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Haemato-Biochemical Alterations in Sub-Clinical Mastitis of Goats

Halmandge, S.C	Assistant Professor, Dept. of Veterinary Medicine, Veterinary College, Bidar
Upendra, H.A	Professor, Dept. of Teaching Veterinary Clinical Complex, Veterinary College, Bangalore
Ramesh, P.T	Professor and Head, Dept. of Veterinary Medicine, Veterinary College, Bangalore
Vivek R. Kasaralikar	Professor, Dept. of Veterinary Medicine, Veterinary College, Bidar

ABSTRACT

The present study was conducted to investigate the haemato-biochemical alterations in subclinical mastitis (SCM) of goats. SCM in goats resulted in statistically significant increase in Total leucocyte count, Granulocytes, Gamma glutamyl transferase and Fibrinogen content. Further, a significant decrease in Lymphocytes was noticed. There was no significant difference in Alanine transaminase, Aspartate transaminase, Total protein, Albumin and Globulin content between healthy and SCM affected goats.

KEYWORDS Haematology, Biochemical, Subclinical mastits, Goats

Introduction

Goats play an important role in the nutrition and income of people worldwide, these animals serve primarily as sources of meat, but also provide milk and skin (Hansen and Perry, 1994). Goat milk differs from cow or human milk in having better digestibility, alkalinity, buffering capacity and certain therapeutic values in medicine and human nutrition. Mastitis, the inflammation of udder, constitutes one of the important and expensive diseases of dairy industry. Subclinical mastitis (SCM) is difficult to detect due to the absence of any visible indications in the mammary glands and in milk (Mohammadian, 2011). SCM is important due to the fact that it is 15 to 40 times more prevalent than the clinical form, is of long duration, difficult to detect, adversely affects milk quality and production of dairy animals and constitutes a reservoir of microorganisms that can infect other animals within the herd due to its contagious nature (Schultz et al. 1978). The aim of present study was to evaluate the influence of subclinical mastitis on haematological and biochemical components of blood in goats.

Materials and method

A total of eight goats which were found to be affected with SCM were subjected for haematological and biochemical investigation and were compared with eight goats which were apparently healthy and negative for SCM based on somatic cell count with a cutoff value of 5 lakh cells per ml of milk (Contreras et al., 1996). Total Leucocyte Count and Differential Leucocyte Count blood sample was enumerated using ERMA auto haematology analyser as per the procedure prescribed by the manufacturer. Alanine transaminase, Aspertate transaminase, Gamma glutamy transferase, plasma total protein and albumin were measured using kits provided by the manufacturer using Semi auto chemistry analyzer. Globulin and fibrinogen content in plasma was determined as per method described by Brar et al. (2000)

Results and discussion

The mean ± SE haematological and biochemical values of healthy and SCM affected goats were presented in Table 1.

Evaluation of haematological parameter revealed a statistically significant increase in TLC in goats .This agrees with the findings of Ajuwape et al. (2005) and Fasulkov et al. (2014) also reported increased TLC in mastitis of goats. Zaki et al. (2008) reported higher TLC in SCM buffaloes. Singh et al. (2014) and Chandrasekaran et al. (2015) reported increased TLC in cows affected with mastitis. Significant increase in TLC in SCM affected goats might be attributed to the stressful effect of infection which might force great number of white blood cells to buildup natural resistance (Zaki et al., 2008; Chandrasekaran et al., 2015).

There was a statistically significant difference indicating that SCM significantly increases granulocytes in goats. The results of present study agrees with the findings of Ajuwape et al. (2005) and Fasulkov et al. (2014) who reported neutrophilia in mastitis of goats. Zaki et al. (2008) reported increase in neutrophils in SCM of buffaloes. Singh et al. (2014) and Chandrasekaran et al. (2015) reported increase in neutrophils in cows affected with mastitis. In lactating goats, the first line of udder defense consists of neutrophil leucocytes, which migrate rapidly into the udder in response to inflammation (Theilen et al., 1959).

There was a statistically significant difference indicating that SCM significantly decreases Lymphocytes in goats. This is in agreement with the findings of Singh et al. (2014) and Chandrasekaran et al. (2015) who reported decreased lymphocyte count in cows affected with mastitis. The significant decrease in mean Lymphocyte per cent in SCM affected goats may be attributed to the compensatory increase in Neutrophils in response to inflammation. The present findings were contrary to findings of Ajuwape et al. (2005) who reported increase in absolute lymphocyte count in mastitic goats.

There was no significant difference in Monocyte count between the healthy and SCM affected goats. The Total and Differential Leucocyte Counts are true indicators of mastitis and will even assist in predicting the prognosis of mastitic goats (Ajuwape et al., 2005).

There was no significant difference in serum ALT and AST of healthy and affected goats. Further, in the present study there was statistically significant increase in serum GGT of SCM affected goats. GGT is found in many tissues but liver is the primary source. GGT is associated with glutathione metabolism. The increased serum GGT with hepatic inflammation was reported by Kaneko et al. (2008). Hence it may be safe to conclude that inflammatory changes in liver caused due to translocation of bacteria to the liver tissue might have resulted in statistically significant increase in the mean GGT values in SCM affected goats

There was no significant difference in plasma total protein, albumin and globulin level between the healthy and affected goats in the present study. Further, there was significant increase in fibrinogen level of SCM affected goats. This agrees with the findings of Fasulkov et al. (2014) who also reported significantly higher fibrinogen values in mastitis affected goats. Further, the present findings are in agreement with Tabrizi et al. (2008) and Singh et al. (2014), who also recorded higher fibrinogen values in subclinical mastitis cows. Increased fibrinogen will be seen in inflammation caused by bacteria, trauma and chemical. Tissue destruction also increases fibrinogen level within 24 hours of injury. Fibrinogen is considered as a more sensitive indicator of an inflammatory process than the total leucocyte count (Schalm et al., 1970). Fibrinogen belongs to the group of moderate acute phase protein, whose concentration increases 2 to 10 times during the response to inflammation (Eckersall, 2000). It is safe to conclude that plasma fibrinogen estimation may be used to detect subclinical mastitis in goats in conjugation with other routine diagnostic tools.

Table 1: Mean ± SE Haematological and Biochemical parameters in healthy and subclinical mastitis affected goats

Parameters	Healthy goats	SCM Affected goats
TLC ($x10^3/\mu L$)	8.28 ± 0.63	11.31 ± 0.89*
Granulocyte (%)	42.25 ± 2.96	57.63 ± 5.45*
Lymphocyte (%)	51.88 ± 3.35	37.25 ± 5.43*
Monocyte (%)	5.88 ± 0.69	5.13 ± 0.64
ALT (U/L)	29.38 ± 9.26	33.71 ± 7.97
AST (U/L)	26.08 ± 7.15	38.88 ± 4.94
GGT (U/L)	37.62 ± 7.58	68.10 ± 11.32*
Total protein (g/dL)	6.67 ± 0.31	7.14 ± 0.22
Albumin (g/dL)	3.21 ± 0.21	3.19 ± 0.15
Globulin (g/dL)	3.46 ± 0.24	3.95 ± 0.16
Fibrinogen (mg/dL)	242.50 ± 31.95	518.75 ± 61.40**

*Means in a row differ significant ($P \leq 0.05$)

**Means in a row differ significant ($P \leq 0.01$)

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