Original Article

TO COMPARE THE EFFICACY OF 0.1% TACROLIMUS VERSUS MOMETASONE FURATE TOPICAL TREATMENT OF ALLERGIC CONTACT HAND ECZEMA

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Abstract

Objective: To compare the efficacy of 0.1% tacrolimus versus mometasone furate topical treatment of allergic contact hand eczema**.**

Materials and Methods: Study design was Randomized Controlled Trial.

Setting: Department of Dermatology, Pakistan Institute of Medical Sciences, Islamabad.

Duration of study: 6 months after approval of synopsis i.e 30th Oct, 2019 to 30th April, 2020.

Data Collection Procedure: After taking approval from hospital ethical committee, 150 patients meeting inclusion criteria were included in this study through OPD of Department of Dermatology, Pakistan Institute of Medical Sciences, Islamabad. In group A, mometasone furoate 0.1% ointment were prescribed. In group B, tacrolimus 0.1% ointment were prescribed. After 8 weeks, patients were re-evaluated and if there were 75% clearance of eczema lesions, then efficacy were labeled. All the information was gathered through proforma.

Results: Total 150 patients were included according to the inclusion criteria of the study. Patients were randomly divided into two groups. Patients in group A were prescribed by mometasone furoate while patients in group B were prescribed by 0.1% tacrolimus. Mean age (years) in the study was 49.99+15.52 whereas there were 62 (41.3) male and 88 (58.7) female patients who were included in the study according to the inclusion criteria. Frequency and percentage of efficacy of mometasone furate versus 0.1% tacrolimus topical treatment of allergic contact hand eczema was 18 (24.0) and 63 (84.0) which was statistically significant (p -value 0.000).

Conclusion: The study concluded that tacrolimus was more effective than mometasone furate for treatment of hand eczema. Future studies at multiple setups must be conduct in order to know the local evidence of efficacy among both the protocols in order to know the implement of practice of more effective drug for better management of patients with hand eczema.

Keyword: Eczema, Mometasone, Tacrolimus.

Introduction

Skin lesion, with a chronic and recurring, are analogous with the clinical picture in allergic contact dermatitis and irritant contact dermatitis; skin patch test, however, are usually negative. This makes the diagnostics difficult, prevents a correct diagnosis and treatment based on the avoidance of allergen.[1] Allergic contact dermatitis or eczema is a type IV (delayed) hypersensitivity reaction. It is both host and hapten specific. The clinical presentation of Allergic contact dermatitis is that of an eczematous corruption, which may be acute, subacute or chronic.[2] Various types of dressings have been used successfully in the treatment of atopic dermatitis.[3] Tacrolimus is a promising alternative therapy for contact dermatitis patients as it is effective from the first month of treatment, well tolerated and offers similar therapeutic results to topical corticosteroid therapy.[4-5] In addition to its known anti-inflammatory effect, tacrolimus 0.1% ointment leads also to a measureable increase of the lipids of the skin barrier in patients with atopic dermatitis, exceeding the effect of mometasone furoate cream.[6-7] One trial found that the efficacy was achieved in 13.3% with mometasone furoate 0.1% ointment (n=30) while in 30% with 0.1% tacrolimus ointment (n=30) for management of allergic contact hand eczerha. The difference was significant ($p<0.05$).[8]

Rationale of this study is to compare the efficacy of 0.1% tacrolimus versus mometasone furoate topical treatment in allergic contact hand eczema. Literature showed that tacrolimus more effective than mometasone furate for hand eczema. But there is not much work has been done in this regard. Moreover, one local study available in this regard. But study was done on small sample size (n=30 in each group). So further trials are warranted to confirm the above stated evidence and that is why, we want to conduct this study to get local evidence using large sample size as compared to previous study and implement the practice of more effective drug for management of patients with hand eczema. This may help to improve our practice and patients satisfaction. This study will help to update local guidelines for better management protocols for treatment of allergic contact hand eczema.

Materials and methods

Study design: Randomized Controlled Trial

Setting: Department of Dermatology, Pakistan Institute of Medical Sciences, Islamabad

Duration of study: 6 months after approval of synopsis i.e 30th Oct, 2019 to 30th April, 2020

Sample Size; Sample size of 150 cases; 75 in each group is calculated with 80% power of study, 5% level of significance and taking expected percentage of efficacy i.e 13.3%[6] with mometasone furoate 0.1% ointment while in 30%[6] with 0.1% tacrolimus ointment for management of allergic contact hand eczema.

Sampling technique: Non-probability consecutive sampling

Sample Selection Criteria

Inclusion criteria

- Patients of age 16-75 years
- Either gender
- Patients presenting with allergic contact hand eczema (as per operational definition)

Exclusion criteria

Patients with comorbid condition like severe hypertension (BP >160/100 mmHg), diabetes (BSR>200mg/dl), hepatic (AST>ALT<>40IU, Hepatitis B or C), renal (creatinine >1.5mg/dl), and hematological diseases (PT>20 sec), pregnancy or lactation Patients with known hypersensitivity to trial drug , co-existing acute infections, neoplasia, food allergy and other skin morbidity causing acute onset of skin rash, skin disorders likely

to affect drug absorption or disorders requiring medical treatment within 5 days before inclusion in the study (on medical record)

Data Collection Procedure: After taking approval from hospital ethical committee, 150 patients meeting inclusion criteria will be included in this study through OPD of Department of Dermatology, Pakistan Institute of Medical Sciences, Islamabad. After taking an informed consent, patients demographic information (name, age, gender, duration of symptoms) were be obtained. Patients will be evaluated by researcher and picture will be taken and stored. Then patients will be randomized using computer generated codes into two groups. In group A, mometasone furoate 0.1% ointment were prescribed. In group B, tacrolimus 0.1% ointment were prescribed. Then patients were asked to apply ointment twice daily for 8 weeks. After 8 weeks, patients were re-evaluated and if there were 75% clearance of eczema lesions, then efficacy were labeled (as per operational definition). All this information were gathered through proforma (attached).

Data analysis: Data was entered and analyzed through SPSS version

21. Quantitative variables like age, duration of disease was presented as mean and standard deviation. Qualitative variables like gender and efficacy was presented as frequency and percentage. Both groups were compared for efficacy by using chi-square. P-value <0.05 were taken as significant. Data were stratified for age, gender and duration of disease. Post stratification, both groups were compared for efficacy by using chi-square test. P-value < 0.05 was taken as significant.

Result

Data was entered and analyzed in SPSS version 21.0. Total 150 patients were included according to the inclusion criteria of the study. Patients were randomly divided into two groups. Patients in group A were prescribed by mometasone furoate while patients in group B were prescribed by 0.1 % tacrolimus ointment for treatment in allergic contact hand eczema. Descriptive statistics of age (years) of patient was also calculated in terms of mean and standard deviation. Mean age (years) in the study was 49.99+15.52, as shown in Table. No. 01 Table. No. 02 showed the distribution of gender of patient was also calculated in terms of frequency and percentage of male and female patients. There were 62 (41.3) male and 88 (58.7) female patients who were included in the study according to the inclusion criteria. Table. No. 03 showed the descriptive statistics of duration of disease among both the groups. Mean duration of disease among both the groups was 9.55+2.97 and 7.27+2.03 respectively.

The objective of the study is to compare the efficacy of mometasone furate versus 0.1% tacrolimus topical treatment of allergic contact hand eczema. Frequency and percentage of efficacy among both the groups was 18 (24.0) and 63 (84.0) which was statistically significant (p-value 0.000). as shown in Table. No. 04 Effect modifier like age stratification was compared with efficacy of mometasone furate versus 0.1% tacrolimus topical treatment of allergic contact hand eczema. Among patients with age 16 – 50 years, frequency and percentage of efficacy among both the groups was 5 (20.8) and 30 (83.3) respectively, which was statistically significant (p-value 0.000), whereas among patients with age 51 – 75 years, frequency and percentage of efficacy among both the groups was 13 (25.5) and 33 (84.6) respectively, which was statistically significant (p-value 0.000), as shown in Table. No. 05 Effect modifier like gender stratification was compared with efficacy of mometasone furate versus 0.1% tacrolimus topical treatment of allergic contact hand eczema. Among male patients, frequency and percentage of efficacy among both the groups was 6 (20.0) and 24 (75.0) respectively, which was statistically significant (p-value 0.000), whereas among female patients, frequency and percentage of efficacy among both the groups was 12 (26.7) and 39 (90.7) respectively, which was statistically significant (p-value 0.000), as shown in Table. No. 06

Table. No. 01 Descriptive statistics of Age (years) of patients

	Mean	Std. Deviation
Age (years)	49.99	15.52
Group A	52.49	15.35
Group B	47.49	15.39

Table. No. 02 Distribution of Gender of patients

	Two groups		Total
	group A	group B	
male	30	32	62
Gender	40.0%	42.7%	41.3%
female	45	43	88
	60.0%	57.3%	58.7%
Total	75	75	150

Table. No. 03 Descriptive statistics of Duration of Disease

	Two groups	n	Mean	Std. Deviation
Duration of Disease	group A	75	9.55	2.97
	group B	75	7.27	2.03

Table. No. 04 Comparison of Efficacy among both the groups

		Two groups		Total	p-value
		group A	group B		
Efficacy	yes no	18	63	81	
		24.0%	84.0%	54.0%	
		57	12	69	0.000
Total		76.0%	16.0%	46.0%	
		75	75	150	

Table. No. 05 Effect modifier like Age stratification and comparison of Efficacy among both the groups

Age groups	Efficacy	Two groups		Total	p-value
		group A	group B		
16 - 50 years	yes	5 20.8%	30 83.3%	35 58.3%	0.000
	no	19 79.2%	6 16.7%	25 41.7%	
51 - 75 years	yes	13 25.5%	33 84.6%	46 51.1%	0.000
	no	38 74.5%	6 15.4%	44 48.9%	

Table. No. 06 Effect modifier like Gender stratification with comparison of Efficacy among both the groups

Gender	Efficacy	Two groups		Total	p-value
		group A	group B		
Male	Yes	6 20.0%	24 75.0%	30 48.4%	0.000
	No	24 80.0%	8 25.0%	32 51.6%	
Female	Yes	12 26.7%	39 90.7%	51 58.0%	0.000
	No	33 73.3%	4 9.3%	37 42.0%	

Discussion

Topical corticosteroids (TCS) and more recently topical calcineurin inhibitors (TCI) provide efficacious first and second-line respective topical anti inflammatory (TAI) therapies for both adults and children with acute flares of AD[10,11]. Once primary disease control (induction of remission) is established, current clinical practice advocates a twice- weekly TAI 'maintenance' dose in combination with a baseline daily emollient therapy as a preventative measure to suppress the repopulation of subclinical inflammatory infiltrate[12, 13]. With clinical trials supporting the use of both TCS and TCI in this proactive manner, authors have questioned which class of TAI is clinically superior through careful evaluation of efficacy, safety, benefits and cost-effectiveness [14]. Referring to epidermal barrier safety, compared to the damage associated with prolonged daily TCS use, the influence of TCI remains inconclusive [8,15–17], with no studies to date reporting the interaction of a proactive TAI dose with the dysfunctional epidermal barrier. The proactive use of topical anti-inflammatory (TAI) therapy to address subclinical inflammation is an effective, contemporary clinical strategy for the management of atopic dermatitis (AD). The interaction of a proactive TAI dose with the subclinical epidermal barrier defect in AD is yet to be determined. A

randomised, observerblind, functional mechanistic study in 17 subjects with quiescent AD was performed to compare the effect of a twice-weekly dose of betamethasone valerate (0.1%) cream (BMVc), against tacrolimus (0.1%) ointment (TACo) on the biophysical and biological properties of the epidermal barrier. Application of BMVc preserved epidermal barrier function and stratum corneum (SC) integrity, but significantly elevated skin-surface pH with concomitant loss of SC cohesion. By contrast, TACo improved SC integrity, exerted an overall hydrating action, and significantly reduced caseinolytic and trypsin-like protease activity. The differential effects reported support the proactive use of TACo to promote reparation of the subclinical barrier defect in AD. To this end, a head-to-head, within-volunteer investigation was designed to compare the effect of a TCS, against a TCI dose on the biophysical and biological properties of the SC, when applied proactively (twice weekly) in volunteers with quiescent AD. Not only do these subjects demonstrate a subclinical barrier defect (inhibited epidermal permeability barrier function, reduced SC hydration and elevated trypsin- like protease activity compared to healthy controls)[8], they are asymptomatic (minimum 6 months), allowing the interaction of the treatments with the defective epidermal barrier to be investigated, independent from their primary anti-inflammatory purpose of disease control. Topical corticosteroids are very effective in atopic dermatitis but their frequent and long-term use, particularly in children have many side effects.[11] Mometasone furoate is a medium potency corticosteroid, indicated for the relief of the inflammatory and pruritic manifestations of atopic dermatitis.[12] Topical calcineurin inhibitors like tacrolimus may be used as alternate to steroid. Topical tacrolimus suppresses inflammation in a similar way to steroids and is equally as effective as a medium potency steroid.[10] It does not cause skin thinning or other steroid related side-effects.[13]Descriptive statistics of age (years) of patient was also calculated in terms of mean and standard deviation. Mean age (years) in the study was 49.99+15.52, whereas study conducted in 2014 showed that average age of patients was 21.73+4.30.[8]Study conducted by Khan MA[8] showed that mean duration (month) of disease was 16.60+17.21 whereas our study findings showed average duration of disease was 9.55+2.97. Our study objective is to compare the efficacy of mometasone furate versus 0.1% tacrolimus topical treatment of allergic contact hand eczema. Frequency and percentage of efficacy among both the groups was 18 (24.0%) and 63 (84.0%) which was statistically significant (p- value 0.000) whereas one trial found that the efficacy was achieved in 13.3% with mometasone furoate 0.1% ointment (n=30) while in 30% with 0.1% tacrolimus ointment (n=30) for management of allergic contact hand eczerha. The difference was significant ($p<0.05$).[8]

Conclusion

The study concluded that tacrolimus was more effective than mometasone furate for treatment of hand eczema. Future studies at multiple setups must be conduct in order to know the local evidence of efficacy among both the protocols in order to know the implement of practice of more effective drug for better management of patients with hand eczema.

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