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A Comparative Study Of A New Combined 4% Hydrophobic Ointment And Psilo-Balsam In Experimental Skin Allergy Of Guinea Pigs

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ABSTRACT
Comparative study of a new combined 4% hydrophobic ointment and psilo-balsam in experimental skin allergy of Guinea pigs.
Experimental allergic dermatitis was caused by method of P. M. Zalkan and E. Ievleva using 2,4-dinitrochlorobenzole on Guinea pigs using a 4% combined ointment of a thick extract of Bidens tripartitae and root of licorice and a comparison with drug psilobalzam. It was found that a combined 4% hydrophobic ointment, a thick extract of Bidens tripartitae and a dry extract of licorice root is more effective in the treatment of contact allergic dermatitis than the antihistamine drug psilo-balsam.

Keywords: allergic deramatitis, 2, 4-dinitrohlorobenzole, Guinea pigs, 4% combined ointment of thick extract of Bidens tripartitae and root of licorice, psilo-balsam.

1. INTRODUCTION

Atopic dermatitis is a chronic inflammatory skin disease that is essentially an allergic reaction [1]. Over the past 30 years, the incidence of atopic dermatitis has increased by 2-10% in adults, and by 10-30% in children [2].

In the treatment of atopic dermatitis (AtD), topical glucocorticosteroids are still the main drugs [3]. The use of corticosteroids for a long time increases the likelihood of developing manifestations of local, sometimes systemic side effects [4].

Promising in this regard are herbal medicines. But very few herbal preparations are used in the treatment of atopic dermatitis. Therefore, the search for new substances of plant origin with pharmacological activity for the treatment of AtD is extremely important [5].

Uzbekistan is rich in reserves of grass of a series of tripartite and licorice. Their tinctures have long been used in traditional medicine in the treatment of skin diseases [6]. If

a combined ointment based on the biologically active substances of these plants were created, then the treatment of skin diseases would be more targeted.

Purpose of the study: a comparative study of the antiallergic activity of a 4% combined ointment from a thick extract of a series of tripartite and dry licorice root extract on a hydrophobic basis obtained from local raw materials, in comparison with the antihistamine psilo-balsam in contact allergic dermatitis on the skin of guinea pigs.

2. MATERIALS AND METHODS

The ointment was prepared on a hydrophobic basis, obtained by enzymatic transesterification of sunflower oil and internal film of beef fat in a mass ratio of 1: 1, with the addition of a thick extract of a series of tripartite and dry extract of licorice root, in a mass ratio of 1:1.5 dissolved in 6 ml of 70% - ethyl alcohol, which is mixed with ointment base in a mass ratio of 1: 22.5.

For the study, guinea pigs were selected in a total of 30 pieces (10 pieces in each group, 3 groups of animals). To all guinea pigs, the shoulder region 3 × 3 cm in size, previously cleared of wool, was applied by the method of P. M. Zalkan and E. Ievleva (1963) in 0.1 ml of 2,4-dinitrochlorobenzene (DNCB) 5% alcohol-acetone (2:1) solution for 2 days, causing contact allergic dermatitis (CAD).

On the 3rd day, the application of ointments to the skin area of animals, with allergic dermatitis, began. Animals of the 1st group were selected as a control group, and nothing was applied to the skin of these animals.

A combined 4% ointment obtained from a thick extract of a tripartite and dry extract of licorice root was applied to the site of allergic inflammation of the skin of animals of the 2nd group, the antihistamine Psilo-Balsam was applied to the 3rd group. All animals of the above groups of ointment were applied according to the scheme once a day for 11 days. Changes in skin size after the last day of the allergen (DNCB) were observed at 1,3,5,7,9 and 11 days of treatment. The severity of the intensity of the development of dermatitis was assessed by monitoring their general condition and the course of the allergy process on the skin: visually, allergic inflammation and the size of the skin folds and body temperature.

The severity of local skin signs was calculated by the method of relative units (points) according to I.V. Kutuzov (1996).

0- no reaction.
0.5 is a manifestation of limited red spots.
1- slight diffuse hyperemia.
2- severe hyperemia and edema.
3- explicit redness and (severe) swelling.
4- formation of hemorrhagic crust.
5 - the formation of extensive ulcers.

The index of severity of cutaneous manifestations (Ind) was calculated in relation to the control group of animals according to the formula, in percent: Ind =100 (Sk-So)/Sk. Where: Sk-total points in the control group; so, the sum of the points in the experimental group.

At the same time, the skin temperature of guinea pigs with allergic dermatitis was recorded using an electronic thermometer and the size of the skin fold using a micrometer.

On the 1st day of our observation, the skin of animals of the first group was characterized by reduced red spots, in some of them the diffuse hyperemia was revealed, and the average was estimated as 0.6±0.1 points. On the 3rd day of the experiment, acute hyperemia, edema and hemorrhagic crusts with large ulcers were detected on the skin, which

averaged 4.6±0.2 points. On day 5, acute redness, swelling, and small ulcers were detected, which averaged 4.3±0.3 points. On the 7th and 9th days, the above changes persisted, the state was estimated at 4.3±0.3 and 4.3±0.2 points, respectively. On the 11th day of our experiment, inflammation was slightly reduced, with hyperemia, edema and some hemorrhagic crusts on the skin, and the average score was 3.5±0.2 points. The total score of this group was 21.4.

In the 2nd group (combined 4% hydrophobic ointment based on the sum of flavonoids of a thick extract of a series of tripartite and dry licorice root extract), the skin of animals on the first day was also limited with red spots, the condition averaged 0.55±0.05 points. By the day 3, there was obvious hyperemia, edema, hemorrhagic crusts, large ulcers, which were estimated at an average of 4.8±0.2 points. From the 5th day, the process of inflammation on the skin of animals began to improve, and the skin of animals was characterized by severe redness, swelling and obvious hyperemia, which averaged 3.9±0.1 points. Starting from the 7th day, it was observed with slightly diffuse hyperemia, edema and overt hyperemia, and in this group the indicators significantly improved in relation to the control, (2.9±0.1 points on the 7th day, 1.8±0.13 points on 9th day). By the 11th day, inflammation of the skin of 6 experimental animals completely improved - no reaction was observed, limited red spots were observed on the skin of 4 animals, and the average score was 0.3±0.13 points. The total score in this group was 14.2. The cutaneous severity index (Ind) was 33.4%.

Observations of animals of the 3rd group (psilo-balsam preparation) revealed limited red spots, slight diffuse hyperemia, which averaged 0.6±0.06 points. On the 3rd day, sharp changes were observed, such as severe redness, swelling and hemorrhagic crusts, large wounds, an average of 4.9±0.1 points. On the 5th day, the skin condition remained practically unchanged and was estimated at 4.7±0.15 points. By the 7th day, the inflammatory process of the skin decreased, with a certain slight diffuse distinct hyperemia, severe redness, swelling, hemorrhagic crusts, an average of 4.2±0.25 points. By the 9th day, there was obvious hyperemia, severe redness, swelling with an average score of 3.1±0.35. The results from this day were reliable in relation to the data of the control group. By the 11th day of observation, the skin of the animals had red spots, slight hyperemia, obvious hyperemia and edema, an average of 2.4±0.33 points, but the results were not reliable. The overall score was 20.1 and the cutaneous severity reduction index (Ind) was 6.1%. In the dynamics of the study, another indicator of allergic dermatitis was studied — the thickness of the skin fold of animals at the site of allergic inflammation (Table 2).

In guinea pigs of the 1st group (control group), the average index of skin fold before the experiment was 0.26 ± 0.016 cm, a day after application of DNCB, the average index was 0.46 ± 0.017 cm and gradually increased from 3 to 7 days (by 3-day 2.28 ± 0.09 cm, on the 5th day 2.97 ± 0.14 cm, on the 7th day 3.14 ± 0.17 cm). Only from the 9th day it began to decline (by 9- day 2.25 ± 0.05, on the 11th day 1.7 ± 0.07).

In animals of the 2nd group, the average thickness of the skin fold before the experiment, the average value was 0.25 ± 0.017 cm, after 1 day after application, DNCB was slightly thickened and the average value was 0.46 ± 0.016 cm, from the 3rd day it began to decrease significantly compared with an indicator of the control group (on the 3rd day 1.45 ± 0.07 cm, on the 5th day 2.27 ± 0.08 cm, on the 7th day 1.69 ± 0.05 cm, on 9- day 1.38 ± 0.07 cm and on day 11 0.41 ± 0.043 cm).

When observing animals of the 3rd group, the average thickness of the skin fold before treatment was (0.24 ± 0.02 cm), from the 1st day after application of DNCB, the indicators increased (1st day 0.52 ± 0.03 cm, on the 3rd day 1.49 ± 0.11 cm, on the 5th day 2.71 ± 0.11 cm) and a significant decrease was observed from the 7th day of the experiment (on the 7th day 2.15 ± 0, 1 cm, 9th day 1.59 ± 0.13 cm, 11th day 1.21 ± 0.2 cm).

Table 1
Changes in the severity of skin processes in points during treatment contact allergic dermatitis in the experiment

Groups (M±m; n=10)	The severity of skin processes in points, days of study						Total points	Ind %
	Day 1	Day 3	Day 5	Day 7	Day 9	Day 11		
1st group (control)	0,6±0,07	4,6±0,16	4,1±0,1	4,3±0,3	4,3±0,21	3,5±0,22	21,4	
2-group (4% ointment)	0,6±0,05	4,8±0,2	3,9±0,1	2,9±0,1**	1,8±0,13**	0,3±0,13**	14,2	33,4
3-group (psilo-balsam)	0,6±0,06	4,9±0,1	4,7±0,15	4,2±0,25	3,1±0,35**	2,4±0,33**	20,0	6,5

* P≤0.01; ** P≤0.001; in relation to control

Table 2
The influence of the studied drugs on the thickness of the skin folds in guinea pigs in contact allergic dermatitis in the experiment

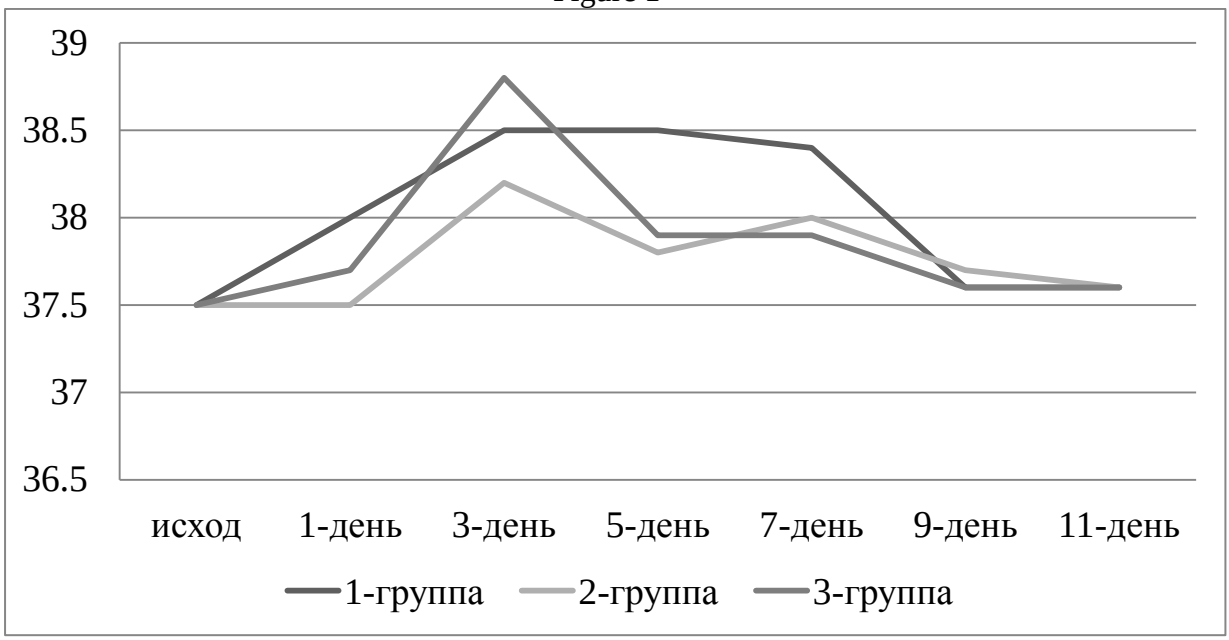
Groups	Skinfold thickness in cm, observation days						
	outcome	Day 1	Day 3	Day 5	Day 7	Day 9	Day 11
1st group (control)	0,26±0,02	0,45±0,02	2,28±0,09	2,98±0,14	3,14±0,17	2,25±0,05	1,7±0,1
2-group (4% ointment)	0,25±0,02	0,46±0,02	1,45±0,07**	2,27±0,08**	1,69±0,05**	1,38±0,07**	0,41±0,08**
3-group (psilo-balsam)	0,24±0,02	0,52±0,03	1,49±0,1**	2,71±0,11	2,15±0,12**	1,59±0,13**	1,21±0,2*

* P≤0.001; ** P≤0.05 in relation to control

During the experiment, not a single lethal outcome of experimental animals was recorded.

During the experiment, the local temperature of guinea pigs with contact allergic dermatitis was observed (Figure 1).

Figure 1



In animals of the 1st group, from the 1st to the 7th day, the temperature was slightly increased and it was decreased to the initial level by the 9th day. In the 2nd group of animals, the maximum increase in local temperature was observed on the 3rd day and began to decrease from the 5th day. In the 3rd group of animals, the maximum increase was also observed by the 3rd day and from the 5th day it began to decline.

According to the results of our experiment, in animals of the 1st group (control group) moderate symptoms of CAD were observed on the 1st day and sharply progressed on the 3rd day. Despite the fact that on the 5th day the reaction partially decreased, it did not significantly change until the end of the experiment. In animals of the 2nd group, the signs of CAD were mild on day 1, which sharply increased on day 3. From the 5th day it began to decline, and from the 7th day there was a significant decrease in the symptoms of dermatitis compared with the control. In the 3rd group of animals, also on the 1st day, CAD was mild, the increase was observed on the 3rd day and slowly decreased until the 7th day, and from the 9th day it started to decrease significantly compared to the control group.

The obtained values of the thickness of the skin fold of experimental animals, on the 1st day of treatment in the 1st group (control), a slight allergic inflammation was detected, and from the 3rd to the 7th day, a sharp increase, and only from the 9th day the intensity of allergic inflammation began to decrease. In the 2nd group of animals from the 1st to the 5th days, a gradual increase was observed, and from the 7th day it began to decrease. And from the 3rd day there was a significant decrease in indicators compared with the control group. In the 3rd group of animals, the thickness of the skin fold increased from the 1st to the 5th day, and from the 7th day - a significant decrease in the indicators compared to the control group.

Thus, the index for reducing the severity of skin manifestations (Ind) was higher, and the overall score was less when using 4% hydrophobic ointment than psilo-balsam. In a comparative study of the treatment of contact allergic dermatitis with a combined 4% hydrophobic ointment, from a thick extract of a series of tripartite and dry extract of licorice root of psilo-balsam, it was found that the use of a new combined 4% hydrophobic ointment

of the sum of flavonoids of a thick extract of a series of tripartite and dry extract of a licorice root is more effective in the treatment of contact allergic dermatitis than the antihistamine psilo-balsam.

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