

6/99 BROKEN HEARTS: SALUKI HEART STUDY UPDATE by MD Sist, DVM

This study was undertaken to try to determine what is normal for the Saluki heart by physical examination, electrocardiogram and echocardiogram. We have now examined 95 Salukis dogs (37males, 49 females, 5 M/N, 4 F/S). Sixty Salukis have been examined once, while the remainder have been examined two or more times. On physical examination, 33 dogs had murmurs which could indicate heart disease.

Electrocardiograms of 20 dogs showed irregular rhythms which could predispose them to sudden death. On echocardiogram, many Salukis appear to have larger hearts whose function differs from mixed breed dogs. If any abnormality was found on physical examination, electrocardiogram or echocardiogram that could indicate heart disease, the dogs were reexamined at a later date.

Sixty three Salukis had no audible heart murmur on their initial physical exam. **One third of the Salukis initially examined had audible heart murmurs**, of these 22 had a soft murmur (grade I-II). These dogs were further evaluated with colorflow doppler echocardiography to determine the significance of the murmur. The majority of the soft murmurs were “innocent” and not indicators of disease. Other performance dog breeds as well as human athletes have been found to have soft, non pathologic flow murmurs. Ten had loud (grade III/VI or louder) murmurs which can indicate significant heart disease. These dogs were re-evaluated throughout the study period to see if any signs of heart disease developed. Four of these dogs were treated for congestive heart failure.

Electrocardiograms were performed to assess the electrical activity within the heart muscle. Seventy five had normal ECG rhythms; 33 Salukis had a normal sinus rhythm, while 42 had a sinus arrhythmia. **Twenty had ventricular arrhythmias or an irregular heart beat which could predispose them to sudden death.** Since an EKG is routinely recorded for a few minutes, it may not accurately describe the average number and severity of arrhythmias that are present. None of these dogs died suddenly, however 5 did develop signs of heart disease during the study period.

The most common measurements made during an echocardiogram are the size of the internal chamber of the left ventricle of the heart during relaxation and contraction (LVIDd and LVIDs) and the pumping ability or contraction of the left ventricle (%FS). Enlargements of the left ventricle, which is the main pumping chamber of the heart, or decreases in the contractility are indicators of heart disease.

For a Saluki sized dog, 40 +/- 4 for LVIDd and 26 +/- 4 for LVIDs are considered normal. The LVIDd for Salukis with no murmur averaged 44.0 +/- 4.2, grade I-II murmur 44.8 +/- 4.1 and grade III or louder 58.3 +/- 4.2. The LVIDs for Salukis with no murmur averaged 31.5 +/- 3.7, grade I-II 32.1 +/- 4.0, and grade III or louder 43.6 +/- 3.6. Thus, **Saluki hearts with no or soft murmurs were not significantly different in size from each other, but they appear to have larger hearts than the accepted mixed breed generated normals.** However, when the Salukis' murmur was significantly loud,

the left side of the heart was greatly enlarged. This can occur in cardiomyopathy as well as when there is compensation for leakage across the heart valve and subsequent heart disease.

The pumping ability of the heart muscle is estimated by calculating the percent fractional shortening (% FS) which is the difference in the measurement of the left ventricular chamber as it dilates and contracts. The lower limit of “normal” for % FS is 25-28% in dogs. If there is any leakage across a valve (or the dog has a murmur) then the value should be higher (greater than 30%). Lower values indicate poor heart muscle contractility and are one of the major indicators in diagnosing cardiomyopathy. The average % FS for the dogs with no murmur was 28%, with a soft murmur 28%, and with a loud murmur was 25%. Several dogs in our study had low % FS when calm, but increased to “normal” when their heart rates increased during excitement. Therefore **Salukis can have % FS lower than the established values and remain free of heart disease.**

The Salukis in our study had larger aortic diameters on echocardiograph examination than has been previously reported in mixed breed normals. The Saluki aortas measured 27 – 28mm, while mixed breed normals of the same weight measured 23 – 25mm. This is similar to the finding in Greyhounds that the major arteries are more elastic and dilate to allow large blood volumes to move quickly from the heart during exercise. Large aortic measurements can indicate aortic valve disease, but no cases were found in our group of Salukis.

We have followed these dogs over 8 years to determine whether any develop significant heart disease, or whether their “normal” heart size and function truly differs from other breeds. In addition to the physical exams performed, detailed measurements have been made of every electrocardiogram and echocardiogram done on each Saluki. The above results are preliminary and the tremendous amount of data generated in this study is being analyzed to characterize these “normal” ranges for Salukis and to see if the changes detected vary significantly from the data generated from mixed breed normals. When completed these findings will be submitted for publication and be made available to Saluki fanciers as well as veterinarians.

The hearts of some of these dogs who have died from a variety of causes have been collected. We have also received hearts from Salukis who have died suddenly. Postmortem studies are currently being done at the Animal Health Diagnostic Laboratory at Michigan State University on the hearts to characterize the pathology found or to confirm that they were indeed normal. This study should be completed this year and will also be submitted for publication as a survey of the incidence of heart pathology in this select population of Salukis.

This will increase the knowledge base about our ancient breed and help insure its place in the future. Without the support of the Saluki Club of America and the generous individuals who have either allowed their dogs to participate, or offered their financial support this would not have been possible. Thank you for your contribution.