

SERO-SURVEILLANCE OF “PESTE DES PETITS RUMINANTS” PPR IN MONGOLIA AND DEVELOPMENT OF RECOMMENDATION

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ABSTRACT

PPR (Peste des Petits Ruminants) is a transboundary disease, listed in the OIE Terrestrial Animal Health Code, which Mongolia and other countries are obligated to report the disease to the OIE according to the criteria [1]. Purpose of this study is to conduct sero-epidemiological survey for detection of PPR antibody in livestock and susceptible animals from aimag, soums near border area because 244 outbreaks have been recorded [2] in China mainland since September, 2013. A total of 1950 goat and sheep serum samples from 52 soums of 15 aimags have been examined by “ID VET” Competitive ELISA kit for antibody detection. Result showed that PPR virus antibodies have been found in 12 samples from 1550 sheep, and 4 samples from 400 goat samples which have been examined. The same result has been shown after the re-testing the positive samples by ELISA with the serum titration of 1:4 and 1:8. PPR Global strategy for prevention, control and eradication of PPR by 2030, has been developed by OIE and FAO [14]. PPR recommendation has been developed in accordance with the Global strategy and sero-surveillance conducted in Mongolia.

KEYWORDS: *PPR, sero-surveillance, ELISA, antibody, recommendation*

INTRODUCTION

PPR (*Peste des petits ruminants*) is RNA virus which is caused by a *Morbillivirus* in the family of *Paramyxoviruses* [6,7,9]. And it classified in 4 lineage depending on its nucleic acid sequence.

Even though primary diagnoses of PPR are made based on the clinical symptoms, still laboratory diagnostic methods are needed for the disease differentiation (bovine rinderpest, bluetongue, ecthyma, foot and mouth disease, goat and sheep pox, coccidiosis) and confirmation [14,17].

Antibody and antigen detection ELISA and virus neutralization test will be conducted on the serum

samples. Also virus antigen can be detected by rapid test, agar-gel immunodiffusion assay and immunofluorescence test. For virus isolation lamb kidney, lung primary cell and VERO (African green monkey kidney cell line) will be used [12,13].

Even though Mongolia is considered as free from PPR, importation growth of live animals and animal derived products are increasing the risk of emerging and re-emerging disease entrance through the border area since Africa, South and East Asia, and China have the PPR outbreak [3, 11]. Therefore purpose of our study was to conduct sero-epidemiological

survey in livestock and susceptible ruminants from border soums and aimags. Temporary recommendation for controlling and preventing from PPR has been developed in 25th of August, 2016 in the frame of this study with the help from GIA, VABA. “Global strategy for prevention, control and eradication of PPR by 2030” developed in 2014 by

OIE has stated that “Preparedness programs for animal disease emergencies, such as the incursion of PPR, are the key to mounting early effective action in the face of an emergency”. Therefore our recommendation has been developed for prevention and control of PPR based on international PPR recommendation by OIE and FAO [4,5,10, 14].

MATERIALS AND METHOD

Samples: A total of 1550 sheep and 400 goat samples from 15 aimags have been used in our study. Serum samples were randomly chosen from the goat and sheep serum samples collected between 2012 - 2015 at the Institute of veterinary medicine (IVM) and 2013 by the Central veterinary and sanitary laboratory (SCVL).

A total of 1716 sheep serum samples were collected from Mongolian border area aimags, which are Khovd (Bulgan, Uench, Altai soums), Govi-Altai (Bugat, Altai, Tsogt, Erdene soums), Bayankhongor (Bayan-Undur, Shine jinst soums), Dornogovi (Erdene, Zamiin-Uud, Ulaanbadrakh, Khuvsgul, Khatanbulag soums), Umnugovi (Khanbogd, Bayan-Ovoo, Nomgon, Khurmen, Bayandalai, Noyon soums) and Selenge (Baruunburen soum) in the frame of “Strengthening the capacity of controlling emerging and re-emerging infectious diseases” project, implemented in 2013, funded by World

Bank and European Union and tested by ELISA for Crimean-Congo hemorrhagic fever [19]. Some of those sheep serum samples were also used in our study (Table 1).

ELISA PPR diagnostic kit, produced by “ID VET” from France (expiry date: January, 2017) was used in the laboratory of virology at the IVM. This ELISA kit (serial 757:0814) is recommended by FAO agriculture reference laboratory (CIRAD, France) for PPR antibody detection which can be used for either small ruminants or other susceptible animals.

Sensitivity of 94.5% and specificity of 99.4% has been identified by comparing the general diagnostic method, virus neutralization test, which was developed by Libeau.G, Préhaud et al. [15,16]. This method was the standard methodology which was recommended by OIE. For diagnostic tests, positive and negative control sera from ELISA kit was used.

RESULTS

Results showed the presence of PPR virus antibodies in 0.9-5% of sheep serum samples out of total samples of Govi-Altai, Khuvsgul, Umnugovi, Dornogobi, Sukhbaatar aimags and 1.3-5% of goat serum samples out of total samples of Khovd, Umnugovi, Tuv aimags by competitive ELISA (Table 1). Same result has been shown after the re-

testing the positive samples by ELISA with the serum titration of 1:4 and 1:8. Results from PPR sero-surveillance from 2013 conducted in sheep flocks of Hovd, Govi-Altai, Bayanhongor, Dornogobi, Umnugovi and Selenge aimags and current study results are summarized in below table.

Table 1
Results from detection of PPR antibody in serum samples

№	Aimags	Sheep		Goat	
		Positive sample	Positive (%)	Positive sample	Positive (%)
1	Bayan-Ulgii	0/60	0 (0%)	0/40	0 (0%)
2	Khovd	0/184	0 (0%)	1/40	1 (2.5%)
3	Govi-Altai	3/240	3(1.3%)	-	-
4	Zavkhan	0/60	0 (0%)	-	-
5	Bayankhongor	0/128	0 (0%)	0/40	0 (0%)
6	Khuvsgul	2/40	2 (5%)	-	-
7	Arkhangai	0/60	0 (0%)	-	-

8	Ovorkhangai	0/40	0 (0%)	-	-
9	Selenge	0/80	0 (0%)	-	-
10	Dundgovi	0/60	0 (0%)	-	-
11	Umnugovi	3/243	3 (1.2%)	1/40	1 (2.5%)
12	Dornogovi	2/235	2 (0.9%)	0/40	0 (0 %)
13	Sukhbaatar	2/40	2 (5 %)	0/40	0 (0 %)
14	Tuv	0/40	0 (0 %)	2/160	2 (1.3%)
15	Dornod	0/40	0 (0 %)	-	-
Total		1550	12 (0,77 %)	400	4 (1 %)

DISCUSSION AND CONCLUSION

Total 1950 serum samples of goat and sheep from 15 provinces has been tested and antibody has detected from total 12 samples, 0,9-5% which are 8 samples from Govi-Altai, Umnugovi, Dornogovi aimags sheep samples of 2013, 2 from Khuvsgul aimag in 2014 and 2 sheep samples from Sukhbaatar aimag in 2013. Antibody has been detected in 4 goat serum samples, 1,3-5%, from Khovd aimag 1, Umnugovi 1 of 2014 and 2 samples from Tuv province in 2010. There were no broad scale surveillances, conducted on Mongolian livestock using ID VET ELISA kit for PPR. The same result has been shown after the re-testing the positive samples by ELISA with the

serum titration of 1:4 and 1:8. Further study has to be conducted for confirmation of positive samples by getting more blood samples and testing molecular and virology tests recommended by OIE.

Preparedness programs for disease emergencies has to be developed for the prevention of PPR since there are high risk of PPR incursion for our livestock through our border from China where the endemic outbreaks are still present [2,8]. In addition general policy has to be developed for the diseases which shows positive result by serological test but shows no clinical symptoms.

RECOMMENDATION

Concerning the current situation and risk analysis, national preparedness program for the PPR emergency is not developed and herders and veterinarians are not aware of PPR itself, and its economic risk, prevention and control. Thus recommendation for prevention and control of PPR was developed for certain areas of authorities, research institutes, veterinarians and herders.

Such as:

For Government Agencies:

1. To develop PPR national strategy for control and prevention
2. To develop diagnostic, prevention and control measures by conducting advanced research with the help of professional organization and also to develop national surveillance system for PPR

For Veterinarians and veterinary authorities and organizations:

1. To provide comprehensive training and information for the private and public veterinarians, border inspection officers, experts of VABA and herders, farmers.

and conduct clinical symptom surveillance thorough out the country.

3. To develop standard instructions after the diagnostics of positive samples and to assess epidemiological situation.
 4. To develop standard procedure for submitting samples by packaging and transporting to laboratories
 5. Strengthening the capacity of submission and transporting the samples of PPR
 6. To send researchers to the international PPR reference laboratory for strengthening the diagnostic skill (ELISA, PCR) and experiences
 7. To form a vaccination fund for emergency outbreak
 8. To submit and approve the Animal Health project
2. To provide diagnostic training of PPR, sample submission and handling for the local and private veterinarians.
 3. To provide distribution map, epidemiological study, clinical symptoms and differentiation methods on Annual regional meeting organized by Mongolian Veterinary Medical Associations.

4. Submitting the paper and articles to the “Veterinary” journal from MVMA and distribute throughout the country.
5. To promote and distribute information about the PPR through TV program on suitable time which herders watch usually.
6. To conduct quarantine and zoning once there is positive outbreak in region, and limit the movement of animals, human and transports in and out of the outbreak zone. Protective ring vaccinations have to be conducted and thorough surveillance is needed.
7. Re-analyze the regulation of small ruminant importation and change if needed.
8. Mongolian and China Collaborated epidemiological surveillance of transboundary animal diseases has to be conducted since Mongolia and China borders long distance in south.

Herders and farmers:

1. To report immediately to the private and public veterinarians in soum and aimag if there is any sign of PPR in their flocks and livestock.
2. To follow the instructions from veterinarians, professional organizations, guidelines of soum and aimag governors.
3. To maintain hygiene and sanitation of livestock fence and sheds
4. Disinfect and sanitize the suspicious materials such as animal manure, fodder and hay, other contacted areas according to the veterinarians’ guide.
5. To avoid any movement and exchange of suspicious animals between and from suspected areas without veterinarians’ permissions.
6. It is necessary to conduct more advanced research on pathogen, risk analysis, epidemiological distribution of PPR infection in Mongolian livestock populations. Providing thorough understanding on economic loss and other potential harms for herders, farmers, veterinarians and other parties is the key to control and prevent from the PPR.

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