



## PESTE DES PETITS RUMINANTS: AN OVERVIEW AND A CASE REPORT FROM PAKISTAN

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### ABSTRACT

Peste des petits ruminants (PPR) is an acute or subacute viral disease of goats and sheep characterized by fever, necrotic stomatitis, gastroenteritis, pneumonia, and sometimes death. The virus also affects several wild small ruminant species. Cattle, buffalo, and pigs are only sub clinically infected. People are not at risk. The disease is of heavy economic significance in small ruminant industry and ranks among the top ten diseases affecting small ruminants. Isolation and quarantine measures, slaughtering of positive animals, proper disposal of infected materials, proper disinfection of utensils and other items of flock are crucial for control of PPR. PPR leads to heavy economic setbacks to the farmers. With the aims and objectives to flourish small ruminant farming and maximizing profit, a few key points should be rigorously adopted.

### 1. INTRODUCTION

Peste des Petits Ruminants (PPR) is an infectious, highly contagious viral disease affecting sheep, goats and wild ruminants with high mortality rate. The ailment is transboundary animal disease and is one of the top ten diseases of small ruminants [1]. The other regional vernacular names of the disease are "Kata", "pseudo rinderpest", "syndrome of stomatitis pneumoenteritis" and "pneumoenteritis complex" [2]. Clinically, the disease is characterized by fever, mucopurulent ocular and nasal discharges, necrotizing and erosive stomatitis, severe enteritis and pneumonia leading to death [3]. The disease is of heavy economic significance in small ruminant industry and ranks among the top ten diseases affecting small ruminants [4]. Economic setbacks in terms of high morbidity, high mortality, dropped production, abortion and trade barrier makes PPR as a disease of global concerns [5].

The etiological agent is a negative sense single stranded enveloped RNA virus belonging to genus Morbillivirus of family Paramyxoviridae. Peste des Petits Ruminants virus (PPRV) is closely related to human measles virus, Rinderpestvirus, canine distemper virus and dolphin distemper virus [6]. There are three proteins associated with the host cell membrane derived viral envelope viz. matrix protein, fusion protein and HN protein. The pathogen is sensitive to environmental changes and rapid inactivation occurs when exposed to unfavorable conditions outside the host, therefore, close contact is required for the virus to be transmitted from infected to susceptible animal [7].

Primary hosts of the virus are sheep, goats and wild ungulates irrespective of age and sex. However, the disease in cattle and buffalo with poor body condition and stress has also been reported with the signs resembling with that of rinderpest [8, 9, 10, 11, 12]. The disease mainly effects sheep and goats but it is more severe in goats where it causes heavy losses [13].

PPRV is shed in all of the body secretions and excretions travel a short distance through aerosol infecting the healthy animals. However, close contact with the infected animal is the most frequent a usual route of transmission. Contamination of feeding and water trough can also serve as additional sources of viral particle transmission.

The clinical signs in ruminants include pyrexia upto 41°C, anorexia, dry muzzle, serous ocular and nasal discharges which becomes progressively mucopurulent. Respiratory distress, necrosis and ulceration of buccal mucosa, dehydration and diarrhea due to gastroenteritis appear in advanced stages of the disease. Pregnant female animals may abort. The severity of clinical signs depends upon the age, breed, body condition and innate immunity of the host and virulence of the virus. Concurrent bacterial and parasitic infection can further aggravate the condition [14].

Diagnosis of the disease is generally based on clinical signs and symptoms.

Virus can also be detected through a number of diagnostic techniques including competitive and sandwich ELISA, virus neutralization test, Agar gel immunodiffusion test, haemagglutination test [15, 16, 17]. The competitive ELISA is the most suitable choice due to high diagnostic sensitivity and, specificity and reliability [18]. Diagnosis on the basis of genomic detection can be done by RT-PCR, Real time PCR and LAMP Assay [19]. The disease needs to be differentially diagnosed from foot and mouth disease and blue tongue disease due to similarities in clinical signs, therefore, it is necessary to confirm clinical diagnosis through laboratory testing.

### 2. PREVENTION AND CONTROL

Vaccination of susceptible animals is the best option to minimize the risk of occurrence in animal population. Live attenuated vaccine is used to immunize the animals against PPR virus. A number of different vaccines like heterologous vaccines, homologous vaccines, recombinant marker vaccines, subunit vaccines, multivalent vaccines are available commercially to immunize the susceptible animals. Isolation and quarantine measures, slaughtering of positive animals, proper disposal of infected materials, proper disinfection of utensils and other items of flock are crucial for control of PPR [20, 21].

A 7-month old buck of Beetal breed was brought to the Veterinary Teaching Hospital, University of Agriculture, Faisalabad, Pakistan with the presenting complaint of being off-fed, depressed and diarrheic. History revealed that the animal was suffering from this condition since last day. Through clinical examination revealed that animals was suffering from high grade fever as it's rectal temperature was 106.4F. Other findings included swollen pre-scapular lymph nodes, dehydration > 7% (sunken eyes and increased skin tenting time), necrotic and erosive oral lesions, mucopurulent ocular and nasal discharge and dyspnea. On the basis of involvement of gastrointestinal system and respiratory system, the disease was diagnosed as PPR.

Supportive therapy plan was instituted and included administration of the following medications:

Lactated ringer 500ml intravenously (Ringer LactateR, M. S. Enterprises Ltd., Kasur, Pakistan), combination of gentamycin and tylosin 3ml intramuscularly (Gentatylor, Bio-Pharmachemie-Vitenam), Inj. Aminophylline 7ml intravenously (National M/H, Shanghai, China), Syp. Scour-X (40ml per oral), Drotaverin 2ml intramuscularly (Nospar, Sanofi-aventis Pvt. Ltd.) and Somogel was applied to the oral lesions. This supportive plan was continued for 4 days and the animal recovered completely after 3 days.

### 3. PRESENT STATUS OF PPR IN PAKISTAN

The disease is endemic in Pakistan and several outbreaks have been reported across the country at varying times of each year. The combined estimates of mean cumulative morbidity and mortality for sheep and goats were estimated 65.37% and 26.51% respectively with a case fatality of 40.40%. The species specific mean cumulative morbidity, mortality and case fatality for goats were 68.80%, 29.45% and 42.75% respectively, while these estimates for sheep were 48.77%, 14.98% and of 26.16% respectively [22]. In Pakistan, PPR is often diagnosed by clinical signs and symptoms, postmortem examination and laboratory tests including serological, culture and molecular techniques. In recent years various molecular techniques including conventional PCR, real-time PCR has been used for diagnosis of PPR [23, 24, 25, 26]. Mass scale vaccination strategies have been implemented in Pakistan to fight against the menace of PPR. In Pakistan PPR vaccination in sheep and goats is done in the months of May-June 1 ml through subcutaneous route to provide immunity for 3 years. Tissue culture based live freeze dried PPR Vaccine produced at the centre for Advanced studies in vaccinology and biotechnology, University of Baluchistan, Quetta in 2007 has been used to immunize the animals against PPR infection [27]. Adjuvanted PPR vaccines are also used that induce better immune response in goats as compared to live vaccine. These adjuvanted vaccine provide immunity for a period of 1 year so booster dose after a year is recommended. Mortality in sheep and goats has reduced considerably due to adaption of vaccination program.

### 4. CONCLUSION

PPR leads to heavy economic setbacks to the farmers. With the aims and objectives to flourish small ruminant farming and maximizing profit, a few key points should be rigorously adopted. Of them, isolation of sick animals and constitution of supportive therapy plan, following the quarantine measures of the newly purchased animals before mixing with rest of the herd members and adopting routine vaccination protocols are highly warranted.

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