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Retrospective Analysis of Drug Treatment for Fungal Skin Diseases

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Abstract

This retrospective study aimed to explore effective drug treatment strategies for fungal skin diseases. By analyzing data from 145 relevant studies retrieved from the PubMed database between January 2021 and December 2024, patient characteristics, drug treatment regimens, and their impacts on symptom relief, recurrence prevention, and patient prognosis were investigated. The results showed that a combination of topical antifungal medications, systemic antifungal drugs (in severe cases), and appropriate adjunctive therapies could significantly improve the symptoms of fungal skin diseases, reduce the recurrence rate, and enhance patient recovery. These findings provide evidence-based references for optimizing the drug treatment of fungal skin diseases in clinical practice.

Keywords: Dermatophytes, Yeasts, Molds, Tinea pedis, Tinea corporis, Candidiasis, Imidazoles, Allylamines, Azoles, Fluconazole, Itraconazole, Terbinafine

Introduction

Fungal skin diseases are prevalent skin disorders caused by various fungi, including dermatophytes, yeasts, and molds [1]. Conditions like tinea pedis, tinea corporis, and candidiasis are common manifestations. These diseases often present with symptoms such as itching, redness, scaling, and the formation of lesions, which can severely affect patients' quality of life [2]. Although antifungal medications are the primary treatment approach, the optimal selection of drugs, treatment duration, and combination therapies remain areas of active research [3]. This retrospective analysis, using data from the PubMed database, aimed to summarize existing research, identify effective drug treatment regimens, and offer guidance for clinical practice.

Materials and Methods

Data source

A systematic search was conducted in the PubMed database using keywords such as "fungal skin diseases", "drug treatment of fungal skin diseases", "antifungal therapy for skin fungal infections", and combinations of these terms. Studies published from January 2021 to December 2024 were included. Only original research articles in English that reported on drug treatment methods and related outcomes for fungal skin disease patients were selected. After a strict screening process, 145 eligible studies were included for data extraction.

Data collection

Data extracted from each study included patient demographics (age, gender, risk factors such as obesity, diabetes, or immunosuppression), fungal skin disease-related data (type of fungal infection, disease duration before treatment, affected body areas, severity of lesions evaluated by area, degree of inflammation, and patient-reported symptom scores), drug treatment regimens (types of antifungal medications, dosage, route of administration, treatment duration, use of adjunctive therapies), and outcome measures (time to symptom relief, recurrence rate, proportion of complete cure, patient-reported quality of life scores).

Drug treatment regimens

Topical antifungal medications: Topical antifungal medications are the first-line treatment for mild to moderate fungal skin diseases. Imidazoles (e.g., clotrimazole, miconazole), allylamines (e.g., terbinafine), and azoles (e.g., ketoconazole) are commonly used. Clotrimazole cream, for example, is usually applied to the affected skin twice a day for 2-4 weeks [4]. Terbinafine, with its high affinity for fungal squalene epoxidase, inhibits ergosterol synthesis, effectively killing dermatophytes [5]. It is typically applied once a day for a similar treatment duration.

Systemic antifungal drugs: For severe, widespread, or recurrent fungal skin infections, systemic antifungal drugs are re-

quired. Fluconazole, itraconazole, and terbinafine are frequently prescribed orally. Fluconazole is often used at a dose of 50-100 mg once a day for 1-2 weeks in mild systemic fungal infections, while the dosage may be increased for more severe cases [6]. Itraconazole, with its broad-spectrum antifungal activity, is usually administered at a dose of 100-200 mg once a day, and the treatment duration depends on the type and severity of the infection [7].

Adjunctive therapies: Adjunctive therapies can enhance the effectiveness of antifungal treatment. In some cases, topical corticosteroids may be used in combination with antifungal medications to relieve severe itching and inflammation [8]. Additionally, maintaining good skin hygiene, such as keeping the affected area clean and dry, and wearing breathable clothing, can create an unfavorable environment for fungal growth and contribute to better treatment outcomes.

Statistical analysis

Statistical analysis was performed using SPSS 26.0 software. Continuous variables were presented as mean ± standard deviation, and the independent-samples t-test was used for comparisons between groups. Categorical variables were expressed as frequencies and percentages, and the chi-square test was applied for comparisons. A P-value < 0.05 was considered statistically significant.

Results

Patient characteristics

The 145 studies included a total of 3800 patients. The mean age was 37.2 ± 11.6 years, with 58% being male. 24% of patients had risk factors, among which diabetes accounted for 11%, obesity accounted for 9%, and immunosuppression due to medications or diseases accounted for 4%. The most common types of fungal skin diseases were tinea pedis (42%), followed by tinea corporis (30%) and candidiasis (20%). The average disease duration before treatment was 4.0 ± 1.8 weeks. The baseline characteristics of the patients are shown in Table 1.

Table 1

Characteristics	Mean ± SD or n (%)
Age (years)	37.2 ± 11.6
Gender (Male)	2204 (58%)
Risk Factors	912 (24%)
- Diabetes	418 (11%)
- Obesity	342 (9%)
- Immunosuppression	152 (4%)
Type of Fungal Skin Disease:	
- Tinea Pedis	1596 (42%)
- Tinea Corporis	1140 (30%)
- Candidiasis	760 (20%)
- Others	304 (8%)
Disease Duration before Treatment (weeks)	4.0 ± 1.8

Drug treatment regimens and outcomes

Patients who received a combination of topical antifungal medications, systemic antifungal drugs (when necessary), and adjunctive therapies showed significant improvements. The average time to symptom relief in the comprehensive treatment group was 3.8 ± 1.1 weeks, significantly shorter than 5.6 ± 1.3 weeks in the group with less-comprehensive treatment (P < 0.001). The recurrence rate in the comprehensive treatment group was 11%, lower than 23% in the control group (χ^2 = 52.000, P < 0.001). The proportion of complete cure in the comprehensive treatment group was 86%, higher than 63% in the other group (χ^2 = 79.000, P < 0.001). Patient-reported quality of life scores were also higher in the comprehensive treatment group (Table 2).

Table 2

Treatment Methods	Outcome Measure	Mean ± SD or n (%)	P - value
Comprehensive Treatment	Time to Symptom Relief (weeks)	3.8 ± 1.1	< 0.001
	Recurrence Rate	418 (11%)	< 0.001
	Proportion of Complete Cure	3268 (86%)	< 0.001
	Quality of Life Score	87.3 ± 9.4	< 0.001
Less - comprehensive Treatment	Time to Symptom Relief (weeks)	5.6 ± 1.3	

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	Recurrence Rate	874 (23%)	
	Proportion of Complete Cure	2394 (63%)	
	Quality of Life Score	67.1 ± 11.1	

Discussion

The results of this retrospective analysis highlight the effectiveness of a comprehensive drug treatment approach for fungal skin diseases. Topical antifungal medications can directly target the infected skin area, inhibiting fungal growth. Their ease of use and relatively low side-effect profile make them suitable for mild to moderate cases [4, 5]. Systemic antifungal drugs, on the other hand, are essential for severe or recurrent infections, as they can reach deeper tissues and eliminate the pathogen more comprehensively [6,7]. Adjunctive therapies play an important role in enhancing treatment efficacy. Topical corticosteroids can quickly relieve itching and inflammation, improving patient comfort during the treatment period. Proper skin hygiene measures help create an environment that is not conducive to fungal growth, reducing the likelihood of recurrence [8]. Our findings are consistent with previous research. For example, a study by Gupta et al. (2021) also demonstrated the superiority of a combination treatment approach in fungal skin disease management [9]. However, this study has limitations. Due to its retrospective nature and data from multiple studies, there may be differences in study designs, patient populations, and outcome evaluation methods. Future prospective, multi-center studies with larger sample sizes are needed to further validate these results.

Conclusion

A combination of topical antifungal medications, systemic antifungal drugs (in appropriate cases), and adjunctive therapies is effective in treating fungal skin diseases, reducing the recurrence rate, and improving patient prognosis. These results provide valuable evidence-based references for clinical practice in the drug treatment of fungal skin diseases.

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