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COMPARATIVE STUDY OF NEW MEDICINE IN THE FORM OF 10% OINTMENT WITH PSILOSIS-BALSAM FOR THE ALLERGIC CONTACT DERMATITIS OF GUINEA PIG

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ABSTRACT

The ointment has been prepared on hydrophobic basis from local raw materials. Allergic contact dermatitis was caused by double application of 5% alcohol-acetone 2,4-dinitrochlorobenzene on guinea pigs according to E.Y. Ivleva and P.M. Zalkan (1965). The experimental animals were divided into 3 groups of 10 animals each. Changes in the skin integument were observed on days 1, 3, 5, 7, 9 and 11 of treatment after the last application of the allergen. The severity of inflammatory manifestations of the skin was assessed in points according to I.V. Kutuzov (1996), and the thickness of the skin fold with a micrometer. In a comparative study of the results of treatment of allergic contact dermatitis, it was found that the use of a new combined 10% hydrophobic ointment of a thick extract of a bur-marigold of tripartite and dry extract of licorice root is more effective in the treatment of contact allergic dermatitis than the antihistamine psilosis-balsam.

Ключевые слова: allergic contact dermatitis, 2,4-dinitrochlorobenzene, guinea pig, 10% combined ointment, thick extract of bur-marigold, dry extract of licorice root, psilosis-balsam.

抽象的

该软膏是在疏水基础上从当地原材料制备的。根据 E.Y. Ivleva 和 P.M.扎尔坎 (1965)。实验动物分为3组，每组10只。在最后一次应用过敏原后的第 1、3、5、7、9 和 11 天观察到皮肤表皮的变化。皮肤炎症表现的严重程度根据 I.V. Kutuzov (1996)，用千分尺测量皮肤皱褶的厚度。在对过敏性接触性皮炎治疗结果的比较研究中发现，使用三方紫花金盏花浓提取物和甘草干提取物的新型组合 10% 疏水性软膏更有效地治疗过敏性接触性皮炎。治疗接触性过敏性皮炎比抗组胺药松香脂好。

Ключевые слова : 过敏性接触性皮炎，2,4-二硝基氯苯，豚鼠，10% 复方软膏，刺参万寿菊浓提取物，甘草干提取物，松萝香脂。

INTRODUCTION

One of the leading places in the structure of allergic pathology is occupied by atopic dermatitis (AD), an allergic skin disease that occurs in early childhood in individuals with a hereditary predisposition to atopic diseases [1, 2]. On the other hand, in conditions of impaired functions of the epidermal barrier, immune inflammation develops in the skin in response to external exposure to allergens [6, 7]. In the treatment of AD, the efficacy of topical corticosteroids has been studied well in numerous studies. They are still the gold standards for the treatment of exacerbations of AD [9].

However, with prolonged use, they can cause a number of side effects, including a slowdown in tissue regeneration processes with the possible formation of widespread ulcers, the appearance of edema, a delay in synthesis and an acceleration of protein breakdown. Therefore, in this case, herbal medicines are perspective [3,4,8].

Research goal. Comparative study of new combined 10% ointment of thick extract of bur-marigold tripartite and dry extract of licorice root

with psilosis-balsam in contact allergic dermatitis of guinea pig.

MATERIALS AND METHODS

The ointment was prepared on a hydrophobic basis, obtained by enzymatic transesterification of sunflower oil and internal film beef fat in a mass ratio of 1: 1.5 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, dissolved in 70% ethyl alcohol, which is mixed with an ointment base in a mass ratio of 1: 22.5. The physicochemical properties of the finished ointment, as well as its dispersion, pH, colloidal stability, acidity, iodine value and viscosity were determined according to the requirements of the WHO International Pharmacopoeia, 4th edition (International Pharmacopoeia vol. 4, 2006) [5]. Allergic contact dermatitis was caused by double application of 5% alcohol-acetone 2,4-dinitrochlorobenzene on guinea pigs according to E.Y. Ivleva and P.M. Zalkan (1965). The focus of sensitization was on the back side with an area of 3x3 cm² from which the hair had been removed previously. 2,4-dinitrochlorobenzene was applied on the skin at the dose of 0.1 ml 5% alcohol-acetone solution (2:1). 30 guinea pigs

weighing 300-400 g were used for the experiment. The experimental animals were divided into 3 groups of 10 animals each.

Group 1 – control group;

Group 2 – with 10% combined ointment of thick extract of bur-marigold tripartite and dry extract of licorice root;

Group 3 – with the antihistamine psilosis-balsam;

The above mentioned ointments were applied to the animals according to the scheme once a day at the same time within 11 days. Changes in the skin were observed on days 1, 3, 5, 7, 9 and 11 of treatment after the last application of the 2,4-DNCB allergen. The ointment was applied to the animals with ACD one day later after the second application of allergen.

The severity of the inflammatory manifestations of the skin was assessed in the scores according to I.V. Kutuzov (1996):

Score 0 – the absence of the reaction;

score 0,5– diameters the manifestation of isolated red spots;

score 1 – diffusive-moderate hyperaemia;

score 2 – clear hyperaemia and swelling;

score 3 – sharp erubescence and noticeable swelling;

score 4 – the formation of hemorrhagic crusts;

score 5 – extensive ulceration.

The index for reducing the severity of skin manifestations (Ind) was calculated in relation to the control group of animals according to the formula, in percentage: $Ind = 100(Sk - So) / Sk$. Of which: Sk – sum of scores in control group; So – sum of scores in experiment group.

At the same time, the thickness of skinfold was measured with a micrometer.

In the first day of our observation, the skin of the animals of the first group (control) was

characterized with limited red spots, and some of them had diffusive hyperaemia, and the condition was assessed, in average, in scores 0.6 ± 0.1 . On the third day of the experiment, acute hyperemia, edema and hemorrhagic crusts with large ulcers were found on the skin, which averaged 4.6 ± 0.2 points. On the fifth day, acute erubescence, acute redness, edema, and small ulcers were revealed, which averaged 4.3 ± 0.3 points. On days 7 and 9, the above changes persisted, the state was estimated at 4.3 ± 0.3 and 4.3 ± 0.2 points, respectively. On days 7 and 9, 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, with a value of 3.5 ± 0.2 points. The overall score for this group was 21.4 (Table 1).

In the second group (combined 10% ointment on the basis of the thick extract of bur-marigold tripartite (sum of flavonoids) and dry extract of licorice root) on the day 1, some animals showed limited red spots and some showed slight diffuse hyperemia, with an average value of 0.6 ± 0.1 points. By the 3rd day, the process was acute, with severe redness, edema, hemorrhagic crusts, small wounds, and it was estimated at 4.7 ± 0.15 points. From the 5th day, the inflammatory process began to decrease, but obvious hyperemia, edema, severe redness, hemorrhagic crusts were observed, and it was estimated at 4.2 ± 0.2 points. From the 7th day, the inflammatory process began to improve, with diffuse hyperemia, pronounced hyperemia, edema, severe redness, which was 3.2 ± 0.2 points. From that day reliable changes were observed compared to control group (day 9 – scores 2.1 ± 0.18 , day 11 – scores 0.8 ± 0.19). Total score

was 15.5, and the index for reducing the severity of skin manifestations (Ind) was 26.9%.

Our observations on the animals of the third group (psilo-balsam ointment) 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, edema and hemorrhagic crusts, large wounds, on average 4.9 ± 0.1 points. On the 5th day, the skin condition practically did not change 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, edema, hemorrhagic crusts, on average 4.2 ± 0.25 points. By the 9th day, there were obvious hyperemia, severe redness, edema with an average score of 3.1 ± 0.35 . The results of this day were significant 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, on average 2.4 ± 0.33 points, but the results were not reliable. The total score was 20.1 and the index for reducing the severity of skin manifestations (Ind) was 6.1%. During the experiment, not a single lethal outcome of the experimental animals was recorded. Summing up the results of our experiment, the skin of animals in group 1 (control group) on 1st day showed mild symptoms of ACD, which progressed on day 3, although they decreased partially on day 5. However, the state remained almost unchanged until the end of the experiment. The total score was 21.4.

Table 1
The changes of the severity of cutaneous processes in scores in the treatment of Allergic Contact Dermatitis in experiment

Gr ou ps (M ± m; n= 10)	The severity of cutaneous processes in scores, days of study						S u m of sc or es	I n d %
	Da y 1	Da y 3	Da y 5	Da y 7	Day 9	Day 11		
Gr ou p 1 (co ntr ol)	0, 6± 0, 07	4, 6± 0, 16	4, 1± 0, 1	4,3 ±0, 3	4,3 ±0, 21	3,5± 0,22	2 1, 4	
Gr ou p 2 (5 % oin tm ent)	0, 6± 0, 07	4, 7± 0, 15	4, 2± 0, 2	3,1 ±0, 18*	2,1 ±0, 18*	0,95 ±0,2 2** *	1 5, 6 , 9	2 6 , 9
Gr ou p 3 (ps ilo sis - bal sa m)	0, 6± 0, 06	4, 9± 0, 1	4, 7± 0, 15	4,2 ±0, 25	3,1 ±0, 35*	2,4± 0,33 *	2 0, 0	6 , 5

* $P \leq 0,05$; ** $P \leq 0,01$; *** $P \leq 0,001$ in relation to Control

Changes on the skin of animals of group 2 were accompanied by mild ACD on day 1, exacerbation on day 3, progression on day 5, and a significant decrease from day 7 with a total score of 15.6 and an index of reduction in the severity of skin manifestations (Ind) 26.9%.

Group 3 animals had symptoms of mild ACD on the 1st day, progression on the 3rd and 5th days, a decrease on the 7th day, but only on the 9th day a significant decrease in the indicator began. The overall score was 20.1, and the index for reducing the severity of cutaneous manifestations (Ind) was 6.1%.

In general, combined 10% ointment of a thick extract of a bur-marigold of tripartite and dry extract of licorice root from local raw materials is more effective in the treatment of contact allergic dermatitis than the antihistamine psilosis-balsam. The index for reducing the severity of cutaneous manifestations (Ind) was higher in new ointment than psilosis-balsam (table 1).

One more indicator of Allergic dermatitis was studied in our research – skinfolds of animals (Table 2).

In group 1 guinea pigs (control group), the average skinfold thickness was 0.26 ± 0.016 cm before the experiment, and 1 day after the application of DNCB it was 0.46 ± 0.017 cm and on the 3rd day - 2.28 ± 0.09 cm, on the 5th day - 2.97 ± 0.14 cm, on the 7th day - 3.14 ± 0.17 cm. Decreasing began on the 9th day (day 9 – 2.25 ± 0.05 cm, day 11 – 1.7 ± 0.07 cm).

Observations on animals of group 2 revealed the following changes in skin folds, which averaged 0.24 ± 0.016 cm before treatment and on the 1st day after applying DNCB, it estimated 0.41 ± 0.01 cm, day 3 - 1.42 ± 0.02 cm, and day 5 - 2.72 ± 0.11 cm. The rates from day 1 to day 5 increased gradually. Only on the 7th day, it began decreasing noticeably compared to Control (day 7 – 1.93 ± 0.09 cm, day 9 – 1.32 ± 0.05 cm, day 11 – 1.01 ± 0.09 cm).

Table 2

The influence of the studied drugs on the thickness of the skin fold in guinea pigs with allergic contact dermatitis in the experiment

Groups	Skinfold thickness in cm, days of observation						
	Result	Day 1	Day 3	Day 5	Day 7	Day 9	Day 11
Group 1 (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
Group 2 (5% ointment)	0,24±0,02	0,41±0,01	1,42±0,02**	2,72±0,11	1,93±0,09**	1,32±0,05**	1,01±0,09**
Group 3 (psilosis-balsam)	0,24±0,02	0,52±0,03	1,49±0,11**	2,71±0,11	2,15±0,12**	1,59±0,13**	1,21±0,2*

* $P \leq 0,05$; *** $P \leq 0,001$ in relation to Control

During the observation on the animals of group 3, the average thickness of skinfold was (0.24 ± 0.016 cm) before the treatment. On the 1st day after the application of DNCB, indicators increased by day 5 (day 1 – 0.52 ± 0.03 cm, day 3 – 1.49 ± 0.11 cm, day 5 – 2.71 ± 0.11 cm), and

significant decrease was observed from the day 7 on of the experiment (day 7 – 2.15 ± 0.1 cm, day 9 – 1.59 ± 0.13 cm, day 11 – 1.21 ± 0.2 cm).

INTRODUCTION

Summarizing the obtained indicators of the thickness of skin folds in experimental animals of group 1, from the first to the seventh day, an increase in the thickness of the skin fold was observed, and from the ninth day it began to decrease. In the second and third groups of animals, the thickness of the skin fold increased up to the fifth day, and from the seventh day it began to decrease significantly in comparison with the control group.

Thus, in a comparative study of the treatment of allergic contact dermatitis, it was found that the use of a new combined 10% hydrophobic ointment of a thick extract of a series of tripartite and dry extract of licorice root is more effective than the antihistamine psilosis-balsam.

CONFLICT OF INTERESTS AND CONTRIBUTION OF AUTHORS

The authors declare the absence of obvious and potential conflicts of interest related to the publication of this article and report on the contribution of each author.

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