

COMPARATIVE ANALYSIS OF HAEMO-BIOCHEMICAL PROFILE OF PESTE DES PETITS RUMINANTS INFECTED SHEEP AND GOATS IN SOUTH EAST NIGERIA

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ABSTRACT

Haemo-biochemical profile of small ruminants within age range 12-18 months exhibiting clinical signs suggestive of PPR was studied. Blood samples (5 ml) were collected from 80 small ruminants (SR) (51 sheep and 29 goats) displaying a combination of the following clinical signs: nasal and ocular discharges, coughing, diarrhoea, respiratory distress, ulcerative stomatitis, weakness, emaciation. The haemo-biochemical profile and presence of PPRV antibodies were determined using standard techniques and competitive ELISA kit respectively. A total of 51 (32 sheep and 19 goats) sera samples were positive to the PPRV antibody while 29 (19 sheep and 10 goats) were negative. Significant increases ($p < 0.05$) in the packed cell volume (PCV) and red blood cell (RBC), and significant decrease ($p < 0.05$) in mean white blood cell (WBC) and platelet counts were observed in PPRV seropositive goats when compared with seronegative goats. There were no significant differences ($p > 0.05$) in the haematologic profile between PPRV seropositive and seronegative sheep. Significant increases ($p < 0.05$) were recorded in aspartate transaminase (AST), alanine aminotransferase (ALT), urea and creatinine, and significant decreases ($p < 0.05$) in total protein (TP), albumin and potassium of PPRV seropositive sheep and goats when compared to seronegative sheep and goats. PPRV seropositive goats had significant higher ($p < 0.05$) total bilirubin (TB) and significant lower ($p < 0.05$) sodium level than seronegative goats. There were no significant differences ($p > 0.05$) in the TB and sodium level between PPRV seropositive and seronegative sheep. The haemo-biochemical profile of PPRV infected goats showed more significant alterations when compared to those of sheep.

Keywords: *Peste des petits ruminants*; haemo-biochemical; sheep; goats; South-east

INTRODUCTION

Peste des petits ruminants (PPR) is a trans-boundary viral disease caused by *Peste-des-petits-ruminants virus* (PPRV) that primarily affects small ruminants. Considering the importance of small ruminants in the livelihood of the poor and marginal farmers in Africa, PPR is an important concern for food security and poverty alleviation (FAO, 2014). This disease is characterised by pyrexia, serous to mucopurulent nasal and ocular discharges, coughing, respiratory difficulty, diarrhoea, pneumonia, necrotic ulcers in mouth, on the tongue, lips and on dental pad. This is usually followed by death or recovery from the disease (Das *et al.* 2015). Different methods are used to diagnose the disease: the presenting clinical signs as a tentative diagnosis, serology and molecular (PCR) approach (Couacy-Hymann *et al.*, 2002) as confirmatory diagnoses. The use of clinical signs alone is not sufficient in the diagnosis of PPR as many respiratory and digestive diseases present same clinical signs and thus are considered as differential diagnoses (FAO, 2014). A combination of presenting clinical signs, history and laboratory findings such as haematology and serum biochemistry can be of great help in the diagnosis of PPR, especially when the cost of serology and or molecular diagnostic method is been considered. There are many conflicting reports of haematology and biochemical profile of PPR infected small ruminants Aytekin *et al.*, 2011; Sahinduran *et al.*, 2012; Das *et al.*, 2015; Islam *et al.*,

2018). Hence the knowledge of the haemogram and biochemical profiles of sheep and goats suffering from natural PPR infection in South-East Nigeria can be helpful in the proper clinico-therapeutic management of the disease.

MATERIALS AND METHODS

Detection of antibody

Blood samples (5 ml) were collected from 80 small ruminants [sheep (n= 51) and goats (n= 29)] showing clinical signs suggestive of PPR (pyrexia, mucopurulent nasal and ocular discharges, coughing, respiratory difficulty, diarrhoea) from Enugu and Anambra State. Four milliliter of each blood was allowed to clot and serum separated by centrifugation at 1500 x g for 10 minutes. The sera were evaluated for the presence of PPRV antibody using commercial competitive enzyme linked immunosorbent assay (cELISA) kit (ID-VET® (Grabel, France) as described by Libeau *et al.* (1995) and biochemical analysis. One milliliter was put in an EDTA sample tube. This was used for haematology analysis.

Determination of haemo-biochemical profiles

Haemoglobin (Hb) concentration, PCV, RBC, WBC and platelet counts were determined as described by Coles (1986) and Schalm *et al.*, (1975). Serum ALT and AST were determined by the Reitman-Frankel colorimetric method, TP by the Biuret method, albumin by bromocresol green method, TB and DB by the modified Jendrassik-Grof method, urea by the Berthelot-Searcy method, creatinine by the modified Jaffe method, potassium and sodium using Randox test kit, all conforming to manufacturers' instructions.

Data analysis

Students *t* test using SPSS software (ver.20.0 for windows, IBM SPSS) was used to analyze data generated and significance was accepted at $p < 0.05$.

Results

Antibody analysis

Out of the 80 sera samples, 51 [sheep (n= 32) and goats (n= 19)] were positive to the PPRV antibody while 29 [sheep (n= 19) and goats (n= 10)] were seronegative.

Haematology profile

There were no significant ($p > 0.05$) differences in the haematological variables tested between PPRV seropositive and seronegative sheep (Fig 1). The mean WBC and platelets count of PPRV seropositive goats were significantly ($p < 0.004$) lower than those of seronegative goats (Fig 2). The mean PCV and RBC of seropositive goats were significantly ($p < 0.05$) higher than those of seronegative goats.

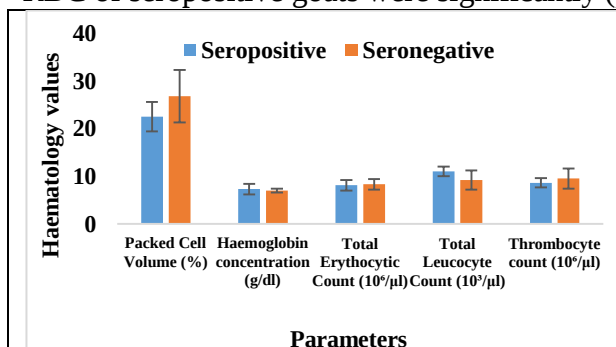


Fig. 1. Haematological parameters of natural PPRV infected sheep

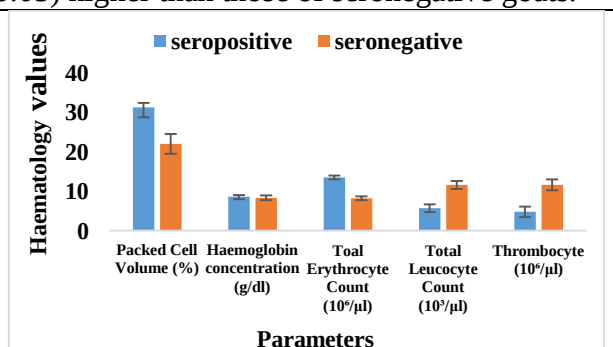


Fig. 2. Haematological parameters of natural PPRV infected goats

Biochemical profile

The mean AST, ALT, urea and creatinine concentrations of PPRV seropositive sheep and goats were significantly ($p < 0.05$) higher than those of seronegative sheep (Fig. 3a and b) and goats (Fig. 4a and b) respectively. The mean TP, albumin and potassium concentrations of PPRV seropositive sheep and goats were significantly ($p < 0.05$) lower than those of seronegative sheep and goats respectively. There were no significant ($p > 0.05$) differences in the direct bilirubin and sodium concentrations between PPRV seropositive and seronegative sheep and goats respectively. While there was no significant ($p > 0.05$) difference in the total bilirubin concentration between PPRV seropositive and seronegative sheep, there was a significant increase in the total bilirubin concentration between PPRV seropositive and seronegative goats.

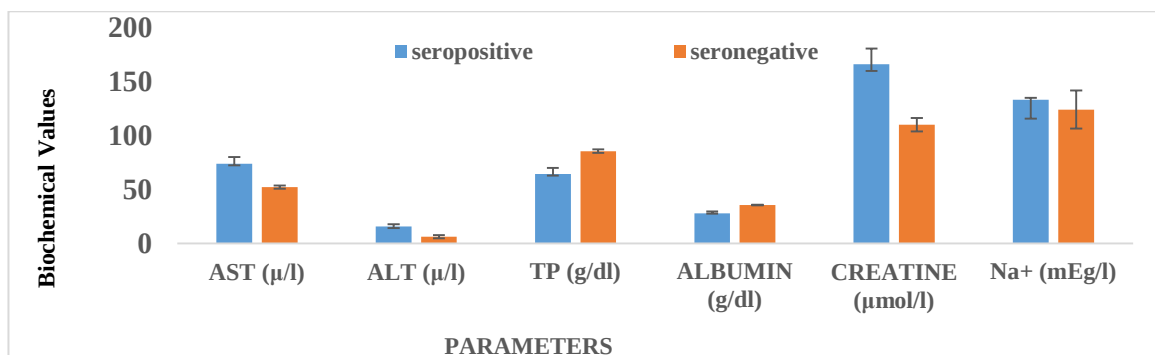


Fig. 3a. Biochemical parameters of natural PPRV infected sheep

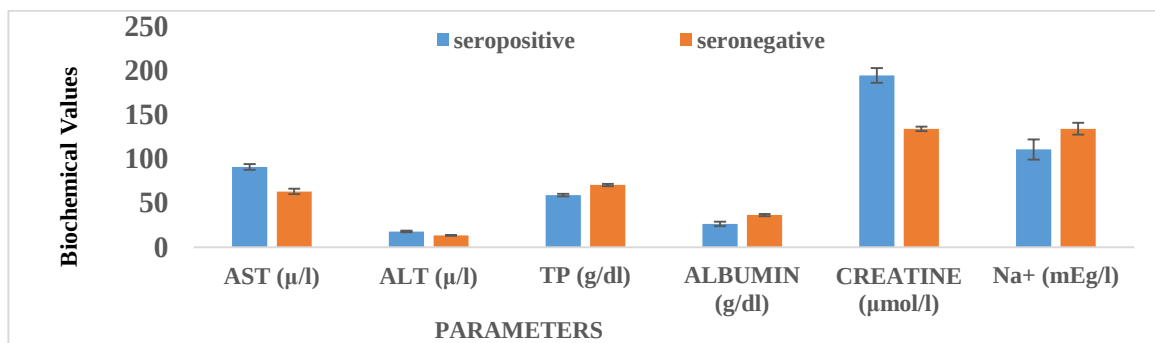


Fig. 4a. Biochemical parameters of natural PPRV infected goats

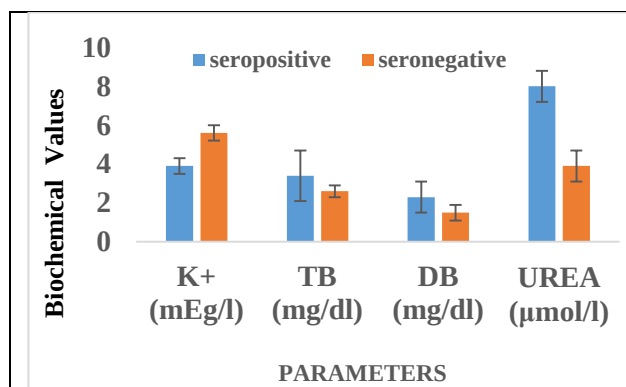


Fig. 3b. Biochemical parameters cont'd of natural PPRV infected sheep

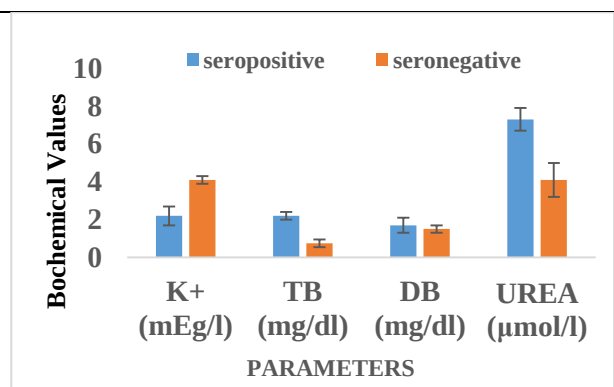


Fig. 4b. Biochemical parameters cont'd of natural PPRV infected goats

Discussion

The PPR seronegative sheep and goats showing clinical suggestive of PPR as observed in this study are likely to be suffering from other diseases such as contagious caprinepleuro-pneumonia, Pastorellosis, salmonellosis etc. that must be differentiated from PPR as they display same clinical signs. The study revealed leucopenia, thrombocytopenia and heaemo-concentration in the PPRV seropositive goats which agrees with the report of previous authors (Sahinduran *et al.*, 2012; Aytekin *et al.*, 2011; Islam *et al.*, 2018). But it contrasted with Das *et al.* (2015), Balogun *et al.* (2017) and Sharma and Tarunpreet (2016). The conflicting haematological reports of PPR affected small ruminants might be attributed to the severity of the disease, immunological/health status of the animal, different phases/stages of the disease, presence of secondary bacterial infections, helminthes infection/infestation, nutritional status of the animal, and the degree of dehydration (Aytekin *et al.*, 2011). Also geographical locations, specie and age may be factors responsible for these conflicting reports. The significant increases in AST and ALT activities, urea and creatinine levels, and lowered total protein, albumin and potassium ions observed in PPRV seropositive sheep and goats is similar to the reports of previous authors (Sahinduran *et al.*, 2012; Aytekin *et al.*, 2011; Sharma and Tarunpreet, 2016; Balogun *et al.*, 2017). The significant increase in total bilirubin concentration observed in PPRV seropositive goats also agrees with the findings of previous authors (Das *et al.*, 2015; Sharma and Tarunpreet, 2016). Thus, this alterations may be attributed to the liver and kidney damage caused by the replication of the virus in these organs (Sahinduran *et al.*, 2012; Sharma and Tarunpreet 2016). Comparing the haemo-biochemical profile of PPRV infected sheep and goats as observed in this study revealed that goats were more severely affected by the PPRV. This agrees with the findings of Truong *et al.* (2014). It has been reported that goats are more susceptible and severely affected by PPRV than sheep which was based on epidemiologic studies (Taylor, 1979). These severe alterations in the haemo-biochemical profile of PPRV seropositive goats may also offer reason why goats are more severely affected by PPRV.

CONCLUSION

It was therefore concluded in this study that PPRV alters haemo-biochemical profile of goats more than sheep.

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