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Successful therapeutic management of theileriosis and anaplasmosis in a crossbred dairy cow aided by whole blood transfusion

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Abstract

A 10-year-old crossbred dairy cow was found to be positive for *Theileria* spp. and *Anaplasma* spp. on blood smear examination. Anaemia and a low haematocrit value advocating whole blood transfusion were the findings of complete blood count. Hence, a whole blood transfusion was administered to the cow. The animal was treated for theileriosis and anaplasmosis as per the standard therapeutic protocol. The cow recovered completely and is still in production. Further details are discussed.

Keywords: Cattle, tick-borne disease, anaemia, whole blood transfusion

Introduction

Theileriosis and Anaplasmosis are described as the tick-borne diseases and have a worldwide occurrence (Brown, 1997) [1] and (Kocan *et al.*, 2003) [2]. Moderate to severe anaemia, lymph node enlargement, economic losses to the farms due to decreased milk production are peculiar findings in theileriosis and anaplasmosis affected cattle in India. The consideration of whole blood transfusion should be done in all animals whose PCV values are below 20%. This therapeutic protocol ensures almost immediate results such as normalising of heart rate, respiratory rate, increase in venous oxygen saturation (Constable *et al.*, 2017) [3].

Materials and Methods

The present therapeutic study was conducted at dairy cattle unit, University Livestock Farm and Fodder Research Development Scheme, Mannuthy. The affected crossbred dairy cow (age 10 years and 358 kg BW) exhibited lethargy, decreased milk production and anorexia for a day. Clinical examination revealed fever (103⁰ F), pale mucosae and enlargement of prescapular lymph node. Anaemia (RBC count 2.27 x 10⁶/μL and Hb count 3.3 g/dL) was the finding of complete blood count. Peripheral blood smear was found positive for *Theileria spp* and *Anaplasma spp*. Based on the clinical signs and low haematocrit value of 15.3%, the animal was subjected to whole blood transfusion immediately. A non-pregnant cow weighing 410 kg, was used as the donor (Figure.1). Complete blood count examination was done for the recipient and donor, using auto-haematology analyser (Orphee Co.). The complete blood count values of the donor cow are presented in tabular form (Table-1). Donor was screened for the presence of blood parasites, using peripheral blood smear and was found negative. The total volume of blood required was calculated using the formula $TV(L) = VDB(\text{volume of distribution of blood}) \times BW(\text{kg}) \times \{[\text{Desired PCV}(\%) - \text{Recipient PCV}(\%)] / \text{Donor PCV}(\%)\}$ (Divers, 2005) [4]. The value of the VDB in cattle is 55. A total of nine blood bags of 350 ml capacity, each were used for this case. Each blood bag was pre-filled with 49 ml of the anticoagulant citrate phosphate dextrose adenine.

Results and Discussion

Therapeutic protocol for treatment of theileriosis and anaplasmosis was administered. The cow was treated for theileriosis with injection buparvaquone @ 2.5 mg/kg body weight deep i/m and for anaplasmosis with injection oxytetracycline @ 10 mg/kg i/v for 5 days. As per the formula, $55 \times 358 \times \{[22-15.3]/39.5\} = 3150$ ml of blood was transfused, over a period of three hours (Figure.2). The procedure was started at 2ml/kg/hour for the first 15 mins, after which the rate was doubled to 4 ml/kg/hour, for the next 15 mins.

At 30 mins in the procedure, the rate was again doubled to 8 ml/kg/hour and lastly at 60 mins, the maximum rate of 10ml/kg/hour was adopted. Temperature, heart rate and respiratory rate were monitored, prior to the initiation, at initiation and every 15 mins during the transfusion. Fortunately, there were no adverse reactions observed in this animal during and after transfusion. Hunt and Wood (1999) [5] have reported tachycardia, tachypnoea, dyspnoea, lacrimation, sweating, muscle tremors, to be some of the clinical signs of blood transfusion reaction in cattle. Complete blood count results, three days post whole blood transfusion, revealed PCV, Hb and RBC values to be 20%, 4.5 g/dL and 3.0 x 10⁶/μL, respectively (Table-2). Peripheral blood smears were found to be negative for blood parasites. Clinical findings were consistent with normal appetite and increase in milk production, suggestive of clinical improvement. These observations are in correlation with Saritha *et al.* (2016) [6], who found similar improvement in a calf post blood transfusion. The cow had a slow steady recovery over a period of 15 days.



Fig 1: Donor cow - during blood collection



Fig 2: Recipient cow – during whole blood transfusion

Table 1: Complete blood count parameters of donor cow

Parameters	Values
Red blood cells x 10 ⁶ /μL	7.82
Haemoglobin (g/dL)	11
Packed cell volume (%)	39.5
White blood cells x 10 ³ /μL	7.6
Lymphocytes%	45
Monocytes%	6.9
Granulocytes%	35

Table 2: Complete blood count parameters of recipient cow

Parameters	Pre – transfusion values	Post-transfusion values
Red blood cells x 10 ⁶ /μL	2.27	3.0
Haemoglobin (g/dL)	3.3	4.5
Packed cell volume (%)	15.3	20
White blood cells x 10 ³ /μL	11.4	8.6
Lymphocytes%	81.2	82.3
Monocytes%	4.2	3.4
Granulocytes%	14.6	14.3

Conclusion

The crossbred dairy cow suffering from anaemia due to the mixed infection of theileriosis and anaplasmosis, was treated successfully with parenteral therapeutic management and whole blood transfusion.

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