PPR SERO-PREVALANCE AND SERO-MONITORING AFTER VACCINATION IN FIELD

[*]Zahid Iqbal Rajput[1,3], Aamir Bin Zahur[2], Noor Ahmed Soomro[3], Imran Rashid Rajput[4], Shakeel Ahmed Lakho[1], Ambreen Leghari.

[1]Shaheed Benazir Bhutto University of Veterinary and Animal Sciences Sakrand, Pakistan
[2]Animal Science Institute, National Agricultural Research Centre, Islamabad, Pakistan
[3]Research & Development Section, Directorate of Animal Husbandry Sindh, Hyderabad, Pakistan
[4]Lasbela University of Agriculture, Water & Marine Sciences, Uthal, Balochistan, Pakistan
[*]Corresponding Author: Zahid Iqbal Rajput, Email: rao_rajput2002@yahoo.com

ABSTRACT: *Peste Des Petitis Ruminant (PPR) is a widely spreading economical important diseases of tropical and sub-tropical countries. It is endemic in Pakistan including Sindh province, where outbreaks have been reported many times. In present investigation, the magnitude of disease and circulation of PPR virus in the area was studied. Sero-monitoring was done after vaccination to study the antibody level for effective control. Two hundred serum samples were collected from non-vaccinated sheep (100) and goats (100) in various villages of Umerkot. The vaccination against PPRV was carried out in the herds of sampled animals. After one month of immunization, 200 serum samples were collected from vaccinated animals (sheep, 100 and goats, 100). Competitive enzyme linked immunosorbent assay (cELISA) was performed to detect the antibodies against PPRV in serum samples collected before and after immunization. Total 30% animals (sheep, 25% and goats, 35%) shown the presence of antibody against PPRV before vaccination. However, 97% animals (93% sheep and 99% goats) were found to be positive after immunization. The percentage of antibody prevalence in pre and post vaccination animals was highly significant (P<0.01) and revealed that the PPR disease could be controlled through vaccination campaign.*

Key Words: PPR, Vaccination, Sheep & Goat, Umerkot

INTRODUCTION

Peste Des Petits Ruminants (PPR) is an important and highly contagious disease of domestic and wild ruminants caused by Morbillivirus which is antigenically very similar to Rinderpest virus [1,2,3,4]. It is included in OIE reportable disease worldwide occurred in tropical and sub-tropical countries. In Pakistan, PPR was recognized in 1991 first time and confirmed in 1994 [5,6,7]. The disease is found in sheep and goats, however some other animals like camel, cattle and pig are also susceptible [8]. Goats are more susceptible than sheep with high mortality, and the disease is known as 'goat plague' also [9]. Transmission is occurred mainly by aerosol rout during close contact from animal to animal [4]. The incubation period of virus is 4-6 days followed by high fever, excessive salivation, nasal and lachrymal discharge gradually become mucopurulent, necrotic lesion in mouth, cough and diarrhea in later stage leading to death [10,11]. Some time, it is confused with contagious caprine pleuropneumonia, pasteurellosis or contagious ecthyma [11,12]. The 100% morbidity and 80-90% mortality rate has been reported in infected herds with devastating economic losses [13,14]. Usually disease is diagnosed on clinical signs and symptoms, although it might be inaccurate and deceiving to many similar diseases. Vaccination is a key tool for successive control of PPR [15]. The outbreaks may be reduced 75-90 percent through mass vaccination in PPR endemic regions [16]. However, beside the vaccination, control of animal movement and proper disposal of dead animals also play an important role in the prevention of disease. In present study, the circulation of PPR virus and after effects of vaccination was recorded in targeted villages for future planning of PPR control program.

MATERIALS AND METHODS

The study was conducted under Agricultural Linkages Program 'Development of model for the control of PPR in Sindh" collaborated with Animal Science Institute, National Agricultural Research Centre, PARC, Islamabad.

Experimental Design

The serum samples were collected from non-vaccinated animals, (sheep/goats) in the field and then animals were immunized with PPR vaccine in the villages of taluka Umerkot. After one month of vaccination, the serum samples were collected from vaccinated animals for antibody detection.

Sample collection

Two hundred blood samples were collected from non-vaccinated sheep (100) and goats (100) of surrounding villages in taluka umerkot. PPR Vaccine purchased from Centre for Advanced Studies in Vaccinology and Biotechnology, Quetta was injected to 70644 (sheep, 18247; goats, 52397) animals in umetkot and surrounding villages. After one month of immunization, 200 blood samples from vaccinated sheep (100) and goats (100) were collected. Serum was separated from whole blood and transported to Animal Science Institute, National Agricultural Research Centre, Islamabad for further analysis. Serum samples were analyzed by competitive enzyme linked immunosorbent assay (cELISA) for antibodies detection.

Detection of antibodies by cELISA

The samples were analyzed by cELISA kit (purchased from BDSL) as per instructions manual. In brief, the diluted antigen (1/3000) of 50 µl was added to 92 well polyvinyl microtiter plate and incubated at 37°C for 1 h. After three washings, each well was added 45µl of blocking buffer. Blocking buffer of 55µl to conjugate and 5µl to monoclonal control wells were also added. The corresponding wells received 5µl of each of negative serum, strong positive control, weak positive serum and test serum. Added 50µl of mAb to all wells except the conjugate control and incubated at 37°C on orbital shaker for 1h. After three washing, 50µl of anti-mouse conjugate was added and incubated at 37°C for 1h. After three washings, added 50µl substrate for 10 min and then 50µl of 1M H_2SO_4 to stop the reaction. The optical density (OD) was recorded at 492 nm by ELISA plate reader connected with computer. Percentage inhibition (PI) was

calculated automatically by attached computer software. The PI value greater than 50% was considered PPR positive.

Statistical analysis

All data gathered was subjected to ANOVA using Microsoft Excel-2003.

RESULTS

Out of 200 serum samples collected before immunization, 25 (25%) sheep and 35 (35%) goats shown antibody against PPRV while the overall antibody presence was recorded in 60 (30%) animals (Table-1). The herds of sampled animals were immunized with PPR vaccine and after two months 200 animals were bled for serum collection. The overall antibody presence after immunization was recorded in 192 (96%) animals. The prevalence in sheep and goats was recorded 93% and 99% respectively. Highly significant difference ($P<0.01$) was found between serum samples of pre and post immunized animals. However, no significant difference was seen between sheep and goats of same period.

Table 1 Sero-prevalence of PPR in sheep and goat of Tehsil Umerkot, Sindh

Animals	Parameters	Before vaccination	After Vaccination
Sheep	Sera collected	100	100
	Positive	25	93
	%	25%	93%
Goat	Sera collected	100	100
	Positive	35	99
	%	35%	99%
Overall	Sera collected	200	200
	Positive	60	192
	%	30%	96%

DISCUSSION

The prevalence of PPRV in Sindh province is documented preciously also [17,18]. The overall antibody prevalence in present study before vaccination was recorded 30% which is not in agreement with reported previously as 37.3% in district Umerkot [17]. In sheep and goats the prevalence before immunization was recorded 25% and 35% respectively those are also not in agreement with reported previously as 58.5% and 32.7% [17]. The difference might be attributed that in previous study, the samples were collected from whole the district Umerkot as well as randomly selected animals while in present study, non-vaccinated animals were sampled from selected villages of taluka Umerkot. The overall antibody prevalence in post-vaccination animals was fond to be 96% including 93% sheep and 99% goats. Highly significant difference between pre and post vaccinated animals indicating the strong herd immunity. Previously, the antibody prevalence in vaccinated animals was reported 75% and 100% in field and experimental goats those are consistent with present study where 99% post-vaccination goats shown antibody against the disease [19].

CONCLUSION

It is concluded that the non-vaccinated animals were prone to PPR virus than that of immunized sheep and goats and the control measure could be taken through mass vaccination.

REFERENCES

[1] Albina, E., Kwiatek, O., Minet, C., Lancelot, R., Servan de Almeida, R. and Libeau, G., Peste des Petits Ruminants, the next eradicated animal disease?. *Vet. Microbiol.*, 165: 38-44(2013).

[2] Bailey, D., Banyard, A., Dash, P., Ozkul, A. and Barrett, T., Full genome sequence of peste des petits ruminants virus, a member of the Morbillivirus genus. *Virus Res.*, 110(1):119-124(2005).

[3] Abubakar, M., Rajput, Z.I., Javed, M., Sarwar, G. and Qurban, A., Evidence of peste des petits ruminants virus (PPRV) infection in Sindh Ibex (*Capra aegagrus blythi*) in Pakistan as confirmed by detection of antigen and antibody. *Trop. Anim. Health Prod.*, 43(4):745-747(2011).

[4] Kula, J., Peste Des Petits Ruminants (PPR): Global and Ethiopian Aspects. A Standard Review. *Global Veterinaria*, 17(2):142-153(2016).

[5] Amjad, H., Forsyth, M., Barrett, T. and Rossiter, P.B., Peste des petits ruminants in goats in Pakistan. *Vet. Rec*., 139(5):118-119(1996).

[6] Pervez, K., Ashraf, M., Khan, M.S., Khan, M.A., Hussain, M.M. and Azim, F., A rinderpest like disease in goats in Punjab, Pakistan. *Pak. J. Livest. Res*., 1(1):1-4 (1993).

[7] Athar, H., Islam, Q.U., Azim, F., Shakoor, A., Maqbool, A. and Chaudhary, N.I., An outbreak of *Peste des Petits* ruminants-like disease among goats in Punjab (Pakistan). *Pak. Vet. J.*, 15:140-143(1995).

[8] Abubakar, M., Manzoor, S., Wensman, J.J., Torsson, E., Ali, Q. and Munir, M., Molecular and epidemiological features of *Peste des Petits ruminants* outbreak during endemic situation. *British J. Virol.*, 3(4): 123-129(2016).

[9] Hussain, M., Muneer, R., Jahangir, M., Awan, A.H., Khokhar, M.A., Zahoor, A.B., Zulfiqar, M. and Hussain, A., Chromatographic strip technology: a pen side test for the diagnosis of *Peste des Petits* ruminants in sheep and goat. *Online J. Biol. Sci.*, 3:1-7(2002).

[10] Kihu, S.M., Gitao, G.C., Bebora, L.C., John, N.M., Wairire, G.G., Maingi, N. and Wahome, R.G., Economic losses associated with Peste des petits ruminants in Turkana County Kenya. *Pastoralism*, (1):1-8(2015).

[11] Adel, A.A., Abu-Elzein, E., Al-Naeem, A.M. and Amin, M., Serosurveillance for peste des petits ruminants (PPR) and rinderpest antibodies in naturally exposed Saudi sheep and goats. *Veterinarski Arhiv*, 74(6):459-465(2004).

[12] Gibbs, E.P., Taylor, W.P., Lawman, M.J.P. and Bryant, J., Classification of *Peste des Petits* Ruminants virus as the fourth member of the genus Morbillivirus. *Intervirol.*, 11(5):268-274(1979).

[13] Parida, S., Muniraju, M., Altanc, E., Baazizid, R., Raje, G.D. and Mahapatra, M., Emergence of PPR and its threat to Europe. *Small Rumin. Res.*, 142:16-21(2016).

[14] Hamdy, F.M., Dardiri, A.B., Nduaka, O., Breese, S.S. and Ihemelandu, E.C., Etiology of the stomatitis pneumoenteritis complex in Nigerian dwarf goats. *Canadian J. Comp. Med*., 40:176(1976).

[15] Hammami, P., Lancelot, R. and Lesnoff, M., Modelling the Dynamics of Post-Vaccination Immunity Rate in a Population of Sahelian Sheep after a Vaccination

Campaign against Peste des Petits Ruminants Virus. *PLoS ONE* 11(9):1-24(2016).

[16] Singh, R.P. and Bandyopadhyay, S.K., Peste des petits ruminants vaccine and vaccination in India: sharing experience with disease endemic countries. *Virus Dis*., 26:215-224(2015).

[17] Abubakar, M., Arshed, M.J., Hussain, M. and Ali, Q., Evidence of Peste des Petits Ruminants in Serology of Sheep and Goats from Sindh, Pakistan. *Transbound. Emerg. Dis.*, 58(2011):152-156(2010).

[18] Nizamani, A.R., Nizamani, Z.A., Umrani, A.P., Dewani, P., Vandiar, M.A., Gandahi, J.A. and Soomro, N.M., Prevalence of peste des petits ruminant virus antibodies in small ruminants in Sindh, Pakistan. *J. Anim. Plant Sci.*, 25(6):1515-1519(2015).

[19] Kabir, M.E., Hossain, M.M. and Ershaduzzaman, M., Sero-surveillance and sero-monitoring of locally produced PPR vaccine in the field and experimental level. *Asian J. Med. Biol. Res.*, 2(1):33-37(2016).