



Clinico-pathological investigation of theileriosis in buffaloes in coastal Odisha

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Date of receipt: 27.08.2019

Date of acceptance: 17.12.2019

ABSTRACT

The present study was conducted in buffaloes over a period of five years from 1st July 2012 to 30th June 2017. The blood samples received in the Department of Veterinary Pathology, College of Veterinary Science and Animal Husbandry, Orissa University of Agriculture and Technology, Bhubaneswar, Odisha from buffaloes suspected to be affected with theileriosis on basis of clinical signs were included in the study. The cases were screened by examination of stained blood smear. Out of 180 numbers of blood samples from buffaloes, 168 (93%) cases were found positive and 12 (7%) cases were found negative. Season wise distribution of cases showed that the disease was highly prevalent in summer (44.04%) followed by rainy (35.11%) and least in winter season (20.83%). The disease was more seen in middle aged (6-9 yrs) animals followed by young to adult animals of <6 yrs of age. The clinical signs recorded in affected buffaloes were non-remittent pyrexia, enlargement of prescapular and prefemoral lymphnodes, anorexia, drop in milk yield, tachycardia, dyspnoea, pale mucous membrane, haemoglobinuria, corneal opacity, icterus, brisket edema etc. The average Hb%, PCV and TEC were 10.25 ± 2.51 g %, 31.02 ± 7.61 and 6.20 ± 1.28 million per cmm respectively indicating anaemia due to erythrolysis. TLC was 8159.23 ± 2324 and the percentage of N, L, E, B and M in DLC were 42.43 ± 14.77 , 52.77 ± 14.91 , 3.58 ± 3.91 , and 1.35 ± 0.75 respectively. The average MCV, MCH, MCHC values were 42.99 ± 7.48 , 14.20 ± 2.46 and 33.06 ± 1.18 respectively.

Key words: Buffalo, theileriosis, clinical signs, hematology, Piroplasms

INTRODUCTION

Buffaloes contribute more than 55% of total milk production of the country. Dairy cattle and buffaloes suffer from tick borne diseases and theileriosis is the biggest obstacle to livestock production (Dhar et al., 1987). The disease is caused by *Theileria annulata* of Genus *Theileriae* under Family *Theileridae* and being transmitted by ticks of *Hyalomma* spp. Theileria are obligate intracellular protozoan parasites that infect both wild and domestic bovines throughout the world along with some species of small ruminants causing clinical and subclinical infections. The disease is also known as 'Mediterranean coast fever' or

'Bovine tropical theileriosis' or simply 'Tropical theileriosis' and production losses and death in dairy animals in Africa, Asia and Middle East countries.

The pathological progression of the disease in a typical acute, often fatal, infection is manifested by clinical signs including enlarged superficial lymph nodes, persistent fever, anorexia, congested mucous membranes, corneal opacity, emaciation, unthriftiness, infertility, tachycardia and tachypnoea (Radostits et al., 2010). During the advanced stage there is lymphoid depletion and disorganization associated with massive lymphocytolysis and depressed leucopoiesis causing severe leukopenia. Due to widespread

destruction of the immune system, the animal shows dyspnoea, recumbency and finally death. Additionally, *T. annulata* infection is associated with profound changes in haematological profile and investigations of peripheral blood may reveal severe anaemia, leukopenia, and lymphocytopenia. Diagnosis of the clinical theileriosis can be made based on combined clinical signs and pathological findings.

Theileriosis very much occurs in buffaloes as like as cattle. Buffaloes not only suffer from clinical form of theileriosis but also act as carrier and source of infection for healthy cattle. But, there has been very little work undertaken globally to study this particular disease in buffaloes. This may be due to that buffaloes are reared in groups at the outskirts of human habitation nearby river, pond or swampy areas. They are hardy animals and are considered more resistant to diseases than indigenous cattle. The clinical signs and symptoms are less noticed as individual care is not taken up in buffaloes as seen in cattle (particularly crossbred and exotic cattle). It is also difficult to access these animals and handle them for treatment or collection of clinical samples for their robust size and hardy nature. There is no systematic study on the occurrence and pathology of theileriosis in buffaloes in India except few sporadic reports. The current investigation was aimed to study the clinico-pathological and hematological changes in affected dairy buffaloes.

MATERIALS AND METHODS

The blood samples were received time to time at Teaching Veterinary Clinical Complex, CVScAH, OUAT from buffaloes with suspected signs of theileriosis. They were then screened for theileriosis by examination of Giemsa stained blood smears. A total of 180 samples were screened and put for further investigation. The haematological values in the affected buffaloes which were found positive by examination of blood smears were recorded. Screening of affected animals was mostly based on clinical signs and presence of piroplasms in blood smear. The important clinical signs shown by theileria affected buffaloes were non-remittent pyrexia, enlargement of prescapular lymph node

(Fig. 1) and prefemoral lymph nodes including other signs as described earlier.



Fig. 1. Swollen pre-scapular lymphnode

RESULTS AND DISCUSSION

Screening of theileriosis

Examination of stained blood smears revealed piroplasms inside erythrocytes. The number of erythrocytes having piroplasms in their cytoplasm per high power microscopic field varied from case to case. The piroplasms were having different shapes like ring, oval, spherical, umbrella, comma, dot etc. (Fig. 2). Most of the blood smears

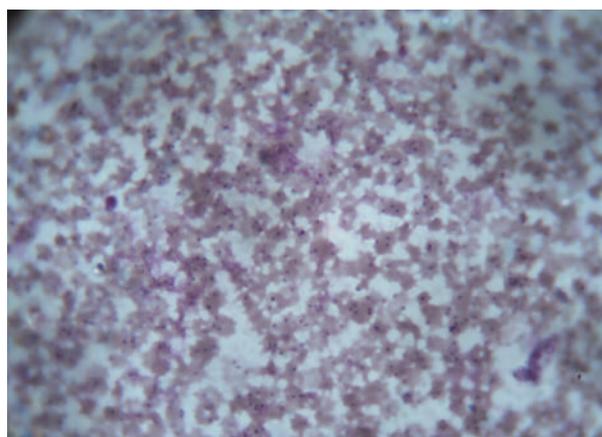


Fig.2. Microscopic examination of blood smear

from buffaloes showed rolex or chain formation of RBCs. Most of the workers (Hasanpour et al., 2008; Sridevi et al., 2011; Vahora et al., 2012; Kaushal et al., 2013; Ariyaratne et al., 2014; Sudan et al.,

2014; Waskel et al., 2015) have reported use of this method as a primary screening practice.

Incidence of disease

Positive cases were detected after screening of suspected blood smear to find out the incidence in coastal districts of Odisha. The cases were from districts adjoining Bhubaneswar namely Khurda, Puri and Cuttack. Only two cases were from Nayagarh district. Out of 180 numbers of blood samples from dairy buffaloes, 168 (93%) cases were found positive and 12 (7%) cases were found negative. Season wise distribution of cases showed that the disease was highly prevalent in summer (44.04%) followed by rainy (35.11%) and least in winter season (20.83%). The age of affected buffaloes varied from 1.5 yrs to 15 yrs with an average age of 6.3 yrs. Distribution of positive cases of theileriosis among different age groups revealed that the disease was more seen in middle aged (6-9 yrs) animals followed by young to adult animals of <6 yrs of age and seen least in older animals of age > 9 yrs. The number of positive cases in the above three age groups were 71 (62.88%), 81 (26.43%) and 16 (10.68%) in <6 yrs, 6-9 yrs and > 9 yrs of age respectively. Out of 168 cases found positive for theileriosis, 154 cases were of females and 14 cases in males.

Many previous workers (Khan et al., 2004; Oura et al., 2011; Vahora et al., 2012; Kaushal et al., 2013; Mohamed et al., 2013; Kundave et al., 2014; Pienaar et al., 2014; Waskel et al., 2015; Memon et al., 2016) have reported occurrence of the disease in buffaloes from various parts of the world. But systematic epidemiological investigation on the disease in India has not been performed. This may be due to the fact that the buffaloes are kept in large herds in riverbeds and barren lands and they cover large areas daily in search of food.

Haematological alterations

Blood is of crucial importance for the maintenance of physiological equilibrium in the

body. However, this equilibrium may be disturbed due to certain physiological and pathological conditions. The knowledge of haematological constituents is useful in diagnosing various pathological and metabolic disorders, which can adversely affect the productive and reproductive performance of buffaloes, resulting in great economic losses to farmers.

There were 168 numbers of positive cases and 12 negative cases found by examination of blood smear. All the 168 cases were subjected to haematological study. The parameters studied were Hb%, PCV, TLC, TEC, DC, MCV, MCH and MCHC. The values were compared with normal values. The average haemoglobin percentage of theileriosis in affected buffaloes was 10.25 ± 2.51 g% which was lower than normal value. The haemoglobin percentage in the affected buffaloes varied from 3.8 to 17.4 g%. Packed cell volume (31.02 ± 7.61) was also lower than normal. The PCV values in the affected buffaloes ranged from 12 to 55. Total leucocyte count of individual cases showed great variation ranging from 2600 per cmm upto 15600 per cmm and the average value was 8159.23 ± 2324 . Total erythrocyte count was lower than normal and the average was 6.20 ± 1.28 million per cmm indicating anaemia due to erythrolysis. In differential leucocyte count the percentage of neutrophil, lymphocyte, eosinophil, basophil and monocyte were 42.43 ± 14.77 , 52.77 ± 14.91 , 3.58 ± 3.91 , and 1.35 ± 0.75 , respectively. Although the average figures seem to be within the normal range there was great variation in individual data for the different cell types. Neutrophil, lymphocyte, eosinophil, basophil and monocyte percentage varied from 8-82, 17-90, 0-20, 0-1 and 0-7 respectively. The average mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC) values were 42.99 ± 7.48 , 14.20 ± 2.46 and 33.06 ± 1.18 respectively (Table 1).

The erythrocyte indices have been reflected in chart 1. Many workers (Osman et al., 2007; Hasanpour et al., 2008; Mohamed et al., 2013; Ariyaratne et

al., 2014; Memon et al., 2016) have reported fall in erythrocytic indices indicating anaemia caused due to erythrolysis due to theileriosis.

Table 1. Minimum, maximum and mean haematological values

Parameters	Min	Max	Affected Buffaloes	Apparently Healthy
Hb (g%)	3.8	17.4	10.25±2.51	13.24±1.97
TLC ('000 per cmm)	2600	15600	8159.23±2324	6800±1036
TEC (million per cmm)	4	10.3	6.20±1.28	7.4±1.34
PCV (%)	12	55	31.02±7.61	38.08±3.92
N (%)	8	82	42.43±14.77	35.22±4.63
L (%)	17	90	52.77±14.91	62.31±5.78
E (%)	0	20	3.58±0.91	3.54±.033
B (%)	0	1	0.07 ± 0.02	0.02±.001
M (%)	0	7	1.35±0.75	1.22±0.42
MCV (fl)	25.92	74.63	42.99±7.48	40.41±6.79
MCH (pg)	8.33	24.18	14.20±2.46	13.64±2.06
MCHC (g per dl)	30.28	36.67	33.06±1.18	38.45±2.06

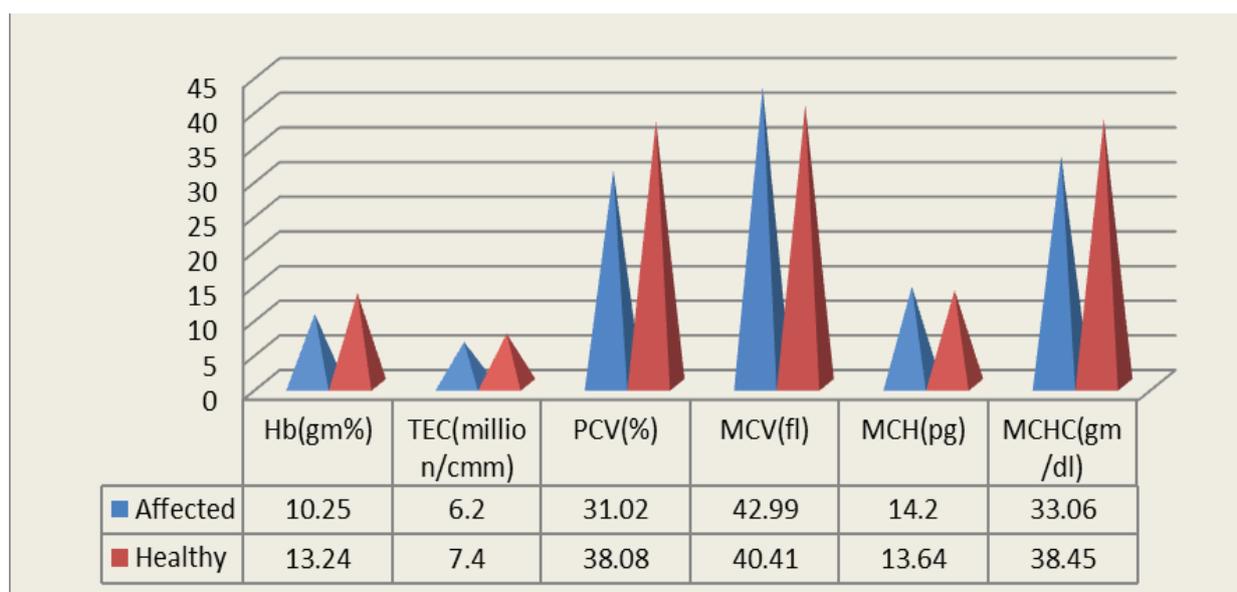


Fig. 3. Comparison of erythrocytic indices of affected ones with healthy buffaloes

CONCLUSION

From the above study it can be concluded that clinicopathological examination of suspected cases of Theileriosis is instrumental in diagnosis of the disease. Microscopic examination of thin blood smears of suspected blood sample is an age old golden method for diagnosis of theileriosis. Haematological estimation of suspected blood sample is usually practiced as an aid to diagnosis by clinician.

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