SEROPREVALENCE OF PESTE DES PETITS RUMINANTS (PPR) VIRUS IN GOATS, SHEEP AND CATTLE AT LIVESTOCK PRODUCTION RESEARCH INSTITUTE BAHADURNAGAR OKARA

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ABSTRACT

Peste des Petits ruminants (PPR) is a contagious viral disease of goats and sheep, characterized by pyrexia, occulo-nasal discharge, stomatitis, pneumonia and diarrohea. The disease is endemic in many regions of world and responsible for significant economic losses in goats and sheep due to high morbidity and mortality rates. In present study, 240 sera were collected from goats, sheep and cattle kept at Livestock Production Research Institute, Bahadurnagar, Okara. Competitive Enzyme Linked ImmunoSorbent Assay (c-ELISA) was used to detect the antibodies in sera against PPR virus. It was found that there was high seroprevalence of PPR antibodies in goats than other animals. The overall PPR antibody seroprevalence recorded in goats, sheep and cattle was 82.72%, 28.75% and 8% respectively.

Key words: Peste des Petits ruminants; (PPR); Competitive Enzyme Linked Immuno Sorbent Assay (c-ELISA); Seroprevalence.

INTRODUCTION

Peste des Petits ruminants (PPR) is a highly contagious viral disease of goats and sheep, characterized by pyrexia, occulo-nasal discharge, stomatitis, pneumonia and diarrohea. The disease is responsible for significant economic losses in goats and sheep productivity in the endemic regions and causes high morbidity of 80-90% and mortality between 50 and 80% (Lefevre and Diallo, 1990). The first clinical description of PPR was made in 1942 in West Africa (Gargadennec and Lalannec, 1942) and later recognized as endemic in West and Central Africa (Scott, 1981), Arabian Peninsula, Middle East, India (Shaila *et al.*, 1996). The existence of PPR has been recognized in Pakistan since 1991 when it gave rise to an epidemic in Punjab province (Athar *et al.*, 1995).

Goats are affected severely but sheep undergo a mild form of the disease (Lefevre and Diallo, 1990), while cattle have a sub-clinical infection (Anderson and McKay, 1994). The present study revealed the seroprevalence against Peste des petits ruminants virus in goats, sheep and cattle at Livestock Production Research Institute, Bahadurnagar, district Okara.

MATERIALS AND METHODS

Study Site: The study was conducted at Livestock Production Research Institute, Bahadurnagar, Okara. A total of 240 blood samples (goats 110, sheep 80, and cattle, 50) were randomly collected irrespective to age and sex, from jugular vein aseptically using disposable needles and kept overnight. Sera were separated into Bijoux bottles and kept on ice for transportation to cell culture laboratory, Veterinary Research Institute, Lahore, where these were centrifuged to remove the traces of blood cells and stored at - 20 ^{o}C till use for analysis.

Serological Testing: For detecting antibody seroprevalence, Competitive Enzyme Linked ImmunoSorbent Assay (c-ELISA) (Libeau *et al.*, 1995) was employed. The c-ELISA kit was purchased from Centre de cooperation Internationale en recherche agronomique pour le developpement (CIRAD) France, comprising, PPR antigen (75/I) strain, anti – PPRV monoclonal antibody, anti-mouse conjugate, control sera, substrate and chromogen.

Fifty µl of diluted PPR antigen was poured in all wells of the microtitration plates and incubated at 37^{o}C for 1 hour in shaker. Then plates were washed with washing buffer and 45 µl blocking buffer was added to all wells of the microtitration plates. Five µl of test serum and 50 µl of anti – PPRV monoclononal antibody were added to all wells and incubated at 37^{o}C for 1 hour in a shaker. Negative, weak and strong positive controls were also maintained. After washing, 50 µl of anti-mouse conjugate was dispensed to all the wells and incubated again for 1 hour at 37 ^{o}C.

After incubation, the plates were washed with washing buffer and 50 µl of substrate / chromogen was dispensed to all wells. Fifty µl of stopping solution was also added to all the wells to stop the reaction.

The ELISA micro-plate was read with an immunoskan reader with an inference filter of 492 nm. The reader was connected to computer loaded with ELISA data interchange (EDI) software that was used to

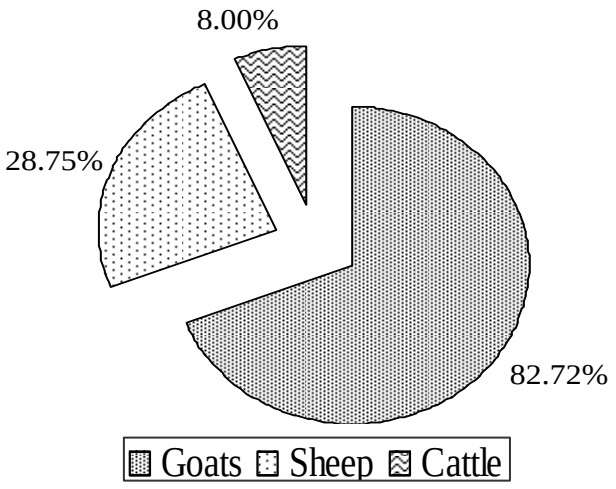
automate reading and calculation of percentage Inhibition (PI) values.

Test sera showing mean PI values of 50% or greater were considered as positive, while the test sera demonstrating mean PI values less than 50% were considered as negative.

RESULTS AND DISCUSSION

In the present study, c-ELISA was employed to assess the antibody seroprevalence of PPR. For this purpose, a total of 240 sera were collected. Overall, PPR antibody seroprevalence recorded in goat was 82.72% (91), in sheep was 28.75% (23) while in cattle was 8% (4) (Figure – 1).

Figure 1: seroprevalence of PPR Virus in Goats, Sheep and Cattle



In present study, antibody seroprevalence in goats was 82.72% which is not in line with the findings of Sunilkumar *et al.* (2005), Rajesh *et al.* (2006) and Al - Majali *et al.* (2008) who reported 0.93%, 9.2% and 49%, respectively. The low prevalence of PPR antibody could be attributed to the variation in sample size.

There was high seroprevalence of PPR antibody in goats than that in sheep. These findings are similar to previously reported epidemiological studies (Dhar *et al.*, 2002; Ozkul *et al.*, 2002), while in Saudi Arabia, the prevalence of PPR in sheep and goats were 3.1% and 0.6%, respectively by using a microtitre neutralization assay (Al-Afaleq *et al.*, 2004). This may be due to low sensitivity of test or low prevalence of PPR disease in this area.

While in other study (Abraham *et al.*, 2005) the antibodies in goats (9%) were slightly lower than in sheep (13%) which may have resulted from the lower number of samples investigated or from the fact that goats were more susceptible and may have died from the disease, where as sheep may have survived.

In current study, PPR antibody seroprevalence in cattle was 8 %. This is in accordance to Abraham *et al*., (2005) who reported 9% seroprevalence of PPR in cattle while Ozkul *et al.*, (2002) reported 15.57% seroprevalence which might be due to high population density and mixed grazing resulting in increased contacts between small ruminants and cattle.

In conclusion, antibody seroprevalence in goats, sheep and cattle confirmed natural transmission of PPR virus under field condition and c- ELISA is one of efficacious tool for determining the seroprevalence of PPR disease in laboratory.

REFERENCES

Abraham, G., A. Sintayehu, G. Libeau, E. Albina, F. Roger, Y. Laekemariam, D. Abayneh and K. M. Awoke (2005). Antibody seroprevalences against Peste des petits ruminants (PPR) virus in camels, cattle, goats and sheep in Ethiopia. Prev. Vet. Med., 70: 51-57.

Ahmed, M., R. Kargar and A. Mozdebar (2006). A seroprevalence survey of Peste des petits ruminants in sheep in Iran. Indian Vet. J., 83: 823-824.

Al-Afaleq, A., E. Abu Elzein, A. L. Naeem A and M. Amin (2004). Serosurveillance for PPR and rinderpest antibodies in naturally exposed Saudi sheep and goats. Vet Arhiv., 4: 459-465.

Al-Majali, A. M., N. O. Hussain, N. M. Amarin and A. A. Majok (2008). Seroprevalence of, and risk factors for, Peste des petits ruminants in sheep and goats in Northern Jordan. Prev. Vet. Med., (Article in Press).

Anderson, J and J. A. McKay (1994). The detection of antibodies against peste des petits ruminants virus in cattle, sheep and goats and the possible implications to rinderpest control programmes. Epidemiol Infect., 112(1):225-231.

Athar, M., G. Muhammad, F. Azim, A. Shakoor, A. Maqbool and N. I. Chaudhry (1995). An outbreak of Peste de petits ruminants like disease among goats in Punjab (Pakistan). Pakistan Vet. J., 15:140-143.

Dhar, P., B. P. Sreenivasa, T. Barrett, M. Corteyn, R. P Singh, and S.K. Bandyopadhyay (2002). Recent epidemiology of peste de petits ruminants virus (PPRV). Vet. Microbiol., 88: 153-159.

Gargadennec, L and A. Lalannec (1942). The Peste des petits ruminats. Bull. Serve. Zootec. Epizoo. Afr. Occid. Fr., 5:16-21.

Libeau, G., C. Prehaud, R. Lancelot, F. Colas, L. Guerre, D.H.L. Bishop and A. Diallo (1995). Development of a competitive ELISA for

detecting antibodies of the pest des petits ruminants virus using a recombinant nucleoprotein. Res. Vet. Sci., 58(1):50-55.

Ozkul, A., Y. Akca, F. Alkan, T. Barrett, T. Karaoglu, S.B. Daglap, J. Anderson, K. Yesilbag, C. Cokcaliskan, A. Genacy, and I. Burgu (2002). Prevalence, distribution and host range of Peste des petits ruminants virus. Turkey. Emerg. Infect. Dis., 8(7): 708-712.

Lefevre, P. C and A. Diallo (1990). Peste des petits ruminants virus. Rev. Sci. Tech. Off. Int. Epiz., 9: 951-965.

Rajesh, A., M. Kumar and R. P. Singh (2006). Epidemiological investigations of PPR in goats in some part of Uttaranchal. Indian Vet. J., 83: 790-791.

Scott, G.R. (1981). Rinderpest and Pest des petits ruminants. In: Gibbs, E. P. J. (Ed), virus: Diseases of food animals, Vol. II: Disease monographs. Academic press, New York. Pp. 401- 425.

Shaila, M.S., D. Shamaki, M. A. Forsyth, A. Diallo, L. Goatley, R. P. Kitching and T. Barrett (1996). Geographic distribution and epidemiology of peste des petits ruminants viruses. Virus Res., 43: 149-153.

Sunilkumar N. S., C. Ravishankar, V. Jayaprakasan, M. Mini and G. K. Nair (2005). Seroprevalence of Peste des petits ruminants in Kerala. Indian Vet. J., 82: 570-571.