

Blood Transfusion in a Calf with Life-Threatening Anemia

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Abstract: *In bovine, anemia occurs due to blood protozoan infection, ecto- and endo parasites and nutritional deficiency. Sometimes it may occur as a result of severe liver dysfunction and bone marrow depression. It is sometimes necessary for the practitioner to transfuse the ruminant with whole blood or plasma. The timely administration of blood in cases of life-threatening anaemia in calves is clinically important. In the present case blood transfusion was carried out successfully with the available resources and it is simple, economical and clinically rewarding.*

Keywords: *blood, transfusion, anemia, calf*

I. Introduction

In severe anaemia where there is extreme depletion of oxygen carrying capacity of the blood occurs and life is threatened, warrant need of blood transfusion is indicated. Most of the animals die due to severe anaemia (Tufani et al., 2009). Therefore, a simple, rapid, inexpensive and timely administration of blood in cases of life-threatening anaemia in cattle is clinically very rewarding. The whole procedure takes about 60 to 80 minutes and, is often economically justifiable (Andrew, 1999).

History and Clinical Findings

A 4 month crossbred female was presented to college hospital, CVSc, Tirupati on lateral recumbency with symptoms of sudden fall and inability to rise. On further enquiry owner reported emaciation, tick infestation and calf was reared in and around forest areas. Clinical examination of calf revealed temperature of 100^o F, blanched mucus membrane, STT < 4sec, CRT < 3sec, increased respiration (shallow inspiration), tachycardia and very rapid pulse. Severe tick and lice infestation were noticed. Blood and serum sample were collected and sent to the laboratory for immediate estimation of complete blood profile, total protein and AST.

Laboratory Investigation

Peripheral blood smear revealed no protozoan parasites and the calf was also found negative for gastrointestinal parasites. The hematological values were Hb – 3g/dl, PCV – 11%, TEC – 2.49 X 10⁶/μl, TLC – 5.03X 10³/μl and the biochemical values were TP – 4.8mg/dl, AST – 89 IU/dl. There is decrease in Hb, PCV, TEC suggesting severe anemia and decrease in TLC and platelets is suggestive of bone marrow suppression. Similar findings were reported by Tufani et al., 2009. Decrease in total protein might be due to tick infestation which is in accordance with Anthony et al., 2007.

Treatment And Discussion

Based on laboratory and clinical findings the calf was diagnosed with severe anemia due to ectoparasites (ticks and lice), where immediate blood transfusion may help in managing the condition. Nuri Mamak and Ismail Aytekin (2012) reported that chronic anemia may be a more common problem in ruminants. Ectoparasites (e.g. Haematopinus spp. and Linognathus spp.) are causes of chronic blood loss anemia, and iron-deficiency anemia.

These can affect neonatal calves. In cattle, the first blood transfusion should usually be safe, regardless of the donor. Blood donors should not have disease like bovine leukosis virus, anaplasmosis, and bovine viral diarrhoea virus (Nuri Mamak and Ismail Aytekin 2012). Total blood volume in cattle represents 7-8% of bodyweight. No more than 25% of total blood volume should be collected from a donor at one time. In practice, 10-15% of an adult's blood volume (5-6 litres) is usually sufficient for most indications. (Gareth Bell, 2006).

Assessment Of Recipient

Total blood volume estimated in cattle is 10-20 mL/kg. As, the calf weighed 40kgs the blood volume estimated was 800ml.

Selection Of Donor

The choice of donor may be restricted by availability, but should be a healthy, mature animal which is amenable to handling. In the present case the calf's mother (4 calvings, Bodyweight: 300 kgs approx.) was selected and the blood profile was carried out to rule out any infection. However the donor was found to be

apparently healthy with Hb – 12 g/dl and PCV– 42 %. Using jugular catheterization, i.e., the hair near jugular furrow was clipped and the site was aseptically prepared. Then, Jugular vein was raised using pressure and a 16G 2 inch needle was inserted into the vein. As the required volume of blood was estimated to be 800ml, the same volume was collected into sterile glass bottles (autoclaved) containing 3.8% sodium citrate anticoagulant and while collecting the bottle was rotated slowly and vertically ensuring proper mixing of blood with anticoagulant. As, the anticoagulant of choice in bovine blood transfusions is sodium citrate, which is both cheap and readily available. 3.8% stock solution sodium citrate (w/v) is used at a rate of 1 part solution: 9 parts blood (Gareth Bell,2006).

II. Administration

First transfusions are usually safe to apply without a blood cross-match but cross matching is recommended when more than 48-72 hours have passed away since the first blood transfusion. However, in the present case cross matching was done by mixing a drop of donor blood with recipient serum. No agglutination was found. Therefore, the collected blood was transfused by securing the calf's head to one side to rise the jugular vein, as the calf was in lateral recumbency. A 18G 2 inch needle was inserted into the raised jugular vein and was connected to the bottle containing donor blood with the help of sterile infusion tube. In order to monitor transfusion reactions blood was first transfused slowly and the vitals of the calf was monitored continuously. After transfusion antihistamine (Zeet* @ 30mg total dose) along with broad spectrum antibiotic (Floxadin** @ 2.5 mg/kg) intramuscular was administered to combat any contamination and prevent adverse effects . In the present case we noticed respiratory distress where 2ml of adrenaline was administered immediately followed by corticosteroid (Dexona*** @ 2ml) as it is effective in relieving respiratory distress by decreasing the permeability of pulmonary vessels in order to maintain vascular integrity and provides relief from hypersensitivity/allergic reactions (Arash, 2009). After the transfusion process, the calf was noticeably normal and after 72 hrs of monitoring the calf was able to stand & had a brighter look.

III. Conclusion

Vital part of veterinary emergency and critical care medicine is transfusion medicine in severe anemia. In severe anaemia where there is extreme depletion of oxygen carrying capacity of the blood occurs and life is threatened, warrant need of blood transfusion is indicated. Most of the animals die due to severe anaemia (Tufani et al., 2009). Blood and blood products can be obtained through the purchase of blood products or donors. Therefore, a simple, rapid, inexpensive and timely administration of blood in cases of life-threatening anaemia in cattle is clinically very rewarding.

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