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## Study Of Efficacy And Safety Of Isotretinoin Versus Minocycline In Grade 3 And Grade 4 Acne Vulgaris: A Comparative Study.

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### ABSTRACT

Acne is a chronic inflammatory disease of the pilosebaceous unit resulting from androgen-induced increased sebum production, altered keratinisation, inflammation, and bacterial colonisation of hair follicles on the face, neck, chest, and back by *Propionibacterium acnes*. The current observational and prospective study was conducted in Patients diagnosed with grade 3 & grade 4 acne vulgaris attending OPD of S.N. Medical College in department of dermatology for a period of 18 months from December 2020 to May 2022 Patients aged 15 years to 45 years above were included in our study.. Patients were divided alternately into two separate groups: Group A comprising 52 patients receiving isotretinoin and group B comprising 52 patients receiving minocycline. A detailed history was taken after obtaining consent from all the participants of study. This study included 104 patients, in group A the IGA (Investigator's Global Assessment) score of 59.62% patients changes from grade 4 to grade 1 while in group B the IGA score of 9.62% patients changes from grade 4 to grade 1. The incidence of side effects observed under the group B(30.77%), mainly transient skin redness and itching of mild to moderate intensity was considerably lower than that seen with group A (61.54%). This study showed that the drug Isotretinoin is more efficacious than Minocycline. The drug Isotretinoin shows more side effects than Minocycline suggests that Minocycline is more safe than Isotretinoin. Both drugs were well tolerated with few adverse events reported as no dose adjustment required during the study.

**Keywords:** Isotretinoin, Minocycline, Efficacy, Safety, IGA score.

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## INTRODUCTION

Acne is a chronic inflammatory disease of the pilosebaceous unit. Early colonisation with *P. acnes* and family history might have important roles in the disease, exactly what triggers acne and how treatment affects the course of the disease remain unclear [1]. Moderately severe acne generally requires oral antibacterials. Tetracyclines/ oxytetracycline and erythromycin are usually the first-line antibacterials. Second-generation tetracyclines, such as lymecycline, doxycycline, and minocycline, show improved absorption. Minocycline has the advantage of being rarely associated with *Propionibacterium acnes* antibacterial resistance, but can occasionally lead to potentially serious adverse effects [2]. Isotretinoin (13-*cis* retinoic acid) is the most potent known inhibitor of sebum production. The multiple modes of action for isotretinoin, including suppression of sebaceous gland activity, normalization of the pattern of keratinization within the sebaceous gland follicle, inhibition of inflammation, reduction of growth of *Propionibacterium acnes* in a secondary manner [3].

The purpose of this study is to make a comparison between Isotretinoin and minocycline for safety and efficacy in patients with moderate to severe acne vulgaris.

## MATERIAL AND METHODS

The present study was conducted in the Department of Pharmacology and Therapeutics in collaboration with Department of Dermatology at S.N. Medical College and associated Hospital, Agra (U.P.).

### Ethical clearance

Ethical clearance with letter no. IEC/2022/123 was taken from Institutional Ethics Committee S.N. Medical College, Agra.

### Inclusion criteria

- Male or female participants.
- Patient having age 15 years to 45 years was eligible to participate.
- Patient having moderate to severe facial Acne vulgaris, defined as an Investigator's Global Assessment (IGA) score of grade 3 (moderate) or grade 4 (severe).
- No use of concomitant acne medications during the 12-week study.
- Participants willing to undergo treatment and follow up.

### Exclusion criteria

- Patients with hypersensitivity to Isotretinoin.
- Patients with hypersensitivity to Minocycline.
- Age less than 15 years and more than 45 years.
- Participants having mild facial acne vulgaris.
- Pregnant women and who intend to become pregnant during the course of treatment.
- Participants who intend to consume alcohol during the treatment course.
- Presence of any renal or hepatic compromise or any pre-existing hyperlipidemia.
- Participants not willing for the necessary investigations.

### Sample size

Patients who fulfill the inclusion criteria were taken as sample during the study period. Total 104 patients were taken as sample.

### Study design

It was an observational, prospective and comparative study to analyse the safety and efficacy of Isotretinoin and minocycline.

## Dosing

**Isotretinoin:** It is indicated for severe acne and moderate cases of acne that are unresponsive to conventional therapy. The classical recommended dose is 0.5 to 1.0 mg/kg/day for 4 to 8 months. In this study 20mg isotretinoin once a day was given to the patient.

**Minocycline:** 50-100 mg bid for 12 weeks. In this study 50mg minocycline twice a day was given to the patient.

In this comparative study, we evaluated the efficacy and safety of Isotretinoin and Minocycline in patients of grade 3 and grade 4 acne vulgaris for a period of 12 weeks.

## Source of data

Patient was enrolled from those diagnosed with grade 3 and grade 4 Acne vulgaris in OPD of Skin & V.D., S.N. Medical college , Agra. Written informed consent was taken.

## Patients were divided alternately into two separate groups:

### Group A:

Comprising of 52 patients with grade 3 and grade 4 acne vulgaris who received oral isotretinoin along with topical clindamycin cream prescribed by dermatologist.

### Group B

Comprising of 52 patients with grade 3 and grade 4 acne vulgaris who received oral minocycline along with topical clindamycin cream prescribed by dermatologist.

## Duration Of Study

The study was done for a period of 18 months from December 2020 to May 2022.

## Pre-Treatment Evaluation

- Lipid profile
- LFT
- RFT
- CBC

## Follow Up And Evaluation

Data was collected from patient at first visit and on subsequent follow up visits (2,4,6,8,12 weeks) for:

- Evaluation of safety.
- Evaluation of efficacy.

## Evaluation of Efficacy was done by

By an improvement of at least 2 grades in IGA score from baseline.

The IGA score is defined as [4]

Investigator's Global Assessment (IGA) of acne severity		
0	'Clear'	Residual hyperpigmentation and erythema may be present
1	Almost clear'	A few scattered comedones and a few small papules
2	'Mild'	Easily recognisable; less than half the face is involved. Some comedones and some papules and pustules
3	'Moderate'	More than half the face is involved. Many comedones, papules and pustules. One nodule may be present
4	'Severe'	Entire face is involved, covered with comedones, numerous papules and pustules, and few nodules and cysts

**Evaluation of Safety was done by**

- Clinical evaluation.
- Adverse event reported.

**Statistics:** After the completion of study, data was analysed by applying SPSS software.

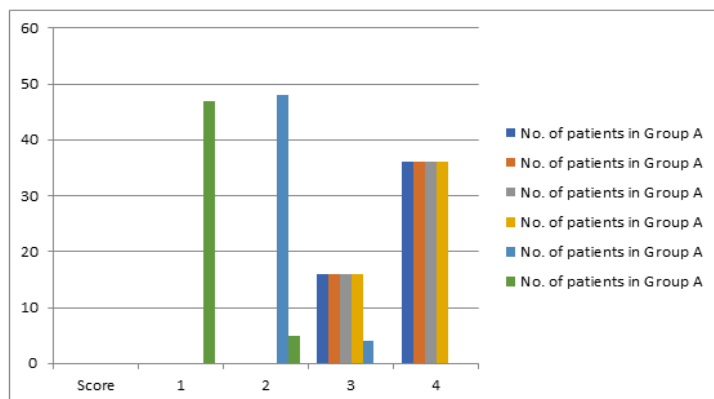
**OBSERVATION AND RESULTS**

A total of 104 patients of age of 15 to 45 years, in good health, with moderate to severe acne vulgaris and had given their written informed consent, who complied with all the inclusion and exclusion criteria were enrolled into the study.

**Table 1: IGA Score**

Score	No. of patients in Group A					
	0w	2w	4w	6w	8w	12w
1	0	0	0	0	0	47
2	0	0	0	0	48	5
3	16	16	16	16	4	0
4	36	36	36	36	0	0

**Figure 1**



**Table 2: IGA Score**

Score	No. of patients in Group B					
	0w	2w	4w	6w	8w	12w
1	0	0	0	0	0	11
2	0	0	0	0	11	41
3	21	21	21	21	41	0
4	31	31	31	31	0	0

Figure 2

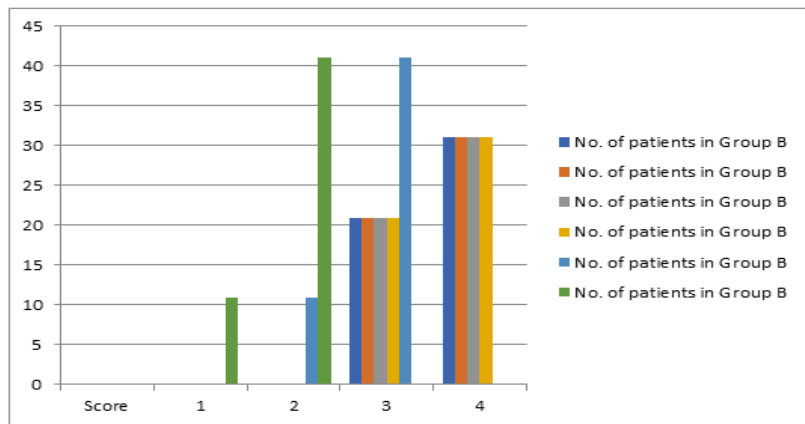
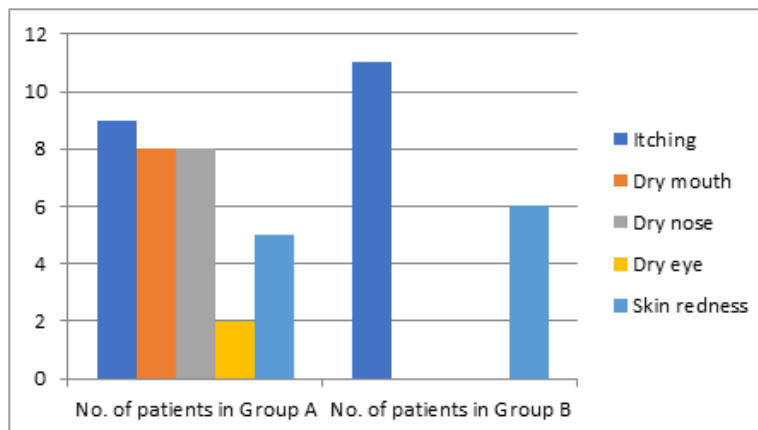


Table 3: Side effects in both groups

Side Effects	No. of patients in Group A	No. of patients in Group B
Itching	9	11
Dry mouth	8	0
Dry nose	8	0
Dry eye	2	0
Skin redness	5	6

Following table shows the side effects found in both the groups

Figure 3



## DISCUSSION

Acne vulgaris is a chronic inflammatory disease of the pilosebaceous unit affecting at least 85 percent of adolescents and young adults. More than 85% of adolescents suffer from acne and in 50% cases, it extends into adulthood [5].

Acne is considered a chronic disease owing to its prolonged course, pattern of recurrence and relapse, and manifestations such as acute outbreaks or slow onset. Moreover, acne causes profound negative psychological and social effects on the quality of life of patients [6]. Therefore; acne vulgaris must be considered a significant medical problem.

In recent years, due to better understanding of the pathogenesis of acne, new therapeutic modalities and various permutation and combinations have been designed. In topical agents; benzoyl peroxide, antibiotics, retinoids, etc are the mainstay of treatment; can be given in combinations. While

systemic therapy includes oral antibiotics, hormonal therapy, and isotretinoin, depending upon the need of patients it has to be selected. Physical treatment in the form of lesion removal, photo-therapy is also helpful in few of them [7].

### Evaluation schedule of patients

In our study, in group A the IGA score of 31 patients (59.62%) patients changes from grade 4 to grade 1, the IGA score of 5 patients (9.62%) patients changes from grade 4 to grade 2 and the IGA score of 16 patients (30.77%) patients changes from grade 3 to grade 1 during the treatment course of 12 weeks.

While in group B the IGA score of 5 patients (9.62%) patients changes from grade 4 to grade 1, the IGA score of 26 patients (50%) patients changes from grade 4 to grade 2, the IGA score of 6 patients (11.54%) patients changes from grade 3 to grade 1 and the IGA score of 15 patients (28.87%) patients changes from grade 3 to grade 2 during the treatment course of 12 weeks.

This suggests that isotretinoin is more efficacious than minocycline and these results are consistent with studies by (Cristina Oprica<sup>1</sup>, Lennart Emtestam, Lena Hagströmer and Carl Erik Nord) [8] and (Pigatto P.D. · Finzi A.F. et al.) [9].

### Side effects in both groups

In our study, the Minocycline was tolerated much better than isotretinoin. The incidence of side effects observed under the minocycline (30.77%), mainly transient skin redness and itching of mild to moderate intensity was considerably lower than that seen with isotretinoin (61.54%). These results are consistent with other studies (H P Gollnick) [10].

### CONCLUSION

The present study was conducted with the aim of comparison of efficacy and safety of isotretinoin (20mg) with minocycline (50mg) in patients of grade 3 and grade 4 acne vulgaris.

The selected patients were divided randomly into two groups- Group A (Isotretinoin) comprised of 52 patients while Group B (Minocycline) comprised of 52 patients. In group A, 20mg oral Isotretinoin once a day was prescribed while in group B, 50mg oral Minocycline twice a day was prescribed.

For evaluation of efficacy and safety follow up was done at 2, 4, 6, 8, 12 weeks in both groups. The overall findings in this study are summarized below-

#### In group A

- The IGA score of 31 patients (59.62%) patients changes from grade 4 to grade 1 on 12 week.
- The IGA score of 5 patients (9.62%) patients changes from grade 4 to grade 2 on 12 week.
- The IGA score of 16 patients (30.77%) patients changes from grade 3 to grade 1 on 12 week.

#### In group B

- The IGA score of 5 patients (9.62%) patients changes from grade 4 to grade 1 on 12 week.
- The IGA score of 26 patients (50%) patients changes from grade 4 to grade 2 on 12 week.
- The IGA score of 6 patients (11.54%) patients changes from grade 3 to grade 1 on 12 week.
- The IGA score of 15 patients (28.87%) patients changes from grade 3 to grade 2 on 12 week.

This suggests that the drug Isotretinoin is more efficacious than Minocycline.

The drug Isotretinoin shows more side effects than Minocycline suggests that Minocycline is more safe than Isotretinoin.

Both drugs were well tolerated with few adverse events reported.

Clinicians need to be well informed about current treatment options, their success rate and limitations and the uncertainty of individual outcomes defined. The management of the patient with grade 3 and grade 4 acne vulgaris is time-consuming, requiring medical assessment, detailed explanation with counseling and reassurance and continued supervision of any medical treatment.

#### REFERENCES

- [1] Williams HC, Dellavalle RP, Garner S. Acne vulgaris. *The Lancet* 2012;379(9813):361-72.
- [2] Goulden V. Guidelines for the management of acne vulgaris in adolescents. *Pediatric Drugs* 2003; 5:301-13.
- [3] Ganceviciene R, Zouboulis CC. Isotretinoin: state of the art treatment for acne vulgaris. *JDDG: Journal der Deutschen Dermatologischen Gesellschaft* 2010;8:S47-59.
- [4] MedicineWise NP. Investigator's Global Assessment (IGA) of Acne Severity. Additional content— Adapalene with benzoyl peroxide (Epiduo) for severe acne vulgaris). Australia. 2011.
- [5] Khan SN, Hussain S, Beg MA, Raihan M. Acne Vulgaris and its Effect on Quality of Life: A Cross-Sectional Study.
- [6] Tuchayi SM, Makrantonaki E, Ganceviciene R, Dessinioti C, Feldman SR, Zouboulis CC. Acne vulgaris. *Nature reviews Disease primers* 2015;1(1):1-20.
- [7] Rathi SK. Acne vulgaris treatment: the current scenario. *Indian J Dermatol* 2011;56(1):7.
- [8] Oprica C, Emtestam L, Hagstromer L, Nord CE. Clinical and microbiological comparisons of isotretinoin vs. tetracycline in acne vulgaris. *Acta dermato-venereologica* 2007;87(3).
- [9] Pigatto PD, Finzi AF, Altomare GF, Polenghi MM, Vergani C, Vigotti G. Isotretinoin versus minocycline in cystic acne: a study of lipid metabolism. *Dermatol* 1986;172(3):154-9.
- [10] Gollnick HP, Graupe K, Zaumseil RP. Comparison of combined azelaic acid cream plus oral minocycline with oral isotretinoin in severe acne. *European J Dermatol* 2001;11(6):538-44.