

Comparison of Therapeutic Efficacy of Topical Tacrolimus 0.1% and Topical Dithranol 0.5% in Treatment of Alopecia Areata

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ABSTRACT

Objective: To compare the therapeutic efficacy of topical Tacrolimus 0.1% and topical Dithranol 0.5% in patients of alopecia areata.

Study Design: Quasi Experimental Study

Place and Duration of Study: Departments of Dermatology, Combined Military Hospital, Hyderabad and Combined Military Hospital, Abbottabad from Sep 2019-2020.

Methodology: Patients fulfilling the inclusion criteria were selected in the first 1 and a half months, after written informed consent. The patients were divided into two Groups A and B, by lottery method. Group A received topical Tacrolimus 0.1% application twice a day and Group B received topical Dithranol 0.5% application twice a day, for 24 weeks. The response of treatment was calculated by two observers and each of them determined the percentage of hair re growth by comparing the pre and post treatment photographs of the patient at 24 weeks.

Results: More than 80% Hair re - growth was observed in 7(23.33%) of the patients in Tacrolimus Group and 12(40%) of the patients in Dithranol Group. Therapeutic efficacy of Dithranol was more than Tacrolimus as their comparison revealed p value=0.039.

Conclusion: Therapeutic efficacy of Dithranol is superior to Tacrolimus in treatment of alopecia areata.

Keywords: Alopecia areata, Anthralin, Tacrolimus.

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INTRODUCTION

Alopecia areata (AA) is a chronic, auto immune, inflammatory disorder.¹ 1.7% of the population may be affected by this disease.² It affects almost 0.1% of the general population.³ There is no epidemiological evidence of its incidence or prevalence in Pakistan.⁴ Mean age of onset is 20 years.⁴ It is self-limiting and involves only the scalp but sometimes it is seen with concurrent atopic disorders, diabetes mellitus, and other autoimmune disorders whose presence carry an unfavorable prognosis.¹ Alopecia Areata can have a severe psychological, social and emotional impact.⁵ Various therapeutic agents have been described for its treatment like topical, intra lesional and systemic steroids, phototherapy, immune modulatory agents, anthralin, minoxidil, interferons, dapsone and Tacrolimus.⁶ None of the therapies are completely curative or preventive.

In our study, we are going to compare two of the

above-mentioned modes of treatment i.e. topical Tacrolimus and topical Dithranol. Tacrolimus is a steroid-free potent immune-suppressant which reduces the proliferation of lymphocytes.⁷ The action of Dithranol, also known as anthralin, is postulated to be decreased expression of Tumor Necrosis Factor α and β (TNF α and TNF β). It produces mild irritation reaction in order to be effective.⁸ The percentage of hair regrowth in patients of AA treated by Dithranol is 18.8%⁹ and that with topical Tacrolimus has been shown to be 0.1%.⁶

Both of these agents have been investigated individually for their efficacy in AA internationally, but they have not been compared directly. There is no standardized treatment for AA and the I could not find a single study of their comparison from Pakistan. If one of these agents can be shown to have superior results in our population, it can help clinicians in managing this disease

MEHODOLOGY

The Quasi-experimental study was conducted at the Dermatology Departments of CMH Hyderabad

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and CMH Abbottabad, Pakistan from September 2019 to 2020. The sample size was calculated using the WHO Sample Size Calculator, taking confidence interval 95%, margin of error 5%. The estimated sample size came out to be 60 patients with 30 patients placed in each Group randomly by lottery method with one Group being treated.

Inclusion Criteria: Newly diagnosed patients of Alopecia Areata with no co morbidities of both genders in years between 20 to 40 age.

Exclusion Criteria: Patients already with Collagen Vascular disease, on Immunosuppressants, or unable to follow up regularly for clinical assessment were excluded.

Permission from Ethical Review Committee of CMH Hyderabad (Trg/Ec/2) was taken. Patients from Dermatology outpatient department (OPD) and admitted patients in skin ward fulfilling criteria were selected. They were examined by Classified Dermatologist. The patients were divided into two Groups A and B, by lottery method. Group A received topical Tacrolimus 0.1% application twice a day and Group B received topical Dithranol 0.5% application twice a day, for 24 weeks. The response of treatment was calculated by two observers and each of them determined the percentage of hair re growth by comparing the pre and post treatment photographs of the patient at 24 weeks.

All statistical workup for the study and application of relevant tests was conducted using the Statistical Package for the Social Sciences (SPSS) version 24. Frequency and percentages were calculated for all qualitative variables included in the study. The mean and standard deviation for age were also calculated for the study participants in both Groups. An association was established if the p-value after applying the chi-square test was less than or equal to 0.05.

RESULTS

Out of 60 patients, 34(56.7%) patients were male and 26(43.3%) were females. In Group A, 18(60.0%) patients were male and 12(40.0%) patients were female while in Group B, 16(53.3%) patients were male and 14(46.7%) were females. The mean age of the patients in Group A was 26.13±7.14 years and in Group B was 27.26±6.88 years. The demographic characteristics of study Participants shown in Table-I.

Complete hair growth response (More than 80% Hair re - growth) was observed in 7(23.3%) of the

patients in Tacrolimus Group (Group A) and 12(40.0%) of the patients in Dithranol Group (Group B). Therapeutic efficacy of Group B was more than Group A as their comparison revealed p -value=0.039 shown in Table-II.

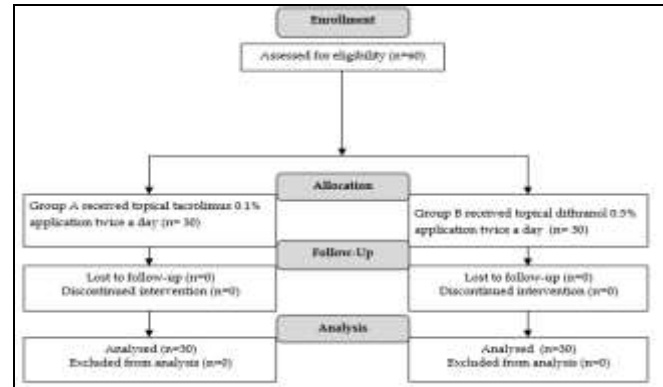


Figure: Patient Flow Diagram (n= 60)

Table-I: Demographic Characteristics of Study Participants (n=50)

Variables	Group A(n=30)	Group B(n=30)
Gender		
Male	18(60.0%)	16(53.3%)
Female	12(40.0%)	14(46.7%)
Mean age in years	26.13±7.14	27.26±6.88

Table-II: Association Of Hair Growth Between The Study Groups (n=60)

Hair Growth	Group A (n=30) Frequency (%)	Group B (n=30) Frequency (%)	p-value
<25	5(16.7%)	2(6.7%)	0.039
<50	14(46.7%)	6(20.0%)	
<80	4(13.3%)	10(33.3%)	
<100	7(23.3%)	12(40.0%)	

DISCUSSIONS

Currently no definitive cure for Alopecia Areata is available. Treatment is aimed at blocking the auto immunity, stimulate and maintain hair growth and prevent the recurrence. Traditionally Topical or Intra lesional or Systemic glucocorticoids are being used by most Consultants.⁷⁻¹¹ Recently The topical immune modulators like Dithranol, Phototherapy or PUVA, DMARDS like cyclosporin or Tacrolimus, interferon or JAK Inhibitors or biologics as Depilumab.^{12,13} Hair stimulants as Topical or Oral minoxidil is being used by many. Selection of Treatment varies with many factors as age, co morbidities or the severity of hair loss or the response to hair growth. Patients' clinical response is variable and hair growth is cyclical in few.

We Often need to involve multi-disciplinary approaches to motivate patients and financially or psychologically. No treatment has been found effective in preventing the recurrence as yet.¹⁴ And no role of any Surgical intervention has been established. Many Off-license treatments have been used as Simvastatin or Ezetimibe or Zinc therapy. Stem cell treatments and Platelet Rich Plasma has had success in few cases. Cosmetic camouflage is acceptable treatment in patients unwilling for systemic treatments or poorly responsive to treatments.

Alopecia Areata does not show any sexual predominance.^{15,16} In our study in the Group A, 60% patients were male and 40% female.

Some studies have shown a very poor response with treatment using topical Tacrolimus like Kuldeep CM.¹ In this study none of the patient's showed hair re growth >75% and only 4% of the patients had regrowth >50%. Thus, a variable trichogenic response has been seen in various studies, however the response seen in our study was more comparable to the first two studies.¹⁷⁻²⁰

Regarding topical Dithranol, regrowth > 80% was observed in (12 patients) 40% of our study Group. Previous studies reported a good response (hair regrowth >60%) in 35% of the patients.²¹⁻²³ Two studies showed a good response in 56.2% of the patients in a 20 weeks study. In another study, 20 % patients showed a regrowth of >75%. Again, our results were more comparable to the first two studies.^{24,25}

In our study a limited population cross section was studied as most patients in our Taboo struck country visit either hakims or rely on Self medication and follow up once the condition has aggravated. Along with that the duration of treatment is long so many patients lost to follow.

CONCLUSION

Amongst the various modalities of treatment available for AA, topical treatments are sometimes preferred by the patients as they are easy to use and save many visits to the clinician. Our study was conducted in the quest for the best possible treatment that can be provided to these patients. We conclude that the therapeutic efficacy of topical Dithranol is more than topical Tacrolimus, although a variable response is observed in different patients.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

MH & MAS: Data acquisition, data analysis, critical review, approval of the final version to be published.

HM & ZS: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

A & KY: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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