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Original article

Preliminary clinical observations following intravenous blood transfusions in the sokoto gudali cattle, Sokoto, Nigeria

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ABSTRACT

Preliminary clinical observations were carried out following intravenous blood transfusions in some eighteen (18) Sokoto Gudali cattle. Six (6) cattle as control, six (6) cattle designated as donors and six (6) as recipients. Blood was collected via venepuncture using commercial blood bags used for humans. The collected blood was immediately transfused to the recipients; observations for clinical signs, reactions and vital parameters were recorded. Repeat intravenous transfusions were also conducted and similar clinical observations were conducted. Reactions observed in recipient include; Hyperthermia tachycardia, hyperpnoea and anorexia. A mean increase of 7.83 cycle/min and 3.83 was observed for respiratory rate, heart beat rate and packed cell volume respectively. A mean decrease in temperature of 3.6^0C was observed in the recipients. No mortality was recorded aside from those clinical observations.

1. Introduction

Transfusion of blood is indicated in certain medical conditions such as massive blood loss as a result of trauma, shock and other conditions that decreases the tissue perfusion of oxygen e.g. infection, increase destruction of erythrocytes or failure to produce erythrocytes, chronic non-regenerative anaemia, Auto immune Haemolytic anaemia that is life threatening, Hypoproteinemia when the plasma protein is less than 5g/dL and when the albumin level is less than 1.5g/dL., liver damage or liver disease, whole blood or preferably fresh plasma can be given to patients with severe liver disease (Smith, 2007).

There are eleven major blood groups systems in cattle, A, B, C, F, J, L, M, R, S, T and Z. The B group has over 60 different antigens, making it difficult to closely match donor and recipient (Umaru, 2012). Blood is a slight alkaline fluid which serves as a carrier of nutrient to all over the body. Gaseous exchange within the soft tissue, Neuro-endocrine activity, thermoregulation and engage in defence activity as well as maintaining of tissue pH. (Merck Manual, 2005). These are known to consist of a fluid portion or plasma in which blood cells (RBC, WBC and platelets) are suspended (Gigar *et al.,* 1995). Frequently, the need for blood transfusion is acute, as in acute haemolysis is haemorrhage, transfusions are also appropriate in the treatment of acute or chronic anaemia, as in replacement of blood loss caused by accident, haemorrhage, shock of plasma substituted (Cynthia *et al.,* 2005). Up to 10% of the blood volume can be taken without ill effect i.e. 10% of the donor body weight (100ml for 10kg). Adverse reaction due to incompatible blood type is rarely seen in ruminant (Learoyd, 2006).

According to Hale, (1995), lack of commercially available blood typing reagents makes complex typing and matching difficult. The most serious risk of transfusion is acute haemolysis, but this should not preclude the clinical use of transfusions. Repeated blood transfusion may be a serious problem associated with delayed haemolysis seen clinically (Hale, 1995). Other complications of transfusion includes sepsis from contaminated blood, hypocalcaemia from too much citrate, hypervolaemias and fever are also seen occasionally. Transfusion may also spread disease from donors to recipients such as RBC parasites, viruses and bacterial pathogens if the donors harbouring the pathogens. (Vamvakes and Blajchaman, 2001). The practice of blood transfusion in animals for therapeutic purposed is relatively of recent origin but has a long history (Learoyd, 2006). The practice of blood transfusion in domestic animals in Nigeria is rare, there is an increase need for the practice of blood transfusion in our domestic animals due to high percentage of death as a result of post-partum haemorrhage and severe anaemia recorded. The process of blood transfusion will therefore greatly contribute to improved veterinary services thereby reducing loss of animals clinically. Blood transfusion in animals in the area of study has not been reported. It has been performed elsewhere majority in small animals i.e. dog and cat (www.thehindv.com). In ruminant blood transfusion cross matching is only rarely performed all that is advisable is to inject 200ml of donor blood to the adult recipient and wait for 10 minutes if no reaction occurred the rest of the blood can probably be safely administered, adverse reaction is more commonly seen in very young animals or pregnant cattle's (www.doctorslounge.com) the aim of this study is to demonstrate the practicability of collecting blood from one bovine and transferring it to another while observing for possible adverse reactions.

2. Materials and methods

Eighteen (18) adult Sokoto Gudali cattle of either six and varying ages were used for this study. The animals were the teaching and research animals of the university farm in Dabagi near Sokoto. They were usually managed semi intensively on the vast grazing land of the farm. However, they are occasionally supplemented with bean haulm, wheat bran, salt lick and fresh tap water *ad libitum*. The animals were conditioned for 21 days before the commencement of the experiment. During this period, a prophylaxis antibiotic along with deworming of the animals was undertaken. Blood samples were taken using EDTA bottles for PCV. The animals were divided into three groups of six (6) controls, six (6) donors and six recipients. The donors were physically restrained and jugular vein was prepared aseptically with Savlon and commercial blood bags were prepared with 18g hypodermic needle was inserted via the jugular vein. The quantity of blood depends on the weight of the animal i.e 10% of the blood volume can usually be taken without any effect i.e rough guide of 1% of the donor body weight i.e 100ml for 10kg as reported by Boden (2001). Samples were stored in the refrigerator for a period of two days before administration. Before administration the PCV were taken and were also warmed to body heat before administration according to Boden (2001). The recipients were prepared and mildly sedated, the site of choice for the transfusion was the cephalic vein materials use includes: Butterfly needle, Given set and Adhesive tape.

The animals were observed for any possible reaction with record taken at every stage. Clinical observation during and after intravenous blood transfusion were conducted.

3. Results and discussion

From the result, the increase in temperature of about 5-10^{0}C by the recipient goats is likely due to an introduction of new substances into the circulation of the animals which is explain by the work of (Smith, 2007). It was observed during the work that there was an increase in PCV after the transfusion (significantly 5-10%) it is therefore expected as appreciable amount of blood i.e. not less than 200ml per goat was transfused compared to the literature, a transfusion rate of 10-20ml/kg recipient weight is necessary to result in appreciable increase in PCV (www.ddoctorslounge.com) other observation in the course of this work include salivation, lacrimation, coughing, urination and hiccoughing. And after transfusion, the animals were highly pyretic with an increase of 5-15^{0}C of body temperature. This signs were also among the reactions seen in the literature. Though there were more reactions which include hematuria, heamogloburiamia, collapse opisthionus muscle tremors etc (www.thehindu.com).

All the reactions listed were not observed in the course f the work. The drop in temperature of the donors after blood collection were not reported elsewhere, the increase in temperature of the recipient after transfusion is in accordance with the observation of Learoyd (2006) and Harrel *et al.,* (1997). Finally, a significant success of the work as an increase observed in PCV of recipients, successful procedure were practicable and clinical observation were mild, so also there was no abnormal reaction of haemolytic or non haemolytic types. Several animals were successfully transfused with blood in the course of surgery at UDUVTH. It is therefore recommended that blood transfusion should be practiced due to its positive contribution to animal health. Further investigation is therefore required or more successful transfusion in animals especially with regards to blood typing and compatibility. From the vital parameters, it was observed that there was slight increase in body temperature, pulse and respiratory rate. This could be a result of rigorous restraining the animals underwent. More so, these types of changes are expected as a foreign blood is being introduced or it could be due to increase or decrease in total body blood volume. This type of reaction can occur on the first transfusion.

Table 1
Vital parameters of Donors before and after collection.

Animal	Temp. (^{0}C)		Resp. Rate		Pulse rate		PCV (%)	
	Before	After	Before	After	Before	After	Before	After
1st donor	39.5	41	26	28	72	72	34	39
2nd donor	38	40.5	22	28	68	76	38	39
3rd donor	40	41	26	30	69	72	39	45
4th donor	40.5	41	28	30	74	79	40	43
Mean±SD	39.5±1.3	40.8±1.6	25.5±3.5	29.0±3.2	70.5±4.0	74.7±3.4	37.7±3.8	41.5±3.5

SD- Standard Deviation

Table 2
Vital parameters of Recipient before after transfusion.

Animal	Temp. (^{0}C)		Resp. Rate		Pulse rate		PCV (%)	
	Before	After	Before	After	Before	After	Before	After
1st Recip.	38	40	26	30	70	72	37	40
2nd Recip.	37.5	40	26	29	74	74	38	40
3rd Recip.	37	39	28	30	79	77	36	41
4th Recip.	38	40.5	28	30	74	76	38	41
Mean±SD	37.6±2.2	39.8±2.4	27.0±2.7	29.0±2.3	74.2±0.4	74.7±0.7	37.2±3.3	40.5±2.2

SD: Standard Deviation

Clinical signs occur rapidly after transfusion (Within 1-45minutes) and range from skin reaction to mild allergic reactions. Treatment includes administration of antihistamine and corticosteroids more sign are treated accordingly (www.Doctorslounge.com).

From the above table it was also observed that there was increase in temperature after transfusion as well as increase in respiration, but only a slight variation in pulse before and after transfusion. After analysis of the blood sample, both sample of recipient before and after transfusion it was observed that there was slight increase after transfusion.

Table 3

PCV,Temperature, Respiratory and Heart rates of the Donor before and after Transfusion.

Animal	Temp. (^{0}C)		Resp. Rate		Pulse rate		PCV (%)	
	Before	After	Before	After	Before	After	Before	After
1st Donor	26	28	34	39	39.5	41	72	78
2nd Donor	22	28	38	31	38	40.5	68	76
3rd Donor	26	30	39	45	40	41	69	72
4th Donor	28	30	40	43	40.5	41	74	79
Mean± SD	25.5±3.5	29±3.3	37.75±1.8	39.5±1.9	39.5±1.3	40.87±1.4	70.75±5.5	76.26±4.2

SD- Standard Deviation.

Table 4

Reaction shown by the Donor.

Donor	1	Mild salivation, Urination
Donor	2	No any observation
Donor	3	No any observation
Donor	4	No any observation

Table 5

Vital parameters of Recipient before and after transfusion.

Animal	Temp. (^{0}C)		Resp. Rate		Pulse rate		PCV (%)	
	Before	After	Before	After	Before	After	Before	After
Recipient	26	30	37	40	38	40	70	70
Recipient	26	29	38	40	37.5	40	74	76
Recipient	28	30	36	41	37	39	79	78
Recipient	28	30	38	41	38	40.5	74	78
Mean± SD	27.0±2.7	29.7±2.3	37.25±3.2	40.5±3.0	37.6±2.2	39.8±2.0	74.2±1.2	75.5±1.0

SD- Standard Deviation

Table 6

Clinical Observations of condition of animal after 1st and 2nd transfusion.

Animals	1st Transfusion	2nd transfusion
Salivation	Mild	Mild
Lethargy	Mild	Mild
Dyspnea	Mild	Mild

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