



Original Research

Comparative Curative Efficacy of Ivermectin and Ivermectin with Vitamin Supplementation Treatment against Naturally Infested *Sarcoptes scabiei* Mite in Rabbits- A Retrospective Study

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Abstract

Sarcoptes scabiei infection is a common disease observed in rabbits. A total of 206 Soviet Chinchilla and New Zealand White rabbits (*Oryctolagus cuniculi*) of either sex aged between six months to two years were divided into two groups viz., Group I (G -I), consisting of 116 rabbits and Group II (G- II) consists of 90 rabbits. Rabbits of G-I were treated twice with ivermectin at a the dose rate of 0.2 mg/kg body weight sub-cutaneously at weekly intervals and G- II were treated with Ivermectin at a dose rate of 0.2 mg/kg body weight along with Vitamin A, D, E and H at the dose rate of 0.025 ml/ kg intramuscularly at weekly intervals for two weeks. Rabbits of G-II revealed faster reduction in the mite density, compared with G-I rabbits. The rabbits of G-II also revealed significant ($P \leq 0.01$) improvements in the sarcoptes-induced skin lesions score (SSLS) and reduction in the mite density at the respective day post-therapy compared with the rabbits of G-I.

Key words: Clinical Score, Ivermectin, Rabbits, *Sarcoptes scabiei*, Vitamin

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Introduction

Rabbits are reared worldwide for wool, meat, pelts, laboratory animals and as pets. The incidence of skin infestations especially mange in rabbits are very high in the hot and humid climate of India (Aulakh *et al.*, 2003). *Sarcoptes scabiei* is the agent that causes infestation in mammals, such as wild and domesticated dogs and cats, wild boars, ruminants, wombats, koalas, great ape, as well as laboratory animals, including rabbits (Sajid *et al.*, 2017). It affects the ears, nose, feet, and the area around the genitalia, besides pyoderma and itching. It is of zoonotic importance, as direct transmission from handling of a rabbit infested with S.



scabiei can cause a self-limiting dermatitis in humans. Considering the potential consequences of *Sarcoptes*-infestation on the health of laboratory rabbits and human besides, economic loss in commercial rabbits, chemotherapeutic remedies are applied including macrocyclic lactones. This work was carried out to find out the effect of Ivermectin alone and in combination of supportive therapy with various vitamins against naturally infected rabbit with *S. scabiei* mites.

Materials and Methods

A total of 206 Soviet Chinchilla and New Zealand white rabbits (*Oryctolagus cuniculi*) of either sex, aged six months to two years presented to Teaching Veterinary Clinical Complex, College of Veterinary Sciences & A.H., R.K. Nagar, West Tripura from February, 2013 to March, 2018 and found positive for *sarcoptes* mites infestation were selected for the present study. All the affected rabbits were divided into two groups. G-I, consisting of 116 rabbits and G- II, consists of 90 rabbits. Rabbits of G- I were treated with ivermectin (¹Connectin®) alone at a dose rate of 0.2 mg/kg body weight sub-cutaneously at weekly intervals for three weeks. However, rabbits under G-II were treated with ivermectin (¹Connectin®) at a dose rate of 0.2 mg/kg body weight along with Vitamin A, D, E and H (²Intavita-H®) at a dose rate of 0.025 ml/ kg intramuscularly at the weekly intervals for two weeks. Skin scrapings from each rabbits were taken from at least 3 different sites and were examined as per standard method (Benjamin, 2007). Five clinical signs (intensity of pruritus, degree of crusts (hyperkeratitis) formation, erythema, pyoderma and degree of alopecia) were assessed and rated on a scale from 0 (absent) to 3 (severe) . The three scores were added up and expressed as a *Sarcoptes*-induced skin lesions score (SSLS) that could have values between 0 and 15 (Kumar *et al.*, 2016). The clinical recovery was evaluated on the basis of improvement in SSLS and reduction in the mite density. The data were analysed using statistical software SPSS 16.0 .

1. Connectin®-M/s Concept pharmaceutical Ltd.; a commercial formulation containing 1% Ivermectin.
2. Intavita-H®- M/s Intas Pharmaceuticals Ltd.; a commercial formulation containing vit. A 250000 IU; vit. D 25,000 IU vit. E acetate 100 IU/ml and Biotin 12.5 mcg.

Results

The most commonly affected body regions in rabbits were nose, paws, eyes, ears, tail, inguinal and dorsal regions. The most common lesions manifested in all symptomatic rabbits (n=206) were pruritis (n=198), crusts/hyperkeratitis (n=196) and alopecia (n=206) (Fig 1a &1b). Microscopic examination of skin scraping from rabbits showed *Sarcoptes scabiei* mites. The mites revealed round body, short legs, a long unjointed stalk with sucker on front pairs of legs, vertical setae and terminal anus. Vitamin supplementation of the ivermectin-treated rabbits revealed both faster clinical (14 days) and parasitological (7-10 days) recovery.

Fig.1a



Fig.1b

**Fig 1a & b:** Hyperkeratitis and alopecia in rabbit infected with *Sarcoptes scabiei*

Out of the 102 rabbits of ivermectin-alone-treated (G- I), 91 rabbits received two injections of ivermectin while the remaining eleven rabbits required three injections to become free of the mites and their developmental stages. The rabbits treated with ivermectin alone revealed both delay clinical (21 days) and parasitological (10–17 days) recovery. Out of 90 rabbits, 76 rabbits of group II required only one injections of ivermectin while fourteen rabbits required two injections of ivermectin to become free of the mites and their developmental stages. The SSLS values of the ivermectin alone-treated rabbits on days 0, 7, 14, 21, and 28 were 6.73 ± 0.17 , 4.34 ± 0.10 , 2.27 ± 0.06 , 1.08 ± 0.06 , and 0.00, respectively, and the percent improvements were 24.45, 66.66, 93.45, and 100 at the day 7, 14, 21, and 28 of treatment, respectively. The mean $\pm$ SE values of clinical scores for severity (SSLS) in the ivermectin-treated-vitamin-supplemented rabbits on days 0, 7, 14, 21, and 28 were 6.63 ± 0.16 , 3.43 ± 0.09 , 1.16 ± 0.08 , 0.00, and 0.00, respectively. While the percent improvements in SSLS at the day 7, 14, 21, and 28 of treatment were 56.84, 97.77, 100, and 100, respectively. The vitamin supplementation of the ivermectin-treated rabbits also revealed faster reduction in the mite density, compared with the ivermectin-alone-treated rabbits. These rabbits also revealed significant ($P \leq 0.01$) improvements in the SSLS and reduction in the mite density at the respective day post-therapy, compared with the ivermectin-alone-treated rabbits.

Discussion

Sarcoptic mange in rabbits has been reported from Israel, America (Redi, 2004) and India (Soundara-Rajan and Iyue, 2005), besides some reports suggest that it is more commonly found in some parts of the world, such as Africa (Scott *et al.*, 2001). One report from India showed an overall 9.3 percent incidence of mange infestation in rabbits (Soundara-Rajan, and Iyue, 2005). *Sarcoptes* mites lead to heavy scratching by the rabbits which also lick the affected areas and leads to alopecia. Besides, secretion of a watery stuff that forms crusts upon drying. Wounds appear first on the lips and nose and later around the head and necks. Self-mutilation leads to wounds and secondary bacterial infection. The feeding behaviour of larvae and



nymphs causes irritation, hypersensitivity reaction, and inflammation, with subsequent hyperkeratosis, seborrhoea, and alopecia (Scott *et al.*, 2001). The intense pruritus often causes alopecia and dermal abrasions, commonly developing to serous encrustations and secondary bacterial dermatitis. Chronic cases can lead to anorexia, lethargy, emaciation and death (Scott *et al.*, 2001). G- II rabbits indicate faster clinical recovery due to amelioration of the altered oxidant/antioxidant balance by potential antioxidant action of the adjunctive therapy. In the present study, we demonstrated both faster clinical and parasitological recovery in the ivermectin plus vitamin-supplemented rabbits. Our results substantiate the previous scientific reports of vitamins mediated restoration of altered oxidant/ antioxidant balance in *Psoroptes*-infested rabbits (Kanbur *et al.*, 2008 and Singh *et al.*, 2012).

Conclusion

In conclusion, supplementation of vitamin A, D, E & H with ivermectin augment the parasitological and clinical recovery in rabbits infected with *S. Scabiei* as compared to ivermectin alone.

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Conflict of Interest

Authors proclaimed that there is no conflict of interest among the authors of this article.

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