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## Efficacy of serum therapy for management of Peste des petits ruminants in goats

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#### Abstract

Peste des Petits Ruminants (PPR) is a viral disease of small ruminants caused by *Morbillivirus* associated with high morbidity and high mortality leading to huge economic losses every year. There is no definitive treatment for PRR infection in goats. In this study, serum collected from PPR recovered goats was used to manage a natural outbreak of PPR in an unvaccinated herd from Ri-Bhoi district of Meghalaya, India. A total of 7 goats naturally infected with PPR were selected for the study. The goats were treated with a daily regimen of serum collected from PPR recovered goat @ 10 ml intravenously, dextrose normal saline at 30 ml/kg body weight, ceftriaxone at 10 mg/kg body weight IV, isoflupredone acetate at 0.5 ml/10 kg body weight intramuscularly and intravenous multivitamin for a period of 3 days. After 3 days of the treatment regimen, 6 goats recovered and one died, giving a recovery rate of 85.7%. The average duration when diarrhoea, respiratory signs, anorexia and conjunctivitis had resolved after serum therapy were 3, 6, 2 and 3 days respectively. It can then be concluded that serum therapy could be used as a therapeutic management for the treatment of PPR infected goats.

**Keywords:** goats, Peste des petits ruminants, PPR, serum therapy

#### Introduction

Peste des Petits Ruminants (PPR) is an important viral disease of small ruminants. The disease is endemic in India and causes huge economic losses every year due to high rates of mortality and morbidity in infected sheep and goats. It is caused by *Morbillivirus* belonging to family Paramyxoviridae. In India, the first PPR outbreak was recorded in Tamil Nadu in 1987 (Shaila *et al.*, 1989) [1]. Since then, outbreaks of PPR has been reported from various parts of the country. The incubation period of the disease is 3-6 days and is characterized by pyrexia (104° to 107°F), oral necrosis, mucopurulent nasal and ocular discharges, cough, pneumonia, and diarrhoea, which may vary according to the immune status, geographic location and season (Radostits *et al.*, 2000; Taylor, 2016) [2, 3]. The affected animals may suffer from anorexia accompanied with poor rumination and constipation which can proceed to development of muco-nasal erosions, pneumonia and diarrhoea. Raghavendra *et al.* (2008) [4] did seroepidemiology of PPR in goats of southern peninsular India and reported 34.91% of the goat sera were positive for the presence of antibody. PPR can be prevented through regular vaccination however, constraints like vaccine availability, acceptability and delivery are some of the reasons why the disease is still very prevalent (Singh *et al.*, 2009) [5]. It is generally known that there is no specific treatment for PPR disease. However, the use of hyperimmune serum has been described by Islam *et al.* (2003) [6] and Yousuf *et al.* (2015) [7] with high clinical success in treating PPR during the incubation up to the diarrhoeal phase. The studies used serum from goats vaccinated against PPR and those that have recovered from PPR with simultaneous antibiotic therapy. The aim of this study was to assess the efficacy of serum therapy with simultaneous antibiotic and supportive therapy in treating goats suffering from a natural outbreak of PPR in a herd.

#### Materials and Methods

The study was carried out during natural outbreak of PPR in an unvaccinated goat herd in the Ri Bhoi district of Meghalaya, India. The animals showed initial symptoms like cough, nasolacrimal discharge, fever, inappetence and lethargy. As the disease progressed further, the animals started to develop pneumonia showing signs of expiratory dyspnoea, persistent cough and matting of eyelids. Some of the animals progressed to diarrhoeal phase with profuse catarrhal diarrhoea and eventually death at an average of 2-3 days after onset of the diarrhoeal

phase. Necropsy was performed on three dead goats and the gross pathological lesions were observed and details noted. In all three necropsies, generalized congestion of the lungs and haemorrhagic intestines were observed. Based on the history, clinical signs and necropsy findings, the diagnosis of PPR was made.

A total of 7 infected goats of either sex ranging from 6 to 12 months of age were selected from the herd for serum therapy and were kept isolated. All seven goats were either in their pneumonic or diarrhoeal phase. Blood from PPR recovered goats was collected freshly prior to each treatment in sterile

red cap vacutainers and the serum was separated by centrifugation at 300 g for 15 minutes. Ten ml of the freshly prepared serum was administered intravenously to each goat daily for 3 days. Simultaneously, each goat was given a regimen of Dextrose normal saline at 30 ml per kg body weight IV, Ceftriaxone at 10 mg per kg body weight IV, Prednisolone at 0.5 ml/kg and other supportive therapy like intravenous multivitamins (IVM) daily for a period of 7 days (Table 1). The goats suffering from mild to severe conjunctivitis were given a boric acid-antibiotic eye wash to relief the symptoms.

**Table 1:** Therapeutic regimen for the selected goats

Therapy	Pneumonic (n=4)	Diarrhoeal (n= 3)
Serum 10 ml per goat IV	+	+
Dextrose Normal Saline 30 ml per kg body weight IV	+	+
Ceftriaxone 10 mg per kg body weight IV	+	+
Isoflupredone Acetate 2mg/ml (0.5 ml/10 kg)	+	-
Supportive Therapy (IVM)	+	+

## Results and Discussion

Out of the 7 goats treated with serum therapy combined with antibiotics and supportive therapy, 6 goats recovered uneventfully. One goat could not complete the entire course of serum therapy as it succumbed to the disease one day after the initial serum therapy dose. Prior to the serum therapy trial, the other affected goats were treated symptomatically with similar antibiotics and other supportive therapies. The average duration when symptoms became inapparent since the initial dose of serum therapy is presented in Table 2. All the selected animals were in their pneumonic or diarrhoeal phase.

**Table 2:** Average duration when symptoms stopped since initial dose of serum therapy

Sl. no.	Symptoms	Average duration (days) (n=6)
1.	Diarrhoea	3
2.	Cough and dyspnoea	6
3.	Anorexia and depression	2
4.	Conjunctivitis and nasolacrimal discharge	3

In our study, the recovery rate among the serum treated goats (n=7) was 85.7%. This was similar to the findings of Islam *et al.* (2003) [6] and Yousuf *et al.* (2015) [7]. Islam *et al.* (2003) [6] reported a recovery rate of 68.75% in PPR affected goats treated with antibiotic combined hyperimmune serum therapy whereas, Yousuf *et al.* (2015) [7] recorded 93.23% recovery rate. Generally, cases of PPR are treated symptomatically using fluids, antibiotics, corticosteroids, antihistamines and other supportive therapies (Chakrabarti, 2003) [8]. Antibiotics like metronidazole and cephalosporins have been reported to be effective in treating PPR affected goats (Kumar *et al.*, 2015, Baruti *et al.*, 2018) [9, 10].

## Conclusion

In conclusion, PPR is a preventable, viral disease in goats with a high incidence rate in India. Our study showed that serum therapy in conjugation with traditional symptomatic treatment using antibiotics and supportive therapies can be used successfully to improve the survivability of PPR affected goats.

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