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Adapalene and tazarotene the topical retinoids correlated for the treatment of acne vulgaris

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Abstract
Background: Acne Vulgaris is prevalent among adolescents. While not life-threatening, acne can be incapacitating. The debilitating effects of acne scarring can lead to diminished self-worth, impaired social functioning, and anger.
Material and Methods: In the study indicated above, a total of 60 patients of both genders were recruited and allocated randomly. The study employed a single-blind, randomized, open-prospective design for the investigation. The study was carried out in the Department of Dermatology, Sambhram Institute of Medical Science, Bangalore, Karnataka, India from November 2019 to October 2020
Results: Numerous skin-conscious adolescents who were going to get married sought treatment, albeit minimal. This study establishes a direct correlation between the prevalence of acne and sebaceous activity. Familial acne vulgaris was seen in 31% of the individuals. Acne has a genetic basis. 15% of women experienced pre-menstrual flare-ups due to alterations in the hydration of the pilosebaceous epithelium before menstruation.
Conclusion: The present investigation revealed a higher prevalence of acne vulgaris among males compared to females. Irrespective of gender, there was a higher occurrence observed during the age bracket of 14-16 years. This study demonstrated a significant prevalence of acne vulgaris among undergraduates. The prevalence of the study's triggering components was higher among male patients.

Keywords: Adapalene, tazarotene, topical retinoids, Acne vulgaris

Introduction
Acne vulgaris, a prevalent dermatological disorder, has a significant impact on a considerable proportion of adolescents. Although acne is not considered a life-threatening condition, it can have a substantial influence on an individual's quality of life [1]. The psychological ramifications of acne and the resulting scars encompass diminished self-perception and self-worth, challenges in social interactions, and potentially even feelings of hostility [2]. Mild acne can significantly impact an individual's emotional well-being, and for certain individuals, the psychological and social stigma linked to the condition represents its most detrimental aspect. There is a correlation between mild to moderate acne and a higher prevalence of depression and suicidal ideation among adolescents [3, 4]. In contrast to other chronic and debilitating dermatological conditions, this assertion remains valid. In summary, acne is a significant medical disease that necessitates appropriate treatment in order to mitigate the risk of scarring, psychological consequences, and eventual impairments in social functioning [5].
In the last quarter-century, a combination of topical and systemic medications has been effectively employed in the treatment of acne vulgaris. Micro comedones are the tiniest lesions responsible for the development of acne. These minuscule comedones are imperceptible to the unaided eye, yet they must still be considered when formulating remedies. These lesions are the main ones that have the potential to develop into either non-inflammatory comedones or inflammatory macules, papules, and pustules. A comedo is a pore that does not cause inflammation [6-8].
Vitamin A is the source of all retinoid compounds. In 1962, it was determined that they were highly effective in eradicating acne. 2 Retinoids possess the capability to rectify the atypical desquamation process by exerting regulatory control on cell proliferation and differentiation, hence influencing the turnover of follicular epithelial cells. The expulsion of adult comedones from the epidermis occurs through this mechanism, resulting in the cessation of

fresh microcomedone formation [9]. The microenvironment of the pilosebaceous follicle is modified by the prevention of hyper cornification. Consequently, an aerobic milieu is established, which exhibits an antagonistic nature towards P. acnes and is expected to facilitate the infiltration of additional topical therapies. *In vitro* and animal research have shown evidence of the direct anti-inflammatory effects of topical retinoids. Furthermore, retinoids have the ability to modify the expression of transcription factors such as AP-1, which control the genetic expression of growth factors and degradative enzymes associated with inflammatory responses. Furthermore, retinoids have a significant role in the initiation of apoptosis by many mechanisms, some of which are associated with the activation of retinoid receptors, while others operate autonomously from this mechanism [10, 11].

The findings provide support and theoretical framework for elucidating the significant decrease in inflammatory lesions observed in meticulously regulated clinical trials employing different compositions of adapalene, tretinoin, and tazarotene. Consistent with these findings, clinical trials including adapalene, tretinoin [12], and tazarotene have demonstrated reductions in inflammatory lesions. Retinoids exhibit a dose-dependent effect in reducing the quantity of both non-inflammatory and inflammatory lesions, as well as impeding the development of microcomedones. Hence, the utilization of retinoid topical medication as a standalone treatment, in combination with other therapies, or as a subsequent maintenance therapy can be advantageous for the vast majority of individuals with acne [13]. Topical retinoids are presently employed as a component of ongoing treatment, sometimes referred to as maintenance therapy, for the majority of acne types. With the rising incidence of antibiotic-resistant strains of P. acnes, the utilization of topical retinoids holds promise in reducing the reliance on antibiotics for acne treatment [14-16]. Hence, it is necessary to conduct a methodical investigation on the efficacy and safety of topical retinoids for the treatment of acne. The objective of this study is to ascertain the comparative efficacy of adapalene and tazarotene as topical medications for the treatment of acne vulgaris.

Materials and Methods

The aforementioned study recruited and allocated 60 patients of both genders in a random manner. A randomized open prospective comparative clinical trial with a single blind design was conducted for this study. The study was conducted at the Department of Dermatology, Sambhram Institute of Medical Science, Bangalore, Karnataka, India over the year of November 2019 to October 2020

Inclusion Criteria

- Individuals of either gender who experience mild to moderate acne vulgaris.
- Age group of 14-16yrs

Exclusion Criteria

- Skin outbreaks caused by medicine in pregnant women and breastfeeding individuals.
- Pharmacological sensitivity below 12 is established.

Methodology

The study's objectives were communicated to the chosen patients, and their agreement was acquired. The ages, genders, jobs, marital situations, and durations of illness of the patients were documented. Acne treatments, both historical and current, were documented, and patients were instructed to abstain from any additional therapeutic approaches. Acne tends to exacerbate throughout the summer, particularly for some individuals, and factors such as stress and variations in the menstrual cycle have been acknowledged as potential causes. A documentation of previous smoking patterns was also created. Furthermore, the presence of hirsutism, oligomeorrhea, and irregular menstruation were identified as additional indications of hyperandrogenism. The patients underwent a comprehensive physical examination. A comprehensive dermatological examination revealed the presence of acne and various other skin problems. The quantity and intensity of comedones, papules, and pustules were evaluated. A total of 100 patients who met the specified criteria were randomly divided into two equal groups. Photographs of the lesions were captured before and during the therapy process. Patients were encouraged to schedule regular check-ins and were advised to promptly report any significant adverse effects. During their treatment, married women were advised to utilize oral contraceptives as a means of birth control. The trial in question was allocated a duration of twelve weeks.

Results and Observations

Table 1: Group I acne patients' reactions to topical adapalene observation

	Average number of lesions (weeks)							Average number of lesions reduced	Percentage Reduction
	0	2	4	6	8	10	12		
Comedones	7.5	8.3	5.3	4.9	3.0	2.2	2.6	6.2	74.6%
Papules	6.5	4.9	5.4	4.3	3.6	2.5	0.4	5.5	85.7%
Pustules	1.8	1.7	0.6	0.5	0.5	0.4	0.6	2.0	100%

Table 2: Patients treated with topical tazarotene (0.1% cream)

	Average number of lesions (weeks)							Average number of lesions reduced	% Reduction
	0	2	4	6	8	10	12		
Comedones	8.9	9.1	8.0	7.1	5.2	4.8	4.4	5.5	53.5
Papules	2.2	4.9	5.0	4.1	3.8	3.9	2.3	3.3	51.8
Pustules	0.5	0.6	0.8	0.1	0.6	0.5	0.3	0.7	100.00

Table 3: Topical adapalene vs. tazarotene patients (Average number of lesions)

Weeks	Adapalene	Tazarotene <13.5
3	11.9	13.3
5	10.5	11.9
4	9.5	11.8
7	7.7	9.7
11	5.8	7.6
12	4.6	6.5
% of Improvement	82.4%	54.98%

Table 4: Comparing acne lesion decrease after 2 weeks

Weeks	Group – I	Group – II
1	19	7.6
3	27	7.2
5	50	24.6
7	60	28.2
11	78	32.4
12	83.5	54.95

Discussions

Acne vulgaris, commonly referred to as the "Stigma of Adolescence," is a significant contributor to the overall distress experienced by adolescents, surpassing the combined impact of all other factors. Many patients refrain from seeking guidance from their doctors. Although the condition may not be of a serious nature, a considerable proportion of young adults who have intentions of entering into marriage in the foreseeable future have actively pursued therapeutic interventions. Based on the results of this study, there is a clear correlation between heightened sebaceous activity and the escalating prevalence of acne among students. In 31% of patients, a familial history of acne vulgaris was identified. There is evidence indicating that a genetic factor plays a role in the onset of acne [12, 13]. A total of 15% of female patients reported experiencing premenstrual flare-ups, which were hypothesized to be attributed to alterations in the hydration levels of the pilosebaceous epithelium. It has been observed that acne lesions tend to exacerbate in reaction to heightened levels of physical and emotional stress, as well as the elevated temperatures commonly associated with the summer season. The objective of acne treatment is to mitigate the underlying mechanisms of acne by the reduction of sebum production, correction of aberrant ductal keratinization, minimization of propionibacterium acnes population, and inhibition of inflammatory mediator release [14, 15].

The group of patients exhibited a moderate to good response, resulting in a significant reduction in both inflammatory and non-inflammatory lesions associated with acne. This cohort of patients also shown greater improvement compared to the other groups. After a duration of eight weeks, there was a reduction of 60% in the number of acne lesions, and an additional improvement of 25% was observed after four weeks. Following a 12-week therapy period, the reduction achieved a significant 80.3%, suggesting a moderate to favorable response [16]. A limited number of individuals reported experiencing adverse effects, including skin irritation, pruritus, dryness, erythema, and peeling. The observed adverse effects were found to be mild and of short duration in comparison to the effects induced by topical tazarotene cream 0.1%. Patients had good tolerance to treatment with 0.1% topical adaplene cream, and the trial concluded with favorable outcomes. Ensuring consistent attendance at appointments was crucial in providing patients with the necessary care. A minor fraction of individuals encountered these adverse side effects, while the overwhelming majority did not exhibit any symptoms whatsoever [17, 18].

The individuals within this cohort demonstrated a modest level of response in both inflammatory and non-inflammatory lesions. The unfavorable effects observed in this experiment were of a highly significant kind. The initial week of treatment was characterized by the presence of erythema, scaling, and dryness of the skin in a significant proportion of patients. The adverse effects observed in this group were found to be more severe and prolonged in duration when compared to those induced by topical adapalene [19]. The rate of decline seen was 7% subsequent to the administration of the medicine for a duration of four weeks. Following a duration of 12 weeks, a comprehensive decrease of 50.04 percent was observed. The negative consequences observed in this study have also been recorded in the pertinent prior research [20]. The application of adapalene cream at a topical concentration of 0.1% resulted in a moderate to good improvement in acne lesions. The application of a topical therapy containing 0.1% tazarotene exhibited a modest enhancement, however accompanied by a higher incidence of unfavourable outcomes. The study demonstrated that the incidence of adverse effects associated with topical adaplene cream was much reduced compared to that observed with topical tazarotene cream. The aforementioned conclusions are derived from previous research conducted at several institutes and research centers [21-23]. In contrast to adapalene, prior studies have demonstrated that tazarotene has a significantly higher prevalence of patients achieving a 50% or more improvement. Conversely, the utilization of adapalene was linked to a significantly greater proportion of patients achieving a heightened degree of improvement in this specific trial. (P = 0.01) (80% vs. 50%).

Conclusion

Males exhibited a higher prevalence of Acne Vulgaris in this study. Individuals aged 14-16, regardless of gender, exhibited the highest rates. The majority of the participants in this study exhibited severe instances of acne vulgaris. This analysis has revealed additional features that are connected with male precipation. The efficacy of adapalene cream 0.1% surpassed that of tazarotone cream 0.1% across all conducted tests. Adapalene and tazarotene creams were effective for individuals aged 14-16. A 10-week course of topical adapalene treatment led to a lesions clearance rate of over 75%, but treatment with topical tazarotene resulted in a lesions clearing rate of only 30%. In contrast to tazarotene, adapalene cream had comparatively few and transient adverse effects.

Conflict of Interest

Nil

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Nil

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