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Haemato-biochemical alterations due to peste des petits ruminants in goats in Assam

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Abstract

A study was conducted in goats with an aim to produce Peste des petits ruminants disease experimentally, to study the haematological and haemato-biochemical profile during the progression of the disease. A mixed tissue sample collected from naturally infected PPR goats was used as inoculum. The haemato-biochemical study of the experimental animals revealed a lower level of total serum proteins, with higher level of serum ALT and AST. Haematology showed an increase in TEC, Hb, and PCV along with a decrease in TLC and DLC.

Keywords: Peste des petits ruminants, haematology and haemato-biochemical profile

Introduction

Among the broad list of diseases of goats, Peste-des-petits ruminants (PPR) is an acute contagious disease which affects mainly small ruminants i.e., sheep and goat. The disease has been considered as an emerging disease in our country causing an economic loss of around rupees four hundred crores annually. Several outbreaks of the disease has been reported in the recent years in Assam, causing a high mortality and morbidity in goat population in the state. PPR is caused by Morbillivirus belonging to the family of Paramyxoviridae. PPR infected animal clinically shows pyrexia, oculo-nasal discharge which later becomes mucopurulent, ulcer and subsequent necrosis of oral cavity, lymphoid organs, gastrointestinal tract and respiratory tract, characterised by diarrhoea, pneumonia and eventually death.

Haematological examination provides data regarding the normal or any abnormality in the type, number and appearance of cells in the blood i.e., RBC, WBC and platelets. While a biochemical examination relays information about the functioning of the internal organs of the body. The disease condition as well infection in the body are manifested as an alteration of the various components of blood, presence or absence of different enzymes and electrolytes.

Experimental production of PPR was performed by various workers, by inoculating viral stock through different routes like subcutaneous route (Kumar *et al.*, 2004) ^[5] and intranasal and subcutaneous route (Truong *et al.*, 2014) ^[10].

Yarim *et al.* (2006) ^[11], Sharma *et al.* (2012) ^[9], Sahindurum *et al.* (2012) observed decrease in Hb conc, TLC and Leucopenia, while neutrophils and monocytes were found to be increased.

Kataria *et al.* (2007) ^[6] recorded a significant difference of ($P \leq 0.05$) between healthy and PPR infected animal i.e., both sheep and goat in TEC, TLC, Hb, PCV, DLC, relative viscosity, specific gravity and ESR. A significant difference of ($P \leq 0.05$) was observed in serum biochemical parameter which included sodium, potassium, glucose, total serum proteins, albumin, globulin, creatine, urea and cortisol.

Ayeteekin *et al.* (2011) reported lower level of Hb, PCV, RBC and PLT (platelet) count in infected group of lamb affected with PPR as compared to control group. But the level of WBC, MCV, MCH and MCHC were found higher in the infected group than those of control group. They also recorded a significant increase in the serum activity of GGT, ALT and AST in the PPR affected animals.

Chauhan *et al.* (2011) ^[2] observed marked leucopaenia and lymphocytopaenia among sheep and goat affected by PPR in an outbreak in Gujarat.

Emikpe *et al.* (2011) ^[3] and Sahinduram *et al.* (2012) observed an increase of packed cell volume in affected animal. Sahinduram *et al.* (2012) observed an increase of serum alanine amino transferase (ALT), aspartate transaminase (AST) and gamma glutamyl transferase (GGT).

Materials and Methods

Experimental Study

12 apparently healthy kids, aged 6 months were tested for PPR antibodies and found negative by competitive ELISA. The kids were allowed to acclimatize for one week and were fed on green pasture, hay and bran daily while water was provided *ad libitum*. The animals were divided into two groups (A and B) each containing 6 animals and were housed in the animal house located within the Department of Pathology, College of Veterinary Science, Khanapara-22. Deworming of the animals were done with Albendazole at the dosage rate of 10 mg/kg body weight.

The experimental animals were examined daily before giving infection for any signs of illness. Parameters including heart rate, pulse rate, respiratory rate and rectal temperature were monitored and findings were recorded.

Preparation of the inoculum

The inoculum was prepared from tissues (lungs, spleen, intestines and lymph nodes) collected from animals naturally infected with PPR after confirming by performing RT-PCR. The positive tissue samples were ground in sterile pestle and mortar in approximately 2 ml of phosphate buffered saline. The supernatant was filtered using a syringe filter having pore size 0.2 μm . The supernatant was then stored at -20°C . Prior to inoculation, these suspension were removed from deep freezer and thawed at 4°C in the refrigerator. The whole procedure was carried out under laminar flow (Ultraklenz, Model no: 1004).

Experimental inoculation of goats with PPR virus tissue suspension

Each animal in the treatment group was inoculated by intranasal route with 2ml of mixed tissue suspensions and 2 ml by subcutaneous route.

Clinical examination and sample collection

All animals were examined twice daily for development of PPR specific clinical signs like anorexia, depression, fever, oculonasal discharges, respiratory signs and diarrhoea. Anorexia and depression were monitored by the lethargic behaviour i.e; less active and less interest in taking food manifested by the animal. All the findings were recorded.

Haematological Studies

For haematological studies 2ml of blood was collected aseptically from the jugular vein of the experimental animals after showing clinical symptoms. Blood was collected by using a sterile plastic disposable syringe in sterile vacutainer containing EDTA. The following haematological parameters were determined in automated haematological cell counter (Model: MS 4e):

1. Total erythrocyte count (TEC)
2. Haemoglobin percent (Hb)
3. Packed cell volume (PCV)
4. Total leucocytes count (TLC)
5. Differential leucocytes count (DLC)

Biochemical Studies

About 5 ml of blood was collected from experimental animals showing clinical signs in clot activator vial and kept in a slanting position for the blood to form the clot at room

temperature for one hour. Once the clot had formed, it was loosened from the walls of the vial to aid retraction. The blood clot was then kept at 4°C overnight and the straw coloured serum was collected in serum vials and were subjected to biochemical analysis by using spectrophotometer as per standard protocol given by manufactured company along with the kits. The different biochemical parameters were as follows:

1. ALT/SGPT
2. AST/SGOT
3. Total serum protein

Result and Discussion

Hematology

Study of hematological parameters is an important and easy way to evaluate the health of an animal. The present study revealed significant ($P < 0.01$) differences between the control group and experimental group. TEC, TLC, Hb, PCV, neutrophil and lymphocyte parameters showed significant ($P < 0.01$) difference; while Monocyte, Eosinophil and Basophil count showed no significant difference between the two groups.

In the present study the value of total erythrocytic count (TEC- $10^6/\mu\text{l}$) in the experimental group was found to be more than the control group. Similar findings were also observed by Kataria *et al.* (2007)^[6] and Islam. (2015)^[4]. This may be due to diarrhea leading to severe dehydration resulting in relative polycythemia.

Haemoglobin (g/dl) content was found to be high in the experimental group. This is in accordance with the findings of Kataria *et al.* (2007)^[6] and Islam. (2015)^[4]. The increase level of haemoglobin can be explained due to severe diarrhea which subsequently lead to dehydration and haemoconcentration.

Packed cell volume (PCV %) was increased in the experimental group as compared to the control, which was due to the increase in the number of red blood cell as explained for TEC and Hb content. Similar finding was observed by Kataria *et al.* (2007)^[6] and Islam. (2015)^[4].

Total leucocytic count (TLC- $10^3/\mu\text{l}$) was decreased in the experimental group. This is in agreement with the findings of Kataria *et al.* (2007)^[6] and Islam. (2015)^[4]. This might be due to immunosuppressed condition of the affected animal due to initial proliferation of the virus in lymphoid organs and subsequent degeneration of lymphoid cells.

In the present experimental study, differential leucocytic count (DLC %) showed an increase in the neutrophil count. Similar findings were made by Kataria *et al.* (2007)^[6] and Islam (2015)^[4]. The rise in neutrophil count might be due to secondary bacterial infection owing to immunosuppressed state of the PPR infected animals.

Lymphocytic count was found to be lower in the experimental group as compared to the control group. This is in agreement with the findings of Kataria *et al.* (2007)^[6] and Islam (2015)^[4]. PPR virus is a lymphotropic virus, due to which it shows a special affinity towards lymphoid organs. Histopathological study of these organs showed depletion of lymphoid cells which is due to replication in the virus in lymphoid organs and subsequent necrosis resulting in lymphopaenia. The results of various haematological parameters of experimentally infected PPR goats and the control counterpart have been given in Table 1.

Table 1: Hematological parameters of control and ppr infected animals

Parameter	Control	Infected
TEC	9.24± 0.20	12.28 ±0.33**
TLC	12.58± 0.86	7.48 ±0.93**
Hb	9.68± 0.44	14.60± 1.97**
PCV	27.80± 1.16	34.80± 1.47**
Neutrophil	46.2± 15.51	58.4 ±15.53**
Lymphocyte	53.2 ±16.39	36.4 ±11.55**
Monocyte	4.90 ±0.44	3.80± 0.24
Eosinophil	2.96± 3.09	2.06± 3.13
Basophil	0.70 ±0.29	0.45 ±4.27

Biochemical Profile

In the present study different biochemical parameters *viz.*, ALT (SGPT), AST (SGOT) and total protein were evaluated. Statistical analysis showed highly significant ($P<0.01$) difference in total protein between the control and the experimental group of animals. Total serum protein in the experimental group was found to be lower than the control group. This finding was found to be similar to the findings of Kataria *et al.* (2007) [6] and Islam (2015) [4]. This may be due to nephropathy characterized by atrophy of the glomeruli leading to passing of protein molecules from the body (Islam, 2015) [4].

A significant difference in ALT ($P<0.01$) and AST ($P<0.05$) activities were observed between the two groups. Both the enzyme activities was found to be elevated in the experimental group as compared to the control group. Similar findings were made by Aytekin *et al.* (2011) [1]. ALT is predominantly found in liver and considered to be the marker of liver function, while AST is found in a wide range of organs (Munir, 2013) [7]. The increased serum level of both the enzymes is an indication of affection and infection in various organs after the initial replication phase of the virus leading to leaking of the enzyme in the blood. The degenerative changes observed in liver during histopathological examination lend, support to an increase in the level of ALT

The result of various serum enzymic studies of experimental PPR infection with comparison to control group have been shown in Table 2.

Table 2: Serum enzymic parameters of control and ppr infected animals

Parameter	Control	Infected
Total Protein	7.29±0.78	5.57±0.76**
ALT (SGPT)	41.86 ±5.88	143.18±26.84**
AST(SGOT)	118.40 ±23.99	281.20 ±59.90*

The present experimental study of PPR infected goats may prove useful for the clinicians in the field condition to take immediate measure in diagnosis and alert relevant personnel's to take appropriate steps and as well as the research scholar working in the similar disease.

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References

1. Aytekin I, Mamak N, Ulucan A, Kalinbacak A. Clinical haematological, biochemical and pathological findings in

lambs with peste des petits ruminants. Kafkas. Univ. Vet. Fak. Derg., 2011; 17(3):349-355.

- Chauhan HC, Lambade PRS, Sen A, Dadawala AI, Ranaware PB, Chandel B *et al.* The use of pathological and histological techniques in the diagnosis of peste des petits ruminants in India. *Veterinaria Italiana.*, 2011; 47(1):41-47.
- Emikpe BO, Akpavie SO, Ohore OG. Haematology and serum biochemical changes in the experimental lineage I variant Peste des petits ruminants virus infection in goats. 5th Plan Commonwealth Veterinary Conference, Accra, Ghana, 2011, 125-132.
- Islam M. Prevalence, pathology and molecular studies of Peste des petits ruminants in goats of Assam. M.V.Sc. Thesis., Assam Agricultural University, Khanapara, Guwahati-22, 2015.
- Kumar P, Tripathi BN, Sharma AK, Kumar R, Sreenivasa BP, Singh RP *et al.* Pathological and immunohistochemical study of experimental Peste des petits virus infection in Goats. *J Vet. Med.*, 2004; B51:153-159.
- Kataria AK, Kataria N, Gahlot AK. Large scale outbreaks of Peste des petits ruminants in sheep and goats in Thar Desert of India. *Slov. Vet. Res.*, 2007; 44(4):123-32.
- Munir M. Peste des petits ruminants virus. Mononegavirus of veterinary importance: Pathobiology and molecular diagnosis. 2013; 1:65-98.
- Sahinduran S, Albay MK, Sezer K, Ozmen O, Mamak N, Haligur M *et al.* Coagulation profile, hematological and biochemical changes in kids naturally infected with peste des petits ruminants. *Trop. Animal Health Prod.*, 2012; 44:453-457.
- Sharma CS, Mehta HK, Prakash MM, Shukla PC. Studies on clinic-haemato-biochemical changes in Peste des petits ruminants in goats. *Veterinary Practitioner.* 2012; 13(2):122-125.
- Truong T, Boshra H, Embury-Hyatt C, Nfon C, Gerdt V, Tikoo S *et al.* Peste des petits ruminants virus tissue tropism and pathogenesis in sheep and goats following experimental infection. *PLoS One.* 2014, 9(1).
- Yarim GF, Nisbet C, Yazici Z, Gumsova SO. Elevated serum total sialic acid concentrations in sheep with Peste des petits ruminants. *Medycyna Wet.*, 2006; 62(12):1375-1377.