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Original Research Article

Topical 0.03% Tacrolimus for Treatment of Post Acne Erythema- A Case Series

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Conflict of interest: Nil

Abstract:

Background: Post acne erythema (PAE) is not an unusual occurrence after acne vulgaris and the treatment is challenging in terms of cost-effectiveness and availability of the therapy.

Objectives: The main objective is to treat PAE using topical 0.03 % tacrolimus.

Method: 7 patients of newly diagnosed PAE were asked to apply tacrolimus ointment & were followed up at 4,8 and 12 weeks.

Result: Out of these 7 patients, 5 showed an excellent response and the rest 2 showed moderate response. Conclusion: Topical 0.03% tacrolimus is an effective and cheap treatment modality for PAE.

Keywords: Post acne erythema, topical, tacrolimus.

Introduction

Acne Vulgaris is a common chronic skin disorder mainly affecting 35-90% of adolescents. Its pathogenesis is multifactorial like release of inflammatory mediators, excess sebum production, Propioniobacterium acnes follicular colonization, hormones, diet etc.[1]

Depending on the severity of acne, patients suffer from post inflammatory hyperpigmentation, post acne erythema (PAE) and scarring. This leads to psychological effects such as avoidance of social activities, reduced self-esteem, anxiety and depression.[2] Here we are specifically talking about rarely discussed PAE. Various therapies have been used to treat PAE. We, here, evaluated the role of tacrolimus ointment in PAE which is easily available and affordable. We observed that there is scarcity of literature regarding tacrolimus use in PAE.

Material and Methods:

Patients of newly diagnosed PAE were taken between the age groups of 18-30 years, irrespective of sex.

Exclusion criteria were cardiovascular disease, rheumatic disorders and vascular insufficiency. Patients were asked to apply 0.03% tacrolimus ointment on post acne erythematous lesions over the cheeks twice daily. Patients were asked to continue topical treatment for acne as before.

This study was conducted in a Government tertiary care hospital of north India. Tacrolimus 0.03% ointment was available free of cost in the hospital so there was no issue regarding affordability. Patients were followed up at 4, 8 and 12 weeks. Close up clinical pictures of all the patients were taken at 0, 4, 8 and 12 weeks respectively. Clinician's Erythema Assessment (CEA) and Patient's Self-Assessment (PSA) scores were used to evaluate the results (Table 1).

Table 1:

Scores	CEA	PSA
0, Clear	Clear skin with no signs of erythema	Clear of unwanted redness
1, Nearly clear	Almost clear; slight redness	Almost clear of unwanted redness
2, Mild	Mild erythema; definite redness	Somewhat more redness than I prefer

3, Moderate	Moderate erythema; marked redness	More redness than I prefer
4, Severe	Severe erythema; fiery redness	Completely unacceptable redness

* CEA, Clinician's Erythema Assessment; PSA, Patient's Self-Assessment [3]

Results

Ten patients of PAE were taken initially. Three patients left in between and rest seven patients followed up till the end. Out of the seven patients, four presented with severe PAE and rest three with moderate PAE as per scores given in table 1. Result was drastic reduction in erythema in terms of CEA and PSA scores at 8-12 weeks as compared to 0 weeks as shown in Table 2. Overall response was moderate to excellent as shown in pictures below (Figure 1, 2, 3, 4). There were no local/systemic adverse effects reported during the treatment. Even after cessation of therapy, there was no relapse.

Table 2:

Case number	Age	Sex	CEA & PSA respectively at 0 weeks	CEA & PSA respectively at 4 weeks	CEA & PSA respectively at 8 weeks	CEA & PSA respectively at 12 weeks	Overall Response
1	19	Male	4; 4	3;3	2;1	0;0	Excellent
2	20	Female	4; 4	3;3	2;2	0;1	Excellent
3	19	Male	3;3	3;2	2;2	1;0	Excellent
4	21	Male	3;2	3;2	1;1	0;0	Excellent
5	18	Female	4;4	3;3	2;2	1;1	Moderate
6	20	Male	4;3	3;2	1;1	0;0	Excellent
7	22	Female	3;3	2;2	2;1	1;1	Moderate

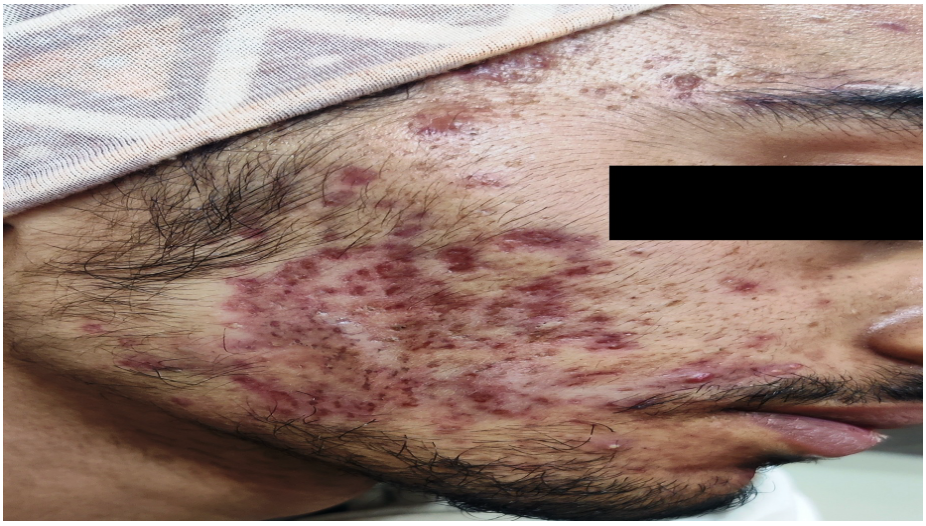

Figure 1a:

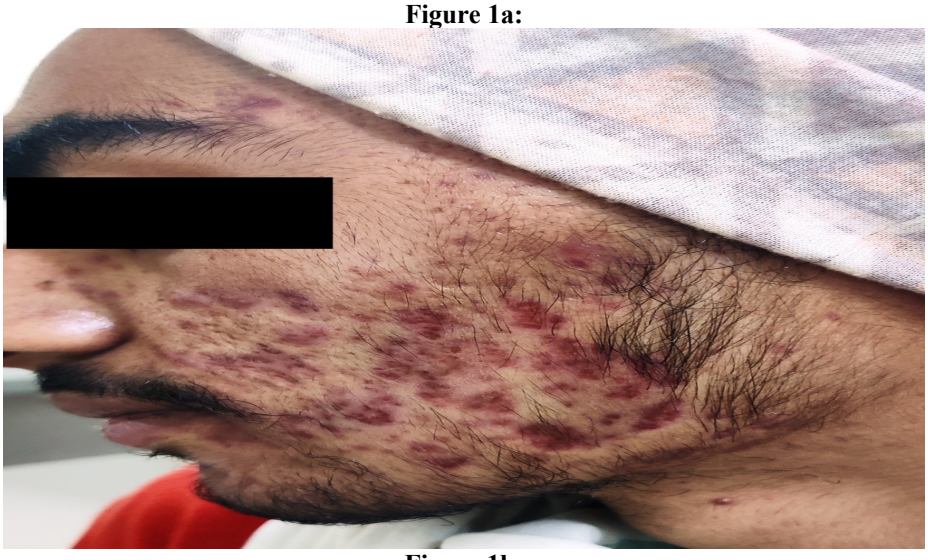

Figure 1b:

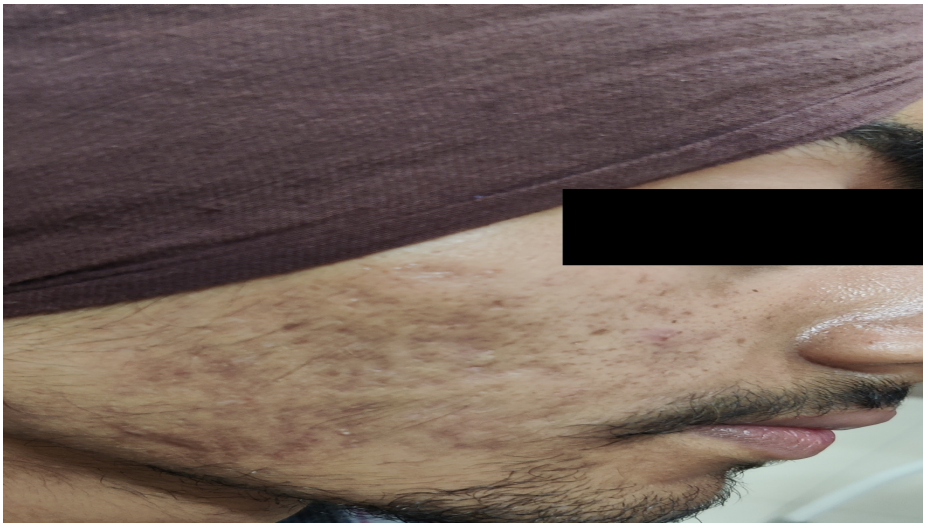

Figure 1c:

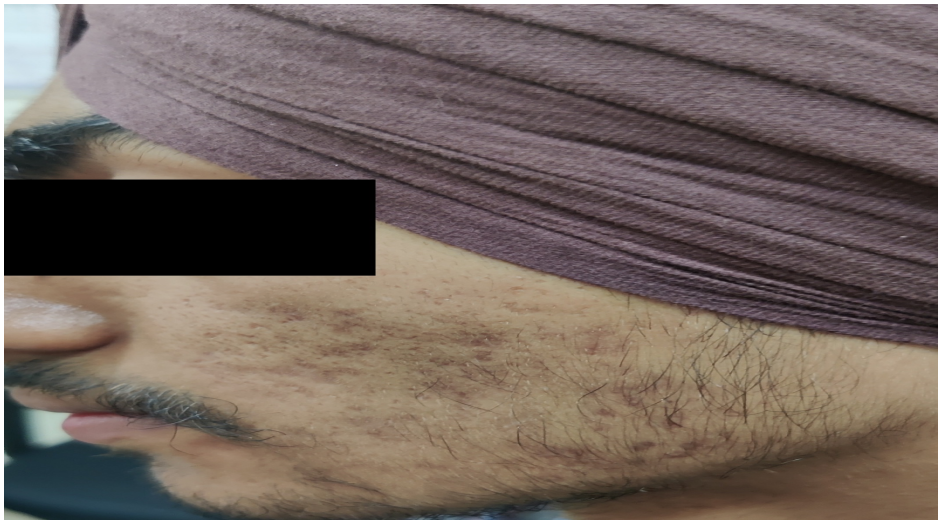

Figure 1d:

Original Figure 1 legend: Excellent improvement in PAE from baseline 0 weeks (a),(b)-right profile & left profile of face respectively to 12 weeks post application (c),(d) –right & left profile of face respectively in patient 1.

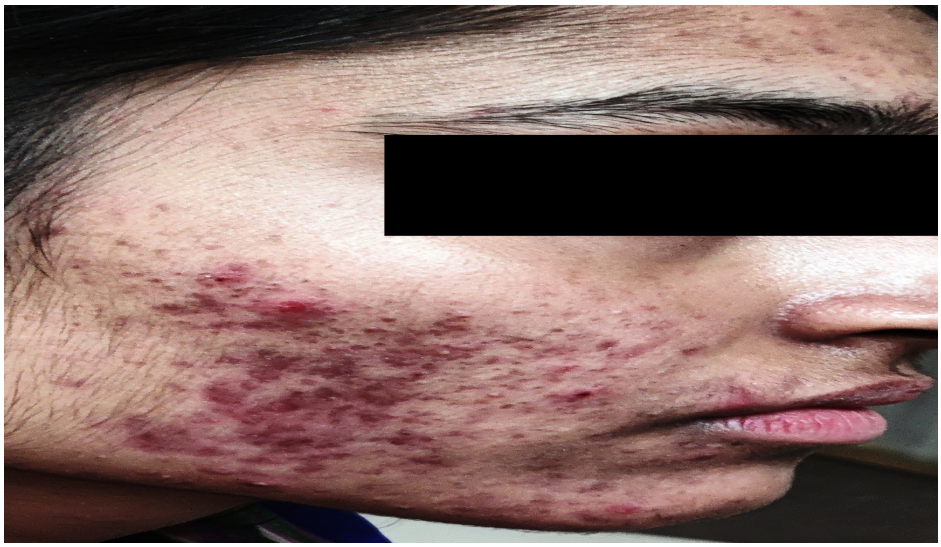

Figure 2a:

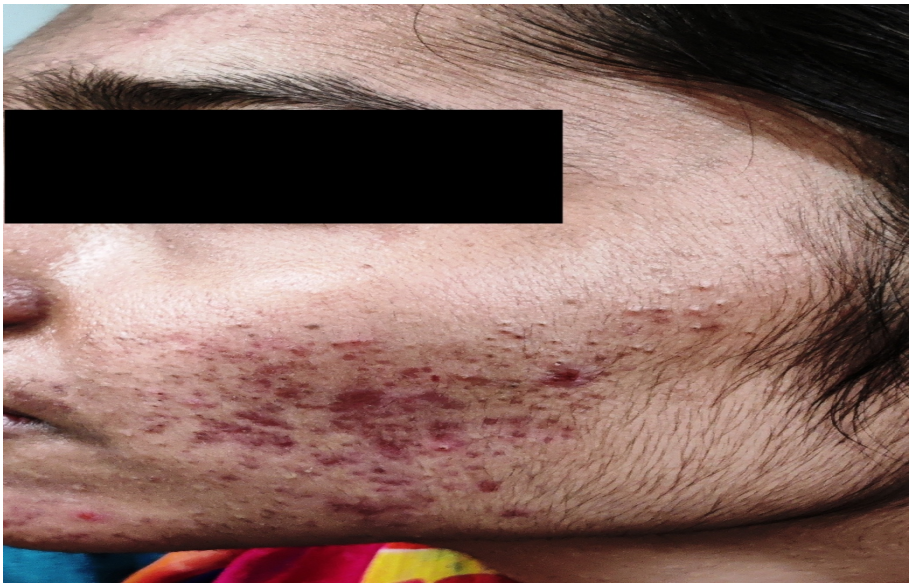

Figure 2b:

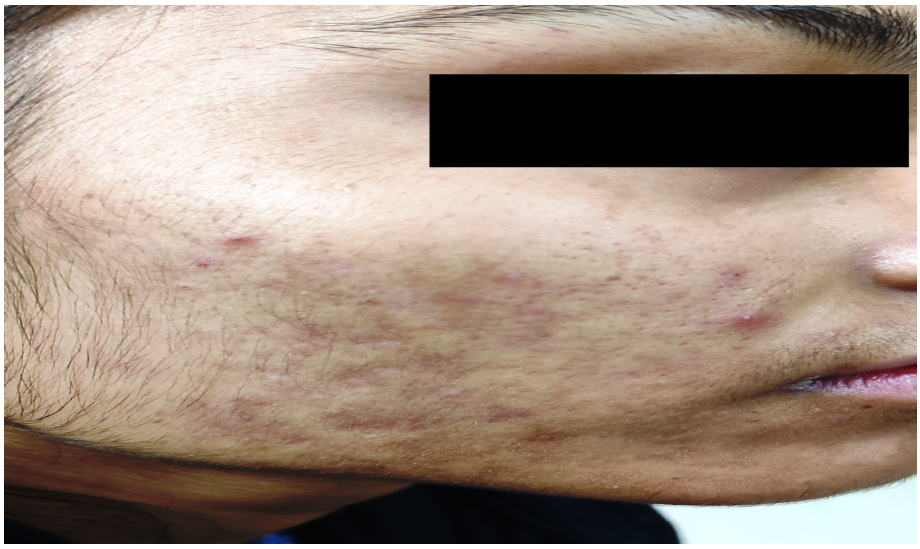

Figure 2 c:

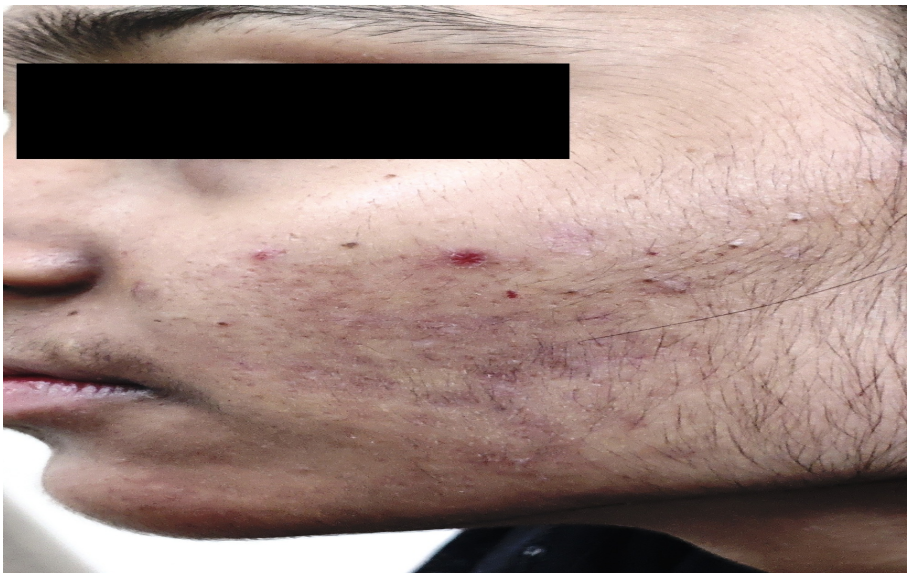

Figure 2d:

Original Figure 2 legend- Excellent improvement in PAE from baseline 0 weeks (a),(b)-right profile & left profile of face respectively to 12 weeks post application (c),(d) –right & left profile of face respectively in patient 2.

Discussion

Natural course of acne may result in dyspigmentation [post inflammatory hyperpigmentation (PIH) and PAE)] or true scarring. Many a times there may be combination of any of the above. In PAE, there is macular erythema, which is more common in skin type's I-III. In darker skin types, PIH is more common. PAE occurs during the resolution phase in acne [4] and described as erythema due to release of inflammatory cytokines, dilatation of microcapillaries within papillary dermis and thinning of epidermis. [5] Differential diagnosis can be rosacea in which erythema is the sign of the disease and post procedural erythema. PAE occurs due to vasodilatation and inflammation. [4] Severity and duration of inflammation is directly proportional to the amount of scarring. Treatment of PAE should target both neovascularization and inflammatory acne cascade. [6]

Tacrolimus (a macrolide lactone) is a potent T cell specific immunosuppressant. It inhibits activation of CD4+ T helper cells, mast cell adhesion, release of inflammatory mediators, production of TH1 and TH2 cytokines. [7] It has been found that topical tacrolimus also inhibits gene expression of VEGF and IGF-1 by inhibiting NF-KB signalling pathway. So, overall it inhibits both neovascularization and inflammatory process and because of this reason, we chose it to be the target molecule for PAE. [8]

Till date, various topical and minimally invasive procedures like lasers have been used. Kelantari et al, did a systemic review of literature in PAE treatment and they found that there exists no gold standard or US-FDA approved treatment modality for PAE. [9]

We could found only one published literature regarding use of topical tacrolimus in the treatment of PAE.

Mhatre et al used 0.1% tacrolimus ointment once nightly in eight patients with acne related macular erythema and they found visible improvement and clinical reduction in erythema at 7 weeks. No side effects were reported. There was no relapse on follow up at 14 weeks. [6]

A comparative split face study was done by Agamina et al on 40 patients of persistent PAE, using triple combination therapy- tranexamic acid 5% + oxymetazoline 1.5% + brimonidine tartarate 0.33%, in which topical placebo was applied on one side of the face and triple combination cream on the other side. The purpose to use this combination was oxymetazoline is a potent vasoconstrictor and brimonidine acts by inhibiting a1 and a2 adrenoceptors respectively; and tranexamic acid shows a positive effect on wound healing. They found triple combination cream was significantly effective as compared to topical placebo according to the global assessment of photographs and computerized analysis of erythema using image analysis software. [10]

A randomized controlled trial was conducted on 30 patients with mild to severe PAE by Washrawirul in which topical nasal decongestant oxymetazoline 0.05% solution was given for treatment of PAE. It showed significantly greater mean difference reduction in PAE counts and reduction in CEA and PSA scores. They concluded that it would be safe and effective for PAE without any rebound effect. [11]

A systemic review on the role of different laser devices in the treatment of PAE was conducted by Sarvipour et al. and they summarized that eye catching results have been inferred with Neodymium-doped yttrium aluminum garnet, fractional carbon dioxide, and pulsed dye lasers. [12]

A study was conducted by Rasha M Genedy in 2016 to evaluate efficacy and safety of topical Brimonidine tartrate solution in the treatment of PAE in 30 patients (twice daily for 4 weeks) and inferred that CEA and PSA score gradually decreased following treatment. [3]

Conclusion

In this case series, we found that the use of 0.03% Tacrolimus ointment for the treatment of PAE showed moderate to excellent response with no local/systemic side effects in such a short duration. Other advantages are cost effectiveness, easy availability and non-invasiveness. There is scarcity of literature using topical tacrolimus as a treatment modality for PAE. Further studies are required to evaluate the role of topical tacrolimus in the management of PAE.

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