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Topical clotrimazole cream for the treatment of tinea cruris

A retrospective study

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Abstract

This retrospective study assessed the efficacy and safety of 1% topical clotrimazole cream for the treatment of patients with tinea cruris (TC).

We included 86 patients with confirmed TC for the presence of fungal hyphae. Of those, 43 patients received 1% topical clotrimazole cream for a total of 4 consecutive weeks, and were assigned to an experimental group. The other 43 patients underwent 1% topical butenafine cream for a total of 2 consecutive weeks, and were allocated to a control group. The efficacy and safety were measured and analyzed after 4 weeks treatment.

After treatment, patients in both groups achieved better improvements in erythema ($P < .01$), scaling ($P < .01$), itching ($P < .01$), and KOH-negative results ($P < .01$), compared with those in patients before the treatment. However, there were not significant differences in erythema ($P = .61$), scaling ($P = .57$), itching ($P = .47$), and KOH-negative results ($P = .67$) between 2 groups. In addition, no treatment-related adverse events were recorded in both groups.

Both 1% topical clotrimazole and butenafine cream are found to be effective and safe for patients with TC. However, there is not significant difference in efficacy and safety between two groups.

Abbreviations: KOH = potassium hydroxide, RCT = randomized controlled trial, TC = tinea cruris.

Keywords: butenafine, clotrimazole, tinea cruris

1. Introduction

Tinea cruris (TC), also known as jock itch, is caused by dermatophytoses, including genera *Epidermophyton*, *Microsporum*, and *Trichophyton*,[1–4] which affect keratinized structures resulting in a characteristic rash with itching and scratching.[5,6] It sparely manifests symptoms and signs at the penis and scrotum, which may help to distinguish this disorder from other rashes.[7] It can also be transmitted among people through direct skin-to-skin contact.[8–10] Several risk factors are responsible for TC, such as excessive perspiration, improper hygiene, and diabetes mellitus.[3,6] It has been estimated that about 10% to 20% of the population affected by fungal skin infections, and is often severe and recurrent.[11–13]

Studies suggested that both topical and systemic treatments can be utilized to treat TC.[3,13] Of those, topical antifungal therapies are the most appropriate to use and are normally well-tolerated with fewer adverse events.[14,15] There are several topical antifungal drugs for TC, such as clotrimazole and butenafine cream.[16,17] Clotrimazole is a broad spectrum topical antimycotic or antifungal agent, and is well tolerated.[18] It acts primarily by changing the permeability of cell membrane of fungi.[18] Butenafine is a synthetic benzylamine derivative antifungal drug.[19,20] It works as antifungal drug by alterations of cell membranes through increased membrane permeability and growth restriction.[19,20] Both topical creams are reported to effectively treat TC. However, there are still insufficient data to compare the efficacy and safety of 1% topical clotrimazole and butenafine creams for the treatment of patients with TC. Thus, this retrospective study compared the efficacy and safety between 1% topical clotrimazole cream and 1% topical butenafine cream for the management of TC.

2. Patients and methods

2.1. Ethical approval

This study was approved by the Ethics Committee of The Second Affiliated Hospital of Mudanjiang Medical University. All patients provided written informed consent in this study.

2.2. Study design

This study was designed as a retrospective study. A total of 86 patient case records, which diagnosed as TC were included

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The authors have no conflicts of interest to disclose.

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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between March 2018 and December 2019 in The Second Affiliated Hospital of Mudanjiang Medical University. Forty-three patients were administrated by 1% topical clotrimazole cream, and were assigned to an experimental group. The other 43 patients underwent 1% topical butenafine cream, and were assigned to a control group. All patient data were collected at baseline and at the end of 4-week treatment. We did not apply randomization approach to this retrospective study. In addition, we also did not blind patients and clinical practitioners because all data were extracted from the completed patient case records. However, the analyst was blinded in this study.

2.3. Patient selection

In this retrospective study, all included patients (over 18 years old) were included, clinically presenting of TC as erythema, scaling, vesicles, itch, pustules, and septate fungal hyphae under microscopic examination of selected scraping lesion by a 10% potassium hydroxide (KOH) mount.[21] All TC was mild to severe grades of dermatophytosis. A written informed consent was provided by all included patients.

Patients were excluded if they were pregnant or lactating, allergic to topical clotrimazole and butenafine cream, pre-treatment with antifungal drugs within 1 month prior to the onset of this study, local skin injury caused by other disorders, systematic mycosis, and patients with insufficient information including failure to present written informed consent. In addition, the usage of other similar antifungal therapy during the period of study was also excluded, because they may affect the efficacy of 1% topical clotrimazole and butenafine creams.

2.4. Drug administration

All patients in the experimental group utilized 1% topical clotrimazole cream, twice daily for a total of 4 consecutive weeks. All patients in the control group were applied 1% topical butenafine cream, once daily for a total of 2 consecutive weeks.

2.5. Outcome measurements

Outcomes consist of KOH test,[22,23] and change in clinical symptoms and signs (including erythema, scaling and pruritus). Mycologic cure was defined as a negative KOH results at the end of study period. Each sign and symptom was appraised by a 4-point scale as follows: 0 = absent, 1 = mild, 2 = moderate, 3 = severe.[24] In addition, we also collected and analyzed data of any record in adverse reactions. All outcome data were measured and analyzed after 4-week treatment by a blinded analyst to the study treatment.

2.6. Statistical analysis

We analyzed all data using SPSS software (SPSS V.17.0, IBM Corp., Armonk, NY). We utilized last observation carried forward method to analyze outcome data. The comparison of outcomes within groups was analyzed by non-parametric Wilcoxon match-paired signed-ranks test. The comparison of all baseline characteristics and outcomes between two groups were analyzed by student *t*-test for continuous data, and χ^2 test for dichotomous data. The 2-side value of $P < .05$ suggests as having statistical significance.

Table 1

Comparison of baseline characteristics between 2 groups.

Characteristics	Experimental group (n = 43)	Control group (n = 43)	*P*
Age (yr)	37.4 (9.8)	34.5 (10.3)	.18
Sex			
Male	29 (67.4)	32 (69.6)	.48
Female	14 (32.6)	11 (30.4)	–
BMI (kg/m^2)	22.6 (2.1)	22.9 (1.8)	.48
KOH-positive	43 (100.0)	43 (100.0)	-
Disease duration (week)	4.2 (1.5)	4.0 (1.9)	.59
Tinea cruris	43 (100.0)	43 (100.0)	–
Educational background			
Primary school or below	0 (0)	1 (2.3)	.50
Secondary school	1 (2.3)	2 (4.7)	.56
High school	9 (21.0)	6 (14.0)	.40
College or above	33 (76.7)	34 (79.0)	.80

Data are present as mean ± standard deviation or number (%). KOH = potassium hydroxide.

3. Results

This retrospective study included 86 eligible patient case records with TC. Of those, 43 cases which utilized 1% topical clotrimazole cream were allocated to the experimental group, while the other 43 ones which received 1% topical butenafine cream were assigned to the control group. All baseline characteristics and demographic information are summarized in Table 1. All those data do not differ statistically significant differences between 2 groups (Table 1).

Before treatment, there were not significant differences in erythema ($P = .94$, Table 2), scaling ($P = .60$, Table 3), itching ($P = .49$, Table 4), and KOH-negative results (Table 5) between two groups. However, after 4 weeks treatment, there were significant differences in erythema ($P < .01$, Table 2), scaling ($P < .01$, Table 3), itching ($P < .01$, Table 4), and KOH-negative results ($P < .01$, Table 5), compared to those before the treatment.

After 4 weeks treatment, patients in the experimental group did not show better outcome improvements than patients in the control group in erythema ($P = .61$, Table 2), scaling ($P = .57$, Table 3), itching ($P = .47$, Table 4), and KOH-negative results ($P = .67$, Table 5). In addition, no treatment-associated adverse events were documented in both groups.

4. Discussion

TC is a very common dermatological disease,[1–4] which can be transmitted among people to people through skin-to-skin contact.[8–10] Antifungal drugs are responsible for the treatment of this disorder effectively, especially for topical cream, such as clotrimazole and butenafine cream. However, there are still insufficient data to compare the efficacy and safety for the treatment of TC between clotrimazole and butenafine topical

Table 2

Comparison of erythema within and between 2 groups.

Erythema score	e	Control group (n = 43)	*P*
Pre-treatment	1.75 (0.61)	1.68 (0.60)	.94
Post-treatment	0.57 (0.62)	0.64 (0.65)	.61
Difference within groups			<.01

Data are present as mean ± standard deviation.

Table 3

Comparison of scaling within and between 2 groups.

Scaling score	Experimental group (n = 43)	Control group (n = 43)	P
Pre-treatment	1.81 (0.54)	1.75 (0.53)	.60
Post-treatment	0.50 (0.55)	0.57 (0.59)	.57
Difference within groups			<.01

Data are present as mean ± standard deviation.

Table 4

Comparison of itching within and between 2 groups.

Itching score	e	Control group (n = 43)	P
Pre-treatment	1.86 (0.40)	1.80 (0.41)	.49
Post-treatment	0.55 (0.55)	0.64 (0.61)	.47
Difference within groups			<.01

Data are present as mean ± standard deviation.

cream. Therefore, this retrospective study compared the efficacy and safety of 1% topical clotrimazole cream to 1% topical butenafine cream for the management of TC.

Two previous studies compared the efficacy of topical clotrimazole with that of tocpical butenafine for TC.[19,20] One randomized controlled trial (RCT) utilized topical 1% butenafine and 1% clotrimazole in TC and tinea corporis.[20] It recruited a total of 80 eligible patients, and the follow-up outcome measurement was done up to 8 weeks.[20] However, there were not significant differences between two topical creams at 4 and 8 weeks treatment, respectively.[20] The other RCT compared the efficacy and toxicity of clotrimazole with those of butenafine for TC and tinea corporis.[19] Its findings showed that no statistically significant difference between two interventions at 4 weeks following treatment. In addition, mild adverse events occurred in both drugs.

This retrospective study compared the efficacy and safety of 1% topical clotrimazole cream to those of 1% topical butenafine cream. The results of this study are partly consistent with previous studies.[19,20] In this study, a total of 86 eligible patients were included. Of those, 43 patients received clotrimazole treatment, while the other 43 subjects underwent butenafine therapy. The results of our study found that both drugs exerted significant statistical differences post treatment compared with those before the treatment. However, there are not significant differences of outcomes between two groups. In addition, no treatment-related adverse events were recorded in both groups.

On the other hand, this study suffered from several limitations. First, this study was conducted at only one center of The Second Affiliated Hospital of Mudanjiang Medical University. Second, this retrospective study was subject to several threats to validity, which may restrict the generalization of its results. Third, some major statistics could not be measured, and substantial biases may impact control selection. Finally, this study only measured and compared the outcome data after 4 weeks treatment. Thus, future studies should pay more attention to avoid above limitations.

Table 5

Comparison of KOH-negative results within and between 2 groups.

KOH-negative results	e	Control group (n = 43)	P
Pre-treatment	0 (0)	0 (0)	-
Post-treatment	21 (48.8)	19 (44.2)	.67
Difference within groups			<.01

Data are present as n (%).

5. Conclusion

The results of this retrospective study found that both 1% topical clotrimazole and butenafine creams exerted significant efficacy after 4 weeks treatment when compared to those before the treatment. However, both drugs did not differ substantially between two drugs in treating TC after treatment.

Author contributions

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