



SAFETY AND EFFICACY OF ORAL AZITHROMYCIN PULSE VERSUS DOXYCYCLINE DAILY IN THE TREATMENT OF ACNE VULGARIS: A HOSPITAL BASED COMPARATIVE STUDY.

Dermatology

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ABSTRACT

Objectives: This present study was to evaluate the prevalence of acne vulgaris and compared the safety and efficacy of azithromycin versus doxycycline for treatment of acne vulgaris.

Methods: All 80 patients were categorised into two groups (group A & group B). Each group had 40 patients of acne vulgaris. The group A patients 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 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 2 months. At each time of clinical assessment of the patient, severity score of acne vulgaris was calculated.

Results: Percentage reduction of mean severity index was up to 81.08% in group A patients and was up to 64.66 % in group B patients after 2 months of treatment. Greater than 80% reduction of severity index was seen in 27(67.5%) group A patients. While in group B, it was seen in 8(20%) patients. Majorities of patients with acne vulgaris were female 55(68.75%).

Conclusions: Acne vulgaris is more preponderance in female than male. Severity index was greatly reduced in patients who were received azithromycin. Hence, azithromycin is a better drug for treatment of acne vulgaris as compared to doxycycline.

KEYWORDS

Acne vulgaris, azithromycin, doxycycline, severity index

INTRODUCTION

Acne vulgaris is a chronic inflammatory disorder of the skin. It affects almost 90% of adolescents, while an increasing number of adults are suffering from this disease [1]. Furthermore, with an accelerated onset of puberty, the prevalence is also showing a rising trend among children [1]. Besides the widespread use of conservative management protocols such as controlling dietary factors [2] and face-washing, [3] oral antibiotic therapy remains the first line of treatment for acne patients who are afflicted with physical and psychosocial side effects of moderate to severe forms of this skin condition [4]. Multiple factors contribute to the pathogenesis of this disease among which early colonisation with *P. acnes* and family history might have important roles, however it remains unclear what exactly triggers the disease and how treatment affects its course [5]. The key pathogenic factors that have been known for years include follicular epithelial hyperproliferation resulting in plugging of the follicles, excess sebum production & the presence and activity of *Propionibacterium acnes* [6].

Nearly 100% of individuals develop acne at some stage of their life with variable severity. Acne has a deep impact on the patient's quality of life, with small, non-inflamed acne lesions not causing more than a slight nuisance but, in individuals with more severe inflammatory nodular acne, the pain, social embarrassment & both physical and psychological scarring can be life altering [7]. The most commonly used antibiotics are Tetracyclines and Macrolides which have shown promising results in the past. Azithromycin is an azalide of macrolide group of antibiotics, derived from erythromycin by insertion of a nitrogen atom in the macrolide ring. This addition has an important advantage over erythromycin including greater tissue penetration and extended half-life [8].

It is primarily a bacteriostatic drug, but in higher concentration can be bactericidal [9]. Doxycycline is a semisynthetic, second generation, broad-spectrum tetracycline derived from oxytetracycline. Currently, it is widely used among others, in the treatment of acne and skin infections, due to its antibacterial and anti-inflammatory effects [10]. Objectives of this study was to compared the efficacy and safety of azithromycin pulse versus doxycycline daily in the treatment of acne vulgaris.

MATERIALS & METHODS

This present study was conducted in Department of Dermatology, Autonomous State Medical College, Shahjahanpur, Uttarpradesh, India during a period from January 2019 to February 2020.

A total 80 patients with 1 year to 2 years of past history of acne vulgaris attending Dermatology OPD were enrolled in this study. Entire subjects signed an informed consent approved by institutional ethical committee was sought.

Inclusion Criteria:

According to the Consensus Conference for the Classification of Acne, [11] those patients who had moderate-to-severe acne with lesions like papules, pustules, nodules and cysts and not responding to the conventional treatment were included.

Exclusion Criteria:

Patients suffering from liver diseases, taking antibiotics for any other illness and pregnancy were excluded from this study.

Methods:

A total 80 patients of acne vulgaris were included in this study. All 80 patients were categorised into two groups (group A & group B). Each group had 40 patients of acne vulgaris.

Severity Index:

Acne lesions were graded according to the severity index described by Michaelsson et al [12] by counting the number of open comedones, closed comedones, papules, pustules, infiltrated lesions and cystic lesions.

Severity index of acne lesions were graded as follows:-

- 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.

Methods:

The group A patients 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 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 2 months.

At each time of clinical assessment of the patient, severity score of acne vulgaris was calculated and recorded by the dermatologists, then the average of their two noted scores was taken for the assessment purpose. At the end of the two 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.

Statistical Analysis

Data was analysed by using simple statistical methods with the help of MS-Office software. All data was tabulated and percentages were calculated.

OBSERVATIONS

This present study was enrolled a total of 80 patients of acne vulgaris with age group 18 years to 25 years. Mean severity score of 1st day of patients in group A had 270.23 and after 2 months of treatment it was reduced to 51.12. Percentage reduction of severity index was up to 81.08% in group A patients after 2 months of treatment.

Similarly, mean severity score of 1st day in group B patients had 265.42 and after 2 months of treatment it was reduced to 93.78. Percentage reduction of severity index was up to 64.66% in group B patients after 2 months of treatment.

Table.1. Mean Severity Score Of Group A & Group B Patients

Group	Mean Severity Score		Percentage decrease
	Initial	After 3 months	
Group A: Azithromycin	270.23(165.4-462.64)	51.12 (16-279)	81.08%
Group B: Doxycycline	265.42 (153.11-400.47)	93.78 (38-257)	64.66%

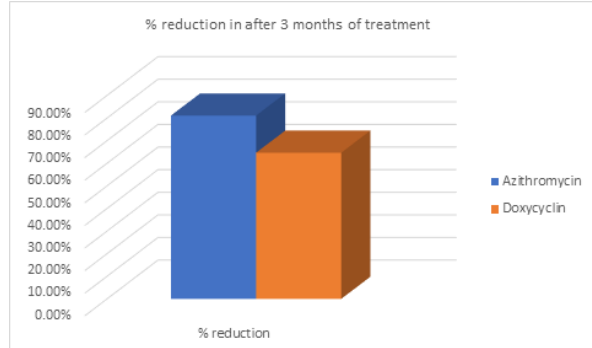


Figure.1. Comparative % Reduction In After 3 Months Of Treatment In Both Group Of Patients

Table. 2. Percentage Severity Reduction In Group A & Group B Patients.

% severity reduction	Group A: Azithromycin	Group B: Doxycycline	Total
<40%	2 (5%)	7 (17.5%)	9(11.25%)
40%-80%	11 (27.5%)	25 (62.5%)	39 (48.75%)
>80%	27 (67.5%)	8 (20%)	32 (40%)
Total	40	40	80

In this present study, greater than 80% reduction of severity index was seen in 27(67.5%) group A patients. While in group B, it was seen in 8(20%) patients.

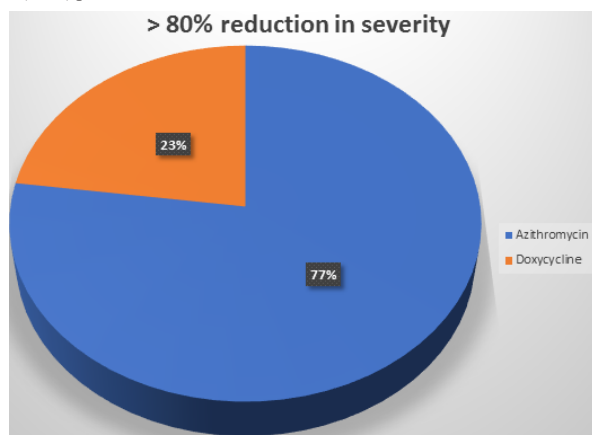


Figure.2. >80% reduction in severity of acne vulgaris in both group of patients after 3 months of treatment.

DISCUSSIONS

Acne vulgaris is a common inflammatory disorder of the Pilo-sebaceous follicles. It is a multi-factorial disease and its pathophysiology centers on the interplay of follicular hyper-keratinization, colonization with *Propionibacterium acnes* (PA), increased sebum production, and inflammation [13].

Antibiotic therapy has long been found useful in the management of moderate-to-severe acne vulgaris. Mechanisms of action include suppressing growth of PA, reducing the production of inflammatory mediators, and acting in immune modulation [13]. Commonly prescribed antibiotics include tetracyclines, doxycycline, minocycline, limecycline and erythromycin. Azithromycin is one of the antibiotics that has been recently prescribe for treatment of acne which is at least as effective as doxycycline and minocycline [14,15].

In this present study, greater percentage reduction (81.08%) was seen in group A (azithromycin) patients as compared to group B (doxycycline) patients (64.66%) after 2 months of treatment.

Similar results are seen in the study conducted by Fernandez et al [16] 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, [17] 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, [18] 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 [19] 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 [20] compared the efficacy of azithromycin with minocycline and observed a satisfactory clinical response (70%-75%) with both these drugs.

Azithromycin is a broad-spectrum macrolide antibiotic. It prevents bacteria from growing by interfering with their protein synthesis. It binds reversibly to the 50S subunit of the bacterial ribosome, thus inhibiting translation of mRNA. It is used in the treatment of acne due to its anti- bacterial, immunomodulatory and anti-inflammatory properties. Common side effects include diarrhoea, nausea and abdominal pain, palpitations, angina, dyspepsia, flatus, vomiting, melena, jaundice, vaginal monilia, vaginitis, nephritis, dizziness, headache, vertigo, somnolence and fatigue [21] Doxycycline is a broad spectrum semisynthetic tetracycline. It inhibits bacterial protein synthesis by reversibly binding to the 30S ribosomal subunit and preventing the association of aminoacyl-tRNA with the bacterial ribosome, thereby giving the immune system time to kill and remove the bacteria. Further inhibition of protein synthesis occurs in mitochondria through binding to the 70S ribosomes. Common side effects include nausea, vomiting, diarrhoea, epigastric burning and oesophagitis. Stevens-Johnson syndrome and toxic epidermal necrolysis may occur with the use of doxycycline. The accumulation of doxycycline in teeth and bones leads to discoloration of teeth. It may also cause enamel dysplasia, bone deformities and impairment in bone growth. It has also been associated with benign intracranial hypertension [22]. In this present study, patients who had such type side effects were excluded from the study. Majorities of patients with acne vulgaris were female 55(68.75%) and rest were males 25(31.25%). And greater than 80% reduction of mean severity index was seen in 27(67.5%) group A patients. While in group B, it was seen in 8(20%) patients.

CONCLUSIONS

This present study concluded that the acne vulgaris is more preponderance in female than male. Severity index was greatly reduced in patients who were received azithromycin. Hence, azithromycin is a better drug for treatment of acne vulgaris as compared to doxycycline.

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