



Whippet Cardiac Health Project
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Update: Adult Onset Mitral Valve Disease in Whippets
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Background

Adult onset valvular heart disease is the most common form of heart disease in dogs and may account for up to 75-80% of canine heart disease. Mitral valve disease (MVD) is an adult onset abnormality of the mitral valve and is the most common type of valvular disease in dogs. MVD usually involves progressive, degenerative changes of the valve leaflets and the string-like structures that hold the valve in place (chordae tendineae). These changes, which often include thickening and varying degrees of mitral valve bending or ballooning (“prolapse”), are associated with abnormal valve closure. Incomplete valve closure during cardiac contraction leads to “backflow” of blood (mitral regurgitation, MR). In some dogs, chronic MVD with MR may be severe enough to progress to congestive heart failure (resulting in fluid retention in the lungs, among other clinical signs). Other complications of MVD include pulmonary hypertension and abnormal heart rhythms.

Studies of Cavalier King Charles spaniels (CKCS) and dachshunds have suggested there is likely to be a genetic component in the etiology of MVD in these breeds. If MVD does have a heritable component in a given breed, identification of early forms of the disease in the breeding population may be valuable in decreasing the prevalence and severity of the disease in that breed. For this reason, identification of affected dogs as early as possible is an important goal and concentrated screening programs based on clinical examination have been developed for some breeds in an attempt to decrease the prevalence of MVD in the population. In addition, reliable identification of affected dogs may identify a population that may be used to develop future screening techniques (e.g. genetic screening).

Whippets have been suggested to be at increased risk for MVD and are also an athletic breed, with many dogs participating in lure coursing, straight track racing and agility. Like some other athletic dog breeds, whippets frequently have soft systolic heart murmurs associated with athletic training or body conditioning. These murmurs are not associated with cardiac abnormality and are thought to represent the sound of blood ejecting from the heart in athletes. Murmurs characteristic of “athletic hearts” share characteristics with so-called “ejection” or “functional” murmurs (representing audible blood flow in a normal heart): low-to-moderate intensity, occurrence during cardiac contraction (systolic timing) and a point of maximal intensity (loudness) at the left heart base. The ability of a veterinarian to hear blood flow within a normal heart may be increased by the deep-chested and thin conformation typical of the healthy whippet. Functional murmurs may be also detected in non-athletic whippets and do not represent disease in these animals. The high prevalence of functional murmurs in whippets may partially explain why whippets with systolic heart murmurs often “have never had a problem”, whereas detection of a systolic murmur in another breed indicates heart disease with high likelihood.

Detection of left-sided heart murmurs is considered to reliably indicate that MR is present in more sedentary breeds (e.g. dachshunds or CKCS) in which MVD is common, but the athletic nature of the whippet breed and the prevalence of functional murmurs may make it difficult to differentiate systolic functional murmurs from systolic murmurs of MR in outwardly normal whippets by auscultation alone. Functional murmurs may be mistaken for MR murmurs, and conversely, when functional or athletic murmurs and MR murmurs co-exist in a patient, the presence of MR may be missed. Therefore, more complicated and equipment-dependent methods of differentiation of functional vs. disease-related murmurs (e.g. phonocardiography and echocardiography) are often necessary to diagnose pre-clinical MVD in whippets.

Two-dimensional and Doppler-echocardiographic imaging contributes greatly to recognition and severity classification in dogs with MVD. Anatomic abnormalities such as valve leaflet thickening and prolapse combined with mitral regurgitation jet size and appearance documented by color-flow Doppler-echocardiography have been identified as early indicators of MVD in CKCS and other breeds. Because these abnormalities are usually progressive, understanding what is expected in normal dogs of a given breed, as well as what early changes look like and the course of development of MVD may provide a basis for clinical staging and more accurate prognosis in affected dogs. Specific information regarding onset, progression and prognosis is needed to make responsible breeding decisions in young or middle-aged dogs.

The Whippet Cardiac Health Study

In 2003, we undertook a study of outwardly healthy whippets at the request and with the support of the Whippet Health Foundation. The original aim of the study was to identify any possible heart disease in the whippet population. In 2003, sixty-eight whippets were submitted for auscultation only at the Whippet National Specialty and preliminary findings confirmed the suspicion that murmurs were common in the clinically healthy whippet population but did not allow certain differentiation of functional vs. murmurs indicating probable MVD. This study indicated that additional evaluation methods were needed to differentiate functional murmurs vs. murmurs of MR in this population. Clinical findings consistent with dilated cardiomyopathy (DCM) were not found in the healthy dogs in this population.

From 2004 to 2014, the Whippet Health Foundation has supported echocardiographic screening of healthy dogs submitted for examination at the National Specialty (this work was also supported by an American Kennel grant in 2007). Through 2012, the investigators of the Whippet Cardiac Health Project have had the opportunity to auscult and perform echocardiographic examinations on greater than 450 dogs, with 105 dogs examined more than once. To date, 45 (43%) of the 105 dogs that were examined more than once underwent auscultation and echocardiography twice, 37 dogs (35%) were examined three times, 17 dogs (16%) were examined 4 times and 5 dogs (5%) were examined 5 times with one dog examined 6 times. Initial examinations were frequently performed on young breeding animals to provide pre-breeding screening in these individuals. Re-examinations and new examinations on older animals provide the valuable opportunity to observe the natural progression of MV disease in affected animals.

Partial data on 226 dogs was evaluated in 2008, encompassing the first half of the study to date. Data on healthy dogs was collected to establish “expected” echocardiographic values for American whippets, and the echocardiographic findings were used to identify the prevalence and probable cause of detected heart murmurs in these dogs. Heart murmurs were extremely common in outwardly healthy whippets and were present in 91% of the 226 dogs with studies evaluated. Fewer dogs with mitral insufficiency were detected by auscultation than were ultimately identified by echocardiography, either because the MR jet was small or because a concurrent functional murmur

obscured the MR murmur. Dogs “missed” by auscultation because of small insufficiency jets and dogs with structural abnormalities of the valve leaflet without MR at a young age are of great interest because the ultimate significance of the mitral valve changes and some forms of mild MR is unknown. The serial examinations available in some dogs will provide additional information as to whether minor changes noted at young age will be progressive and perhaps predictive of outcome, or represent variants of normal MV anatomy. Young dogs with mild changes in their mitral valves are also important to the longitudinal study to investigate the rate of progression, if any, that these dogs show. Lastly, although several dogs examined in the course of this series had findings consistent with pre-clinical (or “occult”) DCM, this echocardiographic diagnosis was uncommon in this population.

Summary

Whippets with non-clinical MR may not be identifiable by auscultation alone and echocardiographic examination is needed to definitively diagnose the cause of a left-sided systolic heart murmur in this breed. It is important that the echocardiogram be performed by a veterinarian or veterinary cardiologist experienced in the unique echocardiographic appearance of whippet hearts (especially in athletic whippets), in order to avoid over- or under-diagnosis of MR or DCM. In the long term, studies like the current Whippet Cardiac Health Project are needed to better understand if minor or mild changes in the mitral valve will progress to significant clinical disease and what the rate of progression may be.

The Whippet Cardiac Health Project will be gathering data once again at the National Specialty in April, 2014. We are especially interested in examining dogs that have been examined previously on the study, and will once again provide screening examinations for interested owners of dogs not on the study.

The investigators of the Whippet Cardiac Health Project gratefully acknowledge the AKC and especially, the Whippet Health Foundation, for financial and logistical support. Special thanks go to Lisa Costello, Mary Beth Arthur and Marie and Ralph Jackson for their help throughout the study and to all of the whippets and whippet owners that have made this data collection possible.