

Research on Haematological and Biochemical Parameters in Lambs Eating Each Other's Wool and on Treatment*

Hasan İÇEN¹
Servet SEKİN¹
Aynur ŞİMŞEK¹
Zahir DÜZ²

¹ Dicle Üniversitesi
Veteriner Fakültesi,
İç Hastalıkları Anabilim Dalı,
Diyarbakır-TÜRKİYE

² Dicle Üniversitesi
Fen-Edebiyat Fakültesi,
Kimya Bölümü,
Diyarbakır-TÜRKİYE

This study was carried out to determine the changes in haematological and biochemical parameters between pre and post treatment, as well as the effectiveness treatment in wool eating lambs.

A total of 20 lambs with wool eating habit were used in the study. After the clinical examination was completed, skin samples were taken from these animals with wool eating habit. In skin specimens, bacteria, fungi and ectoparasites were not observed. Clinical signs of the lambs with wool eating habit were alopecia, growth retardation, stiff gait, parakeratosis, hair loss, and diarrhea. Blood samples were taken pre and post treatment for haematological and biochemical analyses. As a result of haematological analyses statistically no significant difference was determined in terms of total leucocyte and erythrocyte values. In haemoglobin and haematocrite levels however, significant differences were observed ($p<0.01$, $p<0.05$ respectively). When pre and post treatment values were compared in terms of biochemical parameters, there was a significant difference for serum ALP ($p<0.001$), while the difference were not determined to be in significant for creatinin, glucose, total protein, albumin, ALT, LDH levels. In addition, significant decreases were determined between pre and post treatment values for Zn, Cu, and Fe ($p<0,001$, $p<0,001$ and $p<0.05$ respectively), whereas the differences in P, Ca and Mg values were not statistically significant

As a result, we concluded that Zn, Cu, and Fe should be added to the ration of lambs with wool eating lambs and that more comprehensive studies are required to be carried out.

Key Words: Alopecia, wool eating, lambs, trace elements.

Yün Yiyen Kuzularda Hematolojik ve Biyokimyasal Parametreler ile Tedavisi Üzerine Araştırmalar

Bu çalışma, birbirlerinin yünü yiyen kuzuların tedavi öncesi ve sonrası kan tablosundaki hematolojik ve biyokimyasal parametreler arasındaki değişiklikleri tespit etmek ile tedavinin etkinliğinin araştırılması amacıyla yapılmıştır. Araştırmada yün yeme şikayeti gösteren 20 kuzunun klinik muayeneleri tamamlandıktan sonra deri kazıntısı alındı. Deri kazıntısında, bakteri, mantar veya ektoparazite rastlanmadı. Yün yiyen kuzuların klinik muayenesinde; alopesia, büyümede gerilik, tutuk yürüyüş, yün kaybı, parakeratosis ve diare tespit edildi. Bu kuzulardan tedavi öncesi ve sonrası hematolojik ve biyokimyasal analizler için kan örnekleri alındı. Total lökosit ve eritrosit düzeylerinde istatistiksel olarak önemli değişiklik tespit edilmedi. Hemoglobin $p<0,001$, hematokrit $p<0,05$ önemli değişiklikler saptandı. Biyokimyasal parametreler açısından tedavi öncesi ve sonrası değerler karşılaştırıldığında sırasıyla serum ALP düzeyinde $p<0,01$ önemli bir fark belirlendi. Glikoz, AST, ALT, LDH, albumin, Total protein ve kreatinin değerleri bakımından ise gruplar arasında önemli bir fark saptanmadı. Zn, Cu, Fe, $p<0,001$, $p<0,001$, $p<0,05$ düzeylerinde önemli azalmalar tespit edilirken P, Ca ve Mg değerlerinde ise önemli değişiklikler tespit edilmedi.

Sonuç olarak; yün yeme şikayeti gösteren kuzuların yemlerine Zn, Cu, ve Fe ilavesinin ve bu konuda daha detaylı araştırmaların yapılmasının gerektiği kanısına varılmıştır.

Anahtar Kelimeler: Yün yeme, kuzu, iz elementler.

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Yazışma Adresi
Correspondence

Hasan İÇEN
Dicle Üniversitesi
Veteriner Fakültesi,
İç Hastalıkları Anabilim Dalı
Diyarbakır-TÜRKİYE

hicen@dicle.edu.tr

Introduction

Wool eating or wool plucking as a type of allotriophagia occurs in sheep, especially in lambs. It is considered that a deficiency of minerals, such as calcium, phosphorus, sodium chloride, copper, zinc, manganese, cobalt, as well as vitamin or a protein deficiency might be the cause of the disease (1-6).

Clinical signs and abnormalities present in lambs with wool eating disease include growth retardation, diarrhea, poor appetite, salivation, abnormal hooves, swollen joints and stiff gait, hair loss, parakeratosis, and compromised disease resistance (7-9).

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The clinical signs varied with the age of the animals; the younger sheep and lambs are mostly affected, while adults are relatively less affected. (10)

The researcher reported that (7, 10, 11) the important changes were seen on haematological values (haemoglobin and haematocrit), and biochemical parameters (ALP, Zn, Cu, and Fe) on lambs with wool eating habit.

The local farmers have suffered seriously from this problem, which has caused major economic losses and become a serious scourge. No favourable response has been received from attempts in treatment. Therefore It would be important to study epidemiology and pathogenesis of the disease. (7, 11)

The purpose of this study was to determine relationship between clinical signs, haematological, biochemical parameters and the effects of treatment on wool eating lambs

Materials and Methods

A total of 20 lambs with wool eating habit were used in the study. After clinical examination, skin samples were taken for bacteria, fungus and ectoparasites. Blood samples for haematological and biochemical analysis were taken before treatment and 9 weeks after treatment. From these blood samples, erythrocyte, total leucocyte, haematocrit and haemoglobin values were measured by a cell counter (Hemavet 850). Blood samples were kept for 15 minutes at room temperature and centrifuged for biochemical analysis. Albumin, glucose, total protein, ALP (Alkaline phosphatase), ALT (Alanine amino transaminase), AST (Aspartate amino transaminase), LDH (Lactate dehydrogenase), Ca (Calcium), Mg (Magnesium), P (Phosphatase) and Fe (Iron) levels were measured with autoanalyzer (Aiorne 200) and those of Zn (zinc) and Cu (copper) with atomic absorption spectrophotometer (Solaris AA) in the laboratory of Science Faculty of Dicle University.

For treatment 30 mg Fe SO₄, 35 mg CuSO₄ and 250 mg ZnSO₄ kg /food were added for 8 weeks. (12)

The Paired samples T test was performed in order to compare the two groups for each of the evaluated parameters. A difference with p<0.05 was considered to be significant. All statistical analyses were performed with statistics package SPSS version 13.0 (13)

Result

It was found that the flock of lambs were fed only with barley, bran and straw for 30 days. The affected lambs would repeatedly bite off the wool from the other lambs or their own bodies. Most of the biting occurred over the hip, then belly and shoulder. Furthermore, clinical signs such as alopecia, parakeratosis, hair loss, growth failure, stiff gait and diarrhoea were determined (Figure 1, 2).



Figure 1. Lambs eating each other wools.



Figure 2. Alopecia and hyperkeratose.

Mean, standart deviation and differences in values of haematological and biochemical analysis of the lambs obtained in the research are given. in tables 1, 2.

Tablo 1. Haematological values for pre and post treatment of wool eating lambs

Parameter	Pre treatment n=20 $\bar{X} \pm S\bar{x}$	Post treatment n=20 $\bar{X} \pm S\bar{x}$	p
WBC(mm ³)	10410±1743,82	10073±2241,61	
RBC(mm ³ ×10 ⁶)	7,05 ±0,48	8,18 ±0,65	
Hb	7,31±1,79	11,23±1,43***	***p<0,001
Hct	27,64±3,84	32,00±2,88*	*p<0,05

Tab 2. Mean values and standard errors of serum biochemical levels in pre and post treatment of wool eating lambs

Parameter	Pre treatment n=20 $\bar{X} \pm S\bar{x}$	Post treatment n=20 $\bar{X} \pm S\bar{x}$	p
Albumin (g/dl)	2,87±0,13	3,03±0,52	
ALP	401±159,25	185±56,08**	p<0,01
LDH(U/L)	1139,5±188,65	1014,4±408,92	
Creatinin (mg/dl)	1,48±0,17	1,91±0,28	
Glucose(g/dl)	65,2±7,23	64,35±8,34	
AST(U/L)	108,25±43,21	106,1±23,63	
ALT(U/L)	19,5±9,42	29,27±7,57	
Total Protein (g/dl)	6,78±0,24	6,62±0,23	
Fe (µg/dl)	56,6±35,21	109,6±13,63*	p<0,05
Ca(mg/dl)	8,07±1,16	9,75±0,54	
Mg(mg/dl)	2,59±0,74	2,48±0,34	
P(mg/dl)	4,49±1,59	5,78±0,52	
Zn(µg/dl)	63±0,9	120±1,4***	p<0,001
Cu(µg/dl)	73±1,1	131±2,0***	p<0,001

RBC, WBC levels of lambs with wool eating habit were not significantly different, compared to those obtained from pre and post treatment; however PCV (p<0.05) and haemoglobin (p<0.001) values of the diseased animals were significantly different, in terms of pre and post treatment (Table 1).

The difference between pre and post treatment for serum ALP p<0,01 was determined to be significant, whereas glucose, total protein, creatinin, albumin, ALT, LDH, values were not significant statistically. On the other hand the amounts of Zn, Cu and Fe values, p<0,001, p<0,001, p<0,01, p<0,05, respectively were observed to diminish, while Ca, P and Mg values statistically were not different in terms of pre and post treatment.

The lambs were given 30 mg Fe SO₄, 35 mg CuSO₄ and 250 mg ZnSO₄ kg /food orally several times weekly. Clinical status of the affected animals were improved rapidly with supplementation and 8 weeks later, all lambs recovered fully.

Discussion

It is suggested that faulty feeding and trace element deficiencies cause wool eating in lambs, sheep and goats, leading to considerable economic losses (3, 7, 11, 14). Clinical signs of wool eating, such as alopecia, parakeratosis, hair loss, growth failure, stiff gait and diarrhoea were also determined in our study. Similar clinical findings were observed by other authors (6, 15) in natural wool eating in sheep and goat. Nelson et al (9) reported that sheep fed experimentally with rations poor in zinc quickly cause alopecia or brittle wool after

seventeen days of the experiment. Furthermore, Suliman et al (10) found severe alopecia and wool eating syndrome in sheep with zinc deficiency. Clinical findings we obtained from wool eating lambs are compatible with those of the researchers. In the study, RBC, WBC values of lambs with the wool eating habit were not significantly different when the values obtained from pre and post treatment were compared. However PCV (p<0.05) and haemoglobin(p<0.001) values of the diseased animals were significantly different in terms of pre and post treatment. Nelson et al (9) found that haematological values were at normal levels in wool eating lambs and goats. Suliman et al (10) reported that haemoglobin and haemotocrit values were statistically different before and after treatment in zinc deficiency lambs with wool eating habits. In this study, WBC, RBC values were similar to those reported by some researchers (7, 9). At the same time, haemoglobin and haemotocrit values were also the same as those of Suliman et al (10)

Suliman et al (10) reported that serum globulin, total protein ALP, zinc, copper levels decreased, but LDH levels elevated and albumin level was normal in wool eating sheep and lambs. Ott et al (5) found that blood changes typically in serum zinc and albumin levels decreased and globulin levels with wool eating lambs increased. The researchers reported that serum ALP and Mg, Fe, values were at normal ranges while zinc and copper levels were low in wool eating lambs and goats.

Huang youde et al (6, 15) reported that serum sulfur and copper levels decreased, whereas serum Ca, P, Fe, Mn, Zn, Co, Mo, and Se levels were at normal levels in their research on wool eating sheep and goats in China. The findings of this study have shown that the values we obtained were parallel to the decrease of the value of Cu but different with Zn, Ca, Fe values.

Akgül et al (7) reported that serum iron, manganese, phosphorus, calcium, sodium and chloride values of diseased sheep were not significantly different from the control animals. On the other hand, serum zinc and copper values of the diseased animals were significantly lower than the controls. Furthermore, total protein levels of the diseased sheep were significantly different from the control group. On the contrary, glucose, albumin and AST values were not significantly different. ALP and GGT levels increased significantly in the diseased sheep compared to the normal animals

In current study decrease in serum Zn, Cu, Ca, Fe levels was consistent with the other researchers. Suliman et al (10) found decrease in serum Zn level, while no change in Cu level in wool eating lambs. Our findings were parallel to the Zn level but were not compatible with Cu levels. Although Akgül et al (7) did not find any significant changes in Ca and Fe levels, we observed significant changes in Ca and Fe levels. We suppose that it is due to stable feeding.

In the present study, albumin, glucose, AST, ALP were consistent with those reported by Akgül et al (7), while total proteins were not the same. The values

mentioned above were not parallel to those of Suliman et al (10). The difference of ALP value is thought to be high in young and rickety lambs.

Based on this study, it is believed that wool eating syndrome in lambs is the result of reduced zinc, copper and other trace elements values. Similarly, some researchers (6, 9, 10) suggest that sheep, lambs and goats fed for a long time with certain rations that are poor in zinc, copper, sulfur and trace elements develop deficiency syndromes .

The researchers (12, 16) gave 40mg of zinc sulfate in a capsule orally each day for 10 to 14 days to severely affected rams. Also, the ewes were given capsules of

zinc carbonate orally several times weekly. Clinical status of the affected animals improved rapidly with zinc supplementation. In our study, similar findings were seen 4 weeks after treatment and entire recovery at 8 weeks.

Conclusion

We conclude that trace element deficiency may cause wool eating and considerable economic losses. It is thought that Zn, Cu and Fe must be added to the diet of lambs with wool eating complaint. We also, suggest that more comprehensive studies are required.

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