



Investigation of Seroprevalence of Maedi-Visna Infection in some Sheep Flocks in Kars Province, Turkey

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Abstract

Maedi-Visna (MV) is a viral disease that has no treatment and vaccination in sheep which causes chronic respiratory problems, nervous disorders, and yield losses. The aim of this study was to investigate the seroprevalence of MV infection in sheep in Kars province. A total of 200 sheep blood sera taken from 4 local areas (Ortaköy, Boğatepe, Halefoğlu, Borluk) in Kars center were the material of the study. A Commercial ELISA antibody test was used to investigate MV antibodies. At the end of the analysis, 32 of 200 (16%) animals were positive against Maedi-Visna specific antibodies. At the end of this study, no statistically significant difference was found between the groups in terms of breed, location and gender. Only the difference between ages was determined. In conclusion, this study shows that MV disease occurs in sheep in Kars province.

Anahtar Kelimeler: Kars, Maedi-Visna, seroprevalence, sheep

Kars İlindeki Bazı Koyun Sürülerinde Maedi-Visna Enfeksiyonunun Seroprevalansının Araştırılması

Öz

Maedi-Visna (MV) enfeksiyonu koyunlarda kronik seyirli solunum problemlerine, sinirsel bozukluklara ve verim kayıplarına yol açan günümüzde tedavisi ve aşısı olmayan bir viral hastalıktır. Bu çalışmada Kars ilindeki koyunlarda MV enfeksiyonunun seroprevalansının araştırılması amaçlandı. Kars merkezdeki 4 odaktan (Ortaköy, Boğatepe, Halefoğlu, Borluk) alınan toplam 200 adet koyun kan serumu çalışmanın materyalini oluşturdu. Çalışmada MV antikorlarının araştırılması için ticari ELISA antikor testi kullanıldı. Analiz sonucunda 200 hayvanın 32'sinde, MV enfeksiyonuna karşı gelişen spesifik antikor yönünden pozitif olduğu belirlendi. Bu çalışmanın sonunda gruplar arasında ırk, yerleşim yeri ve cinsiyet farkı açısından istatistiksel olarak anlamlı bir fark bulunmadı. Sadece yaşa bağlı olarak istatistiksel anlamlı fark belirlendi. Sonuç olarak, bu çalışma ile MV hastalığının Kars ilindeki koyunlarda olduğu belirlenmiştir.

Key Words: Kars, koyun, Maedi-Visna, seroprevalans

INTRODUCTION

Maedi-Visna (MV) disease, which was first isolated in Iceland, is a viral infection caused by lentiviruses that affects sheep in two different forms of respiratory and nervous system (1-3). MV virus is an exogenous lentivirus, non-oncogenic, and is included in the retroviridae family (4). Studies have reported that the disease is transmitted horizontally and vertically (5,6). Diagnostic laboratory tests are intended to detect antibodies and viruses. Neutralization, Agar Gel Immunosorbent Assay (AGID) and Enzyme Linked Immunosorbent Assay (ELISA), Radio Immunosorbent Assay (RISA), Radio Immuno Assay (RIA) and Western Blot (WB) are used to detect antibodies to specific antigens. According to other methods, in ELISA method, a distinct antibody titer and intermittent antibody response occurs after infection. ELISA, are used to detect antibodies against to MV specific antigens (7,8). MV virus infection has a very long incubation period (9,10). In addition to the effects of the virus on the lung and central nervous system, it can cause damage to many different organs (11,12).

Maedi means dyspnea and is used to describe slow-progressing interstitial pneumonia, Visna means extreme weakness, and it is also used for the disease that causes paresis and paralysis by causing inflammation in the central nervous system (13). The respiratory system is mostly affected by Maedi disease (14). MV disease is common worldwide (15-17). The prevalence of the infection in sheep in North America and Europe is 10-80% and in Africa and South America is between 0-10% (18-20). MV seroprevalence studies in Turkey, has emerged variable results (27, 31, 32, 34, 35). The disease causes serious economic losses (21-22). Maedi virus infection clinical sign is reported to be more common than Visna virus infection (23). Maedi virus infection clinical signs are cough, shortness of breath, cachexia, mastitis, and abortions. However, these symptoms are also related to the severity of the infection. Clinical symptoms of Visna are hind limb weakness, arthritis, weight loss, and mastitis (24).

Currently, there is no vaccine to control the infection (25). In this study, it was aimed to investigate the seroprevalence of subclinical MV disease in sheep in Kars province.

MATERIAL AND METHOD

The study was initiated after obtaining approval from the Local Ethics Committee of Animal Experiments of Kafkas University, Kars, Turkey (KAÜ-HADYEK/2019-005) and the Provincial Directorate of Agriculture and Forestry (No: 52516679-125.99-E.1748511). Blood samples were collected in 2019. In the study, 4 towns (Ortaköy, Boğatepe, Halefoğlu, Borluk) were selected to determine the MV seroprevalence in sheep the Kars province, Turkey. Blood samples were taken from 200 clinically healthy sheep. The blood required for the study was taken properly from the *Vena jugularis* of sheep. The blood samples taken were brought to the laboratory under the cold chain and centrifuged at 3000 rpm for 10 minutes. The serums of the samples whose sera were separated were placed in micro centrifuge tubes and stored at -20°C until analysis. Measured by the indirect ELISA method. Absorbance values were determined in serum samples using MV ELISA commercial kits (ID Screen®, MVV/CAEV Indirect, IDvet, France, Product code: VISNAP-5P, LOT: E28) at 450 nm with a micro plate ELISA reader.

Statistical Analysis

Chi-square (χ^2) test in SPSS 20.0 statistics program was used for statistical evaluation of the data. In terms of parameters examined, differences between groups were considered significant at the $P < 0.05$ level.

RESULTS

In the study presented, MV seroprevalence was found to be 16% (32/200) in sheep in Kars province (Table 1). Seroprevalence was determined as 17% in Akkaraman sheep breed and 15% in Morkaraman sheep breed in the evaluation made according to breeds, while there was no statistically significant difference ($P > 0.05$) between breeds (Table 1). Mild respiratory problems (serous nasal discharge and burring) were detected in 10 positive sheep with normal physical examination findings. The results were evaluated according to age, it was found as 12.87% in 2 aged sheep and 34.48% in 3 aged sheep (Table 1). When the data is evaluated not the statistical analysis to age differences ($P < 0.05$), a significant difference was determined. When evaluated according to gender differences, seroprevalence was determined as 16.04% for females and 15.38% for males (Table 1). There was no statistical difference according to gender ($P > 0.05$).

Table 1. Seroprevalence of Maedi-Visna according to province, breed, age, and gender

Location	Province			P value
	Positive	Negative	Positive %	
Ortaköy (n=56)	11	45	19.64	0.089
Boğatepe (n=57)	6	51	10.53	
Halefoğlu (n=37)	10	27	27.03	
Borluk (n=50)	5	45	10.00	
	Breed			
Akkaraman (n=100)	17	83	17.00	0.70
Morkaraman (n=100)	15	85	15.00	
	Age			
2 (n=171)	22	149	12.87	0.003
3 (n=29)	10	19	34.48	
	Gender			
Female (n=187)	30	157	16.04	0.95
Male (n=13)	2	11	15.38	

Note: $P < 0.05$ is statistically significant and $P > 0.05$ is not statistically significant.

DISCUSSION AND CONCLUSION

Since viral diseases such as MV progress as slowly as persistent infections, they are not noticed in the early stages (26). Although MV Virus infection has a subclinical course, it is a viral disease that causes lymphocytic interstitial mastitis, vasculitis, and arthritis in sheep, as well as lung and central nervous system disorders (8, 26). In this study, 31.2% (10/32) mild respiratory symptoms (serous nasal discharge and burring) were detected, which is consistent with other studies (24,26,30). In MV sheep, it causes such as a decrease in milk yield and quality, a decrease in conception, sending sick animals to early slaughter, low birth weight, and an increase in mortality rate before weaning (27). The seroprevalence of MV, an infection observed in many parts of the world, has been reported between 4.3-97% (1, 2, 28, 29, 30). Alibasoglu et al. (31) reported a seroprevalence rate of 0.9-51% in

animals slaughtered in slaughterhouses in various provinces with a rate of 0.02%. Ün et al. (27) reported that 58 of 1096 samples were positive and seropositivity rate was 5.29% in Şanlıurfa. Çimtay et al. (32) found seropositivity at a rate of 10% (30/300) in serum samples in a study they conducted in sheep in Şanlıurfa. In this study, MV seroprevalence was determined as 16% (32/200) in sheep in Kars province. In the present study, the high MV seroprevalence compared to other provinces; the fact that Kars is a border region, the animal movements are too much, the number of samples in the study is low, and the businesses are family-type old businesses rather than professional farm-style may be among the possible reasons. It was thought that there were differences in seroprevalence because the sample numbers in the regions were not the same. In this study presented, the highest seropositivity among study centers was determined in

Halefođlu with a rate of 27.03%. Seropositivity was determined as 19.64% in Ortaköy, 10.53% in Bođatepe, and 10% in Borluk province. The reason for this difference between provinces, it may be due to variation depending on maintenance conditions, and herd management strategies. Looking at the studies conducted, it is understood that the coldest province is Kars. Due to the cold, your sheep will stay indoors more. Therefore, it can be predicted that contact and contamination may be more. With this result, MV seroprevalence in Kars may be higher than other provinces. Studies have reported that some breeds are more resistant to infection than others (33). Burgu et al. (34) compared the breed sensitivity of domestic sheep breeds to Akkaraman (2.6%), Morkaraman (3.1%) and Karakaya sheep breeds (3.1%), while Sakız (40.5%), Dađlıç (64.7%) and Kıvırcık sheep (32.5%) breed reports a high rate of seropositivity. Yavru et al. (35) reported seropositivity in Akkaraman (2.36%), Morkaraman (1.42%) and Merinos sheep (6.45%) in their study. In this study, the seroprevalence was determined as 17% in the Akkaraman sheep breed and 15% in the Morkaraman sheep breed. Probably, the reason for this difference may be due to the difference in nutritional conditions and risk factors. In addition, they emphasized that positivity increased depending on age. Yavru et al. (35) reported positive results of 2.61% (2 age) and 3.95% (2.5 age) according to different ages in their study. In this study, in accordance with other study, it was found to be 12.87% in 2 aged sheep and 34.48% in 3 aged sheep. Burgu et al. (34) found that the rates of seropositivity in ram samples taken from different farms were higher than the rates found in females in the same farms. They reported that they found it statistically insignificant. In this study, no statistical difference was determined by gender. The probable reason for the statistical difference according to age was thought to be the increase of exposure to the agent with advancing age. No statistically significant difference could be determined according to province, breed and gender. The probable reason was that the provinces were very close to each other, the small number of animals in the study and the individual differences. We believe that the differences that may occur in studies that will spread over wide borders and where the numbers of animals are too high will provide more detailed information.

This result shows that a significant proportion of MV disease is subclinical in sheep in Kars province. In this case, it is thought that it may be beneficial to continuously monitor MV infection for disease control-eradication studies, to carry out periodic sero-epidemiological studies, to support the studies with struggle methods to achieve results, to raise awareness of breeders and to implement disease monitoring programs.

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Conflict of Interest: The authors declare that they have no conflict of interest

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