International Journal of Veterinary Science

www.ijvets.com P-ISSN: 2304-3075 E-ISSN: 2305-4360 editor@ijvets.com

SHORT COMMUNICATION

Peste des petits ruminants (PPR) in Small Ruminants – A Clinical, Haemato-Serological and Pathological Aspects

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ARTICLE INFO

Received: July 27, 2014
Revised: August 04, 2014
Accepted: August 11, 2014

Key words:
Gross pathology
Hematological parameters
Peste des petit ruminants (PPR)
Small ruminants

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ABSTRACT

Peste des petits ruminants (PPR) frequently known as "goat plague" or "Small ruminant plague" is a very noteworthy disease for the economy of any nation. The objective of the study is based on clinical signs, physical evaluation, clinical parameters, complete blood count (CBC) and serum biochemistry. Three animals (two bucks and one ram) were evaluated completely as suffering from PPR after critical investigation. All animals were presenting lymphopenia. In the absence of appropriate treatment all three animals were recommended enrofloxacin dosed at 2.2 mg/kg b.w and ketoprofen dosed at 2 mg/kg for 7 days along with fluid therapy and multivitamins powder for regular use. One of the buck died after 3 days but remaining two animals starts presenting recovery signs after 6 days and ultimately recovered up to 15 days but with weak body condition. Post-mortem of dead animal reveled hemorrhagic trachea, necropsied kidneys and mesenteric swollen lymph nodes. After fifteen days recovered animals were again passed through critical examination to investigate recovery progression. Increase in lymphocytic count to standard ranges was a durable mark of recovery.

Cite This Article as: Tariq A, K Aqil, Z Akbar, K Mahboob, A Sarfraz, R Rafique, F Nasir and S Parveen, 2014. Peste des petits ruminant (PPR) in Small Ruminants – A Clinical, Haemato-Serological and Pathological Aspects. Inter J Vet Sci, 3(4): 206-209. www.ijvets.com

INTRODUCTION

Most of developing regions viz. Asia, Middle East and North Africa have suffered from the problem of "peste des petits ruminant (PPR)", commonly called "goat plague" from the last 2-3 decades. PPR is a contagious disease of goats mainly but can also affect sheep (Kul *et al.,* 2007; Ahmad *et al.,* 2005; Zahur *et al.,* 2008; Tariq *et al.,* 2013). Disease is caused by a member of Paramyxoviridae, named "Morbillivirus" which shows resemblance with canine distemper virus (CDV), rinderpest and measles virus (Kul *et al.,* 2007; Tariq *et al.,* 2013). In Pakistan, disease was first reported in 1991, which has now increased to an alarming situation (Tariq *et al.,* 2013; Ahmad *et al.,* 2005) Disease is found with 43.33% prevalence in Punjab province, Pakistan (Tariq *et al.,* 2013).

Virus is normally transmitted by aerosol way, but may also be spread through direct contact, contaminated water or feed and produces 10-100% morbidity (Ayatiken *et al.,* 2011; Tariq *et al.,* 2013). Clinically, the disease causes a high elevation in temperature, anorexia, salivation, depression, ocular and nasal discharge, erosive stomatitis along with severe diarrhea and lymphopenia. Disease is more severe in young stock where mortality may reach up to 90% (Ayatiken *et al.,* 2011; Tariq *et al.,* 2013). Because of high morbidity it may cause huge production losses due to loss of wool, milk, body condition and abortion (Singh *et al.,* 2014). As disease is important from an economical point of view, this study was planned to cover all the possible clinical aspects of disease including clinical and hematological parameters which may be helpful in diagnosis of disease in developing countries like Pakistan where modern techniques like ELISA and PCR are not yet available at farmer level.

Case history and clinical observation

Three animals including two bucks as (case-I and II) and one ram (as case-III) visited the veterinary teaching hospital at the department of clinical medicine and

surgery, University of Agriculture Faisalabad (UAF), Punjab, Pakistan with a common principal complaint of anorexia, depression and diarrhea. Primarily, all possible clinical parameters including temperature, respiration, pulse and capillary refill time were documented (Table 1). Temperature was elevated up to 105.2°F and 104.8°F respectively in case-I and case-II whereas in case-II it was 104.4°F. In the similar way heart rate was recorded as 93, 89 and 84 bpm while respiration was 35, 34 and 37 resp./min in series of case-I to III. Capillary refill time was not below 2 seconds in any of the case. Keen physical observation revealed erosive lesions in the oral mucosa especially on gums of Case-I and III (Figure 1b and 3b) but not in Case-II (Figure 2b). Serous ocular discharge was present in Case-I and II but absent in Case-III. Similarly nasal discharge was muco-purulent in Case-I and II (Figure 1a and 2a) but was slightly less purulent in Case-II. Lymph nodes were palpable in all animals. Blood samples were collected to check complete blood count and serum biochemistry (Table 2).

Based on a critical observation of clinical signs and serological results the disease was diagnosed as PPR because results were quite similar with previous studies. As there is no treatment for PPRV itself, treatment was done on a symptomatic basis. Along with fluid therapy (Ringer lactate dosed at 15 ml/kg b.w), all the animals were given enrofloxacin dosed at 2.2 mg/kg b.w, ketoprofen dosed at 2 mg/kg b.w and Kanalog cream for their anti-bacterial, anti-inflammatory and soothing effects, respectively, for 7 days similar to Tariq *et al.*, 2013. Animals were kept under keen observation for 15 days. Case-I animal died but remaining two animals recovered in 15 days with weak body condition, so afterwards only multivitamins powder were recommended to tone up the body condition. On post-mortem of case-I animal necropsied kidney (Figure 4b), swollen mesenteric lymph-nodes (Figure 5a) and hemorrhagic trachea (Figure 5b) were the most prominent signs were grasped. For confirmation of recovery, the remaining two animals were passed through critical investigation of all possible clinical parameters similar to day zero which publicized parameters within standard ranges (Tables 3 and 4).

RESULTS AND DISCUSSION

In this study, disease was diagnosed after comprehensive and keen observation of clinical and hematological facets and treated accordingly. Clinical aspects were quite similar to previous reports: Tariq *et al.*, 2013, Kataria *et al.*, 2007, Aytekin *et al.*, 2011 and Aikhuomobhogbe and Orheruata, 2006. Fecal examination was performed as prophylactic measure to check out for parasitic burden but found to be negative in all animals. Still there is no specific anti-viral drug available to be used against this disease but supportive therapy is found to be effective up to some extent (Tariq *et al.*, 2013). Symptomatic and supportive treatment is cooperative when the disease is acute form but it would better to prevent the disease in the first place.

PPR is known to cause huge economic losses especially in Pakistan where its prevalence is very high. In different areas of Pakistan e.g. Punjab, Baluchistan, and Sindh, prevalence is reported to be 70.93, 76.74 and 47.98 respectively (Tariq *et al.*, 2013: Zahur *et al.*, 2008). Still only way to improve production and economy is disease control which can be achieve by regular vaccination and proper planning for its eradication. Ring vaccination may work better to wipe out the disease (Tariq *et al.*, 2013).

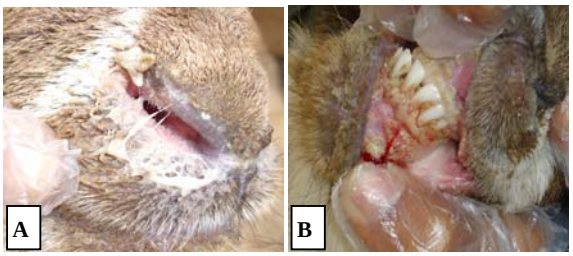

Fig. 1: Case-I **(a)** Muco-purulent nasal discharge **(b)** Oral erosive lesions on gums

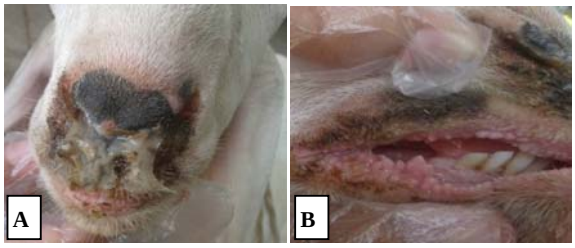

Fig. 2: Case-II **(a)** Purulent nasal discharge **(b)** Absence of any erosive lesions in oral mucosa

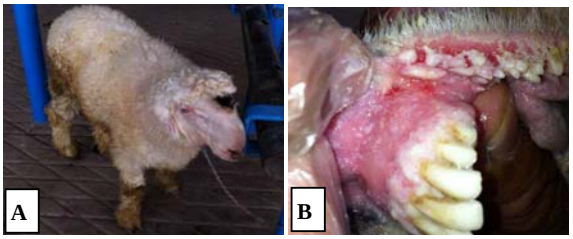

Fig. 3: Case-III **(a)** Animal showing depressed behavior and soiled hind quarters **(b)** Oral erosive lesions on gums

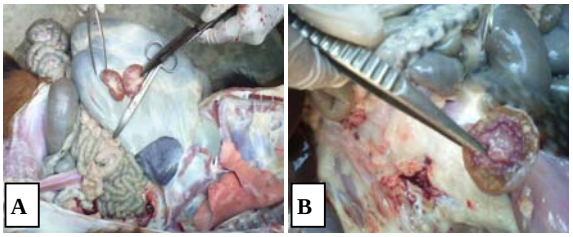

Fig. 4: Case-I **(a)** Post-mortem examination **(b)** Showing necropsied kidneys

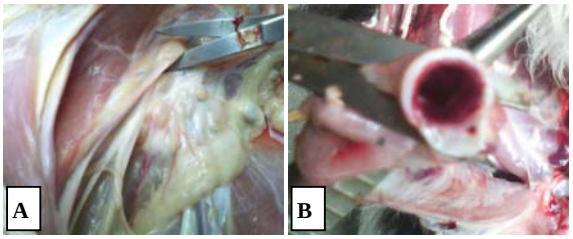

Fig. 5: Case-I **(a)** Showing swollen mesenteric lymph nodes **(b)** Showing hemorrhagic trachea

Table 1: Clinical parameters observed on day zero

Parameters	Case-I	Case-II	Reference ranges	Case-III	Reference ranges
Rectal temperature (^oF)	105.2	104.8	101.3-103.5	104.4	100.9-103.8
Heart rate (beats/min.)	93	89	70-80	84	70-80
Respiration (resp./min.)	35	34	16-32	37	16-34
Capillary refill time	About 2 second	3 sec	< 2 sec.	> 3 sec	< 2 sec.

*Reference ranges (The Merck veterinary manual).

Table 2: Hematological and serological results on day zero

Parameters	Case-I	Case-II	Reference ranges	Case-III	Reference ranges
TEC (10^{12}/1)	12.0	13.3	8~18	13.7	9-15
PCV (%)	27	25	22~38	36	27-45
Hb. Conc. (g/dl)	12.3	12.8	8~14	11.5	9-15
TLC (10^9/1)	6.0	4.9	4~13	7.9	4-12
Neutrophils (%)	63	69	30~48	58	10-50
Lymphocytes (%)	31	28	50~70	34	40-75
Monocytes (%)	03	02	0~4	03	0-6
Eosinophilia (%)	02	01	1~8	03	0-10
Basophils (%)	01	Nil	0~1	02	0-3
Serum biochemistry					
Total Proteins (g/dl)	5.9	6.3	6.1-7.5	6.7	5.9-7.8
Albumin (g/dl)	2.3	2.9	2.7-3.7	2.6	2.3-4.0
Globulin (g/dl)	3.6	3.4	3.2-5.0	4.1	3.9-6.0
Glucose (mmol/L)	3.2	3.5	2.7-4.2	3.6	2.4-4.5
AST (u/L)	137	172	66-230	94	49-123
ALT (u/L)	29	35	15-52	33	15-44
LDH (u/L)	157	193	79-265	214	83-476
Blood Urea nitrogen (mg/dl)	17.1	18.0	10-26	15.2	8.2-25

*Reference ranges (The Merck veterinary manual).

Table 3: Clinical parameters after recovery

Parameters	Case-I	Case-II	Reference ranges	Case-III	Reference ranges
Rectal temperature (^oF)		103.8	101.3-103.5	102.2	100.9-103.8
Heart rate (beats/min.)		79	70-80	72	70-80
Respiration (resp./min.)	Died	28	16-32	22	16-34
Capillary refill time (CRT)		< 2 sec.	< 2 sec.	< 1 sec.	< 2 sec.

*Reference ranges (The Merck veterinary manual).

Table 4: Hematological and serological results after recovery

Parameters	Case-I	Case-II	Reference ranges	Case-III	Reference ranges
TEC (10^{12}/1)		13.8	8~18	13.2	9-15
PCV (%)		29	22~38	39	27-45
Hb. Conc. (g/dl)		10.1	8~14	14.4	9-15
TLC (10^9/1)		7.9	4~13	7.5	4-12
Neutrophils (%)		40	30~48	35	10-50
Lymphocytes (%)		56	50~70	63	40-75
Monocytes (%)		01	0~4	02	0-6
Eosinophilia (%)		03	1~8	Nil	0-10
Basophils (%)	Died	01	0~1	Nil	0-3
Serum biochemistry					
Total Proteins (g/dl)		6.5	6.1-7.5	7.4	5.9-7.8
Albumin (g/dl)		3.1	2.7-3.7	2.9	2.3-4.0
Globulin (g/dl)		3.4	3.2-5.0	4.5	3.9-6.0
Glucose (mmol/L)		3.1	2.7-4.2	4.0	2.4-4.5
AST (u/L)		135	66-230	106	49-123
ALT (u/L)		28	15-52	32	15-44
LDH (u/L)		143	79-265	309	83-476
Blood Urea nitrogen (mg/dl)		17	10-26	18.3	8.2-25

*Reference ranges (The Merck veterinary manual).

Conclusion

This study reflects that disease approach more severely to buck than ram. Lymphopenia was the key sign recorded in all cases. Post-mortem exposed necropsied kidneys, severely hemorrhagic trachea and swollen mesenteric lymph nodes which may be further use as a land mark for confirmation of PPR in future.

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