

EFFECT OF HERBAL-MINERAL SUPPLEMENT ON BLOOD VALUES IN ANEMIC DOGS

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A total of 137 dogs were screened for the presence of anaemia. The dogs with Hb less than 12 gm/dl were considered as anaemic. The overall prevalence rate of anaemia in dogs from Jammu region was 47.44 per cent. Age wise prevalence was more (80%) among the dogs below 3 years and less (20%) among the dogs of more than 3 years age. Highest incidence of anaemia (44.61%) was among pups less than 6 months of age and lowest in age group of 3-6 years. The clinical parameters *viz.* respiration rate and heart rate were significantly ($P < 0.05$) higher in anaemic dogs. Effect of herbal mineral supplement (Ferro-com) on haematological indices was studied. Significant improvement in the Hb, PCV, TEC, total plasma protein, albumin and globulin level were observed. Thus, it was concluded that anaemia is widely prevalent in dogs with higher prevalence among <3 years age group. Supplementing anaemic dogs with herbal mineral preparation results in significant improvement in haematological indices and iron level.

Introduction

Iron deficiency is common in chronic blood loss from blood sucking parasites, gastrointestinal injuries and haemorrhagic disorders in young animals. The key step in treating iron deficiency is to identify and treat the cause of blood loss. Iron is required for the synthesis of heme which interacts with globin to form haemoglobin. However, iron preparations should only be given to animals with confirmed iron deficiency as they replenish iron stores. The parental iron therapy is expensive, painful and associated with risks of anaphylaxis or late serum sickness. Though the oral administration of iron and amino-acid chelates have shown better results than un-chelated iron preparations, they are very costly and also tend to increase the incidence of gastrointestinal complications. Therefore, present study was undertaken to evaluate the efficiency of alternate medicine (herbal-mineral supplement) in the treatment of anemia in canines.

Material and Methods

The present study was conducted on 137 dogs which were brought to Veterinary Clinic & Teaching Hospital, F.V.Sc & A.H., SKUAST-J, R. S. Pura. The dogs were screened for the presence of anaemia. The dogs with Hb less than 12 gm/dl were considered as anaemic. Out of screened animals, 10 dogs having moderate anaemia (Hb >5g/dl and <12g/dl) were treated with the herbal-mineral combination (Ferro-com, Indian Herbs, Saharanpur, U.P.) @ 1 t.s.f b d. orally for 14 days and 10 dogs were kept as

control. FerroCom is prepared by complexing ferrous iron (Fe^{2+}) and naturally occurring dimeric and oligomeric-dibenzo-alpha-pyrone with small molecular weight herbal gallo-tannoids. Blood samples (5-7ml) were collected on 0, 3rd, 7th and 14th day post treatment in heparinised glass vial and plasma was separated for estimation of iron and biochemical profile. However, for hematology blood samples (1ml) were collected in EDTA. Iron and TIBC was estimated using iron binding capacity kits supplied by Erba Mann Heim Pvt. Ltd. Blood glucose was estimated using Gluco-check. Total plasma protein (Biuret method), albumin (Bromo cresol green), total bilirubin (diazo method), BUN (GLDH-urease method), creatinine (Jaffe's alkaline-picrate method), alanine amino transferase (ALT) and aspartate amino transferase (AST) were analysed using kits supplied by Erba Mann Heim Pvt. Ltd. The data were analyzed statistically using student's t- test to determine the significance of differences between the mean values of two study groups.

Results and Discussion

The overall prevalence rate of anaemia in dogs from Jammu region of Jammu and Kashmir State was 47.44 per cent. However, Moninder (2003) reported higher prevalence of 68 per cent in of Punjab. The variations in the incidence among different states could be due to various reasons like nutritional and managerial practices. Age wise prevalence was more (80%) among the dogs below 3 years and less (20%) among the dogs of more than 3 years age.

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The clinical parameters *viz.* respiration rate and heart rate were significantly ($P < 0.05$) higher in anaemic dogs. The increased heart rate might be due to a compensatory mechanism to improve cardiac output and maintain the oxygen supply to the tissues during blood and fluid loss (Rogers and Ceyda 2000). The increase in respiration might be due to progressive development of hyperventilation. In anaemic animals, due to low haemoglobin, the oxygen carrying capacity of blood is reduced leading to hypoxia which causes compensatory increase in depth and rate of breathing mediated by chemoreceptors located in the carotid and aortic bodies, contraction of spleen which forces more blood into circulation leading to increased stroke volume and heart rate (Kohn *et al.* 2008). Upon treatment with herbal-mineral supplement the respiratory rate and heart rate of anaemic dogs showed significant ($P < 0.05$) improvement (Table 1) whereas, no significant change was observed in body temperature. These findings are in agreement with those reported by Joshi *et al.* (2003) who recorded a significant decrease in respiration rate with no significant change in the body temperature.

The clinically anemic animals upon treatment with herbal-mineral supplement showed a significant improvement in the Hb and PCV at 14 days after treatment (Table 2). The mean TEC also revealed a significant improvement at day 14 as compared to day 0. However no significant changes were observed in TLC or DLC upon treatment (Table 2). The findings in the present study are in agreement with the findings of Abiramy *et al.* (2003) who reported significant increase in Hb following iron therapy. Following oral iron therapy, MCV, MCH and MCHC increased significantly ($P < 0.05$) from 56.7fl, 15.9pg and 27.24% on day 0 to 60.90fl, 17.60pg and 28.37% on 14th of post treatment, respectively.

The average plasma iron and TIBC of anaemic dogs were 112.4 μ g/dl and 332.0 μ g/dl, respectively. Upon treatment with herbal mineral supplement the plasma iron level increased to 120.7 μ g/dl on day 3rd to 122.7 μ g/dl on 7th day to 124.60 μ g/dl on 14th day of post treatment. The mean TIBC level increased to 328.0 μ g/dl,

325 μ g/dl and 324.0 μ g/dl, respectively on day 3rd, 7th and 14th of post treatment. Our findings are in agreement with Abiramy *et al.* (2003) who reported marked increase in iron values after oral iron supplementation in anaemic dogs. The mean plasma level of protein, albumin and globulin in anaemic dogs were 6.06g/dl, 3.30g/dl and 2.76g/dl, respectively. Upon treatment plasma protein, albumin and globulin increased to 6.33g/dl, 3.45g/dl and 2.90g/dl on 3rd day, 6.70g/dl, 3.62g/dl and 3.07g/dl on 7th day and 6.62g/dl, 3.56g/dl, 3.03g/dl and 0.33mg/dl, respectively on 14th day post treatment. The bilirubin level was significantly increased to 0.41 mg/dl in anaemic dogs which came to normal on 14th day post treatment with herbal mineral supplement (Table 3). Findings in present study are in agreement with the finding of Moninder (2003) who reported significant increase in protein, albumin and globulin values however Abiramy *et al.* (2003) observed no significant change in total protein levels after iron therapy.

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Table 1. Effect of Herbal mineral supplement on clinical parameters (Mean± S.E)

Parameters	Healthy control (n=10)	Anaemic dogs			
		Pre treatment	Post treatment		
		Day 0	Day 3	Day 7	Day14
Rectal temperature (0F)	102.02 ±0.18	101.91 ±0.29	102.20 ±0.17	102.0 ±0.16	102.5 ±0.22
Respiration rate/min	29.16 ±0.87	39.80 a ±1.06	35.4 a ±2.01	34.2 a ±2.54	32.4 b ±1.12
Heart rate /min	86.83 ±1.19	101.4 a ±1.88	96.8 a ±2.59	94.6 a ±3.02	91.8 b ±2.57

Values with superscripts 'a' differ from control at P≤0.05

Values with superscripts 'b' differ from day 0 at P≤0.05

Table 2. Effect of Herbal mineral supplement on haematological parameters (Mean± S.E).

Parameters	Healthy control (n=10)	Anaemic dogs			
		Pre treatment	Post treatment		
		Day 0	Day 3	Day 7	Day 14
Hb (g %)	13.8 ±0.47	10.1 a ±0.50	10.25 a ±0.60	11.35 a ±0.41	11.17 ab ±0.20
PCV (%)	42.66 ±1.05	36.6 a ±1.69	37.75 ±2.32	42.0 ±2.11	42.25 b ±1.80
TLC (x 10 ³ /μl)	8.57 ±0.24	10.11 ±0.82	9.84 ±0.76	9.05 ±0.13	9.23 ±0.32
TEC (×10 ⁶ / μl)	6.65 ±0.22	6.42 ±0.25	6.65 ±0.27	7.30 ab ±0.16	7.40 b ±0.28
DLC (%)					
N	70.33 ±1.11	71.40 ±1.16	72.23 ±0.98	70.86 ±1.08	70.68 ±1.10
L	25.33 ±1.02	23.2 ±1.06	23.9 ±0.87	24.10 ±0.89	24.80 ±1.08
M	2.53 ±0.12	2.77 ±0.11	2.54 ±0.09	2.28 ±0.28	2.19 ±0.31
E	1.71 ±0.25	1.82 ±0.13	1.36 ±0.21	1.39 ±0.12	1.21 ±0.13
MCV (Fl)	64.83 ±1.07	56.7 a ±0.50	57.70 a ±0.38	59.50 ab ±0.79	60.90 abc ±0.52
MCH (Pg)	20.71 ±0.33	15.9 a ±0.28	16.62 a ±0.31	17.25ab ±0.29	17.60 abc ±0.30
MCHC (%)	31.20 ±0.46	27.24 a ±0.15	27.62 a ±0.19	27.95 ab ±0.13	28.37 abc ±0.13

Values with superscripts 'a' differ from control at P≤0.05
 Values with superscripts 'b' differ from day 0 at P≤0.05
 Values with superscripts 'c' differ from day 3 at P≤0.05

Table 3. Effect of Herbal mineral supplement on plasma biochemical profile (Mean± S.E).

Parameters	Healthy Control (n=10)	Anaemic dogs			
		Pre treatment	Post treatment		
		Day 0	Day 3	Day 7	Day 14
Glucose (mg/dl)	91.33 ±2.95	101.2 ^a ±2.2	97.25 ±3.11	96.50 ±3.09	92.33 ±3.71
Total protein (g/dl)	6.69 ±0.14	6.06 ^a ±0.24	6.33 ±0.22	6.70 ^b ±0.10	6.62 ^b ±0.01
Albumin (g/dl)	3.88 ±0.04	3.30 ^a ±0.10	3.45 ^a ±0.06	3.62 ^{abc} ±0.02	3.56 ^{ab} ±0.08
Globulin (g/dl)	2.74 ±0.10	2.76 ±0.15	2.90 ±0.17	3.07 ^{ab} ±0.08	3.03 ^{ab} ±0.06
Total bilirubin (mg/dl)	0.33 ±0.02	0.41 ^a ±0.01	0.39 ^a ±0.02	0.32 ^{bc} ±0.03	0.33 ^{bc} ±0.01
Creatinine (mg/dl)	1.06 ±0.08	1.31 ±0.10	1.22 ±0.12	1.13 ±0.10	1.11 ±0.11
BUN (mg/dl)	20.13 ±2.29	22.18 ±1.44	18.22 ±1.47	18.57 ±1.34	17.20 ^b ±0.61
AST (IU/L)	18.50 ±2.07	23.8 ±2.40	22.0 ±2.94	22.25 ±2.25	20.33 ±1.85
ALT (IU/L)	24.5 ±3.76	29.6 ±2.3	27.5 ±2.50	27.5 ±1.84	26.33 ±1.33
Iron (µg/dl)	144.83 ±7.01	112.4 ^a ±5.04	120.7± ^a 5.64	122.7 ^a ±6.48	124.60 ^a ±3.10
TIBC (µg/dl)	322.33 ±15.34	332.0 ±10.20	328.6 ±9.08	325.4 ±9.88	324.0 ±7.91

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