

A Comparative Study of Efficacy of Calamine Lotion versus Topical Corticosteroid in Intertrigo Treatment

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Abstract:

Background: Intertrigo is an inflammatory dermatitis caused by moisture, friction, and lack of ventilation. Topical corticosteroid has been used for intertrigo treatment with concerning of infection and side effects.

Objective: The objective of this study was to compare the efficacy between calamine lotion and topical corticosteroid by clinical and instrumental evaluation for the treatment of intertrigo.

Materials and Method: In this randomized split-side open-label prospective trial, Thirty-three patients with intertrigo enrolled at the Dermatology Clinic of Phramongkutklao Hospital, were randomly assigned to apply two types of topical treatments twice daily for 15 days on separated side (left and right) of the body. The degree of erythema was evaluated by instrumental and clinical using mexameter (erythema index) and visual analogue scale (VAS) at baseline and at 15 days. Subject-completed visual analogue scale was carried out by patients to evaluate the pruritus.

Results: All 33 patients showed significant improvement of erythema along with pruritus intensity from baseline for both groups ($p < 0.001$). However, there was no significant difference in the erythema index, erythema intensity and pruritus degree between topical corticosteroid and calamine lotion ($p > 0.05$). Mild skin irritation was described in only 1 case (3%) on the calamine lotion side.

Conclusion: Our results suggest that calamine lotion can be as effective as conventional topical corticosteroid in the treatment of intertrigo, so it would be considered an alternative option to avoid corticosteroid used.

Keywords: Calamine lotion, Intertrigo, Topical corticosteroid

Introduction

Intertrigo is an inflammatory dermatitis induced by friction in conjunction with other stimulants such as humidity, perspiration, or inadequate ventilation.¹ It can be recognized by an erythematous moist patch in the intertriginous area, including the inframammary, groin, and abdominal folds, which can cause itching or burning sensation.¹⁻² Secondary bacterial and fungal infections are commonly found.³ Intertrigo occurs in 2.5% of adult patients, with an average age of 41.⁴

Topical treatments are now being explored as a therapy for intertrigo. There are numerous sorts, such as topical corticosteroids, antimicrobial compounds, skin barriers, zinc oxide ointments, and petrolatum. However, present studies are unable to determine whether sort of treatment produces superior benefits.^{1,5}

Calamine lotion is a commonly used treatment for several types of dermatitis.⁶⁻⁷ It is also a highly safe drugs that has been approved by the U.S. Food and Drug Administration for use by infants, pregnant women, and breastfeeding mothers.⁷ Calamine contains zinc oxide, which has anti-itchy, anti-bacterial, and anti-inflammation properties, and the component calamine powder has the effect of soothing and drying the skin with the following properties⁶⁻⁹, calamine lotion is likely to be effective in treating intertrigo. From our experience, some patients showed improvement of their intertrigo without side effects after treatment with over-the-counter calamine lotion.

The objective of this trial was to compare the efficacy between calamine lotion and topical corticosteroids in treating intertrigo by assess the degree of erythema and pruritus.

Material and Methods

Study design

A randomized controlled trial was conducted from July 2022 to December 2023, enrolling 33 patients diagnosed with intertrigo by dermatologists at Phramongkutklao Hospital in Bangkok, Thailand.

Methods

We included patients aged 20 years and older who presented with a symmetrical intertrigo that has been diagnosed by dermatologists. Our participants were required to have not treated the rash area with any type of medication within a month and were not currently taking immunosuppressive drugs. We excluded patients who failed to apply medication more than twice, as well as those with suspected Infection in the rash area, from the study. Informed consent was obtained before participating in the study. The study protocol was approved by the Institutional Review Board of the Royal Thai Army Medical Department (R058h/65).

Demographic data, including age, gender, co-morbidities, body mass index, and affected areas were collected. The mexameter and erythema visual analog scale were used to assess the degree of erythema on both sides of the skin folds. The mexameter measures the erythema index objectively and consistently using light absorption spectra.¹⁰ Mexameter values vary from 1 to 1000, where 1 represents white and 1000 represents red. Erythema visual analog scales (supplement No.1) were evaluated by the researcher, which were graded in to 4 stages (1 indicates very faint erythema; 2: faint erythema; 3: bright erythema; and 4: bright red). The degree of

pruritus was assessed by the patients using pruritus visual analog scales (supplement No.2), which were divided into 10 levels (0: no pruritus to 9: very severe pruritus). The erythema and pruritus levels were collected synchronously at baseline (day 1) and 15 days of treatment (day 15). Exclusion of infection was performed by wet smear with 10% potassium hydroxide at the beginning and end of treatment. Treatment-related adverse effects were also documented.

After collecting the initial data (at day1), the patients were randomly assigned to apply medicine to each side of their rashes with calamine lotion on one side and 0.02% TA cream (TA cream) on the other side. The topical medicines were applied twice a day and follow patients until day 15. Because of the difference between medical texture, double blinding the trial was not feasible.

Statistical analysis

The demographic data were presented as number, percentage, range and mean ± SD. Generalized Estimating Equation (GEE) was used to compare the efficacy of calamine lotion and topical corticosteroids. P-value ≤ 0.05 was considered statistically significant.

Results

The patients’ demographic information was displayed in Table 1. Most patients were male, and the average age was 68 years old (range, 53-96 years). Dyslipidemia, high blood pressure, and diabetes were common disorders. The groins, axillae, inframammary folds, and buttocks were the area most frequently affected by rashes, respectively. The patients’ mean BMI of 25 kg/m² was also discovered, which is in line with earlier research.² Before beginning therapy, preliminary data revealed that the amount of redness was measured using the mexameter.

Table 1 Patient Demographics (n =33)

Variable	Statistics data
Age	68.67 ± 13.2
Gender	
Male	17 (51.5%)
Female	16 (48.5%)
Co-morbidities	
Diabetes	9 (27.3%)
Hypertension	24 (72.7%)
Dyslipidemia	26 (78.8%)
Others	12 (36.4%)
Affected areas	
Groins	22 (66.7%)
Axillae	5 (15.2%)
Inframammary folds	5 (15.2%)
Buttocks	1 (3%)
BMI (kg/m ²)	25.18 ± 3.01

The results of therapeutic efficacy were summarized in Table 2. Calamine lotion and 0.02% TA cream were found to have similar initial redness and itching levels. After 15 days of treatment, calamine lotion and TA cream significantly reduced mean erythema index compared to baseline ($p < 0.001$). Calamine lotion could reduce the mean erythema index by -89.17 (-117.67 , -60.68), which is equivalent to a 20% reduction, whereas TA cream was able to reduce it by -95.6 (-121.45 , -69.74), or a 22.35% reduction (Figure 1). For the evaluation of redness level by visual analog scale, calamine lotion and TA cream were able to reduce the average redness level by

-1.15 (-1.43 , -0.87) and -1.24 (-1.51 , -0.98), respectively (Figure 2). The efficacy of the two medications in lowering redness level was not significantly different, as determined by mexameter ($p = 0.854$) and the visual analog scale ($p = 0.647$).

Both treatments were found to significantly reduce the itching level, as measured by a visual analog scale ($p < 0.001$). The average itching level was able to be decreased by -2.67 (-3.59 , -1.74) and -3.36 (-4.36 , -2.37) with calamine lotion and TA cream, respectively (Figure 3). This corresponds to the reduced amount of redness.

Table 2 The results of therapeutic efficacy

	Calamine	TA	p-value
Erythema index (mexameter)			
Baseline	426.39 ± 104.98	427.81 ± 114.3	0.901
15 days	337.22 ± 89.5	332.21 ± 95.51	0.756
Mean change	-89.17	-95.6	0.854
(95%CI)	$(-117.67, -60.68)$	$(-121.45, -69.74)$	
p-value	$< 0.001^*$	$< 0.001^*$	
Erythema (by VA)			
Baseline	2.27 ± 0.52	2.3 ± 0.53	0.744
15 days	1.12 ± 0.6	1.06 ± 0.66	0.601
Mean change	-1.15	-1.24	0.647
(95%CI)	$(-1.43, -0.87)$	$(-1.51, -0.98)$	
p-value	$< 0.001^*$	$< 0.001^*$	
Itching			
Baseline	5.12 ± 2.26	5.18 ± 2.64	0.857
15 days	2.45 ± 2.71	1.82 ± 2.23	0.126
Mean change	-2.67	-3.36	0.410
(95%CI)	$(-3.59, -1.74)$	$(-4.36, -2.37)$	
p-value	$< 0.001^*$	$< 0.001^*$	

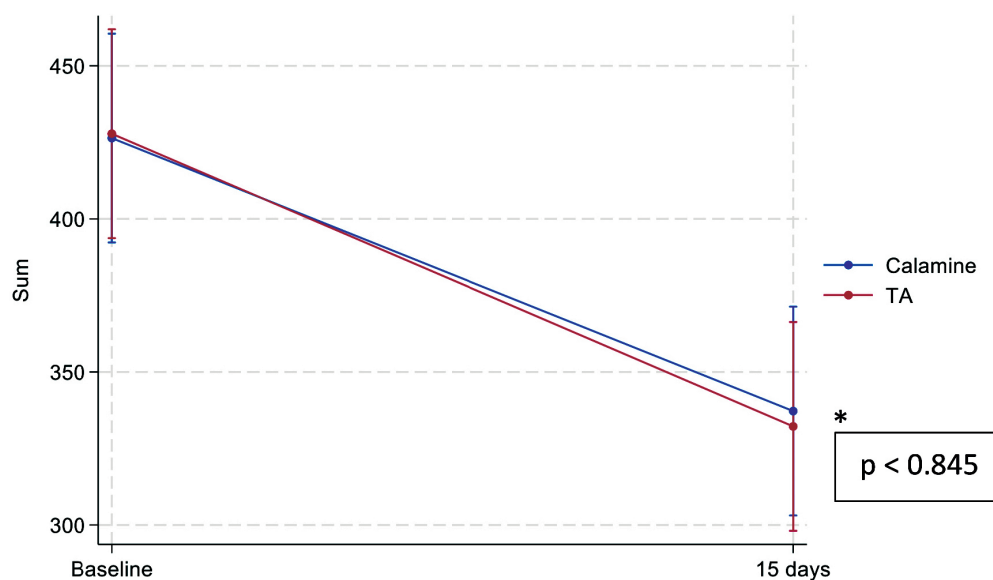


Figure 1 The graph demonstrates the average erythema index for calamine lotion and 0.02% TA cream before and after 15 days of therapy.
(*significant reduction compared with baseline, $p < 0.001$)

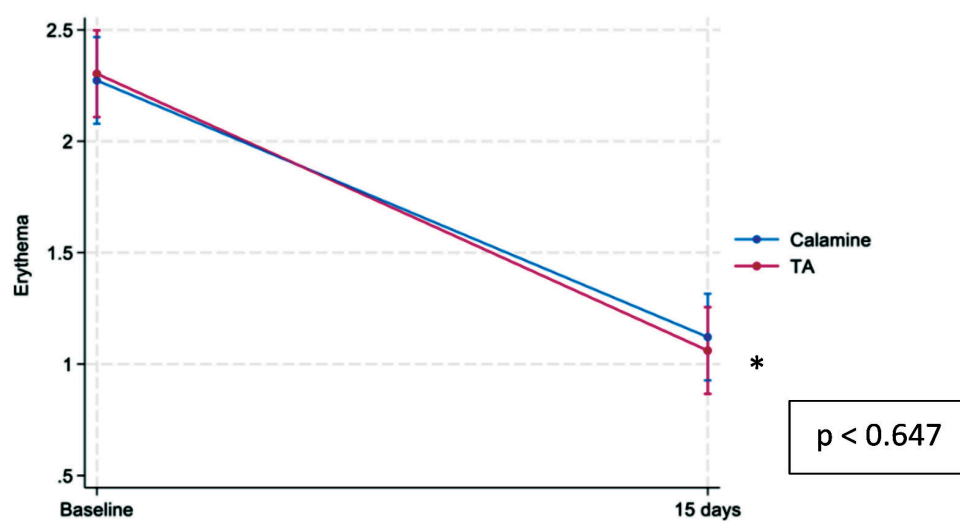


Figure 2 The graph demonstrates the average erythema level by visual analog scale for calamine lotion and 0.02% TA cream before and after 15 days of therapy.
(*significant reduction compared with baseline, $p < 0.001$)

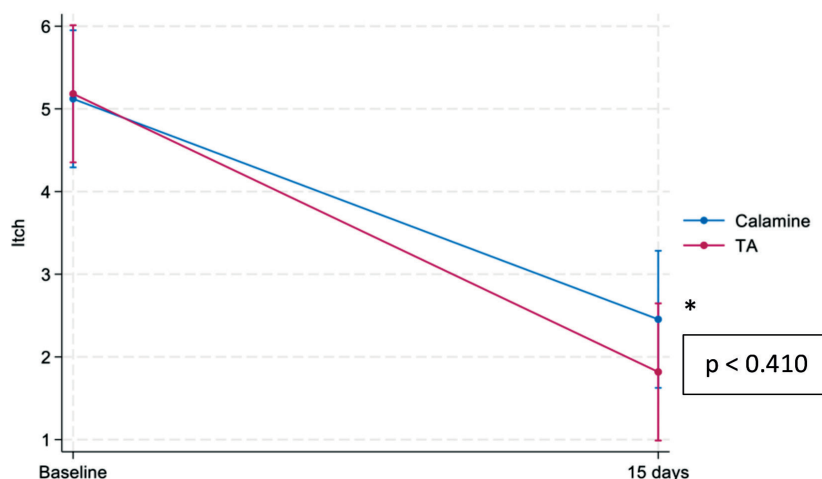


Figure 3 The graph demonstrates the average itching level by visual analog scale for calamine lotion and 0.02% TA cream before and after 15 days of therapy.
(*significant reduction compared with baseline, $p < 0.001$)



Figure 4 Patient treated with calamine lotion for intertrigo at the axilla before and after 15-days treatment.

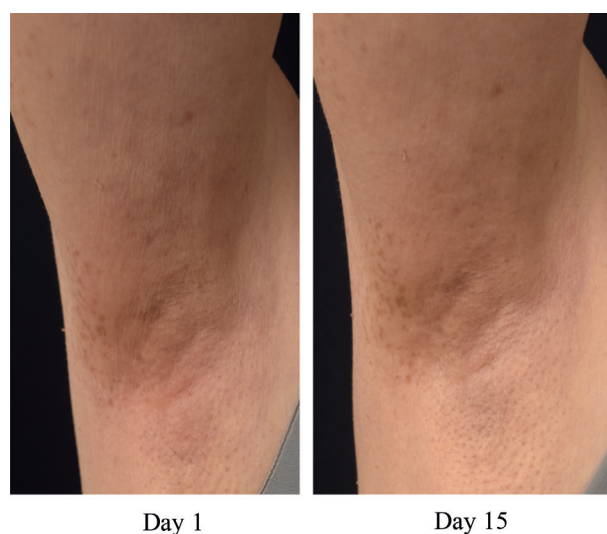


Figure 5 Patient treated with 0.02% TA cream for intertrigo at the axilla before and after 15-days treatment.

Treatment side effects were monitored throughout the trial, as shown in Table 3. One patient on the side was treated with calamine lotion reported irritation following the initial application. Following that, the irritation subsided. The patient could

continue to receive treatment until the end. There were no further side effects discovered from applying both types of medications, such as allergic contact dermatitis, severe drug reactions, secondary infections, or skin atrophy.

Table 3 Treatment-related adverse events

Complications	Calamine lotion	TA cream
Skin irritation	1 (3.0%)	-
Contact dermatitis	-	-
Cutaneous infection	-	-
Skin atrophy	-	-
Anaphylaxis	-	-

Discussion

Our study was the first trial to evaluate calamine lotion with topical steroids for treating intertrigo. Furthermore, the efficacy of both medicines was evaluated using both instrumental and clinical measures. Both drugs were found to significantly reduce the level of redness of the rash and itching.

After 15 days of therapy, the side of the rash treated with topical corticosteroids showed a slightly greater reduction in erythema and itching severity than the sides treated with calamine lotion.

However, no significant differences were discovered. This suggests that there was no difference between the efficacy of the two therapies.

Mild irritation was observed in only 1 of the participants (3%) on calamine lotion side. It was discovered via observation that patients who were irritated frequently acquired rashes along with scratches that caused abrasions. According to Nijhuris, et al. (2021), treating intertrigo with zinc oxide ointment might cause itching if

administered to an existing inflamed skin rash.¹¹ Both drugs showed no major side effects or new infections during the 15-day course of treatment. There were no side effects associated with steroid use in this trial. However, as intertrigo are a recurrent condition, the patient might need to keep using steroid therapy, which could lead to more steroids-related adverse effects such as fungal infection, skin atrophy and telangiectasia. Long-term follow up is needed for this condition.

In addition to the efficacy on minimized the redness and relieve the irritation, calamine lotion is widely available and cost-effective. Treatment is highly safe and conveniently accessible to patients. Short-term treatment and avoidance of the areas with abnormal skin barrier can decrease side effect of calamine lotion.

The limitation of our study was a small sample sized and no data on long-term follow up. Studies in larger populations with longer follow up are necessary.

Conclusion

Calamine lotion is as effective in reducing redness and itching as topical corticosteroids in treating intertrigo. As a result, calamine lotion may be a viable choice for intertrigo treatment.

Conflict of Interest

The authors do not have conflict of interest to be declared.

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Supplements

Supplement No.1: Erythema visual analog scale

Erythema grade	Score	Description
Very faint erythema	1	Skin has very light pink color.
Faint erythema	2	Skin reaction is more apparent with clear borders but still pink with more intensity.
Bright erythema	3	Erythema is apparent in bright pink and borders are clearly defined.
Very bright erythema	4	Skin is bright red, border are very well defined, capillaries and bruising may be visible.

Supplement No.2: Pruritus visual analog scale

VAS scoring	Meaning
0	No pruritus
1-3	Mild pruritus
4-6	Moderate pruritus
7-8	Severe pruritus
9	Very severe pruritus