



HAEMATOBIOCHEMICAL ALTERATIONS IN RABBIT MANGE

S SOUJANYA^{1*}, A ANAND KUMAR², J JYOTHI³ AND D MADHURI¹

¹Department of Veterinary Pathology, College of Veterinary Science, Rajendranagar, PVNRTVU, Hyderabad 500 030, Telangana, India

²Department of Veterinary Pathology, College of Veterinary Science, Tirupati 517501, SVVU, Andhra Pradesh, India

³Veterinary Clinical Complex, College of Veterinary Science, Rajendranagar, PVNRTVU, Hyderabad 500030, Telangana, India

*Email: sonurv36@gmail.com (corresponding author): ORCID ID 0000-0001-9653-4995

ABSTRACT

Mange in rabbits is an economically important parasitic disease which cause significant loss in productivity, body weight and fur quality. Forty eight rabbits with clinical signs of alopecia, anorexia, pruritis, skin erosions and dry crust like lesions on extremities, ears, nose and face were brought to Veterinary Clinical Complex, Rajendranagar and Hyderabad. Skin scrapings were collected, processed and examined under microscope to detect mite infestation. Different mites i.e. *Sarcoptes scabiei*, *Psoroptes cuniculi*, *Notoedres cuniculi*, *Demodex cuniculi* and *Cheyletiella parasitivorax* were noticed in rabbits. Haematological examination revealed a significant ($p<0.05$) decrease in haemoglobin, PCV, RBC count and a significant ($p<0.05$) increase in TLC count in affected rabbits. Serum analysis showed a significant ($p<0.05$) increase in ALT and AST levels in infected rabbits. Treatment with ivermectin along with proper management resulted in recovery from mange in rabbits.

Key words: Alopecia, *Demodex cuniculi*, ivermectin, mange, *Notoedres cuniculi*, pruritis, *Psoroptes cuniculi*, rabbit, *Sarcoptes scabiei*, scabies

In rabbits, mite infestation is considered as common and an important cause of pruritis (Mian, 2017). Mange in rabbits results in severe itching, seborrhea, alopecia, hypersensitivity reaction, crusting, hyperkeratosis, anorexia, lethargy, emaciation, restlessness, biting and scratching of affected areas and even death (Scott et al., 2001; Davies et al., 1991). In rabbit farming mange infestation due to *Sarcoptes scabiei* is one of the common problems (Darzi et al., 2007). It is highly contagious, zoonotic and cause significant morbidity resulting in huge economic losses (Kumar et al., 2002). Overcrowding and poor hygiene are the most important predisposing factors for *S. scabiei* infestation (McCarthy et al., 2004). In Sarcoptic mange, lesions are commonly seen on ears, nose, feet and perineal area (Kachhawa et al., 2013). Two forms of *Psoroptes cuniculi* infestation are recognized in rabbits. Auricular mange is confined to the ear canal and the pinnae (Kyung-Yeon and Oh-Deog, 2010), extra auricular mange is spreading all over the body of the rabbits (Bates, 1999). *P. cuniculi* causes extensive pyodermitis in the ear or on the body surface of rabbit (Siegfried et al., 2004). It lives in the external auricular meatus and fed on the serous exudate, skin secretions and blood (Fichi et al., 2007). In rabbits, *Notoedres cuniculi* mange has been reported in Africa

and Asia (Elshahawy et al., 2016; Foley et al., 2016; Panigrahi et al., 2016). The life cycle of *Notoedres* is similar to *S. scabiei* and transmission occurs through direct contact with skin lesions or indirect contact with fomites (Sinnott et al., 2020). *Cheyletiella parasitovorax* is known as rabbit fur mite is a nonburrowing mite and it can be visible to the naked eye as “walking dandruff”. *Demodex cuniculi* in rabbits is often subclinical. The present paper reports the diagnosis and successful therapeutic management of mange in rabbits.

MATERIALS AND METHODS

48 rabbits were presented to Veterinary Clinical Complex, Rajendranagar, Hyderabad with a history of itching, scrapping, anorexia, depression and skin lesions during the year 2021. Skin scrapings were collected by using scalpel blade by deeply scrapping the affected parts of the skin until the blood ooze out and then processed based on the standard protocol (Soulsby, 1982). For haematological examination, 1 to 2 ml of blood was collected from ear vein into an anticoagulant coated vacutainers for hematological examination. Total erythrocyte count (TEC), total leukocyte count (TLC), hemoglobin (Hb) concentration

and packed cell volume (PCV) were estimated by using automatic whole blood analyzer (Huma count, med source ozone biochemical Pvt. Ltd). For serum analysis, approximately 2 ml of blood was collected from each rabbit into serum vacutainers and allowed to clot for 3 to 4 hr, later centrifuged at 2000 rpm for 10 minutes. Serum was separated into Eppendorf tubes and stored at -20 °C. Serum biochemical analysis was done in auto biochemistry analyzer (Prietest touch-Robonik India Pvt. Ltd., Navi Mumbai) by using Transasia biochemical kits (Transasia biomedical Ltd., Solan, Himachal Pradesh). International Federation of Clinical Chemistry (IFCC) method was carried out for analysis of Alanine amino transferase (ALT) and Aspartate amino transferase (AST) (Shaw et al., 1983). The data obtained were subjected to statistical analysis by applying one way ANOVA using Statistical Package for Social Sciences (SPSS) version 20.0. Differences between the means were tested by using Duncan's multiple comparison test and significance level was set at $p < 0.05$ (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

48 rabbits were presented to Veterinary Clinical Complex, Rajendranagar, Hyderabad with a history of itching, scrapping, anorexia, depression and skin lesions. Clinical examination of the rabbits revealed clinical signs like pale mucous membranes, erythema of skin, alopecia, weight loss, formation of scaly like lesions and crusts mainly on hair less parts of the body i.e., nose, face, ears and feet. Out of 48 examined rabbits, 20 (41.66%) were infected with mange which was diagnosed by microscopic examination of skin scrapings. Based on morphology of mites, the species of mites were identified. *S. scabiei* was noticed in 11 rabbits (Fig. 1), *P. cuniculi* in 2, *N. cuniculi* in 2, *D. cuniculi* in 4 (Fig. 2)

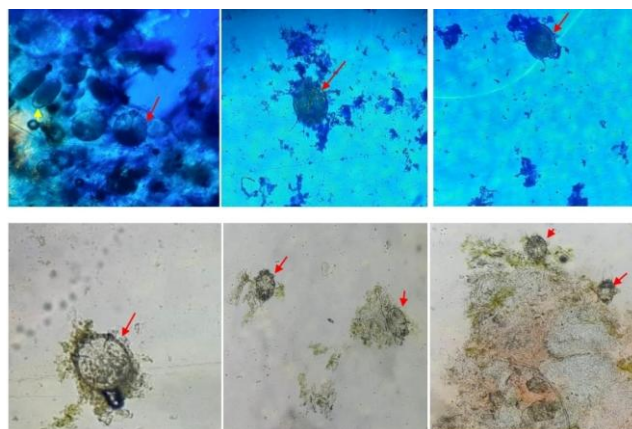


Fig. 1. Skin scrapings of rabbits-*S. scabiei* (red arrow)

and *C. parasitivorax* in 1 rabbit were observed.

The rabbits which were negative for mite infestation were taken as control group. Haematological analysis revealed a significant ($P < 0.05$) decrease in RBC count, haemoglobin, PCV and a significant ($p < 0.05$) increase in TLC count in affected rabbits when compared with control. Serum analysis showed a significant ($p < 0.05$) increase in ALT and AST levels in infected rabbits in comparison with control rabbits. The details are as below:

Parameter	Control (n=28)	Affected (n=20)
RBC(10^6 / mm ³)	4.53± 0.09 ^a	2.18± 0.07 ^b
Haemoglobin (gm/ dl)	10.75± 0.12 ^a	7.17± 0.09 ^b
PCV(%)	32.77± 0.30 ^a	14.44± 0.15 ^b
TLC(10^3 / mm ³)	8.79± 0.18 ^b	16.2± 0.21 ^a
ALT (IU/ l)	64.27± 0.60 ^b	104.23± 0.35 ^a
AST (IU/ l)	27.00± 0.29 ^b	50.67± 0.23 ^a

Values mean± SE, One way ANOVA, Means with different superscripts in a column differ significantly ($p < 0.05$).

In present study the prevalence of sarcoptic mange is high when compared with other mites. *S. scabiei* is the common burrowing mite in rabbits and produce skin lesions all over the body (Deshmukh et al., 2010). Diagnosis of mange is usually done by microscopic examination of skin scrapings. Clinical signs such as development of erythema, alopecia, scales, crusts and reduced appetite along with presence of large density of mites below the crusts as observed in present study are in accordance with the previous findings (Oraon et al., 2000; Kaplaywar et al., 2017). Alterations in haematological and serum biochemical parameters in mange affected rabbits of current study are in

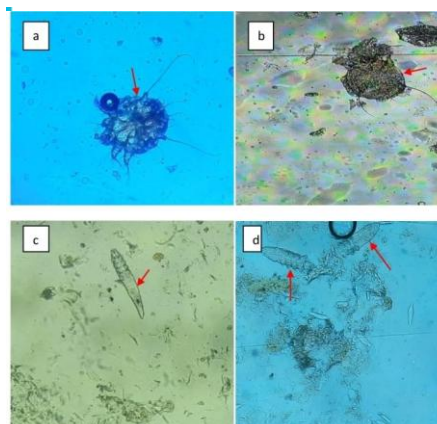


Fig. 2. Skin scrapings of rabbits showing mites- a. developmental stages (yellow arrow) *P. cuniculi*, b. *N. cuniculi* and c and d. *D. cuniculi*

correlation with the earlier experiment (Rania et al., 2017). The decreased RBC count, Haemoglobin and PCV in affected rabbits might be due to mite induced anaemia because mites feed on tissues and blood of host. The elevated TLC could be due to increased immune response in affected animals against mite infestation. The elevated ALT and AST activities indicate the hepatic damage induced by mites. From the degenerated hepatic cells there is leakage of ALT and AST into blood stream resulting in their elevation.

In the present study, the affected rabbits were treated with Ivermectin @ 200 µg/kg body weight, subcutaneously at weekly interval for three weeks. After 3 weeks, again skin scrapings were collected and examined under microscope which were found negative for mites. Skin lesions were also decreased and successful recovery of rabbits was observed from mange. Ivermectin when given subcutaneously, it will selectively binds to glutamate and gamma-aminobutyric acid (GABA) gated chloride channels in the mites nervous system, resulting in hyperpolarization of cells, paralysis and finally death of mites (Aulakh et al., 2003). Blow lamp used by Darzi et al. (2007); Mitra et al. (2014) and deltamethrin spray was used by Rao et al. (2020) for control of rabbit mange. The present study suggest that rabbit mange can be effectively controlled by ivermectin therapy along with proper management like avoiding overcrowding, disinfection of cages and by maintaining hygiene in the farm.

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AUTHOR CONTRIBUTION STATEMENT

All authors equally contributed. S Soujanya analyzed the skin scrapings, blood, serum samples and written the original manuscript. J Jyothi involved in treatment of rabbits and done the statistical studies. D Madhuri corrected the draft. All authors read and approved the manuscript.

CONFLICT OF INTEREST

No conflict of interest.

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