

HEMATOLOGIC ALTERATION IN STRAY DOGS WITH RESPECT TO AGE AND SEX - AN AID TO DIAGNOSIS

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Stray dogs act as a source of infection to healthy dogs and often their hematological values bring confusion in diagnosis. We collected 100 dogs of various age groups and sexes and collected blood samples for analysis. Before selection of animals, all stray dogs were tested and recorded to be parasitologically negative through blood and stool examination. The heart beat, pulse rate and rectal temperature were under normal range. The appetite of all the dog were normal. No significant variation was recorded among both the sexes. The age wise variation in hematology was not significant except the RBC count was recorded to be higher in adult dogs than that of juveniles and puppies and eosinophil count was recorded to be higher in adults and juveniles than in puppies.

Keywords: Stray dogs, Hematology, RBC, Eosinophilic count.

Usually, stray dogs are a reservoir for many diseases and act as source of infection to other dogs. Also, stray dogs rarely show symptom upon decrease in immunity. Hematology is one of the diagnostic methods often employed for both tentative diagnosis and at times it can be used even for confirmation of diagnosis. But often there is a normal deviation in values which may confuse with other disease condition. Hematology is done in routine practice to assess the health animals (Smith, 2000). However, for stray dogs in India, there is no published data / information is available. Infectious diseases like Parvo may also being harbored in stray dogs acting as a source of infection to other breed dogs (Mira *et al.*, 2018). So establishment of normal haematological values in stray dogs is highly necessitated to know the health condition. Hence to evaluate the hematology of stray dogs was the main aim to conduct the present study.

Materials and Methods

About 100 Stray dogs of various age group near Durg were taken under study during (January – July) 2019. Blood samples were collected from animals. The details of animals were collected through a well-designed questionnaire with any history of vaccination, age, sex and geographic location from nearby households. The body condition score was assessed for each individual.

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Parasitological examination of blood and stool was done to exclude the sick dogs. A total of 30 puppies of about four months of age were selected for the study. About 40 adult dogs were also selected for the study; above one year of age and below three years of age, and 30 dogs of 5 years were selected. In this study sexwise distribution was, 60 females and 40 male.

Blood samples were collected from the cephalic vein of each animal and immediately dispensed in tubes with EDTA. Cell count was done through microscope (100x) with Giemsa stained slides. Hematological parameters including: red blood cells (RBCs) and white blood cells (WBCs) count, hemoglobin concentration (Hb), Mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were manually estimated. Packed cell volume (PCV) was also determined.

Statistical analysis

The significance between various groups was analyzed through χ^2 and p-value using IBM SPSS Statistics 20.0 software (SPSS Inc., Chicago, IL, USA). Mean and standard deviation for hematology values were generated initially by using the combined data set (n=100). Independent t-tests for equality of means were used to test for a significant effect of sex on blood variables. T-statistics, mean differences

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between groups, standard errors of those differences, and p-values were calculated. One-way ANOVAs were used to test for significant interactions of age and BCS against blood cell counts.

Results and Discussion

All stray dogs were found to be parasitologically negative through blood and stool examination. The heart beat, pulse rate and rectal temperature were under normal range. The appetite of all the dog were normal. The hematological parameters of all

the 100 dogs were recorded under normal range (Table-1). There is no significant variation among both the sexes (Table-2). The age wise variation in hematology was not significant except the RBC count was recorded to be higher in adult dogs ($6.8 \pm 2.5 \times 10^6$ cells/ μ l) than that of juveniles ($5.4 \pm 1.2 \times 10^6$ cells/ μ l) and puppies ($5.7 \pm 2.3 \times 10^6$ cells/ μ l) and eosinophil count was recorded to be higher in adults (4.8 % \pm 1.8) and juveniles (4.0 % \pm 1.1) than in puppies (2.2 % \pm 1.4; Table-3).

Table 1: Mean values of hematology of 100 stray dogs

Test	Mean \pm SD	Reference range
RBC($\times 10^6$ cells/ μ l)	6.2 \pm 2.5	5.5-8.5
Hb(g/dl)	12.4 \pm 1.8	14.2-19.2
PCV(%)	39.2 \pm 9.1	29-55
MCV(fl)	76.4 \pm 32.4	65-80
MCH(pg)	22.7 \pm 7.9	12.2-25.4
MCHC(%)	36.4 \pm 8.8	32-36
WBC($\times 10^3$)	9.8 \pm 2.9	5.9-16.6
Neutrophil(%)	35.0 \pm 14.4	51-84
Monocyte(%)	2.0 \pm 2.5	1-9
Lymphocyte(%)	45.0 \pm 12.7	8-38
Eosinophil(%)	4.7 \pm 2.1	0-9
Basophil(%)	0.3 \pm 0.5	0-1

Table-2: Hematology and serum of male and female stray dogs

Hematology/serum biochemistry	Female	Male	p
RBC($\times 10^6$ cells/ μ l)	6.4 \pm 2.9	6.1 \pm 1.3	0.09
Hb(g/dl)	11.3 \pm 2.2	11.5 \pm 1.8	0.90
PCV(%)	39.4 \pm 9.0	39.8 \pm 9.6	0.79
MCV(fl)	74.7 \pm 40.5	78.2 \pm 23.2	0.78
MCH(pg)	21.3 \pm 8.6	22.6 \pm 4.3	0.32
MCHC(%)	31.8 \pm 7.5	31.6 \pm 6.4	0.84
WBC($\times 10^3$)	10.0 \pm 4.2	9.6 \pm 3.5	0.08
Neutrophil (%)	39.7 \pm 16.1	36.2 \pm 12.2	0.60
Monocyte(%)	2.2 \pm 1.9	2.4 \pm 1.5	0.84
Lymphocyte(%)	43.2 \pm 12.5	44.1 \pm 6.4	0.85
Eosinophil(%)	3.5 \pm 1.8	4.6 \pm 2.8	0.41
Basophil(%)	0.8 \pm 0.4	0.5 \pm 0.3	0.1

Table-3: Hematology value of stray dogs in different age groups

Hematology/serum biochemistry	Adult	Juvenile	Puppy	p
RBC($\times 10^6$ cells/ μ l)	6.8 \pm 2.5	5.4 \pm 1.2	5.7 \pm 2.3	<0.001
Hb(g/dl)	13.8 \pm 2.2	12.8 \pm 3.1	10.8 \pm 2.6	0.45
PCV(%)	45.2 \pm 9.5	37.5 \pm 9.7	34.3 \pm 6.4	0.61
MCV(fl)	85.2 \pm 41.2	64.2 \pm 15.6	68.2 \pm 21.1	0.45
MCH(pg)	21.2 \pm 7.8	23.1 \pm 6.8	18.1 \pm 8.6	0.45
MCHC(%)	33.5 \pm 7.7	36.4 \pm 9.9	31.1 \pm 8.8	0.79

WBC(x10 ³)	9.7±4.1	9.8±3.8	7.7±3.6	0.22
Neutrophil (%)	45.6±11.8	36.3±11.2	34.1±19.1	0.08
Monocyte(%)	2.9±3.8	2.2±2.4	3.9±2.9	0.35
Lymphocyte(%)	42.3±12.1	44.2±9.3	45.1±12.4	0.61
Eosinophil(%)	4.8±1.8	4.0±1.1	2.2±1.4	<0.05
Basophil(%)	1.9±0.5	1.1±0.7	0.8±1.3	0.58

The significant increase in RBC count may be due to development and maturation of red bone marrow and other organs in adult dog leading to proper haemopoiesis. During juvenile stage the red bone marrow might turn into yellow with increase of age leading to decrease haemopoiesis might be the probable cause. Also, the destruction of fetal erythrocytes increases with growth of puppies leading to significant reduction in circulating red cells as also reported by Lee *et al.*, 1976, in first month of life. Subsequently the RBC in blood increases gradually till adult age of life i.e. one year of age as also mentioned by Anderson and Gee, 1958. Other findings claim for gradual increase in Hb and hematocrit concentration upto 18 month of age as also recorded by Weiner and Bradley, 1972. Usually, the composition of bone marrow changes with progression of age, where the hematopoietic tissues regress and is replaced with nonhematopoietic tissue leading to reduced production of RBC in geriatric dogs.

The increase in Eosinophil count in adult and juvenile might be due to more and longtime exposure to parasitic infections/ any other infections, since eosinophil is one of the most essential components in host defense and immunity. Usually puppies born with less immunity, where colostrum feeding is essential at initial days of post-delivery. Previous researchers have claimed for 85-90% of immunoglobins originated due to colostral transfer and the immunoglobulin concentration in transition milk remains elevated during first two days post-delivery. So, puppies fed with colostrum and taken proper care remain immune to infections, whereas puppies not nourished properly are exposed to several infection. In such cases a higher eosinophil count may be recorded in

puppies. Since, stray dogs take care of their newborn properly and remain alert towards their puppies, may be the reason for passive immunity and thus we have recorded the eosinophil count comparatively less than adult and juvenile dogs. Proper care of newborn is essential in dogs to have proper health and long life.

Conclusions

In our study we had recorded a lower RBC count in puppies and Juvenile dogs under normal health condition and the eosinophil count was recorded higher in adult and juvenile dogs than puppies. Our findings may be an aid to diagnosis in stray dogs.

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