

EFFECT OF ALTERNATIVE METHODS OF BLOOD TRANSFUSION ON HAEMATOLOGICAL PARAMETERS IN ANAEMIC DOGS

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The study on haematological changes revealed significant increase in haemoglobin (Hb), packed cell volume (PCV) and total erythrocytes count (TEC) at pre and 24 hrs. post blood transfusion in treatment groups blood bag, alternative method of blood transfusion followed by treated group with iron sorbitol, folic acid, B₁₂ injection in above mentioned parameters and however difference in values after said period was found to be very less.

Key Words: Blood bag method, alternative method, Blood Transfusion, Packed blood cell transfusion (PBC), Iron component therapy, Anaemia, Dog

Introduction

Anaemia is commonly encountered in veterinary practice. It is not clinically evident until the level of haemoglobin fall below 8g./dl. The need of blood transfusion apart from specific therapy are associated when considerable fall in haemoglobin percent, red blood cell count and packed cell volume. There are various alternative methods viz. blood bag method, autoclaved saline glass bottle method, packed blood cell transfusion of blood transfusion methods, to combat various diseases associated with anaemia. Many a times the availability and strength of a single donor may be a problem for sufficient fresh blood transfusion. In such cases heterologous donor blood transfusion is recommended. Although the techniques of transfusing blood from one dog to another has been known for centuries, but process of transfusion not easily accomplished in clinical cases as there is lack of blood typing reagent suitable to donors and commercial blood bank. Now this situation is beginning to change the focuses on practical and accessible transfusion methods for dog.

Therefore present study deals with the application of whole blood transfusion by blood bag method, alternative method (glass bottle containing 3.8% Na-Citrate solution @ 1 ml/10ml of blood), packed blood cell transfusion (PBC) and Iron component therapy in clinical cases of anaemia. This approach can be an effective path to improve the haematological profiles i.e., PCV, Hb and TEC in deficient/ anaemic dogs.

Materials and Methods

Screening of Anaemic Cases in Dogs (Recipients): One hundred and twenty eight clinical cases of dogs of various age groups were studied. Out of 128, 80 cases were found positive at Patna and area around Patna for anaemia. The cases were screened on the basis of clinical symptoms, haematological parameters, blood smear examination and faecal examination by direct smear technique for detection of parasitic egg. Besides, this ectoparasitic infestation, poor managemental condition and other conditions associated with anaemia were also taken into account. All the clinical cases of anaemia were subjected for detailed clinical examination as described by Benzamin (2001). Out of 20 cases of anaemic dogs randomly divided into four groups (T₁, T₂, T₃ and T₄) and were treated with repeated blood transfusion other supportive therapy as per the experimental design.

Collection of Blood from Donors and transfusion: Thirty (30) community dogs, previously vaccinated, free from external and internal parasites and regularly screened for blood parasites, apparently healthy with an average body weight of 15 kg were selected as blood donors and were maintained with normal balanced diet. Collection site was clipped, scrubbed and disinfected with skin antiseptic. Eighteen guage needles were used in donor dogs for collection of blood. The blood was collected from jugular vein at the dose rate of 20ml/kg body weight in CPD-A plastic bags, sterile glass bottle containing 3.8% Na-citrate

solution. The packed blood cell was transfused after mixing with physiological saline solution. Packed blood cell was prepared by collecting anticoagulated blood from donor and blood was centrifuged at 3000 rpm for 2 min. The supernatant fluid was discarded and packed cell mix with normal saline was and suspension was prepared for transfusion. Before each transfusion major and minor cross matching was done on serum and red blood cells from respective animals as per Schalm *et al.* (1975). The blood collected in CPD-A plastic bag, 3.8% Na citrate containing cleaned sterile saline glass bottle and blood cell normal saline suspension was used without refrigeration in T₁, T₂ and T₃ groups of anaemic dogs. The transfusion of blood was done at the dose rate of 20 ml/kg. body weight through saphanus/cephalic vein using a blood transfusion set. While T₄ was treated with iron sorbitol, folic acid, B₁₂ injection. Prior to transfusion in recipient dogs the corticosteroid and antihistaminic were given to avoid any adverse reactions. Analysis of donor blood for haematological parameters were done as per method described by Schalm *et al.* (1975) and

statistical analysis to study the effect of alternative methods of Blood Transfusion on Haematological Parameters in anaemic dogs was done as per description given by Snedecor and Cochran (1967).

Results and Discussion

Table No 1, 2 and 3 showed the effect of different methods of blood transfusion on the haematological parameters of anaemic dogs. The average estimates of Hb percentage in anaemic dogs were found to be ranged from 5.22±0.33 to 5.36±0.26 g percentage in different groups. In healthy control group with other four groups the average estimate of Hb was observed to be 13.62±0.30 g percent which vary significantly (P<0.05). The changes in mean haemoglobin level in all the four groups showed significant increased (P<0.05) level of haemoglobin concentration after 24 hr of treatment in the dogs belongs to groups T₁, T₂, T₃ as compared to T₄ groups. While the dogs of group T₅ revealed non-significant progressive improvement in haemoglobin concentration with the advancement

Table – 1: Mean value ±S.E. of Hb (g/dl) in anaemic dogs treated with different methods of blood transfusion & control groups (n=5) .

	Before 1 st transfusion	24 hours after 1 st transfusion	48 hours after 1 st .transfusion / before 2 nd transfusion	24 hours after 2 nd transfusion
Blood Bag method	5.22 ^{CB} ± 0.33	7.96 ^{bB} ± 0.28	8.10 ^{bB} ± 0.30	10.86 ^{aB} ± 0.24
Alternative method	5.34 ^{CB} ± 0.23	8.04 ^{bB} ± 0.26	8.22 ^{bB} ± 0.28	10.88 ^{aB} ± 0.28
Packed Blood Cell transfusion	5.36 ^{CB} ± 0.26	8.12 ^{bB} ± 0.22	8.26 ^{bB} ± 0.20	10.96 ^{aB} ± 0.26
Iron Inj. Treated	5.34 ^{CB} ± 0.24	5.92 ^{bC} ± 0.28	5.98 ^{bC} ± 0.28	6.44 ^{AC} ± 0.27
Healthy Control	13.62 ^{aA} ± 0.30	13.64 ^{aA} ± 0.38	13.72 ^{aA} ± 0.27	13.82 ^{aA} ± 0.29

Means with similar superscripts (column-wise –A,B,C & row-wise –a, b, c) did not differ significantly at P<0.01 .

Table – 2 : Mean value ±S.E. of TEC (X 10⁶ / Cumm) in anaemic dogs treated with different methods of blood transfusion & control groups (n=5)

	Before 1 st transfusion	24 hours after 1 st transfusion	48 hours after 1 st .transfusion / before 2 nd transfusion	24 hours after 2 nd transfusion
Blood Bag method	3.22 ^{CB} ± 0.29	4.10 ^{bB} ± 0.56	4.18 ^{bB} ± 0.53	4.91 ^{aB} ± 0.58
Alternative method	3.35 ^{cB} ± 0.26	4.18 ^{bB} ± 0.58	4.17 ^{bB} ± 0.55	5.18 ^{aB} ± 0.55
Packed Blood Cell transfusion	3.35 ^{cB} ± 0.26	4.19 ^{bB} ± 0.58	4.24 ^{bB} ± 0.57	5.25 ^{aB} ± 0.57
Iron Inj. Treated	3.64 ^{aB} ± 0.21	3.74 ^{aC} ± 0.21	3.79 ^{aC} ± 0.20	3.95 ^{aC} ± 0.19
Healthy Control	6.10 ^{aA} ± 0.16	6.14 ^{aA} ± 0.11	6.18 ^{aA} ± 0.15	6.20 ^{aA} ± 0.16

Means with similar superscripts (column-wise –A,B,C & row-wise –a, b, c) did not differ significantly at P<0.01 .

of above mentioned periods. The present finding is an accordance with the finding of Asha *et al.* (1993), Brar and Nauriyal (1994a&b), Bhalerao (1997), Srinivasa Rao *et al.* (1998), Gupta *et al.* (1999), Shekhar *et al.* (2004), Tandekar *et al.* (2009) who also found the same trend of findings. This might be due to the direct effect of blood transfusion. In T₄ group there was significant increase in haemoglobin which may be due to accelerated haemopoiesis. In T₅ group there was non-significant but progressive increase was noticed

due to good diet provided. Similar trend was also observed in TEC and PCV level.

Among different methods of blood transfusion non-significant (P< 0.05) improvement in Hb, TEC and PCV level was observed in Packed Blood Cell transfusion method followed by alternative method and Blood bag method. Among different methods significant (P< 0.05) improvement in different haematological parameters were observed from 24 hours after first transfusion, which continued in 48 and 72 hours post transfusion.

Table – 3 : Mean value ±S.E. of PCV (%) in anaemic dogs treated with different methods of blood transfusion & control groups (n=5) .

	Before 1 st transfusion	24 hours after 1 st transfusion	48 hours after 1 st . transfusion/before 2 nd transfusion	24 hours after 2 nd transfusion
Blood Bag method	19.0 ^{cB} ± 0.53	27.2 ^{bB} ± 0.32	27.64 ^{bB} ± 0.36	35.18 ^{aB} ± 0.49
Alternative method	18.14 ^{cB} ± 0.51	25.96 ^{bB} ± 0.60	27.40 ^{bB} ± 0.50	34.06 ^{aB} ± 0.30
Packed Blood Cell transfusion	17.60 ^{cB} ± 0.97	28.56 ^{bB} ± 1.32	28.84 ^{bB} ± 1.39	39.16 ^{aC} ± 1.48
Iron Inj. Treated	18.76 ^{cB} ± 0.62	20.36 ^{bC} ± 0.75	20.46 ^{bC} ± 0.75	22.24 ^{aD} ± 0.79
Healthy Control	42.60 ^{aA} ± 1.45	42.76 ^{aA} ± 0.153	43.20 ^{aA} ± 0.76	43.64 ^{aA} ± 0.99

Means with similar superscripts (column-wise –A,B,C & row-wise –a, b, c) did not differ significantly at P<0.01 .

Thus in the absence of blood bag for blood transfusion and for the purpose of only red blood cell transfusion, the other two methods that is alternative method (T₂) and Packed Blood Cell transfusion (T₃) can be an important life saving tools for canine suffering from anaemia.

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