



# ACVIM

Cardiology  
Fact Sheet

## **ACVIM Fact Sheet: Myxomatous Mitral Valve Degeneration**

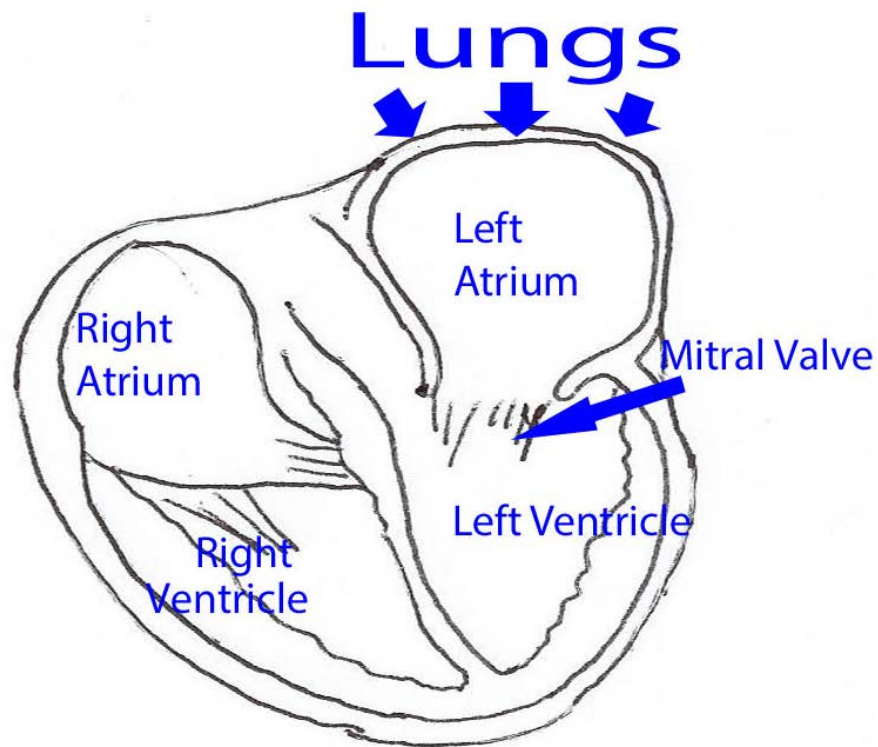
### ***Overview***

Myxomatous mitral valve degeneration (MMVD) is the most common acquired type of heart disease and new murmurs in older dogs. A heart murmur is a sound heard with every heartbeat and is caused by turbulent blood flow in the heart. MMVD is a manifestation of a process that can affect all heart valves but usually it is detected in the mitral valve. MMVD affects primarily small breed dogs later in life but can affect larger breed dogs. Some smaller breed dogs are affected earlier in life than others with the Cavalier King Charles Spaniel being the most prominent breed described to date.

The mitral valve (see figure 1) is the valve in between the left atrium and the left ventricle. The left atrium is the chamber that oxygenated blood flows into after passing through the lungs. Blood then passes through the mitral valve into the left ventricle and gets pumped out into the body. The mitral valve closes when the left ventricle contracts and thus preventing blood from flowing back into the left atrium. An unaffected mitral valve is thin and supple and is anchored in place by strands of tissue called chordae tendonae (CT).

Myxomatous degeneration is a process that occurs when the valve becomes thickened with formation of small nodules on the edges of the leaflets. This prevents complete closing of the valves and as a result blood can flow backward into the left atrium. The resultant backflow is called mitral regurgitation. Over time, the atrium and ventricles compensate by enlarging. The leak progressively worsens over time, although the exact time course is very variable from patient to patient.

The increasing volume of the leak along with long-term compensatory mechanisms eventually leads to an increase in the pressure within the atrium. This increase in pressure can also happen suddenly if the CT rupture and producing a partially unanchored mitral valve. This is called mitral valve prolapse. The increase in pressure is transmitted upstream to the lungs leading to fluid exuding from the capillaries in the lungs. This is termed congestive heart failure (CHF) and requires therapy.



**Figure 1**

***Signs & Symptoms***

A new heart murmur is generally the earliest means by which MMVD is detected. After a murmur is first detected, symptoms generally do not appear for three to four years. Often the first outward sign of worsening MMVD is a cough. Coughs can occur in MMVD for one of two reasons. The first is the heart enlargement that occurs with progressing MMVD. At a certain point, the heart becomes so large that it pushes on the airways and causes a cough. The second potential reason is more serious—MMVD patients may be coughing because of congestion in the lungs/CHF. These patients require medical attention. A recent study has documented that rising breathing rates during sleep are likely indicative of worsening heart disease.

***Diagnosis***

The first stage in the diagnosis of MMVD is hearing a murmur during an examination. A diagnosis of MMVD is by ultrasound of the heart, also known as an echocardiogram. This test can distinguish between MMVD and other causes of murmurs. The leak in the mitral valve can be detected by color flow Doppler echocardiography, a type of ultrasound that detects the direction of blood flow. Chest x-rays can provide information

about the severity of the disease by looking at heart size and are the definitive means of diagnosing congestive heart failure. Blood tests called BNP or NT-proBNP look at the level of a blood hormone that is elevated when the heart becomes enlarged and these are also useful in determining severity of MMVD.

### ***Treatment & Aftercare***

There are no medications that are proven to slow or prevent the progression of MMVD, particularly in the early stages of the disease. If the MMVD patient is coughing due to heart enlargement, a cough suppressant may be utilized.

Treatment for CHF includes furosemide, pimobendan, an ACE inhibitor and spironolactone. Furosemide is commonly known as Lasix and is a very potent diuretic and as such, it acts on the kidneys to help remove water from the body. This helps decrease the congestion in the lungs. Pimobendan helps the heart work more effectively and has been shown to improve survival in MMVD patients. ACE inhibitors and spironolactone block deleterious compensatory mechanisms that occur with severe heart disease and have been shown to prolong survival as well. Other medications that are sometimes used in treatment of CHF include hydrochlorothiazide, amlodipine and torsemide. Often the onset of congestive heart failure is sudden and may require hospitalization. When patients are hospitalized, patients generally receive supplemental oxygen and intravenous (IV) furosemide therapy. This therapy usually allows dogs to get past the initial crisis stage and most patients are able to survive the crisis and resume normal life with the assistance of medication. Dietary modification including sodium restriction is useful at this stage.

Generally, it is recommended to follow up with a cardiologist every 6-12 months during the pre-clinical phase of MMVD to monitor progression of the disease. Once clinical signs develop rechecks occur more frequently—every three to four months or as needed by the patient's condition. Rechecks might involve blood tests to monitor kidney function and electrolyte levels as these can be negatively affected by the medications used to treat CHF. Chest X-rays are utilized to check for recurrence of CHF and echocardiograms are utilized to monitor heart size and blood flow related conditions in the heart.

### ***Prognosis***

The prognosis for newly diagnosed MMVD varies widely. While the average time from when a murmur is first heard until CHF is present is approximately four years, the speed of progression of the disease is difficult to predict for individual patients. Once a patient has developed congestive heart failure, the average survival is 12-14 months, although this can vary as well. The most frequent cause of death for MMVD patients in congestive heart failure is euthanasia due to either inability to control the signs of congestion no matter how much medication is given or inability of the patient to tolerate the amount of medication needed to control congestion.

### ***Fact Sheet Author***

John MacGregor, DVM, DACVIM (Cardiology)

© 2014

***Fact Sheet Disclaimer***

The fact sheets which appear on the ACVIM website are provided on an "as is" basis and are intended for general consumer understanding and education only. Any access to this information is voluntary and at the sole risk of the user.

Nothing contained in this fact sheet is or should be considered, or used as a substitute for, veterinary medical advice, diagnosis or treatment. The information provided on the website is for educational and informational purposes only and is not meant as a substitute for professional advice from a veterinarian or other professional. Fact sheets are designed to educate consumers on veterinary health care and medical issues that may affect their pet's daily lives. This site and its services do not constitute the practice of any veterinary medical or other professional veterinary health care advice, diagnosis or treatment. The ACVIM disclaims liability for any damages or losses, direct or indirect, that may result from use of or reliance on information contained within the information.

ACVIM advises consumers to always seek the advice of a veterinarian, veterinary specialist or other qualified veterinary health care provider with any questions regarding a pet's health or medical conditions. Never disregard, avoid or delay in obtaining medical advice from your veterinarian or other qualified veterinary health care provider because of something you have read on this site. If you have or suspect that your pet has a medical problem or condition, please contact a qualified veterinary health care professional immediately.

ACVIM reserves the right at any time and from time to time to modify or discontinue, temporarily or permanently, these fact sheets, with or without notice.

