

AGE-SPECIFIC BLOOD PRESSURE DIFFERENCES IN TWO DOG BREEDS

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In this study, German shepherd (GSD) and Labrador retriever (LAB) were selected for the study and were categorized according to their age into four groups (Group 1: above 6 months and below 1 year of age, Group 2: above 1 year and below 3 years of age, Group 3: above 3 years and below 5 years of age and Group 4: above 5 years) with five dogs from each breed in each group. The systolic and diastolic pressures were higher in GSD in all the groups. The pulse pressure was found to be lower in LAB of all age groups except group-1. The mean arterial pressure values were found to be significantly higher in GSD of all age groups. The cardiovascular status in dogs can only be interpreted if breeds and age groups are taken into account considering the existence of a large number of breeds.

Keywords: Cardiovascular status, Diastolic Pressure, Mean Arterial Pressure, Pulse Pressure, Systolic Pressure.

Blood pressure is considered as one of the many important tools in the assessment of cardiovascular status. Some of the vets use the pressure measurement as a reference point during surgery. Oscillometric determination of blood pressure in healthy dogs was recorded by Doiguchi *et al.*, 2001. Bodey *et al.* (1996) also measured blood pressure in dogs and cats. Gaur and Varshney (2001) conducted studies on hypertension in dogs. The mean arterial pressure and the pulse pressure are also very important diagnostic tools for the determination of cardiovascular status (Hamlin *et al.*, 1982). Therefore, the aim of the present study is to compare the breed-related changes in normal blood pressure values in different age groups of two popular large-sized dog breeds in India.

Materials and Methods

Forty, privately owned, apparently healthy exotic breeds of dogs with twenty individuals each from the breeds, German Shepherd and Labrador Retriever were selected for the study. The dogs were categorized according to their age into four groups (Group 1: above 6 months and below 1 year of age, Group 2: above 1 year and below 3 years of age, Group 3: above 3 years and below 5 years of age and Group 4: above 5 years) with five dogs in each group.

The mean systolic and diastolic systemic arterial blood pressures were recorded by indirect automatically inflating and deflating sphygmomanometry, using an oscillometric principle. The cuff of the digital automatic blood pressure monitor (Dr Morepen, Switzerland- BP 3BG1) was placed on the medial aspect of forelimb over the brachial artery. The mean arterial pressure was calculated by the formula 2 multiplied with the Diastolic pressure + Systolic Pressure divided by 3, i.e.,

$$MAP \simeq \frac{(2 \times DP) + SP}{3}$$

The pulse pressure was calculated as difference between systolic and diastolic pressure.

All the data of the entire study were analyzed using Microsoft excel and processed using SPSS 11.00 for windows, adopting a significance level of 5 percent (P<0.05) in all cases.

Results and Discussion

All the results obtained are given in the tables 1, 2, 3 and 4.

Systolic Pressure: In group-1, the systolic pressure of LAB differed significantly (P<0.05) from GSD. In group-2, t-test revealed that the systolic pressure of LAB differed significantly (P<0.05) from GSD. In group-3, GSD and LAB had no significant

difference from each as far as systolic pressure was concerned. In group-4, t-test revealed that

the systolic pressure of LAB is significantly lower than GSD.

Table-1: Normal blood pressure values in different breeds of dogs above 6 months and below 1 year of age (GROUP-1)

Breed	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)	Pulse Pressure (mmHg)	Mean Arterial Pressure (mmHg)
German Shepherd	134 ^a ±1.63	86.4 ^a ±1.5	47.40 ^a ±0.5	102.26 ^a ±1.5
Labrador Retriever	121.4 ^b ±1.44	71.2 ^b ±1.5	50.2 ^b ±0.5	87.9 ^b ±1.5

Note: Different superscripts a and b read column wise differ significantly at 5% level (P<0.05).

Table-2: Normal blood pressure values in different breeds of dogs above 1 year and below 3 years of age (GROUP-2)

Breed	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)	Pulse Pressure (mmHg)	Mean Arterial Pressure (mmHg)
German Shepherd	142.8 ^a ±2.7	97.6 ^a ±5.36	45.2 ^a ±5.95	112.66 ^a ±3.7
Labrador Retriever	116.2 ^b ±2.7	78.4 ^b ±5.36	37.8 ^b ±5.95	90.99 ^b ±3.7

Note: Different superscripts a and b read column wise differ significantly at 5% level (P<0.05).

Table-3: Normal blood pressure values in different breeds of dogs above 3 years and below 5 years of age (GROUP-3)

Breed	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)	Pulse Pressure (mmHg)	Mean Arterial Pressure (mmHg)
German Shepherd	135.2 ^a ±2.83	81.4 ^a ±2.002	53.8 ^a ±2.29	99.33 ^a ±2.04
Labrador Retriever	129 ^b ±2.83	78.4 ^b ±2.002	50.6 ^b ±2.29	95.25 ^b ±2.04

Note: Different superscripts a and b read column wise differ significantly at 5% level (P<0.05).

Table-4: Normal blood pressure values in different breeds of dogs above 5 years of age (GROUP-4)

Breed	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)	Pulse Pressure (mmHg)	Mean Arterial Pressure (mmHg)
German Shepherd	149.6 ^a ±3.47	90.2 ^a ±2.37	58.2 ^a ±1.91	109.99 ^a ±2.62
Labrador Retriever	128 ^b ±3.47	78.4 ^b ±2.37	49.6 ^b ±1.91	94.91 ^b ±2.62

Note: Different superscripts a and b read column wise differ significantly at 5% level (P<0.05).

Diastolic Pressure: The diastolic pressure of GSD and LAB differed significantly (P<0.05) from each other in group-1. In group-2, the diastolic Pressure of GSD differed significantly (P<0.05) from LAB. In group-3,

no significant difference existed between diastolic pressures of GSD with respect to LAB. In group-4, the diastolic pressure of LAB was significantly lower than GSD.

Pulse Pressure: The pulse pressure of GSD differed significantly ($P < 0.05$) from LAB in group-1. In group-2, no significant difference was observed ($P > 0.05$) between GSD and LAB. In group-3, the pulse pressure of GSD had no significant difference from LAB. In group-4, the pulse pressure had no significant difference in between GSD and LAB.

Mean Arterial Pressure: The Mean Arterial Pressure of GSD and LAB had significant difference ($P < 0.05$) amongst them in group-1. In group-2, the mean arterial pressure of GSD and LAB had no significant difference ($P > 0.05$) between them. In group-3, Labrador (mean 95.25 ± 2.04 mmHg) and GSD's mean arterial pressure had no significant difference. In group-4, the mean arterial pressure of LAB was significantly lower than GSD.

The present findings on systolic pressure are in agreement with Bodey *et al.* (1996). The diastolic pressure was higher in GSD in group 1 and 2, while Labrador recorded lower values in almost all the groups. The pulse pressure was found to be higher in GSD of all age groups except group-1. The mean arterial pressure values were found to be significantly higher in GSD of all age groups.

The cardiovascular status in dogs can only be interpreted if breeds and age groups are taken into account considering the existence of a large number of breeds. The blood pressure of a small breed may differ from a large breed, and also differ between same-sized breeds with advancement of age. The arterial pressure is equal to cardiac output multiplied with the total peripheral vascular resistance. Moreover, cardiac output is determined by stroke volume times heart rate. The heart rate and stroke volume are different in different breed and size of dog which results in variable cardiac output.

This might be the reason behind variation in blood pressure in different breeds and sizes of dogs. So, only one standard value of blood pressure is never going to help the cause. The study focussed on two most popular dog breeds of India. It not only gives us the normal blood pressure values for the healthy dogs of the breeds taken for study but also elucidates how the blood pressure values differ amongst the breeds. Moreover, the study also appries about the blood pressure changes at different stages of a dog's life span.

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