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Energy Status, Body Condition, and level of Inflammatory Markers in Pregnant Ewes in the Transition Period

Mahla Nemati Mazrae[1]✉, Ehsan Anassori[2]✉, Ali-Goli Ramin[2]✉

[1] *Graduate from the Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*
[2] *Department of Internal Medicine and Clinical Pathology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran*

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Abstract

BACKGROUND: Body condition and its relationship with inflammatory indicators in the transition period of ewes can be used as a key to prevent the occurrence of metabolic complications in this period.

OBJECTIVES: This study aims to determine the levels of inflammatory markers and their relationship with body condition and energy status in the transitional period in Makuei ewes.

METHODS: This study was performed on 45 female peri-parturient Makuie ewes aged 3-5 years with 2-4 breeding lambs. Blood samples from the jugular vein were prepared in three periods, 21 days before delivery, baseline (time zero), and 21 days after delivery.

RESULTS: The mean glucose and cholesterol concentrations were not significantly different between the groups with low, moderate, and high body conditions. Non-esterified fatty acids (NEFA) and β-hydroxybutyrate (BHB) concentrations were significantly higher in groups with lower and higher body condition scores (BCS) than in the normal group. There was a significant positive correlation between energy-related indices (NEFA, BHB) and the BCS of the pregnant and lactating ewes. The concentration of fibrinogen, sialic acid, and blood ceruloplasmin increased in the first three weeks and decreased after delivery. These indices significantly increased in relatively obese and lean groups than in the normal group during the study. The correlation of BHB and NEFA with sialic acid, ceruloplasmin, and fibrinogen was also reported in the study groups in the pre- and post-partum periods.

CONCLUSIONS: Ewes with normal BCS (2.75-3.25) have a good energy status. Low levels of NEFA in ewes indicate that the mobility of fats is low, and the inflammation process is lower in the transition period of these animals. Furthermore, low BCS can be a predisposing factor for inflammation in ewes during the pre-partum period. This effect may be due to the increased metabolic requirements and compromised immune function associated with negative energy balance in the transition period of ewes.

Keywords: Body condition, Ceruloplasmin, Sheep, Sialic acid, Triglyceride

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Corresponding author: Ehsan Anassori, Tel/Fax: +9844-31942625/+9844-32777099

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Figure Legends and Table Captions

Table 1. Mean scores for blood indices before, during, and after delivery in ewes in the transition period.
Table 2. Correlation coefficients between the level of inflammatory markers and BCS in the transition period.
Table 3. Coefficients for the correlation of the level of energy and inflammatory markers with BCS in the transition period.
Table 4. Correlation between the concentration of energy and inflammatory indices and BCS during the transition period.
Figure 1. Blood fibrinogen changes in lean, normal, and obese ewes in the transition period.
Figure 2. Blood ceruloplasmin changes in lean, normal, and obese ewes in the transition period.
Figure 3. Blood sialic acid changes in lean, normal, and obese ewes in the transition period.