

# Analysis on curative effects and safety of 2% liranafate ointment in treating tinea pedis and tinea corporis & cruris

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**Abstract:** The paper is intended to analyze and evaluate the specific curative effect and safety of 2% liranafate ointment in treating patients with tinea pedis and tinea cruris. 1,100 cases of patients with tinea pedis and tinea corporis & cruris were selected as research objects and were divided into two groups according to the random number table method. They were treated with different methods: 550 cases of patients were treated with 2% liranafate ointment for external use in the observation group and the rest 550 cases of patients were treated with 1% bifonazole cream in the control group. The treatment time was two weeks for patients with tinea corporis & cruris and four weeks for those with tinea pedis respectively. Meanwhile, the one-month follow-up visit was conducted among the patients to compare the curative effects of two groups. After the medication, the curative effectiveness rate was 87.65% (482/550) in the observation group, while that was 84.91% (467/550) in the control group. After the average follow-up visits of (15.5±2.4), the curative effectiveness rate 96.55% (531/550) in the observation group, while that was 91.45% (503/550) in the control group. Two groups of patients recovered well with a low incidence of adverse reactions in the treatment, and the overall curative effect was good with the inter-group difference at  $P > 0.05$ , so it was without statistical significance. The curative effect of 2% liranafate ointment is safe and obvious in treating tinea pedis and tinea corporis & cruris, so it is valuable for clinical popularization and application.

**Keywords:** 2% liranafate ointment; tinea pedis; tinea corporis & cruris; curative effect; safety

## INTRODUCTION

Tinea pedis is caused by fungal infection. Without glandula sebace between pelma and toes, fatty acid that inhibits the filamentous fungi of skin is not available, so it is rather poor in physiological defense functions. In addition, abundant sweat glands, poor air flow and partial moist & warmth all promote the growth of filamentous fungi. Moreover, thick stratum corneum of pelma and keratin between stratum corneum provide abundant nutrition for fungi and promote the growth of fungi. Generally, fungi damage the skin on one side and then infect the other side several weeks or months later. Blisters mainly appear in toe pulps and toe sides, and they are most common between toe 3 and toe 4. Small blister profunda may be found at pelma and gradually turn into big blisters. The skin lesions of tinea pedis is characterized by clear bounders and outward expansion. Without effective treatment, the illness may worsen, and the following symptoms such as erosion, oozing liquid, bacterial infection and pustules may be found in the fungal-infected areas because of scratching.

Tinea corporis & cruris is the general term of tinea corporis and tinea cruris. Tinea corporis refers to the dermatophyte infection of body and limb skin that excludes hair, palmoplantar, nail and groins. Tinea

corporis & cruris are found worldwide, especially in tropical regions featuring relatively high risks. Researches show that: tinea corporis & cruris spread between people, animals and soil. Generally, domesticated animals are commonly affected by tinea corporis, and other risk factors include tinea capitis or tinea pedis, close contact with patients, contaminated clothes and furniture, immune-suppression, occupational exposure as well as entertainment exposure etc. Tinea corporis & cruris are usually found in exposed parts, but they may spread to any body parts. Tinea cruris is the dermatophyte infection of groin parts especially in inner thigh roots and ruga parts, and it may spread to abdomen and buttocks among severely-affected patients.

The normal lives of patients are more or less affected by problems of swelling, blisters and erosion that are caused by tinea corporis & cruris and tinea pedis. In addition, the patients are also hurt by the appearance of these symptoms, so it is necessary to adopt quick and effective methods for treatment (Lei *et al.*, 2015). In recent years, numerous researches have shown that liranafate is beneficial to the dermatophyte treatment (Wang *et al.*, 2007, Wang *et al.*, 2007). 1,100 patients with tinea corporis & cruris and tinea pedis were selected as research objects in the paper. 2% liranafate ointment and 1% bifonazole cream were respectively used for treating patients of different groups with good treatment effects. The details are summarized as follows:

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## Data and methods

### General data

The 1,100 patient, who were treated for tinea corporis & cruris and tinea pedis from 25 hospitals between March 2015 and March 2016 were selected as research objects: 734 male patients and 366 female patients; 669 cases of tinea pedis and 431 cases of tinea corporis & cruris. The research subjects age from 12 to 56 with the average age at (35.5±5.6). The shortest course of disease is 5 days and the longest for up to 28 months with average at (9.4±2.2) months. According to the random number table method, the patients were divided into two groups, and the comparison of basic data was not of statistical significance (see table 1) ( $P>0.005$ ), so the comparison result was reliable.

### Inclusion and exclusion standard

Inclusion standard (Dong, 2015): The patients are diagnosed with tinea pedis (hyperkeratosis type excluded) or tinea corporis & cruris through clinic and fungus microscope examination, which is further confirmed by fungal culture. The female urine pregnancy test result is negative. All the research subjects are voluntary to participate in the research and sign the written form of informed consent.

Exclusion standard (Dong, 2015). The patients whose infected parts are complicated by other obvious skin diseases that may influence the curative effect evaluation, the patients who are allergic to research medicine (liranafate and bifonazole) or preparation composition, those with severe dysfunctions of heart, liver and kidney, those with poor immunity or long-term use of glucocorticoid and immunity inhibitors, pregnant wives and lactating women, those who received the partial or systematic antifungal drug treatment in two or four weeks before inclusion; those who participated in other clinical researches in four weeks before inclusion.

### Treatment method

The patients of the observation group were treated with 2% liranafate ointment for external use. The medicine was applied in the infected part once every day. The treatment time is 2 weeks for the patients with tinea corporis & cruris and 4 weeks for those with tinea pedis.

The patients of the control group were treated with 1% bifonazole cream. The medicine was applied in the infected part and then gently rubbed for several minutes once every day. The treatment time is 2 weeks for the patients with tinea corporis & cruris and 4 weeks for those with tinea pedis.

### Clinical observation indexes

The fungus microscopic examination was done for the exuvium of the target position: negative means clear and positive means unclear. The incidence of adverse reactions was compared between two groups of patients.

The effective rates of clinical treatment were compared between two groups of patients with the therapeutic evaluation standard as follows (Tao *et al.*, 2007). (1) healing: symptoms and signs completely disappeared; (2) obvious effects: symptoms and signs obviously improved with the integral decline index  $\geq 60\%$ ; (3) effective: symptoms and signs obviously improved with the integral decline index between 20% and 60%; (4) ineffective: symptoms and signs hardly improved with the integral decline index  $<20\%$ .

effective treatment rate = (healing + obvious effects) / total number of patients \* 100%



**Fig. 1:** effect comparison before and after the treatment of tinea pedis

*Fig. source:* Wang Aiping, Liuwen and Jin Lan *et al.*, Evaluation on curative effects and safety of 2% liranafate ointment in treating tinea pedis and tinea corporis & cruris [J]. Chinese Journal of Mycology, 2007, 02(02): 107-110.



**Fig. 2:** effect comparison before and after the treatment of tinea corporis & cruris

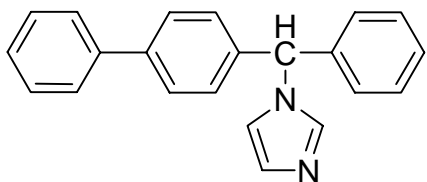
*Fig. source:* Wang Y., Y.N. Shen and H. M. Zhu *et al.*, Multi-center random double-blind contrastive observation of liranafate ointment in treating tinea corporis & cruris and tinea pedis [J]. Chinese Journal of Dermatology, 2007, 40(08):476-478.

## STATISTICAL ANALYSIS

The study focused on the curative effect and safety of 2% liranafate ointment in treating tinea pedis and tinea corporis & cruris. Statistical software SPSS21.0 was used for the analysis and processing of relevant data. The enumeration data were represented in the form of (n, %) and examined through chi-square, while the measurement data were represented in the form of ( $\bar{x}\pm s$ ) and examined through t. Only when  $P<0.05$  satisfies, it was of statistical significance.

## RESULTS

The result of fungal microscopic examination: Of 550 patients in the observation group, 12 patients were confirmed as positive through fungal microscopic examination, and the rest 538 patients were negative. The fungal clearance rate was 97.82%. of 550 patients in the control group, 17 patients were confirmed as positive through fungal microscopic examination, and the rest 533 patients were negative. The fungal clearance rate was 96.91%. The inter-group difference comparison was  $P > 0.05$  without statistical differences.



**Fig. 3:** molecular structure of bifonazole

*Fig. source:* Tao S.J., Y. Wang and J. Gu *et al.*, Clinical study of multi-center random double-blind parallel control of liranafate ointment in treating tinea corporis & cruris [J]. Chinese Journal of New Drugs and Clinical Remedies, 2007, 26(12): 881-884.

After treatment, clinical features such as pruritus, erythema, papule, blister, erosion, oozing and desquamation etc. got more or less improved in two groups of patients (see fig. 1 and fig. 2). 8 cases of patients were found with adverse reactions (2 with pruritus, 5 with burning sensation and 1 with erythema) with the incidence of adverse reactions at 1.45% (8/550) in the control group. 7 cases of patients were found with adverse reactions (2 with pruritus, 3 with pain and harshness and 2 with erythema) with the incidence of adverse reactions at 1.27% (7/550) in the observation group. The inter-group difference comparison was  $P > 0.05$  without statistical differences.

After treatment, the effective treatment rate was 87.65% (482/550) in the observation group, while that was 84.91% (467/550) in the control group. The inter-group difference was  $P > 0.05$  without statistical differences.

After the average follow-up visit for up to (15.5±2.4) days, the effective treatment rate was 96.55% (531/550) in the observation group, while that was 91.45% (503/550) in the control group. The inter-group difference was  $P > 0.05$  without statistical differences.

## DISCUSSION

Bifonazole, a kind of broad-spectrum antifungal medicine (see fig. 3 for the structure), has good therapeutic effects in treating the fungal infection of superficial skin, so it is widely applied in clinical practice (Yang *et al.*, 2015). In

the treatment of the group, the patients were treated with this medicine in the control group. The therapeutic effectiveness rate was rather obvious after treatment and in two weeks of follow-up visits.



**Fig. 4:** molecular structure of liranafate

*Fig. source:* Zhao W.J., Z.Q. Wang and H. Du *et al.*, Test method and sample determination of liranafate ointment skin penetration [J]. Chinese Journal of Hospital Pharmacy, 2010, 30(05):391-393.

The major components of 2% liranafate ointment is liranafate (see fig. 4 for the structure), which can repress the synthesis of cellularity ergosterol and express antifungal activity by inhibiting the squalene epoxidation reaction

Liranafate, a kind of thiocarbamic acid medicine and squalene epoxidase inhibitor, prevents the biosynthesis of ergosterol in the fungal cell membrane and expresses the antifungal activity mainly by inhibiting the squalene epoxidation reaction of fungal cells (Deng 2014). Despite the short-term development and clinical use of this medicine, numerous clinical researches show that liranafate has good antifungal activity in treating dermatophytes, dematiaceous fungi, dimorphic fungi, other filamentous bacteria & saccharomycetes, especially for dermatophytes (Zhao 2010). In addition, liranafate will neither cause abnormality nor influence the multiplication of bone marrow cells according to the point mutation function research and cell chromosome influence results in the clinical practice (Zhang 2015). Research results proved that the incidence rate of adverse reactions for 2% liranafate ointment was 1.86% (Lang, 2015). When the patients were treated with 2% liranafate ointment in the observation group, the curative effect was good with the incidence rate of adverse reactions at 1.27% (7/550) and good safety.

In conclusion, the adverse reactions were less with safety and effectiveness when 2% liranafate ointment was used for treating tinea pedis and tinea corporis & cruris. In terms of the overall curative effect, it matched 1% bifonazole cream, so 2% liranafate ointment was suggested in treating tinea pedis and tinea corporis & cruris in the clinical practice.

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**Table 1:** General data comparison between two groups of patients (n=550)

group	gender composition	disease composition	average age	average disease course
observation group	male: 363 cases; female: 187 cases	tinea pedis: 342 cases; tinea corporis & cruris: 208 cases	(36.2±4.3) years old	(10.3±1.8) months
control group	male: 371 cases; female 179 cases	tinea pedis: 327 cases; tinea corporis & cruris: 223 cases	(34.9±4.2) years old	(11.7±1.6) months
p	>0.05	>0.05	>0.05	>0.05

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