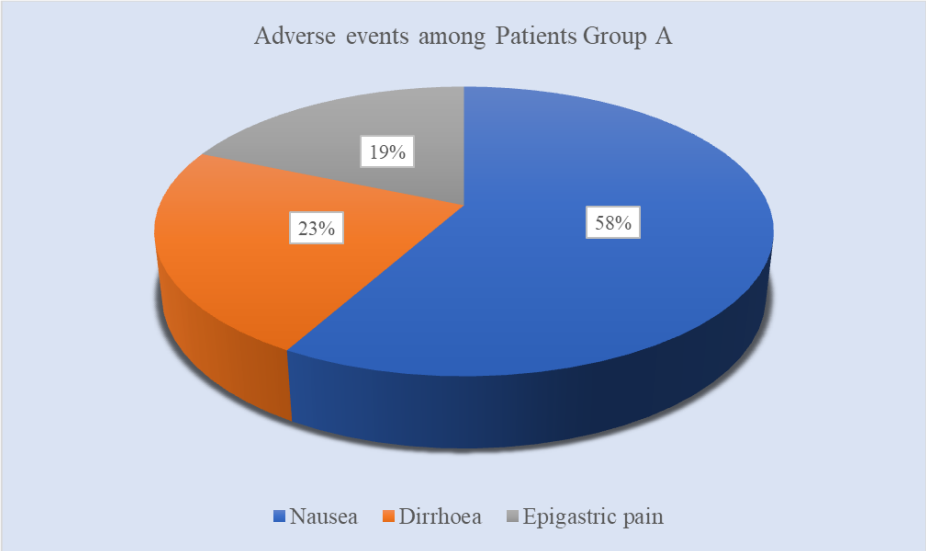

Figure V: Pie chart showed adverse events among Patients of Group A (n=40)

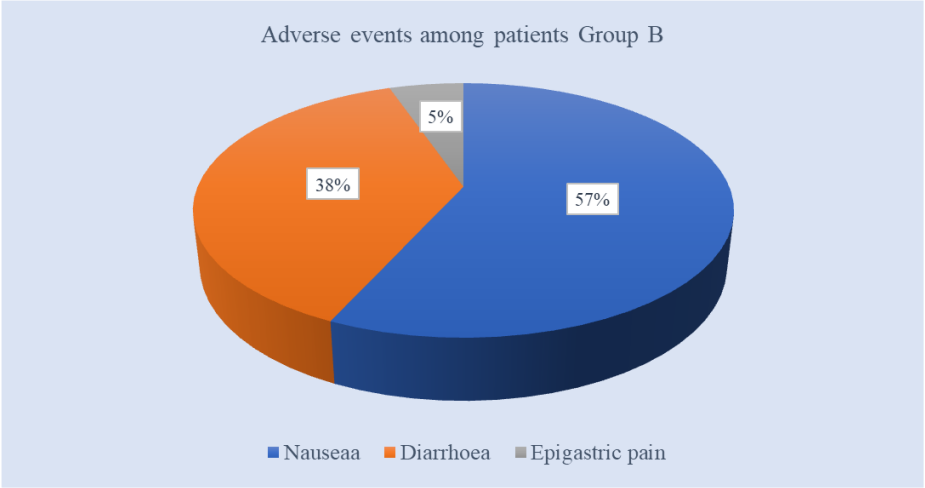

Figure VI: Pie chart showed adverse events among Patients of Group V (n=40)

DISCUSSION

Azithromycin is an azalide of the macrolide group of antibiotics. It has an azamethyl substitution in the macrolide ring. The addition of the second amine group resulted in important advantages over erythromycin, including greater tissue penetration and an extended half-life [10]. Azithromycin is primarily a bacteriostatic drug, but in higher concentrations, it may act as bactericidal. The most common treatment-related side effects of azithromycin include including nausea, diarrhea, and abdominal cramping [11]. On the other hand, minocycline, a semi-synthetic, second- generation tetracycline, with a better pharmacokinetic profile compared to doxycycline and it is not phototoxic [12]. In this study, in analyzing the adverse event during the treatment tenure, we found in group A among 24%, 8% cases of diarrhea and nausea had been found respectively. In this group, we observed not any case with epigastric pain which was found in another group. However, in group B among 28%, 16%, and 8% cases of diarrhea, nausea, and epigastric pain had been found respectively. Regarding the adverse events between both the groups, we found a significant correlation where the P value was 0.048. The most commonly known side effects of minocycline are nausea, vertigo, and mild dizziness [13]. Azithromycin was administered as a single oral dose (500 mg/day) for 4 days in four cycles for every 10 days and minocycline

was administered 100 mg daily for 6 weeks [14]. In this current study group-A (Azithromycin) between baseline and final score distribution, we found a significant correlation where the P value was 0.023. On the other hand, in group B between baseline and final score distribution, the P value was found 0.073. In this study, in severity score comparison between the groups in the evaluation stage we observed, in group A at 63%, 30%, and 8% participants had the score point 1, 2, and 3 respectively whereas in group B 65%, 28%, and 8% participants had the score point 1, 2 and 3 respectively. In this final assessment, we found a significant correlation between the groups (P=0.002). In a study, it was reported that azithromycin has the greatest advantage over other systemic anti-bacterial agents in acne vulgaris because it is a long-acting drug and can be used in a single dose three times weekly [15]. Besides this, Federico reported a good-excellent response of 90.4% of azithromycin after 4 weeks of therapy [16] which was slightly higher than Singhi [17] who reported a response of 70.25 %. But, Gruber *et al.*, [18] compared azithromycin with minocycline and observed a satisfactory clinical response (70-75%) with both the drugs.

CONCLUSION AND RECOMMENDATIONS

In this study, the efficacy of both azithromycin pulse therapy and minocycline was found satisfactory. But as per the findings regarding the safety profiles, we can conclude that minocycline is safer than azithromycin pulse therapy in treating acne vulgaris. But, patient compliance with azithromycin pulse therapy of had been approved by most of the patients of the azithromycin receiver group. But as this was a single-centered study with a small-sized sample, the findings of this study may not reflect the exact scenario of the whole country.

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