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Research Article

Comparative Treatment of Experimentally Induced Mange in Rabbits

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Abstract:

This study evaluated the efficacy of various treatments against Sarcoptes scabiei var. cuniculi in 30 local breed rabbits (1–2 years old, 1–2 kg body weight). Infected animals showing mange lesions were randomly assigned to six groups (n=5). Group I received 1% ivermectin subcutaneously; Group II was treated with pyrethroid dipping; Group III with a topical 10% lindane-sulfur ointment; Group IV with 25% benzyl benzoate lotion; Group V with 20% Sibahbah fruit ointment; and Group VI with 20% Cotoneaster fruit ointment. Clinical signs, mite and ova counts, and hematological changes were monitored.Ivermectin was the most effective treatment, resulting in complete clinical recovery and disappearance of pruritus and lesions by day 16 post-treatment. One rabbit in this group died on day 8 due to emaciation despite improved skin lesions. Pyrethroid treatment showed limited efficacy, with continued itching and lesions in some animals; two rabbits died by day 10. Lindane-sulfur ointment was ineffective, as mite and ova counts remained high and all animals died. Benzyl benzoate reduced lesions slightly but failed to eliminate mites or their ova. The Sibahbah ointment significantly reduced mite and ova counts (from 170 to 60), showing partial efficacy. Cotoneaster ointment had no observable effect. In all ineffective treatments, total leukocyte counts remained elevated and did not return to normal levels.These results indicate that ivermectin is the most effective treatment against rabbit mange, while some herbal preparations like Sibahbah may have supportive roles in integrated mange control.

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Introduction:

Many authors referred to the ability of different types of Sarcoptic mites to transmit from one host to another. Schmidt [1]referred that *sarcoptes canis* of dog and fox can transmitted to human and domestic animals, from cattle to human or from cattle to equine and vice versa , Sarcoptic mange in rabbits may be a very serious disease, and usually take a generalized form leading to general debility , emaciation and death of animal within a matter of weeks. The main sites of the appearance of lesions are head, ear, legs, with a main sign of intense pruritus, scratching, erythema, skin scaling, loss of fur and self-inflicted trauma [2 to 5].

Hydrocarbons, organophosphorus compound [6 to 8]. Gamma benzene hexachloride (Lindane) is an excellent miticide in the treatment of scabies [6]. Benzyl benzoate is a relatively harmless substance that in high concentration is toxic to *Acarus scabiei*. The compound has been widely employed in the treatment of scabies [6].

The present study was conducted to compare the efficacy of different drugs for treatment of sarcoptic mange experimentally induced in rabbits.

Aim of study:

was to evaluate and compare the therapeutic efficacy of different topical and systemic agentsincluding Ivermectin, Pyrethroid, Lindane-sulfur, Benzyl benzoate, Sibahabah, and Cotoneaster in the treatment of experimentally induced mange in rabbits, through clinical observation and quantitative assessment of mite and egg reduction over time.

Materials and Methods:

The study was conducted on 30 local breed rabbits from both sexes, of 1-2 years old, with a body wight means of 1-2 kgs.

Animals were experimentally infected by keeping them in direct contact with rabbit naturally infected with *Sarcoptic scabiei var cuniculi*.Rabbits that showed mange lesions were divided into 6 groups of 5 each .Those of group I were treated by ivermectin 1 % (Uvemic 1 % Uvedco Company , AlSalt Jordan) at a dose rate of 1 mg /kg b.wt.

Subcutaneously twice at a 4 days interval, while those of the group II were treated by dipping in pyrethroid

(Tenvalerate,chemovet 20 , EG-D (0.02%) 1/1000 dilution three times at a 4 days interval [20].

Those of group III EG-F Iraqi General Company , Local Production Authority were treated by local application of 10% Lindane – Sulfur ointment (Gamma benzene hexachloride 100%, Vapco Jo Company Amman- Jordan).Rabbits of the group IV were treated by 25% lotion of Benzyl benzoate (Domizyle- lotion – Domina pharmaceutical , Damascus - Syria) daily for 10 days (consecutive days) without bathing or washing . Those of group V were treated by local application of 20% ointment prepared from Cotoneaster fruit.

Animals were monitored daily for the clinical signs that appear during the study as hair conditions (appearance or disappearance), itching and appetite, improvement of body weight and condition. Skin scrapings were obtained for mites and their ova according to [9]), in addition to the hematological picture (hemoglobin concentration Hb, Packed cell Volume PCV, Total leucocytic count TLC [10].

Drug efficacy was calculated according to the following formula:

$$\%Efficacy = \frac{\text{Mean number of mites and their eggs pre treatment } their\ number\ post\ treatment}{\text{Mean number of mits and their eggs pre treatment}} x100$$

Ethical Approval:

Each and every experimental technique was authorized by the College of Veterinary Medicine of kerbala and complied with the ethical approval number (UOK.VET.SU.2022.056**).**

Results:

The results of the study revealed that the treatment with ivermectin gave the best response, as the number of mites (adult, larvae, nymph) and their ova started to decrease 5 days post treatment and disappeared completely 20 days from the beginning of treatment (Table 1). TLC ranged from 6200 to 11600/cmm of blood and PCV from 45 to 62%. The lesions and signs of pruritus,itching started to disappear and the animal returned to normal in this respect, complete clinical recovery occurred 16 days post treatment. Only one animal died 8 days post treatment after period of emaciation, loss of appetite of improvement in respect of lesions and signs, mites and their ova numbers.

While those treated with Pyrethroid, hairs started to appear in 25% of animals 16 days post treatment. One animal died 8 days post treatment, signs of itching continued in spite of the appearance of the lesions on hind legs, second animal died [10] days post period of weakness. Mites number decreased during the first week but egg number increased during this period, both increased during the second week. TLC increased in number (ranged from 8000 to 16200/cmm).

In treatment with Lindane- Sulfur ointment both mites and their ova numbers were increased during the first week, but decreased during the second week in spite of that their number remained higher than those did before treatment did, the animals then died.

In treatment with Benzyle benzoate mites and their ova number continued in their high levels, during the 1 st week, decreased during the 2 nd then disappeared. The lesions started to disappear after 3 days (3 times of treatment), but did not disappeared completely.

The treatment with 20% Sibahbah ointment showed an effect on mites' number as they decreased to 60 / ml in comparison with 170/ ml in addition to their ova number, but Contneaster ointment did not showed any effects. TLC ranged between 8000 to 95000, and 7550 to 10400/ cmm respectively.

Table 1: Mites and their ova numbers of animals infected with mange treated by Ivermectin (I), Pyrethroid (II), Lindane – Sulfur (III), Benzyl benzoate (IV) , Sibahabah (V), and Contoneaster (VI).

Group	Days									
	0		7		14		21		28	
	M	E	M	E	M	E	M	E	M	E
I	170	80	120	60	30	47	55	25	-VE	-VE
II	90	38	30	60	90	120	-VE	-VE	---	---
III	30	10	90	120	70	50	-VE	---	---	---
IV	106	470	205	135	80	66	37	6	---	---
V	170	141	60	150	90	120	----	---	---	---
VI	40	30	40	50	80	-VE	20	-VE	---	---

M: Mite Number, T: total egg and mites' number, E: egg numbers, Values are mean of 5 animals in each group.

Table 2: Respiratory rates/ minutes of animal infected with mange and treated by Ivermectin(I), Pyrethroid (II), Lindane-Sulfur(III) , Benzyl Benzoate (IV), Sibahbah(V), and Cotoneaster (VI).

Groups	Days				
	0	7	14	21	28
I	78	77	80	65	104
II	100	100	100	-----	-----
III	70	100	108	-----	-----
IV	130	115	68	-----	-----
V	80	85	90	-----	-----
VI	100	105	95	-----	-----

Table 3 : Body weight g of animals infected with mange and treated by Ivermectin (I)Pyrethroid (II), Lindane-Sulfur(III) , Benzyl Benzoate (IV), Sibahbah(V), and Cotoneaster (VI).

Groups	Days				
	0	7	14	21	28
I	1225	1225	1200	1520	-----
II	1520	1395	1950	-----	-----
III	1395	1950	1200	-----	-----
IV	1600	1620	1430	-----	-----
V	1420	1400	1410	-----	-----
VI	1500	1480	1490	-----	-----

Discussion:

The observed reduction in fecundity apparently was attributed to a lower rate of ova position by females on the latter group of calves rather than to inhibition of egg development [20].[13]Motile mites were not detected 2 weeks later. Lindane 0.03% caused , 85% mortality after 3 days , but mite number increased rapidly then after, with all the other acaricides mite number breturend to near normal 21 day after treatment [5] Gamma benzene hexachloride (1% Lindane) is an excellent miticide in the treatment of scabies .Pruritus is usually relieved with 24 hours and the great majority of patients do not require a second treatment.

Ivermectin is the drug of choice for treatment of mange in rabbits, while other preparation either they have no effects or they have effects but led to death, or the impractical use of them as it need to be applied directly to animals. In addition, the ivermectin save with little complication and has effects on other internal and external parasites if present. [19] showed 0.05% fenvaleratate killed all the mites after 7 days with the goats remaining mite free for 21 days.

Benzyl benzoate is a relatively harmless substance that in high concentration is toxic to *Acarus scabiei* , the compounds has been widely employed in the treatment of scabies [5] .The [14] study the efficacy of benzyl benzoate against ectoparasite in rabbits, followed by the application of benzyl all treated rabbits showed normal regrowth of hair and skin within 10 -15 days. There was no recurrence of the disease within 2 months.

[18] 90% mites destroyed during the first week Sheep with *sarcoptes sacbe var* ovis ivermectin S.C. itching disappear within 12 days and complete recovery occur 1-3 months [16] one dose of ivermectin destroyed *sarcoptes* mange in sheep .It is possible to tret rabbits infected with *Psoroptes and sarcoptes* by Ivermectine [17] .[10] Ivermectine appeared to be safer effective in reducing and prevalence of ear mites in naturally infested rabbits. Ivermectine at 2 does repeated in 18

days appeared be safe and effective in reducing the prevalence of ear mites in naturally infested rabbits.

Injection S.C. does of Ivermectine in rabbits with sarcoptic, lesions regressed progressively from the second week after treatment and all were cured clinically after 3-5 weeks [11] observed that lesions of *sarcoptes* in rabbits occurred during 2 nd week and complete recover occur after 3-4 weeks. Ambulatory Surgical Centers. show does of Ivermectine , in rabbits with mixed *psoroptes* and sarcoptic mange , clinical cures were disappearance of all stages of the mites was seen after 10 days [12] and rabbits infected with *Psoroptes* and sarcoptes recorded complete clinical recovery after 8- 17b days S.C. Ivermectine . Mites in all stage disappear completely after 10 days. [13] Camel infected with *sarcoptes manges* treated with ivermectin twice 2 weeks intervals scratching and uneasiness subsided one week after the second injection and motile mites were not detected 2 weeks later. Healing of the lesion was slow. [14] 10- 15 days complete recovery in rabbits with *Psoroptes and Sarcoptes* [15] IM Ivermectin in calves infected with *Sarcoptes* mange lead to disappearance within 20 days from treatment Hb, PCV decreased, RBC decreased [21] in calves, [22], [23] in Camel.

Conclusion:

Ivermectin is the drug of choice for treating mange in rabbits. Other treatments are either ineffective, associated with fatal outcomes, or impractical due to the need for direct application to the animals. Additionally, ivermectin is generally safe with minimal complications and provides effective control of both internal and external parasites if present.

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Conflict of Interest: None

Reference:

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