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Haemato-Biochemical Studieson Dermal Mycosis in Dromedary Camel

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A B S T R A C T

This study was conducted to investigate the effect of novel polyherbal preparation on haematobiochemical profile of dermal mycoses infected camel in the villages adjacent to Bikaner, Rajasthan. A total of 16 dermal mycoses infected camels (of either sex or different age group) were included, where blood sample were taken before and after the treatment. Haematogram picture depicted a significant decrease in neutrophil and increase in lymphocytic count. Whereas other hematological parameters did not varied significantly. After recovery significant reduction in ALKP (alkaline phosphatase) and ALT (alanine transminase) were recorded while AST (aspartate transaminase), serum total protein, albumin and globulin varied nonsignificantly. Post treatment serum Se values increased significantly as compared to pretreatment. A nonsignificant increase in Cu, Co and Zn were recorded in study group. These change in blood profile ascertain the potential of this herbal preparation for dermal mycoses in camel.

Introduction

Dromedary camel is well adapted than any other domestic animal to the arid and semi-arid regions of the Rajasthan state of the India. The physiological attributes of the camel makes this animal to thrive and use in climatic extremes (Yagil, 1985). The skin surface acts as anatomic and physiologic barrier between the animal and environment. During life time, skin has its own functions and even after death the utility of skin remains. The diseases of camels are closely related to their natural environment and the type of husbandry. Camelids like other livestock are exposed to a range of skin affections due to bacteria, viruses, parasites and fungal infections. Amongst skin infections, fungal infections are more prevalent than the bacterial infections. Young ones are more prone to infection than adults, which might be due to stronger immunity in older animals as a consequence of multiplicity of contacts with the fungus rather than an intrinsic role of age (Descamps *et al.*, 2003; Moriello *et al.*, 2003).

In India, record of Ayurvedic and herbal medicine date back to about 3000 BC. Herbal therapy has increase in popularity in last few decades among animal owners seeking alternative treatment to conventional western medicine because it's lesser cost, alternative to drug resistance and easy availability. Several published reports from different countries (Mohamed and Hussein, 1996; Agab, 1998; Nomanda, 1998 and Muhammad *et al.,* 2005) have described the traditional practices used by the camel owners. Camel owners living in remote areas of the desert remained cut off from the comparatively progressive areas. Medicinal plants represent a rich source of antimicrobial agents (Mahesh and Satish, 2008). Many of the plant materials used in traditional medicine are readily available in rural areas at relatively cheaper than modern pharmaceutical drugs. Plants generally produce many secondary metabolites, which constitute an important source of bactericides, fungicides, pesticides and many pharmaceutical drugs.

Haematological and biochemical system of camel also play a vital role to defense the fungal infection along with skin. Fungal infection have a varied and often profound effect on the cellular elements of the haemato-biochemical system. These infection may increase or decrease number of circulating erythrocytes, leukocytes and platelets or may induce qualitative changes in these elements, some of which affect their function. This study focuses on diverse haematological and biochemical manifestation in dermal mycosis affected camel.

Materials and Methods

The present investigation was carried out on 16 cases of camels affected with dermal mycoses (irrespective of sex, age and breed) from village adjacent to Bikaner district, an arid desert region of Rajasthan. The camels which showing peculiar skin lesion of mycoses along with other sign and symptoms of pruritis, alopecia were included in the study. All the relevant samples and photography of the lesions where thought necessary were collected. Confirmation of dermal mycoses was done on the basis of direct microscopic examination and cultural examination of skin scrapings. Treatment of the dermal mycoses cases was done with herbal drug formulation developed by I.C.A.R.-National Research Centre on Camel, Bikaner (Provisional Patent Filed).Treatment by this herbal drug formulation applied tropically. Blood samples were collected from all these cases before and after two months of the start of the treatment.

Collection of blood samples

For haematological examination blood samples from all these 16 cases of dermal mycoses were collected by jugular vein in sterile vacutainers having ethylene diamine tetra acetic acid (EDTA) disodium salt as an anticoagulant added at the rate of 1mg/ml of blood of as recommended by Jain (1986).For biochemical studies, blood was simultaneously collected in another sterile vacutainers having no anticoagulant. These vacutainer tubes were kept in slanting position for one hour at 37^0C. Blood clots of these slants were broken and tubes were centrifuged at 2,500 rpm for 30 min. The serum was harvested in small Pyrex tubes and was stored in the deep freeze at -20^0C till analysis.

Haematological examination

For haematological examination blood samples were analysed for haemoglobin by Sahli-Hellige haemoglobinometer, packed cell volume (PCV) by microhaematocrit method, total erythrocyte count (TEC), total leucocyte count (TLC) and differential

leucocyte count (DLC) as per the method described by Jain (1986).

Biochemical estimation

Biochemical analysis of serum samples was done to estimate serum total protein, alkaline phosphatase (ALKP), serum aspartate aminotransferase (SGOT), serum albumin, serum alanine aminotransferase (SGPT), serum globulin. These were determined by the Vet Test Chemistry Analyzer using kit supplied by Idexx laboratories, as per the manufacturer's subscribed procedure.

Estimation of serum minerals (Zn, Co, Cu, Se)

Minerals (Zn, Co, Cu, Se) present in serum of camels affected from dermal mycoses were estimated by Microwave digestion system (MDS) and Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES). The samples of before treatment and after recovery both are estimated by the same procedure, as per the manufacturer's subscribed procedure.

Digestion of serum samples by MDS

Digestion of serum samples was done by Microwave digestion system model MDS-10 of SINEO Microwave Chemistry Technology Co. Ltd. China. For digestion 0.5 ml of serum sample was taken in the digestion vessel to this 7 ml of conc. HNO_3 was added. The instrument was warmed for 10-15 minutes, then prepared sample vessels were placed inside the cavity of the instrument. Then the automated programme for serum digestion was created, which allows digestion in three stages by controlling temperature at 130^o, 150^o and 160^o C for 10 minutes. After digestion cooling starts automatically. Finally the digested sample was diluted to 100 ml with distilled water.

Mineral Estimation by ICP

Estimation of minerals in digested serum samples was done by Inductively Coupled Plasma – Optical Emission Spectrometry as per the manufacturer's instructions (Thermo Scientific Ltd. USA.). Instrument was allowed to warm up for 10-15 minutes and then the required sample details were feeded in the instrument and the diluted sample was subjected to estimation as per the described procedure.

Analysis of haematological and biochemical parameters conducted by paired T test.

Results and Discussion

Haematological parameters

The mean ± SE values of TEC, haemoglobin, PCV, TLC and Differential leukocyte count of dermal mycoses cases of camels, before and after treatment is presented in Table 1.

The statistical analysis of data revealed that neutrophil and lymphocytic count varied significantly. Whereas total erythrocyte count, Hemoglobin concentration, packed cell volume, total leucocytes count, monocytic count and eosinophilic count did not varied significantly ($P \leq 0.05$) (Table.1). Significant variation in neutrophils and lymphocytes only may be due to the fact that secondary bacterial infections might have invaded the discontinued integrity of the skin caused by the fungal lesions. Foutah *et al.*, (2012) reported a significant reduction of erythrocyte count, haemoglobin content and packed cell volume, some adverse effect on haemato-biochemical parameters however by ringworm infection in camel. Mathur *et al.*, (2011) also observed that variations in most of the haematological parameters in dematomycoses in camels occurred within the normal physiological range.

Table.1 Mean ± SE blood picture of camels before and after treatment

Parameter	Pre- treatment	Post- treatment
Erythrogram		
RBCs (10^6/ mm^3)	9.9 ±0.33	10.06±0.25
HB (gm %)	9.06±0.31	9.24±0.27
PCV (%)	30.56±1.10	30.94±0.95
TLC (10^3/mm^3)	12.43±0.87	11.75±0.30
Differential leukocytic count (10^3/mm^3)		
Neutrophils (%)*	64.13±1.96	62.19±1.35
Monocytes (%)	1.81±0.19	1.94± 0.11
Lymphocyte (%)*	30.18±1.73	31.75 ±1.29
Esinophil (%)	3.87 ±0.56	4.12 ±0.54

*Mean differ significantly (P≤0.05)

Table.2 Mean Liver enzymes, protein profile of camels before and after treatment

Parameter	Pre- treatment	Post- treatment
Liver enzymes		
AST(U/L) SGOT	35.81±4.34	34.06±2.57
ALT(U/L) SGPT*	22.88±1.21	19.19±1.92
ALKP(U/L)*	69.44±16.2	54.25±11.3
Protein profile		
T.P.(gm/dl)	6.86± 0.32	6.81±0.18
Albumin (gm/dl)	3.65±0.20	3.76±0.12
Globulin (gm/dl)	3.22±0.16	2.9±0.089
A/G (ratio)	1.13	1.26

*Mean differ significantly (P≤0.05)

Table.3 Mean ± SE value of serum minerals of camels before and after treatment (in PPB)

Treatment	Cu	Co	Se*	Zn
Pre- treatment	1377.74±465	58.669±21.13	619.825±61.01	2082.06±97
Post-treatment	1480.46±331	73.375±26.6	758.9875±55.2	2594.469±695

Mean* differ significantly (P≤0.05)

Biochemical estimation

Mean ± SE values of liver enzyme and protein profile of dermal mycoses cases of camels, before and after treatment is presented in the Table 2.

After recovery it was found that values of ALKP and ALT decreased significantly as compared to values recorded before treatment while AST decreased immaterially. Foutah *et al.*, (2012) reported significant increase in ALT and ALKP in camels suffering with ringworm as compared to control. Insignificant reduction in serum total protein, albumin beside insignificant increase in

globulin was observed in the present study (Table.2). It has also been observed by Foutah *et al.,* (2012) and Gorakh *et al.,* (2006), in camels suffering with ringworm.

Estimation of serum minerals (Zn, Co, Cu, Se)

Mean ± SE values of serum minerals profiles of dermal mycoses cases of camels before and after treatment has been presented in the Table 3.

In the present study statstically significant increase ($P \leq 0.05$) in serum Selenium (Se) status was observed in recovered camels as compared to pre-treatment infected. Insignificant increase in Copper (Cu), Cobalt (Co) and Zinc (Zn) was recorded in camels after recovery compared to pre-treatment values.

Similarly significant decrease in blood Se concentration has been reported in cattle infected with dermatophytes. No significant decrease in Zn concentration was observed in infected camels, whereas in cattle significant decrease of this mineral has recorded due to infection with dermatophytes (Al-Qudah *et al*, 2010; Kojouri *et al*, 2009). Insignificant decrease in Co and Cu concentration in infected camels. These are similar to the findings of Al-Qudah *et al.,* (2010) and Kojouri *et al.,* (2009) in cattle.

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