



Investigation of Hematological Profiles in the Growth Process of Van Cat Breeds

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SUMMARY

In this study it was aimed to determine hematological parameters of healthy Van Cat breeds during their growth period from birth to one year old. For this purpose; 20 Van Cat breeds (10 male and 10 female) were used in the same care and nutrition conditions in Van Cat Research Center. Blood samples were taken regularly from the Van Cat breeds every month for a year. Hematocrit and hemoglobin levels were the lowest in the first ($29.9 \pm 0.9\%$, 10.0 ± 0.3 g/dL) and second ($29.9 \pm 1.9\%$, 10.0 ± 0.7 g/dL) months and reached the highest level ($40.4 \pm 2.2\%$; 13.0 ± 0.6 g/dL) at the 10th month during the growth period. The percentage of granulocytes was lowest in the first month, and increased in the following months. Lymphocyte/Monocyte (%) ratios was determined that decrease in between 4th and 12th month, and lowest value ($18.6 \pm 3.2\%$) at 5th month. In conclusion; it was reached that it would be useful to interpretation the changes of hematological parameters in growth process of the Van cat breeds.

Key Words: Van Cat breeds, Growth Process, Hematological Parameters

ÖZET

Van Kedisi Yavrularının Büyüme Sürecinde Hematolojik Profilin Araştırılması

Bu çalışmada sağlıklı Van Kedisi yavrularında doğumdan bir yaşına kadar olan büyüme sürecinde hematolojik parametrelerin belirlenmesi amaçlandı. Bu amaçla Van Kedisi Araştırma Merkezinde aynı bakım ve beslenme şartlarında barındırılan 10 erkek ve 10 dişi olmak üzere toplam 20 yavru Van Kedisi kullanıldı. Van Kedisi yavrularından bir yıl boyunca her ay düzenli olarak kan örnekleri alındı. Büyüme döneminde hematokrit ve hemoglobin değerleri birinci (29.9 ± 0.9 , 10.0 ± 0.3 g/dl) ve ikinci (29.9 ± 1.9 , 10.0 ± 0.7 g/dL) ayda en düşük seviyede belirlendi. En yüksek seviyesine 10. ayda (40.4 ± 2.2 , 13.0 ± 0.6 g/dL) ulaştı. Granülosit yüzdesi ilk ayda en düşük oranda ölçüldü, daha sonraki aylarda ise artış görüldü. Lenfosit/Monosit oranlarının (%), dördüncü ve on ikinci aylar arasında azaldığı, en düşük değer beşinci ayda (18.6 ± 3.2) olduğu belirlendi. Sonuç olarak yavru Van kedilerinde hematolojik parametrelerin yorumlanmasında büyüme dönemindeki değişimlerin göz önünde bulundurulmasının yararlı olacağı kanısına varıldı.

Anahtar Kelimeler: Van Kedisi, Büyüme, Hematolojik Parametreler

INTRODUCTION

Van cats generally possess a semi-long hair, a body being long and white and a foxlike tail, and their walk similar to that of tiger. Eye color is one of the characteristic features of Van cats. According to this feature they are classified into three groups: one with both eyes blue, one with both eyes amber (tones of yellow), and one with one eye blue and the other amber (dischromatopsy). These traits are thought to be endemic to the region of Van in Turkey where a Neolithic human settlement most likely have existed at least 12000 years ago. Europeans introduced Van cats to the world by around the 1950s. These cats like swimming and playing with water, the only cat species with such qualities (Altınok et al. 2007; Altınok et al. 2011).

Hematological values in animals are reported vary according to age, gender, environmental conditions and seasons. It is reported that daily physiological changes around 5% in blood parameters could be observed even in the animals having the same qualities and which are under the same conditions (Eksen et al. 1992; Nakai et al. 1992; Jain 1993; Çınar et al. 1997; Feldman et al. 2000; Thrall et al. 2004; Chege et al. 2013; Paltrinieri et al. 2014).

There are lots of studies related to hematologic parameters in cats (O'Brien et al. 1998; Moritz et al. 2004; Becker et al. 2008). However, the researches on hematologic parameters in Van cats are limited (Eksen et al. 1992). Besides, not a study involving the development period of Van cats from birth to 1 year is available. Therefore, it is aimed-with this study-to contribute to

scientific studies and literature.

MATERIALS and METHODS

The research was conducted on a total of 20 healthy Van kittens – 10 males and 10 females- hosted under the same care and feeding conditions in the Van Cat Research Centre.

The parents of the off-springs were hosted under the suitable care and feeding conditions peculiar to them in order to minimize the other factors that could affect the data to be obtained from the off-springs. Then, routine anti-parasitic treatments and preventive vaccination were applied. Only the cats which were healthy were mated controllably, their records were taken and the off-springs not experiencing abnormalities during the birth process were included into the study.

The blood samples were first taken after the birth in the 7-14 day-period when the eyes of the offspring opened, and then they were taken every month following the development process until they were 1 year old. For hematological analysis blood samples were taken cats in the tubes with anticoagulant (EDTA) from vena radialis (*V. cephalica*). The blood were studied immediately.

Hematological analyses were determined by hematology device (QBC Vetautoreader®- Idexx).

Statistical analysis of hematological parameters were made on a montly basis using paired-t test. For analysis, the level of significance was set at $P < 0.05$ for the data entry and statistical analyses, SPSS 20.0 was used (SPSS 2012).

RESULTS

Table 1. Monthly hematological parameters up to 1 year in Van Cats.

Months	Parameters								
	Htc (%)	Hg (g/dl)	WBC ($10^9/L$)	PLT ($10^9/L$)	Grans (%)	Grans ($10^9/L$)	L/M (%)	L/M ($10^9/L$)	MCHC (g/dl)
1	29.9±0.9 ^b	10.0±0.3 ^b	13.7±1.6	557.0±118.2	64.6±2.8 ^c	8.9±1.0	34.8±2.9 ^a	4.8±0.6	33.5±0.6
2	29.9±1.9 ^b	10.0±0.7 ^b	16.2±2.5	492.3±73.5	73.0±3.2 ^{bc}	12.1±2.1	27.0±3.2 ^{ab}	4.0±0.6	33.6±0.5
3	30.2±1.1 ^b	10.1±0.5 ^b	14.5±2.1	519.1±85.3	69.8±2.9 ^b	11.3±1.8	29.4±3.1 ^a	4.5±0.7	33.6±0.6
4	35.1±1.7 ^{ab}	11.4±0.6 ^{ab}	21.5±3.3	548.0±99.8	76.4±2.6 ^{abc}	16.7±2.8	23.6±2.6 ^b	4.7±0.5	32.6±0.6
5	34.8±2.4 ^{ab}	11.5±0.7 ^{ab}	25.2±3.8	502.1±76.5	79.0±3.5 ^a	20.3±3.9	18.6±3.2 ^b	4.9±0.8	33.2±0.7
6	34.9±2.1 ^{ab}	10.9±0.5 ^b	22.4±3.5	530.4±82.6	77.3±2.7 ^b	17.3±3.2	21.4±3.1 ^b	4.8±0.6	32.8±0.5
7	35.2±1.8 ^{ab}	11.8±0.4 ^{ab}	21.4±3.1	485.3±64.3	76.8±2.6 ^{abc}	16.2±2.1	23.1±2.6 ^b	5.1±1.3	33.6±0.7
8	39.8±1.8 ^a	13.0±0.6 ^a	22.3±2.7	603.1±36.7	79.3±2.8 ^{ab}	18.0±2.5	20.6±2.8 ^b	3.9±0.7	32.8±0.2
9	38.3±1.7 ^a	12.3±0.5 ^{ab}	19.5±2.6	534.6±67.5	77.2±2.6 ^b	16.9±2.3	21.8±2.7 ^b	4.6±0.6	33.3±0.6
10	40.4±2.2 ^a	13.0±0.6 ^a	17.7±1.9	395.0±58.4	76.1±3.3 ^{abc}	13.6±1.6	23.8±3.3 ^b	4.1±0.7	32.2±0.5
11	35.6±1.7 ^{ab}	11.7±0.6 ^{ab}	18.4±2.6	352.3±17.5	75.8±4.9 ^{abc}	14.3±2.5	24.1±4.9 ^b	4.1±0.8	33.0±0.3
12	39.5±1.9 ^a	12.9±0.7 ^{ab}	18.3±2.4	406.5±36.4	74.6±3.7 ^{abc}	13.5±2.1	25.3±3.6 ^b	4.0±0.6	33.1±0.5
P	**	**	-	-	*	-	*	-	-

* $P < 0.05$, ** $P < 0.01$

a,b,c: The difference between the averages which expressed with different symbols are important in the same column.

DISCUSSION

Blood values are reported to vary according to age, gender, environmental conditions and seasons (Nakai et al. 1992; Jain 1993; Feldman et al. 2000; Thrall et al. 2004). Hematocrit shows the ratio of the patterned elements of blood to total volume (Moritz et al. 2004). Researchers (Eksen et al. 1992; Çınar et al. 1997) have reported that hematocrit ratio for cat varies between 24-45%. Hematocrit ratio, in this study, was the lowest (29.9±0.9 %), in the newborns, then it started to increase after the 3rd month and while it was 35.1±1.7 (%), 34.8% ±2.4 and 34.9%±2.1 respectively in the 4th, 5th and 6th months, continued to increase with advancing age and it increased to the highest level (40.4%±2.2) in the 10th month. It was observed that there was a statistical significant in haematocrit value increases during the development process in the firsts three months and the following months (8th, 9th, 10th and 12th), these values were within the limits

that the researchers (O'Brien et al. 1998; Moritz et al. 2004; Becker et al. 2008) had already reported for cats.

Hemoglobin (Hg) are present in erythrocytes and they are the necessary building blocks for erythrocyte functions. There is a positive relation between the number of erythrocyte and hemoglobin concentration. All animals have a positive relationship between the numbers of red blood cell hemoglobin concentration. Researchers (Eksen et al. 1992; O'Brien et al. 1998), have reported that hemoglobin level for healthy cats is 8-15 g/dl. In this study, while it was 10.0±0.3 g/dl on average in the first months, it was found at normal levels as 13.0±0.6 g/dl after 8 months (Table 1). Although a statistically significant between the first three months and following months (6th, 8th, 10th) for Hb concentration was determined, these findings were in line with the values for cats stated before (Eksen et al. 1992; Çınar et al. 1997; O'Brien et al. 1998; Turgut 2000; Thrall et al. 2004; Moritz et al. 2004; Becker et al. 2008).

Leukocyte number which is responsible for cellular and humoral defense mechanisms in the organism is reported to vary between 5.5 and 24.0 ($10^9/L$) in healthy cats (Eksen et al. 1992; Çınar et al. 1997; O'Brien et al. 1998; Thrall et al. 2004; Moritz et al. 2004). Leukocyte number in this study was found as 13.7 ± 1.6 to 25.2 ± 3.8 ($10^9/L$) on average (Table 1). It was observed that these values were in parallel with those the researchers (Eksen et al. 1992; Nakai et al. 1992; Çınar et al. 1997; O'Brien et al. 1998; Turgut 2000; Thrall et al. 2004; Moritz et al. 2004; Yıldız 2008; Chege et al. 2013) had reported for healthy cats. Leukocyte, granulocytes (neutrophils, eosinophils and basophils) and agranulocytes (lymphocytes, monocytes) divide by two parts (Turgut 2000; Aytug 2012). The hematological device used in this study analyzed the leucocyte subtypes as described above. While L/M (%) ratio was higher in the first month than following the birth of their newborn cat, it was determined that decreased between 4-12 month and lowest value ($18.6 \pm 3.2\%$) at 5th month (Table 1). These values were found to be within the limits of the researchers (O'Brien et al. 1998; Thrall et al. 2004; Yıldız 2008) noted.

Researchers (Eksen et al. 1992; Çınar et al. 1997) have reported the platelet counts for adult cats $3.0-7.2 \times 10^5/mm^3$. Platelet counts in this study 352.3 ± 17.5 ($10^9/L$) 603.1 ± 36.7 ($10^9/L$) were determined in the whistle-blower value for adult cats.

CONCLUSION

As a result, consideration of changes in hematological parameters during the growth of Van cat kittens, will be important in improving the diagnosis of disease and treatment procedures. In addition, Following the birth of a routine check on a monthly basis may change these hematological parameters. We conclude that would be useful to our colleague veterinarians whose will follow.

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