Therapeutic management of blood transfusion reaction in a crossbred cow

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ABSTRACT
A crossbred cow aged 6 year was presented to Teaching Veterinary Hospital of the Institute with the history of fever, tick infestation, anemia and decreased milk yield since last 10 days. Clinical examination revealed fever, pale mucous membrane and nil rumen motility. Hematological examination findings were anemia, leucopenia, relative neutrophilia and lymphopenia and decreased platelets. Blood smear examination revealed *Anaplasma Marginalae* infection. Animal was treated with blood transfusion, oxytetracyclin, oral hematinic and multivitamin. After half an hour of start of transfusion, cow showed transfusion reaction in the form of urticarial eruptions all over the body, edema of eyelids, lips and over the face, frothy discharge from mouth with slight muscle tremor and shivering. Transfusion reaction was successfully managed with Adrenalin, Dexona, Avil along with normal saline.

Key words: Anaplasma, Blood transfusion, Cow, Reaction.

Blood transfusion is the most satisfactory treatment in anemic patient. In cattle, due to large number of red cell antigens, blood typing is not feasible and it is almost impossible to find out a perfect donor. Cross matching is done as an alternate to blood typing to safeguard against transfusion reaction. Generally first transfusion is considered safe in cattle even done without cross matching due to absence of naturally occurring alloantibodies (Smith, 2002). This article reports a rare case of transfusion reaction and its management in a crossbred cow.

Case history and observations
A cow aged 6 year was presented to teaching veterinary hospital of Guru Angad Dev Veterinary and Animal Sciences University Ludhiana with the history of fever, tick infestation, anemia and decreased milk yield since last 10 days. Clinical examination revealed fever (temperature-103.6°F), pale mucous membrane and nil rumen motility. Blood was collected from jugular vein in EDTA and submitted to diagnostic laboratory for hemoprotozoan and hematological examination. Radiography of reticular area was done to rule out any potential foreign body.

Hematological examination findings were anemia (Hb-6.1g/dl, PCV- 14.2%), leucopenia (3110/µl), relative neutrophilia( 70%) and lymphopenia(30%) and decreased platelets( 72X10^3). Blood smear examination revealed *A. marginale* infection. No potential foreign body was detected on radiographic examination of reticular area. Animal was treated with blood transfusion, oxytetracyclin(Inj Terramycin, Pfizer ltd.) @22mg/kg b.wt i/v once a day for 7 days, Tab CoCu-R (Rajan Healthcare) @ 5 tab orally once a day for 15 days, Bolus Yeasacc(Petcare) @ 2 orally twice a day for 5 days. Before blood transfusion major and minor cross matching of donor and recipient blood were done for compatibility. The result of cross matching was compatible. Four liter of blood was collected in sterilized glass bottles from donor animal by using 14 gauze needle from jugular vein of the animal. Sodium citrate(3.85%) was used as anticoagulant @ 1ml/10 ml of blood for blood collection. Blood transfusion was done by using transfusion set with filter (Fig. 1). Initially the rate of transfusion was kept at 60 drops / minute. After half an hour of start of transfusion, cow showed transfusion reaction in the form of urticarial eruptions all over the body, edema of eyelids, lips and over the face, frothy discharge from mouth with slight muscle tremor and shivering (Fig. 2,3). After development of clinical signs of transfusion reaction, blood transfusion stopped immediately and animal was administered with Inj. Adrenalin(Vasocon, Neon Labs) @ 0.02ml/kg b.wt i/m, Inj. Dexamethasone(Dexona, Sarabhai Zydus)@ 0.2mg/kg b.wt i/v and Inj. Pheniramine maleate(Avil, Intervet) @ 0.5mg/kg b.wt. i/v along with normal saline @5liter i/v. After 20 minutes of administration of this treatment, clinical signs of transfusion reaction started to subside and after two hour animal recovered completely and became normal (Fig. 4-6).

On the basis of clinical, hematological and blood smear examination findings, animal was diagnosed to have anemia due to anaplasmosis. Anaplasma are obligate intraerythrocytic parasite. They infect mature erythrocyte by an endocytic process and reproduction occur by binary fission. Parasitized erythrocytes are removed by phagocytosis.

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Fig 2&3: Signs of reaction as frothing from mouth, swelling of eyelids, urticarial eruptions over the skin

Fig 4-6: Disappearance of clinical signs after two hour of treatment in the same cow.

Product contents and concentration-

InjTerramycin - Oxytetracycline Hydrochloride 50 mg/ml
Inj Tribivet- Vitamin B1 50mg + Vitamin B6 50mg + Vitamin B12 500mcg/ml
Inj Dexona- Dexamethasone 4.4mg/ml
Inj Avil- Pheniramine maleate 22.75mg/ml
Inj Vasocon- Adrenalin(1:1000) 1mg/ml
BolusYeastac - 5 x 10^9 live Cells of Saccharomyces cerevisiae Strain 1026/gm.
Tab CoCu-R Cobalt 19.47 mg, Copper 196.10 mg, Magnesium 3.28 mg, Manganese 10.83 mg, Zinc 3.84 mg, Iron 13.38 mg, Iodine 0.56 mg/gm

in the reticuloendothelial system with release of acute phase inflammatory reactants and the consequent development of anemia and fever. The appearance of antierythrocytic antibodies late in the acute stage may exacerbate the anemia. Blood transfusion was done to replace red blood cells, platelets, coagulation factors and blood proteins to maintain the proper tissue oxygenation. Blood transfusion was done after proper major and minor cross matching even then animal had transfusion reaction. Ideally blood typing and examination of plasma for alloantibodies of both, donor and recipient is required before transfusion but this is not feasible in cattle (Radostits et al., 2007). In ruminants there are large numbers of red cell antigens and there is extensive phenotypic variation so it is very difficult to find a perfect donor. Cross matching detects only antibodies to red blood cells and not to white blood cells and platelets, therefore immunogenic transfusion reactions can occur even after cross matching (Harrell and Kristensen, 1995). This might be the reason for reaction in the present animal. During transfusion reaction there is release of pharmacologically active mediators of anaphylaxis like histamine, serotonin, catecholamine, vasoactive polypeptides such as kinin, cationic proteins, anaphylatoxins, prostaglandins and slow release substances- A(Harrell and Kristensen, 1995). Transfusion reaction was successfully managed by using adrenalin, dexamethasone and pheniramine maleate. In the treatment of systemic reaction in which autocoids other than histamine play major roles, the main stay of therapy is epinephrine. Epinephrine administered intramuscularly is
often immediately effective and corticosteroid potentiate the effect of epinephrine and may be given immediately following the epinephrine (Durham, 1996, Brunton et al., 2006). Terramycin was used to eliminate anaplasma from the animal body. It acts by interference with protein synthesis of the microorganism through inhibition of attachment of aminoacids to the ribosome. Copper and cobalt were used to enhance erythropoeisis since these trace minerals play role in hemoglobin synthesis. Treatment of animal with terramycin, multivitamin and hematinic lead to marked recovery within 7 days of treatment.

This study concludes that blood transfusion is not completely safe even after major and minor cross matching and the animal should be kept under strict veterinary supervision during transfusion. Blood transfusion reaction is effectively managed by administration of epinephrine, dexamethasone, pheniramine maleate along with fluid therapy.

REFERENCES