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Clinico-haematological alterations due to sarcoptic mange in Osmanabadi goat flock and its therapeutic management

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Abstract

A flock of Osmanabadi goats (n=20) was presented to the clinics with the history of hair loss, intense pruritus, decrease in body weight and eventual mortality of four kids since last month. Clinical examination revealed tachycardia, tachypnea and pale mucosae. Marked focal to generalized alopecia was noticed over the face, ears, around eyes and neck with concurrent crusting, hyperkeratosis, thickening and folding of affected skin along with severe pruritus. In few animals, the lesions were extended over shoulder and thoraco-abdominal region, limbs and scrotum. Haematological analysis revealed marked granulocytic leukocytosis and anemia. Skin scrapping examination revealed presence of numerous *Sarcoptes scabiei* mites and their eggs. All the affected goats were treated with two doses of ivermectin @ 0.2 mg/kg subcutaneously at weekly intervals along with antihistaminic and multivitamin for 5 days, haematinics for 15 days. Appreciable response to the therapy was observed in treated flock by fortnight with marked resolution of clinical signs after one month of therapy in terms of regrowth of hairs, subsidence of crusting, hyperkeratosis and skin thickening accompanied with enhanced skin pliability and shine. Similarly, improved haemogram and increased weight gain in kids was observed signifying the encouraging response to the therapy.

Keywords: Sarcoptic mange, Ivermectin, Osmanabadi goats, Alopecia, Treatment,

Mange is a contagious and widespread acariasis of animals responsible for economic losses due to growth retardation, decreased weight gain, damage to the skin and hides, treatment cost and mortality (Rahbari *et al.,* 2009). Sarcoptic mange is a highly contagious ectoparasitic infestation of several animal species including humans caused by *Sarcoptes scabiei* and transmitted directly through contact as well as indirectly through fomites (Ibrahim and Abu-Samra, 1987). Animals reared under poor husbandry practices like overcrowding, lack of cleanliness and poor feeding are predisposed to Sarcoptic mange, a major cause of economic losses to small marginal farmers (Rahbari *et al.,* 2009). Sarcoptic mange is characterized in early stages by the presence of erythematous papules followed by intense pruritus, excoriation, scratching and biting with loss of hairs, thick brown scabs overlaying the raw surfaces, thickening, and wrinkling of the surrounding skin (Constable *et al.,* 2017). Traditional as well as commercial Osmanabadi goat farming is an important source of income to rural farmers and entrepreneurs of Maharashtra state. The present communication elucidates alterations in clinico-haematological parameters in Osmanabadi goats suffering from Sarcoptic mange.

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Materials and Methods

Osmanabadi goat flock with 20 units comprised of adults (1-4 year) and young kids (1-1.5 months) was admitted to Teaching Veterinary Clinical Complex, College of Veterinary and Animal Science, Udgir, Maharashtra with complaint of itching, hair loss, decreased weight gain and mortality of four kids over a period of one month. History revealed poor husbandry practices which included overcrowding, lack of cleanliness and allowing young kids for grazing with adult goats for a day. All the ailing goats were subjected to detailed clinical examination and haematological analysis.

At least three skin scrapings were collected carefully from all the goats with selection of lesions bordering healthy skin. A skin fold was hold between forefinger and thumb and the site was scrapped at right angle with scalpel blade dipped in glycerine until oozing of blood from the site. The scrapping were placed in the test tube containing potassium hydroxide solution and heated until hairs and epidermal scales were dissolved followed by centrifugation. Supernatant was discarded while sediment was used for microscopic examination for identification of mites according to microscopic characteristics described by Greiner (2012).

About 2 ml of whole blood was collected in

EDTA tubes from jugular venipuncture for haematological analysis. Blood samples were analyzed on automated hematology analyzer (Abacus Junior Vet, Diatron GMBH, Austria) before treatment and after 30 days.

Treatment: All the affected goats were treated with two doses of Ivermectin @ 0.2 mg/kg SC at weekly interval along with supportive therapy comprising of antihistaminic (Inj. Chlorpheniramine maleate @ 0.25 mg/kg IM and multivitamin (Inj. Vitamin A, D3, E & B complex @ 1-2 ml IM, 5 days) for 5 days and haematinic (Glycine chelated Fe & Cu, Co, Cholecalciferol, Niacinamide, Folic acid, Cyanocobalamin, Pantothenic acid and Vit. E @ 5 ml PO SID) for 15 days.

Statistical analysis: Data collected on clinical parameters and haematology was analyzed by using paired't' test for equal number of observations using SPSS version 20.

Results and Discussion

Sarcoptic mange is an economically important parasitic infestation and its control is important for profitable goat farming in goat rearing countries. In the present study, the occurrence of mange in Osmanabadi goats was observed during October-November months of winter season, which is in agreement with reports of earlier workers (Parmar and Chandra, 2018; Vishe *et al.,* 2012). Poor husbandry practices like overcrowding, poor hygiene and subnormal nutrition predisposed the goats in the present study to mange, which is in agreement with findings of Rahbari *et al.* (2009) and Giadinis *et al.* (2011).

Microscopic examination of skin scrapings revealed presence of numerous *Sarcoptes scabiei* mites having characteristic features such as round shaped body with comparatively short third and fourth pairs of legs, which often do not project beyond the margin of the body along with long and unsegmented / unjointed stalk (pedicle) connecting a sucker to the leg (Fig.2a-b). In addition, numerous mite eggs (Fig. 2 c-d) (average size 148 x 80 µm) were evident in skin scrapings. These microscopic findings observed in the present study were in consonance with earlier reports by Greiner (2012).

Clinical examination (Table 1) of the ailing goats revealed normal body temperature (100.96±0.23 ^{0}F), tachycardia (87.33±3.03 bpm), tachypnea (41.20±2.93/ min) and pale mucosae. Typical dermatological clinical signs observed were focal to generalized alopecia, crusting, cracks, hyperkeratosis, skin thickening and folding, severe pruritus leading to self-mutilation in affected goats (Fig.1 a-d). Scoring for distribution of lesions on body showed lesions like alopecia, crusting, hyperkeratosis and dermatitis on face (100%), ears (85.71%), eyes (64.28%), and neck (50%) of the affected goats. Few cases showed lesions extending to shoulder and thoraco-abdomen (28.57%), limbs (21.42%) and scrotum in male goats. Severe pruritus leading to restlessness, decreased feed intake might be the reason for loss of body weight in the affected flock. Earlier workers reported lesions like intense pruritus, erythema, crust formation, hyperkeratosis, alopecia and thickened, rough and wrinkled skin in goats affected with Sarcoptic mange (Constable *et al.,* 2017; De and Dey, 2010). Giadinis *et al.* (2011) also reported generalized and diffuse alopecia, pruritus, hypotrichosis, erythema, hyperpigmentation, excoriations, thick crusts, skin folding and lichenification spread all over the body of goats ailing from chronic generalized Sarcoptic mange.

Haematological findings of lowered hemoglobin and hematocrit with granulocytic leukocytosis observed in goats were in agreement with the findings of Sengupta *et al.* (2008) in experimentally induced mange in Black Bengal goats and Vishe *et al.* (2012) in Surati buffaloes and buffalo calves. The findings of anemia were also in agreement with the findings of De and Dey (2010) as well as Parmar and Chandra (2018) in goats and sheep, respectively. The chronic loss of appetite in the ailing goats due to mange infestation and pruritus might be responsible for the development of anemia. The granulocytic leukocytosis in the ailing goats could be attributed to inflammatory response with influx of neutrophils and eosinophils against Sarcoptic mange.

Being ectoparasitic infestation along with development of anemia, the goats were treated with Ivermectin as ectoparasiticide and supportive therapy of antihistaminic, multivitamin and haematinic to correct pruritus and anemia. Gradual improvement in treated goats was observed in the form of reduction in the intensity of pruritus, absence of restlessness, regrowth of hairs on affected parts and gradual shedding of crusts and resolution of hyperkeratosis. Clinical examination of goats one month later showed promising results with the absence of skin lesions, regrowth of hairs on the affected parts, subsidence of folds over skin and thickness, improved skin luster and pliability, improved

Table 1: Mean values (+SE) of vital clinical parameters and haematological parameters in goats (n=7) ailing with Sarcoptic mite before treatment and 30 days post treatment.

Parameters	Before treatment (Day 0)	After treatment (Day 30)	't' value
Rectal temperature (^{0}F)	100.96±0.23	101.13±0.15	-0.571^{NS}
Heart rate (/min)	87.33±3.03	73.46±0.98	4.169**
Respiration rate (/min)	41.20±2.93	24.93±0.62	5.387**
TEC (X 10^6/µl)	10.85±0.94	5.87±0.76	3.159*
Hb (gm %)	5.84±0.33	7.77±0.22	-6.350**
Haematocrit (%)	16.78±0.73	23.72±0.91	-7.064**
TLC (X 10^3/µl)	20.49±2.61	10.17±0.66	3.460*
Granulocytes (%)	69.22±4.41	37.05±5.79	6.191**
Monocytes (%)	0.62±0.91	2.05±0.94	-1.452^{NS}
Lymphocytes (%)	30.11±4.41	60.85±5.36	-6.087**
Thrombocytes (X 10^3/µl)	380.57±18.48	397.42±11.61	-0.720^{NS}

^{NS}Non-significant, *Significant (P<0.05), **Highly significant (P<0.01)

weight gain and absence of mortality in kids (Fig. 3 a-d). Ivermectin has been successfully used in the treatment of Sarcoptic mange (Giadinis *et al.,* 2011; Constable *et al.,* 2017; Parmar and Chandra, 2018). In the present study, two weekly doses of ivermectin revealed good clinical recovery with initiation of hair regrowth by 15 days and uneventful recovery by one month. Clinical examination and haematological analysis (Table 1) of representative goats from flock after one month revealed significant (P<0.01) decrease in heart rate and respiration rate and significant increase (P<0.01) in hemoglobin and hematocrit values indicative of increase in haemogramn in the treated goats. Parmar and Chandra, (2018), reported similar observations of improved erythrogram in sheep treated for Sarcoptic mange. Leukogram also revealed significant reduction (P<0.05) in total leukocyte count while highly significant (P<0.01) reduction in granulocyte and increase in lymphocyte count suggestive of decreased inflammatory response and enhanced cell-mediated immunity in treated goats. Post-recovery follow up two months later revealed no evidence of dermatological disease and associated mortality in the treated goat flock suggesting treatment fully effective.

In conclusion, an outbreak of Sarcoptic mange was investigated in Osmanabadi goat flock during winter months characterized by alopecia, crusting, cracks, hyperkeratosis and thickening of skin of face, ear, eyes and neck of goats along with severe anemia and granulocytic leukocytosis. The infestation showed encouraging response to two weekly doses of ivermectin along with supportive treatment.

Declaration of competing Interest: The authors declare that they have no conflicts of interest.

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