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Original Research Article

A comparative study of topical retinoids tretinoin-0.04% and adapalene - 0.1% in acne grade 1 and grade 2

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ABSTRACT

Background: Acne is a chronic, self-limiting inflammatory disease of pilosebaceous unit. It is multifactorial, of which Propioniobacterium acne and Sebum play an important role in etiopathogenesis.
Aims and Objectives: The aim of the study is to compare efficacy of Tretinoin and Adapalene in Acne Vulgaris and to compare the side effects of topical tretinoin and adapalene.
Materials and Methods: Randomized prospective comparative clinical trial with sample size of 50 patients who are recruited from department of dermatology of MMCH&RI.
Result: Adapalene 0. 1% produced numerically greater lesion reduction than tretinoin 0. 04% for all lesion types. Thus, Adapalene was found superior to Tretinoin in reducing average number of lesions. Highest reduction in number of lesions with both topical retinoids was for comedones (p< 0. 001) followed by papules (p<0. 00) and pustule (p= 0.001).
Conclusion: In Patients who applied adapalene, most of them were reduced to grade 0 and grade I and only few were in grade II. Whereas in patients who applied tretinoin only few were reduced to grade 0 and many were in grade I and grade II. Side effects were more commonly seen in patient treated with topical Tretinoin than with topical Adapalene. Adapalene was better tolerated than tretinoin. Hence adapalene is a safe and effective in treatment of acne.

1. Introduction

Acne is a chronic, self-limiting inflammatory disease of pilosebaceous unit.[1] It is multifactorial, of which Propioniobacterium acne and Sebum play an important role in etiopathogenesis. Vitamin A plays a role in keratinisation.[2] The various retinoid preparations available are tretinoin, isotretinoin, adapalene and tazarotene.[3,4]

Mechanisms of action of retinoic acid are: Restoration of disturbed keratinisation, increase in cell turnover and decrease in cohesiveness of stratum corneum, and regulation of prostaglandin synthesis.[5,6] Topical retinoids have the following effects: Reduces the number and formation of precursor lesions, reduces mature comedones, exhibits anti-inflammatory effect and promotes normal desquamation of follicular epithelium.[7] Tretinoin is a first-generation topical retinoid available in 0.025%, 0. 05%, 0 .1% strengths in cream, gel and liquid formulation. Adapalene (synthetic napthoic acid derivative) is a third-generation topical retinoid. It is available as a 0. 03% and 0.1% alcoholic gel.

2. Aims and Objectives

The aim of the study is to compare efficacy of Tretinoin and Adapalene in Acne Vulgaris and to compare the side effects of topical tretinoin and adapalene.

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3. Materials And Methods

Randomised prospective comparative clinical trial with sample size of 50 patients who are recruited from department of dermatology of Meenakshi Medical College and Research Institute, Kanchipuram, Tamil Nadu, India. All the patients attending the Outpatient Department of Dermatology in Meenakshi Medical College and Research Institute, with Acne grade 1 and grade 2 lesions were included in the study. Consent was obtained from the patients prior to enrolment into the study. Patients were randomly selected and grouped to avoid and minimise bias as much as possible. First 25 patients who came to study centre, within the study period, having acne, fulfilling inclusion and exclusion criteria, willing to apply topical retinoids irrespective of age, sex, occupation or grade of Acne were given topical adapalene 0.1% and last 25 patients were grouped for topical tretinoin 0.04%.

According to the number of acne lesions on the face, patients were graded into grade 1 and grade 2 initially. Grade 1 has only comedones and few papules. Grade 2 has comedones, many papules and few pustules. Grades were calculated every 4 weeks and recorded respectively at 0, 4, and 8 weeks. Reduction percentage was calculated by calculating the percentage reduction in the average number of lesions from GR-0 to GR-4.

Side effects were recorded at 4th week and 8th week. Clinical photographs of the lesions were taken before the commencement of therapy and after the completion of therapy.

3.1. Inclusion criteria

1. Healthy male and non-pregnant females aged >12. and<35 yr with clinical diagnosis of acne grade 1 and 2.
2. Patient with facial lesions only.

3.2. Exclusion criteria

1. Pregnant and lactating women.
2. Hypersensitivity to retinoids.
3. Presence of any skin condition that would interfere with diagnosis or assessment of acne.
4. Patients with Polycystic ovaries.

4. Results

hows the data of pre-therapeutic grading. Out of 25 patients using adapalene, 12 patients were Grade I and 13 were grade II. Out of 25 patients usingtretinoin, 12 patients were Grade I and 13 were grade II. (Table 1).

In table 2 data pertaining to post therapeutic grading was shown. Out of 25 patients using adapalene, 14(56%) were reduced to grade 0, 9(36%) were reduced to grade I and only 2(8%) accounts for grade II. (Table 2).

On the other hand, out of 25 patients using tretinoin only 7(28%) patients were reduced to grade 0, 12(48%) were in grade I and 6 (24 %) patients accounts for grade II.

Mean Reduction Rate:

4.1. Adapalene

The mean of comedones was initially 7.20, which reduced to 5.68 at 4th week and which further reduced to 3.12 at 8th week. The mean of papules was initially 2.92, which reduced to 1.96 at 4th week and which further reduced to 0.76 at 8th week. The mean of pustules was initially 0.72, which reduced to 0.24 at 4th week and which further reduced to 0.04 at 8th week.

4.2. Tretinoin

The mean of comedones was initially 6.88, which reduced to 5.68 at 4th week and which further reduced to 4.12 at 8th week. The mean of papules was initially 3.04, which reduced to 2.40 at 4th week and which further reduced to 1.92 at 8th week. The mean of pustules was initially 0.56, which reduced to 0.40 at 4th week and which further reduced to 0.32 at 8th week.

4.3. Side effects

Following were the side effects reported after topical application of adapalene and tretinoin and were duly recorded with every patient. Comparative chart of side effects occurring after topical application of adapalene and tretinoin in total number of patients is shown in Table 3 and Table 4. Side effects were more commonly seen in patients who applied topical tretinoin than in patients who applied topical adapalene.

Out of 25 patients using adapalene, side effects were seen in 8 patients (32%).

Out of 25 patients using tretinoin, side effects were seen in 18 patients (72%).

5. Discussion

In our study, Side effects were more commonly seen in patients who applied topical tretinoin than in patients who applied topical adapalene. In a study done by Dunlap FE, Mills OH1, adapalene 0.1% gel showed significantly less irritating to the skin in terms of producing erythema, dryness, desquamation and burning/stinging (P< 0.02). 32 patients experienced mild to moderately severe adverse events, 3patients had adverse events considered to be drug related (two with skin discomfort; one with skin dryness). This study showed that a majority of patients preferred adapalene 0.1% gel over tretinoin 0.025 % cream and that it caused significantly less skin irritation.

In another study by Jain S 2 it was found that tretinoin 0.05% gel exhibits a greater anti-acne efficacy than

Table 1: Pre-therapeutic grading

Pre-Therapeutic Grade		Group		Total	P value
		Adapalene	Tretinoin		
Grade I	Count	12	12	24	1.000
	% Within Pre-Therapeutic Grade	50.0%	50.0%	100.0%	
	% Within Group	48.0%	48.0%	48.0%	
Grade II	Count	13	13	26	
	% Within Pre-Therapeutic Grade	50.0%	50.0%	100.0%	
	% Within Group	52.0%	52.0%	52.0%	
Total	Count	25	25	50	
	% Within Pre-Therapeutic Grade	50.0%	50.0%	100.0%	
	% Within Group	100.0%	100.0%	100.0%	

Table 2: Post therapeutic grading

Post-Therapeutic Grade		Group		Total	P value
		Adapalene	Tretinoin		
Grade 0	Count	14	7	21	0.031*
	% Within Post-Therapeutic Grade	66.7%	33.3%	100.0%	
	% Within Group	56.0%	28.0%	42.0%	
Grade I	Count	9	12	21	
	% Within Post-Therapeutic Grade	42.9%	57.1%	100.0%	
	% Within Group	36.0%	48.0%	42.0%	
Grade II	Count	2	6	8	
	% Within Post-Therapeutic Grade	25.0%	75.0%	100.0%	
	% Within Group	8.0%	24.0%	16.0%	
Total	Count	25	25	50	
	% Within Post-Therapeutic Grade	50.0%	50.0%	100.0%	
	% Within Group	100.0%	100.0%	100.0%	

Table 3: Side effects

Side Effects		Group		Total	P value
		Adapalene	Tretinoin		
Present	Count	8	18	26	0.005**
	% Within Side Effects	30.8%	69.2%	100.0%	
	% Within Group	32.0%	72.0%	52.0%	
Absent	Count	17	7	24	
	% Within Side Effects	70.8%	29.2%	100.0%	
	% Within Group	68.0%	28.0%	48.0%	
Total	Count	25	25	50	
	% Within Side Effects	50.0%	50.0%	100.0%	
	% Within Group	100.0%	100.0%	100.0%	

adapalene 0.1% gel, but has higher skin irritation potential.[8]

In another study performed by Tu P, Li GQ, side effects such as Erythema, burning, pruritus, scaling and dryness were more common and more severe in the tretinoin group vs. the adapalene group. Adapalene offers comparable efficacy to tretinoin, but is less irritating. It represents a good alternative for the treatment of mild to moderate acne vulgaris in Chinese patients.[9]

In the present study there was a reduction in the number of all types of lesions, i.e., come done, papule and pustule. Present study, the group that applied topical Adapalene showed better lesion reduction compared to that showed by the group that applied topical Tretinoin. In a study done by Shalita and Weiss J S, adapalene gel produced numerically greater lesion reduction than did tretinoin gel for all lesion types.[10]

In another study by Grosshans E, Marks R, the efficacy of adapalene gel was found to be superior to tretinoin gel after one week of treatment, with respect to reduction in inflammatory lesion.[11]

In one more study conducted by W.J. Cunliffe and R. Caputo 5, it was found that Adapalene gel 0.1% was significantly more effective in treating acne lesions than 0. 03% adapalene gel. Adapalene gel 0.1 % was significantly more effective than 0.025% or tretinoin gel in one study and of the same effectiveness in the other study.

Table 4: Side effects

Side Effects		Group		Total	P value
		Adapalene	Tretinoin		
No side effect	Count	17	7	24	
	% Within Side Effects	70.8%	29.2%	100.0%	
	% Within Group	68.0%	28.0%	48.0%	
Dryness	Count	1	9	10	
	% Within Side Effects	10.0%	90.0%	100.0%	
	% Within Group	4.0%	36.0%	20.0%	
Burning	Count	2	0	2	
	% Within Side Effects	100.0%	.0%	100.0%	
	% Within Group	8.0%	.0%	4.0%	
Photo sensitivity	Count	2	4	6	
	% Within Side Effects	33.3%	66.7%	100.0%	0.001**
	% Within Group	8.0%	16.0%	12.0%	
Dryness + Itching	Count	3	0	3	
	% Within Side Effects	100.0%	.0%	100.0%	
	% Within Group	12.0%	.0%	6.0%	
Burning + Photo sensitivity	Count	0	5	5	
	% Within Side Effects	.0%	100.0%	100.0%	
	% Within Group	.0%	20.0%	10.0%	
Total	Count	25	25	50	
	% Within Side Effects	50.0%	50.0%	100.0%	
	% Within Group	100.0%	100.0%	100.0%	

6. Conclusion

From the present study following conclusions can be made:

1. Adapalene 0. 1% produced numerically greater lesion reduction than tretinoin 0. 04% for all lesion types. Thus, Adapalene was found superior to Tretinoin in reducing average number of lesions.
2. Highest reduction in number of lesions with both topical retinoids was for comedones ($p< 0. 001$) followed by papules ($p<0. 001$) and pustule ($p= 0.001$).
3. In Patients who applied adapalene, most of them were reduced to grade 0 and grade I and only few were in grade II. Whereas in patients who applied tretinoin only few were reduced to grade 0 and many were in grade I and grade II.
4. Side effects were more commonly seen in patient treated with topical Tretinoin than with topical Adapalene.
5. Adapalene showed significantly less irritation to the skin in terms of producing erythema, dryness, photosensitivity, itching and burning. Adapalene was better tolerated than tretinoin. Hence adapalene is a safe and effective in treatment of acne.

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No external funding was received to carry out this work.

9. Conflict of Interest

None declared

References

1. Benner N, Sammons D. Overview of the Treatment of Acne Vulgaris. *Osteopath Family Physic*. 2013;5(5):185–90.
2. Williams HC, Dellavalle RP, Garner S. Acne vulgaris. *Lancet*. 2012;379(9813):361–72.
3. Thiboutot D, Gollnick H, Bettoli V, Drno B, Kang S. New insights into the management of acne: an update from the Global Alliance to Improve Outcomes in Acne group. *J Am Acad Dermatol*. 2009;60(5):1–50.
4. Suva AM, Patel AM, Sharma N, Bhattacharya C, Mangi RK. A Brief Review on Acne Vulgaris: Pathogenesis, Diagnosis and Treatment. Research and Reviews. *J Pharmacol*. 2014;4(3):1–12.
5. Tan AU, Schlosser BJ, Paller AS. A review of diagnosis and treatment of acne in adult female patients. *Int J Women's Dermatol*. 2018;4(2):56–71. doi:10.1016/j.ijwd.2017.10.006.
6. Leyden JJ, Berger RS, Dunlap FE, Ellis CN, Connolly MA. Comparison of the efficacy and safety of a combination topical gel formulation of benzoyl peroxide and clindamycin with benzoyl peroxide, clindamycin and vehicle gel in the treatments of acne vulgaris. *Am J Clin Dermatol*. 2001;2(1):33–9.
7. Tan HH, Tan A, Barkham T. Community-based study of acne vulgaris in adolescents in Singapore. *Br J Dermatol*. 2007;157(3):547–51. doi:10.1111/j.1365-2133.2007.08087.x.
8. Gollnick H, Cunliffe W, Berson D. Management of acne: a report from a Global Alliance to Improve Outcomes in Acne. *J Am Acad Dermatol*. 2003;49(1):1–37.
9. Galvin S, Gilbert R, Baker M. Comparative tolerance of adapalene 0.1% gel and six different tretinoin formulations. *Br J Dermatol*. 1998;139(52):34–40. doi:10.1046/j.1365-2133.1998.1390s2034.x.

10. Gloor M, Hubscher M, Friederich HL. Untersuchungenzurexternen Behand- lung der Acne vulgaris mit Tetracycline und Oestrogen. *Hautarzt*. 1974;25:391–4.
11. Culp L, Tuchayi M, Alinia S, H. Tolerability of topical retinoids: are there clinically meaningful differences among topical retinoids? *J Cutan Med Surg*. 2015;19(6):530–8.

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