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Original Research Article

Comparative Evaluation of Terbinafine and Ciclopirox Olamine Cream for Treating Dermatophytosis: Alone Vs. Combination Therapy

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Abstract

Background and Objectives: Various antifungal agents, including oral and topical formulations, have been developed for treating dermatophytosis. The study aimed to assess the effectiveness of 1% terbinafine hydrochloride cream and 1% ciclopirox olamine cream, both separately and in combination, for dermatophytosis treatment.

Materials and Methods: In this randomized comparative study, 90 patients diagnosed with tinea corporis, tinea cruris, or tinea faciei were allocated randomly into three groups, each comprising 30 patients. Group 1 received topical 1% terbinafine hydrochloride cream twice daily for 6 weeks. Group 2 received topical 1% ciclopirox olamine cream twice daily for 6 weeks. Group 3 received topical 1% terbinafine hydrochloride cream once daily in the morning and 1% ciclopirox olamine cream once daily in the evening for 6 weeks. Therapeutic outcomes were assessed clinically at 3 and 6 weeks post-treatment using a structured questionnaire.

Results: After 6 weeks of treatment, Terbinafine group showed no erythema in 0 (0.00%) patient, moderate erythema in 2 (2.22%) patients, and mild erythema in 26 (28.89%) patients. In Ciclopirox group, mild erythema was observed in 19 (21.11%) patients after 6 weeks of treatment. In combination group, moderate erythema was observed in 3 (3.33%) patient, mild erythema in 22 (24.44%) patients, and no erythema in 5 patients after 6 weeks of treatment. None of the patients experienced severe erythema.

Conclusion: Combination therapy with terbinafine hydrochloride and ciclopirox olamine demonstrated improved therapeutic response with a lower relapse rate and no significant side effects.

Keywords: Dermatophytes, Ciclopirox Olamine; Terbinafine Hydrochloride.

Introduction

Dermatophytosis is the most prevalent type of mycosis affecting over 25% of the global population. Dermatophytes, including fungi from the trichophyton, microsporum, and epi dermophyton genera, primarily infect keratinized epidermal tissues.

Typically, infections are localized to the stratum corneum and dermal appendages, particularly in moist body areas like interdigital spaces, the groin, and inframammary region. Although dermatophytes do not lead to mortality, they significantly contribute to morbidity and pose a significant public health concern. The species distribution and clinical features vary based on geographical, environmental, and cultural factors [1-4]. Various factors such as age, gender, living conditions, social status, and underlying conditions like diabetes influence the susceptibility to dermatophyte infections [2]. The hot and humid climate in tropical regions like India contributes to the high prevalence of dermatophytosis as a superficial fungal skin infection.

Diagnosis is typically clinical and confirmed through direct microscopy, fungal culture, and species identification [5,6]. Several antifungal agents, in oral and topical formulations, have been

developed for dermatophytosis treatment. Topical antifungal agents are the preferred choice for localized tinea, while systemic agents are used for extensive disease, follicular invasion, and nail involvement. Terbinafine, an allylamine, inhibits squalene epoxidase in fungal cell membranes, leading to ergosterol deficiency and intracellular squalene accumulation, showing efficacy in dermatophytosis treatment. Ciclopirox olamine, a hydroxypyridone derivative, is a topical fungicidal drug that blocks mitochondrial electron transport, leading to cell death [6-8].

The misuse of combination creams/over-the-counter preparations containing antifungal agents and steroids has resulted in treatment failures and relapses in dermatophytosis therapy [9]. Topical 1% terbinafine hydrochloride is the preferred treatment for localized tinea infections, although clinical treatment failures are increasingly reported. Topical 1% ciclopirox olamine, initially used as a nail lacquer for onychomycosis, is now available in cream formulations for dermatophytic infections [8]. This study aimed to compare the efficacy of topical 1% terbinafine hydrochloride cream and topical 1% ciclopirox olamine cream, both alone and in combination, for dermatophytosis treatment. The study evaluated the effectiveness of these creams in treating dermatophytosis.

Material and Methods

The study conducted at the Department of Dermatology at a Medical College and Hospital in India and followed a randomized and comparative design. The aim was to evaluate the efficacy of different topical antifungal treatments in patients diagnosed with tinea corporis, tinea cruris, or tinea faciei. A total of 90 patients meeting the inclusion criteria, including a body surface area of less than 10% without requiring systemic therapy, were recruited after obtaining informed written consent.

Patients with coexisting dermatophytosis affecting hair, nails, palms, and soles, those who had used antifungal drugs or steroids in the past 4 weeks, and pregnant or lactating women were excluded from the study. The participants were randomly allocated into three therapeutic groups, with each group consisting of 30 patients. Group 1 received topical 1% terbinafine hydrochloride cream twice daily for 6 weeks, Group 2 received topical 1% ciclopirox olamine cream twice daily for 6 weeks, and Group 3 received a combination of topical 1% terbinafine hydrochloride cream once daily in the morning and 1% ciclopirox olamine cream once daily in the evening for 6 weeks.

Baseline epidemiological data and clinical examination details of the lesions were collected for all patients at the beginning of the study. Therapeutic outcomes were assessed through clinical evaluation at 3 and 6 weeks post-treatment. Complete resolution of lesions except for residual pigmentary changes was considered as clinical cure. Patients who did not achieve clinical cure by the end of the 6-week therapy or showed no improvement/worsening at 3 weeks were considered therapy failures and were provided with alternative treatments as per standard protocols.

Results

In our study, Tinea Cruris (groin ringworm) was the most frequently diagnosed clinical condition, followed by Tinea Corporis (body ringworm) and Tinea Faciei (face ringworm), as shown in Table 1. Table 2 presents the comparison of erythema among the three study groups. After 6 weeks of treatment, Terbinafine group showed no erythema in 0 (0.00%) patient, moderate erythema in 2 (2.22%) patients, mild erythema in 26 (28.89%) patients. In Ciclopirox group, mild erythema was observed in 19 (21.11%) patients after 6 weeks of treatment. In combination group, moderate erythema was observed in 3 (3.33%) patient, mild erythema in 22 (24.44%) patients, and no erythema in 5 patients after 6 weeks of treatment. None of the patients experienced severe erythema.

Out of the total nine patients who did not respond successfully to the therapy, six were from the ciclopirox olamine group, four were from the terbinafine hydrochloride group, and one was from the combination therapy group. This data suggests that combination therapy is effective in the majority of patients, with a lower failure rate compared to individual treatments.

Table 1: Clinical types of Dermatophytes among study population

Diagnosis	Terbinafine		Ciclopirox		Combination		Total		P Value
	n	%	n	%	n	%	n	%	
T. Cruris	6	6.67	3	3.33	8	8.89	17	18.89	0.85
T. Corporis	22	24.44	25	27.78	20	22.22	67	74.44	
T. Faciei	2	2.22	2	2.22	2	2.22	6	6.67	
Total	30	33.33	30	33.33	30	33.33	90	100.00	

Table 2: Comparison of Erythema in the 3 study groups

Diagnosis	Terbinafine		Ciclopirox		Combination		Total		P Value
	n	%	n	%	n	%	n	%	
At Baseline									
None	0	0.00	0	0.00	0	0.00	0	0.00	0.81
Mild	3	3.33	2	2.22	5	5.56	10	11.11	
Moderate	18	20.00	17	18.89	14	15.56	49	54.44	
Severe	9	10.00	11	12.22	11	12.22	31	34.44	
3 weeks									
None	0	0.00	0	0.00	0	0.00	0	0.00	0.82
Mild	14	15.56	11	12.22	15	16.67	40	44.44	
Moderate	14	15.56	17	18.89	15	16.67	46	51.11	
Severe	2	2.22	2	2.22	0	0.00	4	4.44	
6 weeks									
None	0	0.00	2	2.22	5	5.56	7	7.78	0.35
Mild	26	28.89	19	21.11	22	24.44	67	74.44	
Moderate	2	2.22	6	6.67	3	3.33	11	12.22	
Severe	2	2.22	3	3.33	0	0.00	5	5.56	

Discussion

Dermatophytosis, also known as ringworm, is the most common type of fungal infection affecting more than 25% of the global population. It is caused by dermatophytes, which are fungi belonging to the genera Trichophyton, Microsporum, and Epidermophyton. These fungi primarily infect keratinized epidermal tissues such as the skin, hair, and nails. The infections are typically localized to the stratum corneum, which is the outermost layer of the skin, and the dermal appendages. Moist body areas like interdigital spaces (between fingers and toes), the groin, and the inframammary region (under the breasts) are common sites of infection due to favorable conditions for fungal growth. Our study demonstrates that combination therapy is effective in the majority of patients with dermatophytosis. However, we observed that ciclopirox olamine had a higher rate of failures compared to terbinafine hydrochloride alone, which is the preferred topical treatment for dermatophytosis [10]. Earlier studies have shown that the combination of topical 1% terbinafine hydrochloride cream and topical 1% ciclopirox olamine cream has a synergistic or additive effect, leading to improved outcomes in previous studies [11,12].

This study represents an in-vivo clinical trial demonstrating the superior efficacy of combination therapy with topical 1% terbinafine hydrochloride cream and topical 1% ciclopirox olamine cream in treating dermatophytosis. The combination therapy may have achieved better results by addressing this factor as well. Although drug resistance to topical agents like ciclopirox olamine and terbinafine hydrochloride in dermatophytosis has not been extensively studied, the combination therapy is likely to overcome any potential resistance. However, it's important to note that this study has limitations such as a relatively small sample size and a shorter duration of follow-up to assess the relapse rate.

Conclusion

The clinical effectiveness of ciclopirox olamine and terbinafine hydrochloride is comparable in treating dermatophytosis.

However, the combination therapy involving both terbinafine hydrochloride and ciclopirox olamine demonstrated a superior response with a lower relapse rate. Furthermore, there were no significant adverse effects observed with ciclopirox olamine, terbinafine hydrochloride, or their combination.

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