Treatment of localized psoriasis with a topical formulation of zinc pyrithione

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KEY WORDS

psoriasis, zinc pyrithione, emollient

ABSTRACT

Background Psoriasis is a common chronic condition of the skin that is resistant to many therapies.

Aim To test the efficacy of a topical formulation of zinc pyrithione in an emollient base compared with an emollient alone in the treatment of psoriasis.

Methods This was a randomized double-blind clinical trial. Patients with localized psoriasis involving less than 10% of body skin areas were enrolled in the study. They were randomly allocated to one of two treatment groups. Group A was treated with emollient cream containing 0.25% zinc pyrithione and group B was treated with emollient cream alone twice daily for 3 months. Response to treatment was assessed using PASI scores.

Results Of 60 participants, 30 patients in group A and 30 patients in group B completed the study. The mean PASI scores before and after treatment were 3.4 ± 1.8 and 0.9 ± 1.3 in group A ($p < 0.01$), and 4.3 ± 2 and 3.9 ± 1.3 in group B ($p > 0.05$), and there was a significant difference between the two groups' mean PASI scores at the end of the study ($p < 0.01$).The differences in the mean PASI scores before and after treatment were 2.4 ± 2 and 0.4 ± 0.1 in groups A and B, respectively ($p < 0.01$).

Conclusion A topical formulation of zinc pyrithione can be used to treat localized psoriasis.

Introduction

Psoriasis is a chronic inflammatory condition of the skin that affects 2% of the world population, and the course of the disease is dynamic, capricious, and replete with flares and remissions (1). Currently there are many antipsoriatic treatments, including topical corticosteroids, anthralen, tars, calcipotriol, keratolytics, photo therapy (UVB), photo chemotherapy (PUVA), and systemic treatment, including methotrexate, hydroxy urea, cyclosporine, and retinoid compounds (2–4). Biologics are also a fairly new approach, but only some of these, including alefacept, etanercept, adalimumab, ustekinumab, and infliximab have been approved by the FDA for the treatment of psoriasis.

As with any drugs that suppress the immune system, biologics could make the body more vulnerable to other infections and diseases. Another disadvantage is that they have to be given either by injection or by intravenous infusion. Infusion can take two hours per session. Biologics are also currently more expensive than conventional treatments (5). Due to the chronic nature of the disease and the need for long-term treatment, patients prefer to use simple, topical, and safe therapies. Zinc pyrithione is an antiproliferative agent and successful treatment of psoriasis with it was reported in one case (1). In this study a topical formulation of zinc pyrithione was compared to a topical emollient for treating psoriasis in a clinical trial.

Materials and methods

This was a randomized double-blind clinical trial. Patients were selected from among psoriasis patients with less than 10% of body skin involvement, and of both sexes and various age groups.

Participants or their guardians were informed about the study and signed a consent form. Patients under 5 years old, pregnant women, patients with scalp and facial lesions, and those with severe clinical forms of psoriasis including postural, erythrodermic, palmoplantar, and generalized psoriasis were excluded. The topical formulations were prepared at the pharmacology department of the Isfahan University of Medical Sciences. The trial formulation included zinc pyrithione (0.25%) in an emollient base containing olive oil (8%), sorbitan isostearate (1%), propylene glycol (5%), and water up to 100%.

The control formulation contained all the above compounds except the zinc pyrithione. Both formulations were prepared in identical tubes and were coded. Neither physicians nor patients were informed about which drug was being used.

Patients were randomly divided into two groups: A (trial) and B (control). Patients in Group A were treated with zinc pyrithione in an emollient base and patients in Group B were treated with an emollient alone. Before and after treatment the PASI (a measurement tool for psoriasis according to severity of induration, erythema, and scaling) was determined (Table 1) (6) and recorded in patients' files. The patients were treated twice daily for 3 months. Response to treatment was assessed by PASI scores at the end of the study.

Statistical analysis

All analysis between Groups A and B was performed using SPSS software (Version 13, SPSS Inc, Chicago). A paired *t*-test was used for before and after treatment in each group and an independent t-test between the two groups was used after treatment.

Results

Out of 60 participants, 30 patients in Group A (17 male and 13 female) and 30 patients in Group B (14 male and 16 female) were followed to the end of the study.

The mean age was 30 ± 17 in Group A and 35±14 in Group B.

The means of severity of induration, erythema, scaling, and PASI scores before treatment were 2.5 ± 0.9, 2.4 ± 1, 2.9 ± 7, and 3.4 ± 1.8 in Group A and 2.7 ± 1, 2.4 ± 1, 2.4 ± 1, and 4.3 ± 2 in Group B ($p > 0.5$ for each).

The means of these variables after treatment were 0.8 ± 0.8, 0.9 ± 0.7, 0.4 ± 0.8, and 0.91 ± .3 in Group A and 2.6 ± 1, 2.2 ± 1, 2 ± 1, and 3.9 ± 2.5 in Group B ($p < 0.01$ for each between the two groups), and also $p < 0.01$ for each before and after treatment in Group

Table 1. Assessment of psoriasis severity. PASI= $0.1(E_h+I_h+S_h)A_h+0.2(E_u+I_u+S_u)A_u+0.3(E_t+I_t+A_t)A_t+0.4(E_l+I_l+S_l)A_l$; E = erythema, I = induration, S = scaling, A = area.

Area scoring		Erythema, indurations, and scaling	Overall assessment
Score	**% involvement**		
1	<10%	0 = Clear	0 = Clear
2	11–30%	1 = Mild	1 = Mild
3	31–50%	2 = Moderate	2 = Moderate
4	51–70%	3 = Severe	3 = Severe
5	71–90%	4 = Extraordinarily severe	
6	91–100%		

Table 2. Mean differences of induration, erythema, scaling, and PASI in the trial and control groups.

Mean of differences	A (trial)	B (control)	P value
Induration	1.7 ± 1	0.1 ± 0.8	p <0.01
Erythema	1.5 ± 0.5	0.1 ± 0.5	p <0.01
Scaling	2.4 ± 0.9	0.4 ± 0.7	p <0.01
PASI	2.4 ± 2	0.4 ± 0.1	p <0.01

Table 3. Mean of PASI before and after treatment and mean differences in trial and control groups.

Groups	PASI (means)		Mean differences	*p* value
	Before treatment	After treatment		
A (trial)	3.4 ± 1.8	0.9 ± 1.3	2.4 ± 2	$p < 0.01$
B (control)	4.3 ± 2.5	3.9 ± 2.5	0.4 ± 1.2	$p = 0.08$
p value between groups before and after treatment	$p = 0.11$	$p < 0.01$	$p < 0.01$	

A but in Group B $p > 0.05$ for each, except for scaling before and after treatment.

The mean of differences of severity of induration, erythema, scaling, and PASI scores were 1.7 ± 1, 1.5 ± 1, 2.4 ± 0.9, 2.4 ± 2 in Group A and 0.1 ± 0.8, 0.1 ± 0.5, 0.4 ± 0.7, 0.4 ± 0.1 in Group B ($p < 0.1$ for each between the two groups; Table 2).

The mean PASI scores and differences in mean PASI scores before and after treatment in the trial and control groups are shown in Table 3.

The percentages of mean PASI score reductions were 70.5% in Group A and 9.3% in Group B. Five patients in Group A and no patients in Group B were lesion-free at the end of the study.

Discussion

This study was carried out on an appropriate number of patients whose relevant variables matched in the two treatment groups (e.g., age, sex, and type of lesions), and the results showed that there was a significant difference between the severity of indurations, erythema, scaling, and PASI scores between the two groups at the end of the study, and before and after treatment in the trial group (Fig. 1), whereas in the control group only scaling decreased significantly (Fig. 2). Moreover, the emollient cream's effectiveness on scaling compared with topical zinc pyrithione was less for all the items above. On the other hand, there were no side effects regarding either kind of treatment.

Zinc pyrithione is a therapy for seborrheic dermatitis. The exact mechanism is not known (7). It may be antiproliferative via DNA interactions and antipityrosporum, antiseptic, and keratolytic mechanisms (8–10).

Zinc pyrithione is the active ingredient in several anti-dandruff shampoos, and the effectiveness of zinc pyrithione in the treatment of seborrheic dermatitis has been well documented. Some writers believe that seborrheic dermatitis and psoriasis may lie at opposite ends of the same spectrum. Although the exact mechanism of action of the zinc pyrithione preparation is unknown, it can be speculated that its antiproliferative mechanism of action involves the regulation of DNA

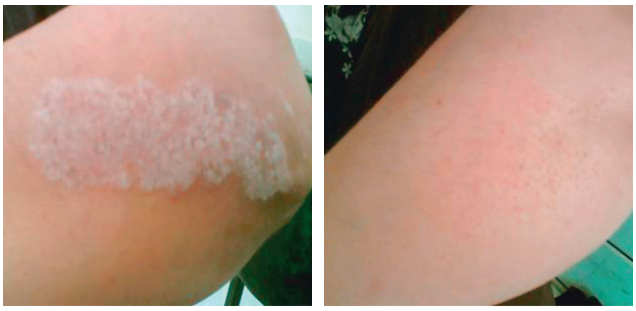

Figure 1. Psoriasis plaque before and after treatment with the topical formulation of zinc pyrithione.

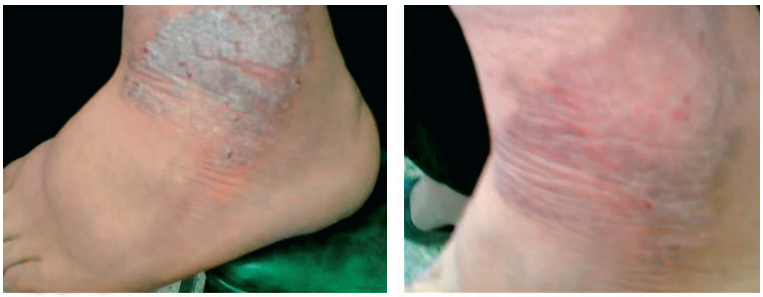

Figure 2. Psoriasis plaque before and after treatment with emollient cream alone.

transcription factors containing zinc-finger binding domains (11, 12). It is well known that many enzymes require the binding of metal ions for activation. One of the (zinc-requiring) enzymes or transcription factors plays a key role in the regulation of cellular proliferation. It is also well known that a zinc deficiency produces a disease state (acrodermatitis enteropathica) that includes psoriasiform lesions (13). Perhaps the vehicle or activated form of zinc pyrithione permits a physiological level of zinc to be reached in the target cells (epidermal and lymphocyte) and regulates cellular proliferation. Using zinc pyrithione in an emollient base also could have additional effects.

In a past study, an aerosol preparation of zinc pyrithione in a vehicle containing isopropyl myristate was confirmed as a safe and effective treatment for psoriasis in one case (1). Our study findings again confirmed the effectiveness of zinc pyrithione in an emollient base compared with an emollient alone. In five cases it led to complete lesion clearing. There were no side effects from this compound, and patient acceptance was good. Considering these impressive results, we recommend using zinc pyrithione in an emollient base as an effective treatment for psoriasis lesions.

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