

ANTIBIOTIC COMBINED HYPERIMMUNE SERUM THERAPY FOR PESTE DES PETITS RUMINANTS INFECTED GOATS

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ABSTRACT

The peste des petits ruminants (PPR) has now been recognized as endemic viral disease associated with high morbidity and mortality rates in goats of Bangladesh. As there is no known effective drug against viral diseases, an attempt was made to evaluate the efficacy of antibiotic combined hyperimmune serum therapy (ACHST) against the deadly viral disease, PPR in goats. Naturally PPR infected 128 goats were randomly selected and used for this trial experiment in six different goat farms during the period from March 2001 to July 2003. The distribution of animals were 38 at the BLRI Goat Isolation Shed, Savar, 31 at Military Goat Farm, Savar, 14 at Bangladesh Missionary Farm, Sripur, 11 at the Olympia Goat Farm, Savar, 23 at the Globe Goat Farm, Kaliakoir and 11 at the Islam Nagar Goat Farm, Savar, and each of the selected goat was injected with specific hyperimmune serum @ 10 ml / goat IV daily for 3 days and oxytetracycline @ 1 ml / 10 kg body weight IM twice at 48 hours intervals, which resulted 78.94%, 70.97%, 57.14%, 63.64%, 60.87%, 63.64% and 68.75% recovery rates respectively with an average of 68.75%. The comparative evaluation of ACHST at different stages of naturally PPR infected goats showed highest recovery rate in incubation period (90.63%), followed by prodromal (78.13%), pneumonic (73.33%) and lowest in diarrhoeal (46.93%) phases. It may be concluded from these results that ACHST could be used as therapeutic measures for PPR infected goats.

Key words: Goat, PPR, antibiotic, hyperimmune serum, therapy

INTRODUCTION

Peste des petits ruminants (PPR) is a highly contagious viral disease of goats. The causal viral agent is a member of the genus *Morbillivirus* under the family of *Paramyxoviridae*. The PPR virus identified in Bangladesh after a severe outbreak in 1993 from the border belt areas of south western districts and the disease is now endemic in this country. Outbreaks of PPR in different organized goat farms are generally associated with introduction of new goats from out side. The disease is characterized by mainly three symptoms like discharges (nasal, ocular and oral), diarrhea and death, hence it is called 3D disease. The other symptoms are high fever, eroded stomatitis, pneumonia and gastroenteritis (Radostits *et al.* 2000). Clinically the disease has marked resemblance to rinderpest of cattle. PPR occurs mainly in three forms, peracute, acute and subclinical. Peracute and acute form of the disease are seen in 4 phases include incubation, prodromal, pneumonic and diarrhea/death. The affected animal standing apart with impaired appetite accompanied with poor rumination and constipation. Two to five days after onset of fever, mucosal erosion as pin heads of necrotic epithelium on the mucous membrane lining of the mouth, nasal passages and urogenital tracts. After two or three days of mucosal erosion the fever regress and pneumonia accompanied with diarrhea. The peri-oral and peri-nasal areas are encrusted with mucopurulent discharges. The high morbidity (100%) and mortality (50 to 90%) rates in goats caused by PPR have been described in Bangladesh, followed by evaluation of ELISA as field diagnostic method and inactivated vaccine to control this disease (Sil *et al.*, 2000 – 2001ab). This paper describes the therapeutic efficacy of antibiotic combined hyperimmune serum against clinical PPR in goats.

MATERIALS AND METHODS

The therapeutic trial with antibiotic combined hyperimmune serum therapy (ACHST) was conducted on 128 clinically infected Black Bengal goats aged between 8 to 30 months, maintained at the six different goat farms during the period from March 2001 to July 2003. These selected goats belonged to the BLRI Goat Isolation Shed, Savar (n = 38), Military Goat Farm, Savar (n = 31), Bangladesh Missionary Farm, Sripur (n = 14), Olympia Goat Farm, Savar (n = 11), Globe Goat Farm, Kaliakoir (n = 23), and Islam Nagar Goat Farm, Savar (n = 11). The diagnosis of PPR was made on the basis of history, clinical findings, and isolation and identification of causative virus by AGID test and ELISA as described by Sil *et al.* (2000 – 2001ab). These selected 128 goats were divided into four groups viz. A, B, C, and D on the basis of phases of infection cycle. Group A consisting of 49 goats with diarrhoea and pneumonia signs, Group B consisting of 15 goats showed only signs of pneumonia, Group C consisting of 32 goats with high fever, ocular and nasal discharges, and Group D consisting of 32 contact goats in the same shed.

Antibiotic combined hyperimmune serum therapy for PPR

Each goat of all the four groups was treated with antibiotic combined hyperimmune PPR serum with or without addition of sulphonamides or metronidazole and the treatment schedule is presented in the Table 1. The hyperimmune serum against PPR was prepared from the PPR vaccinated goats and goats recovered from PPR.

Table 1. Experimental design on therapeutic evaluation against naturally PPR infected goats

S/N	Status / Therapy	Dose and route	Group A (n = 49)	Group B (n = 15)	Group C (n = 32)	Group D (n = 32)
1.	Phases of disease	-	Diarrhoeal	Pneumonic	Prodromal	Incubation
2.	Hyperimmune serum ¹	10 ml / goat IV daily for 3 days	+	+	+	+
3.	Antibiotic ²	1 ml / 10 kg bwt IM, 2 nd dose after 48 h	+	+	+	+
4.	Sulphonamide ³	1000 mg / goat orally daily for 3 days	+	+	-	-
5.	Metronidazole ⁴	400 mg / goat orally daily for 3 days	+	-	-	-
6.	Oral saline ⁵	Quantity sufficient	+	-	-	-

n = No. of goat used, ¹Obtained from PPR vaccinated goats and goats recovered from PPR, ²Oxytetracycline (Renamycine[®] LA, Renata Ltd.), ³Streptosulpha[®] (Novartis), ⁴Metryl[®] (Square), ⁵ORS[®] (SMC).

RESULTS AND DISCUSSION

Outbreaks of the PPR have been reported to be associated with high morbidity (100%) and mortality (50-90%) rates in susceptible goats and the disease is now considered endemic in Bangladesh (Sil *et al.*, 2000 – 2001ab). There are no known effective drugs against virus etiology of this disease. However, hyperimmune serum and supportive treatment with fluid therapy for dehydration and antibiotics to prevent secondary bacterial infection could be used to save the life of the infected goats. Accordingly, a treatment trial study was conducted with antibiotic combined hyperimmune serum therapy (ACHST) in 128 PPR infected goats of six different goat farms in Bangladesh. Of the 128 goats treated with ACHST, of which 88 (68.75%) goats recovered from the disease within 3 to 5 days of treatment. The recovery rate at BLRI Goat Isolation Shed was found highest (78.94%), followed by Military Goat Farm (70.97%), Olympia Goat Farm (63.64%), Islam Nagar Goat Farm (63.64%), Globe Goat Farm (60.87%) and Bangladesh Missionary Farm (57.14%) (Table 2). Comparatively higher recovery rate (78.94%) of PPR infected goats of BLRI Goat Isolation Shed might be due to their better hygienic care and management along with the therapy.

Table 2. Efficacy of hyperimmune serum combined with antibiotics at different stages of PPR infection in goats

S/N	Name of farms	Phases or stages of disease									
		Incubation		Prodromal		Pneumonic		Diarrhoeal		Total	
		No. treated	Survived No. (%)	No. treated	Survived No. (%)	No. treated	Survived No. (%)	No. treated	Survived No. (%)	No. treated	Survived No. (%)
1.	BLRI GIS	08	08 (100.0)	11	10 (90.90)	03	03 (100.0)	16	11 (68.75)	38	30 (78.94)
2.	MGF	07	07 (100.0)	06	04 (66.67)	02	02 (100.0)	16	08 (50.00)	31	22 (70.97)
3.	BMF	05	04 (80.00)	04	04 (100.0)	02	01 (50.00)	03	01 (33.33)	14	08 (57.14)
4.	OGF	03	03 (100.0)	04	02 (50.00)	00	00 (00.00)	04	00 (00.00)	11	07 (63.64)
5.	GGF	06	05 (83.33)	03	02 (66.67)	06	04 (66.67)	08	03 (37.50)	23	14 (60.87)
6.	INGF	03	02 (66.67)	04	03 (75.00)	02	01 (50.00)	02	00 (00.00)	11	07 (63.64)
Total		32	29 (90.63)	32	25 (78.13)	15	11 (73.33)	49	23 (46.93)	128	88 (68.75)

BLRI GIS = BLRI Goat Isolation Shed, MGF = Military Goat Farm, BMF = Bangladesh Missionary Farm, OGF = Olympia Goat Farm, GGF = Globe Goat Farm, INGF = Islam Nagar Goat Farm.

The recovery rates at different clinical phases of PPR infected goats like incubation, prodromal, pneumonic and diarrheal phase were 90.63%, 78.13%, 73.33% and 46.93% respectively (Table 2). The present study revealed that ACHST at incubation phase of PPR infection provides better recovery rate than at other phases of infection. The findings of this study is better than the findings of Anene *et al.* (1987) who studied the appraisement of the treatment of naturally occurring PPR in goats with oxytetracycline, chloramphenicol 25% aqueous solution and metamerazine in different groups at the recommended dose rates and found recovery rate of 14.29%. The authors did not use hyperimmune serum against PPR along with antibiotic therapy. Wosu (1990) also found better recovery rate (58.8%) in PPR therapy with broad spectrum antibiotics (chloramphenicol, penicillin, streptomycin) along with intestinal sedatives, fluid therapy and scrubbing the labial scabs with lemon fruits. It may be concluded from this study that ACHST can be used successfully to limit the spread of virus and to recover the PPR infected goats that are under incubation and in early stage of infection.

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