CASE REPORT

Management of Post-parturient Haemoglobinuria in a Primiparous HF Cow using Whole Blood Transfusion with an Alternative Approach

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Post-parturient haemoglobinuria is a sporadic condition seen world-wide, most commonly affects high-yielding dairy cows at the onset of lactation. It is characterized by development of acute intravascular haemolysis often associated with haemoglobinuria leading to potentially life-threatening anaemia. Beef and non-lactating cattle are rarely affected. The exact cause is unknown, but phosphorus depletion or hypophosphatemia, as well as copper deficiency and possibly haemolysing substances contained in certain feeds have been incriminated as potential causative or risk factors. Severe intracellular phosphorus depletion of RBCs is known to increase their osmotic fragility possibly predisposing to intravascular haemolysis. Blood transfusion is the first line of therapy in the treatment of animal which is suffering from various types of severe haemorrhage or blood loss. Blood transfusion is the transfusion of the whole blood or its components (blood cells or plasma) obtained from a healthy animal (donor) to another animal (recipient) whose blood is deficient in quantity and quality. This report documents such a clinical case in HF crossbred cow that was managed successfully with blood transfusion.

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Case History and Observations

A crossbred HF cow aged 3 years was presented to the VCC, Kumarganj, Ayodhya with a history of anorexia, dullness and voiding of reddish urine. On examination, the vital signs were tachycardia, tachypnoea, weak pulse, rectal temperature of 103.6 ^{0}F, pale to icteric conjunctival mucous membrane (Fig. 1), absence of rumination and haemoglobinuria were observed. Haematological parameters were Hb - 3.1 g/dL, HCT- 9.3%, total RBCs -1.95 million/µL, and WBCs - 9500/ µL. So it was decided to go for instant blood transfusion.

Fig. 1: Pale conjunctiva

Treatment and Discussion

The donor cow was selected considering standard criteria on the basis of clinical examination, haematological examination (examined for haemoprotozoan and CBC) and of same breed and non-lactating. It was a crossbred HF cow aged 5 years, weighing 380 kg, having 10 g/dL Hb, 8.5 millions/µL total RBC, 30% PCV and 11600/µL total WBC. After proper restraining in the travis, the donor cow was sedated with 0.3 mL xylazine intramuscular injection. After aseptic preparation of right jugular area of donor cow, blood was collected with 16 G

needle in 20 mL syringe and filled-in the urine bag (2 lit capacity) containing anticoagulant sodium citrate 3.85% @ 1 mL /10 mL blood.

The recipient animal was also restraint in the same way as that of donor without sedation. The uro-bag containing whole blood was attached to the blood transfusion tube (BT-Tube). The jugular area of recipient was aseptically prepared in the same way as that of donor. Inj. Chlorpheniramine maleate 10 mL and inj.Dexamethasone 10 mL were given i/m ten min prior to blood transfusion in order to avoid transfusion reaction. The blood bag was suspended 1 meter above the level of the recipient's head, and with a 16 G needle inserted in the jugular vein, the blood flow was started relatively slowly for the first few min and then gradually increased the flow rate to maximum due to absence of transfusion reaction. The entire transfusion was performed within two and half hour. Post-transfusion reactions were absent. The animal was treated for six days with intravenous oxytetracycline (@ 10 mg/kg b.wt), sodium acid phosphate injection 10 mL, intravenous fluids, multivitamin injections in order to prevent secondary bacterial infection and as supportive therapy (Cohrs and Grünberg, 2018). The animal made uneventful recovery.

Diagnosis of postparturient haemoglobinuria is usually made by recognition of clinical signs, particularly dark urine and anaemia during the characteristic stage of lactation. Haemoglobinuria may best be diagnosed by noting failure of the urine to clear with centrifugation (excluding haematuria) and presence of concurrent severe anaemia. Low PCV, erythrocytes, and haemoglobin and serum inorganic phosphorous, whereas increase in TLC, percentage of granulocyte and serum total bilirubin. In the present case, blood transfusion therapy was given after choosing apparently one healthy donor, along with other supportive therapies for a week. A characteristic increased value of PCV to 15.2% on 25th day of blood transfusion was noted. The animal showed an uneventful recovery.

Acute phosphorus losses associated with hypophosphatemia are a well-recognized problem in high-yielding dairy cows at the onset of lactation. Phosphorus depletion can also result from chronic renal tubular disease due to impaired renal reabsorption of phosphorus. Chugh *et al.* (1998) reported the severe hypophosphatemia leading to postparturient haemoglobinuria (PPH) in buffaloes. Increased fragility of RBCs associated with hypophosphatemia is suggested to subject erythrocytes to destruction by circulating oxidants (Jubb *et al.,* 1990). Phosphorus deficiency is usually primary, *i.e.,* involving an absolute deficiency in the diet (Radostits *et al.,* 2007). Symptoms are classical and the phosphorus deficiency, leading to hypophosphatemia, may be a mechanism of postparturient and related syndromes of haemoglobinuria by decreasing red cell glycolysis and resultant ATP synthesis. Chronic phosphorus depletion and hypophosphatemia is most effectively treated by providing sufficient amounts of feed with adequate phosphorus content. Intravenous administration of phosphorus-containing solutions is the most appropriate approach. In cattle, rapid administration of mono or dibasic sodium phosphate salt solutions is commonly practiced.

The best treatment for severely affected cows with PPH is transfusion of large quantity of whole blood (Roberts, 1986). In PPH affected animals about 4 liter blood to a 400 kg cow is recommended. If the animal is incapable and mucous membrane is colourless, at that time this amount of blood will usually be enough for upto two days by which time an additional transfusion may be necessary. After the blood transfusion, supportive fluid therapy is necessary to reduce the danger of haemoglobinuria nephrosis (Radostits *et al*., 2007).

In this particular case, blood transfusion was performed with an alternative approach, which is more suitable under field condition in case of unavailability of regular blood transfusion bag. Whole blood was collected from donor in a sterile urine bag with 20 mL disposable syringe. Sterile urine bag is easily available and it is coast effective. Preferred 3.8% sodium citrate solution (anti-coagulant) @ 1 mL for 10 mL of whole blood and it was also easily available either at VCC or in the form of powder at district veterinary hospitals.

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