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MITRAL VALVE DISEASE IN DOGS – WHAT DO THE EXPERTS SAY?
THE ACVIM CONSENSUS REPORT ON MITRAL VALVE DISEASE IN THE DOG

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Introduction

Other than heartworm disease, most important cardiovascular syndrome in veterinary medicine is canine chronic mitral valvular disease (canine chronic valvular heart disease – CCVHD, endocardiosis, myxomatous valve degeneration, mitral regurgitation [MR]), affecting 85% of dogs aged 13 years or older and constituting 75% of canine heart disease.1

The American College of Veterinary Internal Medicine’s Board of Regents selected a group of European and U.S. ACVIM-boarded cardiologists to arrive at a consensus as to the diagnosis and treatment of CCVHD.1 Appropriately, the 10 panel members represented diverse points of view on cardiac therapeutics. Evidence was derived from sources ranging from placebo-controlled, double-blind clinical trials and other experimental data to anecdote, clinical experience, and expert opinion, with greater weight put on the former. To achieve consensus, all 10 panelists had to agree on the recommendation. In addition to putting forth consensus recommendations on diagnostic and therapeutic options, the panel revealed instances when the majority of panelists agreed upon a recommendation, even if consensus was not reached. The group chose to use a new grading system for cardiac disease severity and progression, which is described below. In addition to the panels’ recommendations, I will render my own personal opinion, when I feel that it is appropriate to do so. Space constraints preclude discussion of the panel’s recommendations on diagnostic steps for each category of CCVHD and treatment recommendations for refractory heart failure (Stage D). Hence I will cover only management recommendations for dogs at risk for CCVHD, those with very early disease, those with cardiac enlargement, those hospitalized for heart failure, and those treated for heart failure at home.

Mitral Valve Disease Severity Classification

The panel chose to adapt a novel classification scheme modeled after that put forth by the American Heart Association and the American College of Cardiology. This scheme avoids the NYHA classification pitfall of
using progressive loss of exercise tolerance to grade disease severity. In addition, it adds an early category (A), during which dogs are without evidence of disease, but which are at risk for developing disease (e.g. Cavalier King Charles Spaniels). The ACVIM classification system is shown in Figure 1. Class A CCVHD patients are at risk, B1 have murmurs but no cardiomegaly, B2 have cardiomegaly, Ca have acute heart failure, requiring hospitalization, Cc have chronic heart failure and are treated at home, Da patients have refractory heart failure, requiring hospitalization, while Dc have refractory heart failure but can be managed at home. The panel attempted to achieve consensus on the management of dogs in all categories of severity. Only the therapeutic recommendations for ACVIM Class A through C are discussed herein.

Stage A CCVHD

**CONSENSUS:** The panel recommends no drug therapy during this stage. Breeding stock in which a murmur of mitral regurgitation is discovered during the normal breeding years (6-8 years) should be removed from the breeding program.

Stage B1 CCVHD

**CONSENSUS:** No drug or dietary therapy is recommended for either small or large dogs with MR.

**Author’s Comment:** This author suggests that owners might benefit in long-term by starting mild salt restriction at B1 and B2, while appetite is presumably still good; this avoids the necessity of abrupt changes later and allows the dog’s palate to be “trained” to a lower salt “preference”. The panel did not address the possibility of hypertension in B1 patients, but would likely agree that if hypertension is diagnosed, its control is imperative, probably by the administration of both an ACE-Inhibitor and amlodipine. This logic would apply to all stages of CCVHD.

Stage B2 CCVHD

**CONSENSUS:** None (The panel was not unanimous on any recommendation at this state.)

**MAJORITY:** ACE-Inhibitors were recommended by the majority of panelists for dogs with CCVHD and cardiac remodeling (enlargement). A majority of panelists recommended AGAINST the use of Beta-blockers at this disease stage. A majority of panelists suggested dietary alteration, including mild salt restriction, high palatability and adequate protein and carbohydrate content.

**Author’s Comment:** Although controversial, this author does utilize ACE-Inhibitors in Stage B2 CCVHD, as the majority of evidence supports their use.\(^3,4\) In an unpublished survey of 100 ACVIM-boarded cardiologists, nearly 60% used ACE-Inhibitors in small breeds and nearly 70% in large breeds, at this stage of CCVHD.\(^5\) For more dedicated clients, I sometimes prescribe up-titration of a Beta-blocker (e.g., carvedilol or atenolol) and would consider the use of spironolactone based on recent evidence from our laboratory indicating that “aldosterone escape” occurs with benazepril in normal dogs undergoing furosemide-induced RAAS activation. This indicates that, for “complete” renin-angiotensin-aldosterone (RAAS) suppression, drugs which blunt this system at different points in the cascade are possibly indicated.\(^6\) Specific data from clinical trials, for the moment, are lacking for both Beta- and aldosterone-receptor blockade in Stage B2 CCVHD.

Stage C – hospitalized/acute (Ca) CCVHD

**CONSENSUS:** A consensus was reached by the panel on the use of furosemide (PO, IM, IV, CRI)\(^7,8\) and pimobendan for hospitalized heart failure patients. As clinical conditions dictate, the panel also agreed that
oxygen, using cage or nasal tube; mechanical fluid removal (thoracic or abdominal fluid which contributes to dyspnea); specific nursing measures to relieve dyspnea/discomfort (appropriate humidity and temperature and body positioning); sedation (e.g., buprenorphine and/or acepromazine; morphine); and nitroprusside (mixed vasodilator) and/or dobutamine (inotropic effect, afterload reduction, mitral orifice size reduction) by CRI.

MAJORITY: Although consensus was not reached, a majority of panelists recommended ACE-inhibitors as off-loading (vasodilators) in the acute Stage C patient. This approach is supported by human studies evaluating IV enalaprilat (the active metabolite of enalapril) in acute heart failure9,10 and the results of the IMPROVE Trial which demonstrated a fall in pulmonary artery wedge pressure (equivalent to left atrial pressure, the driving pressure producing pulmonary edema) with oral enalapril therapy.11

Author’s Comment: Only a minority of panelists advocate the use of nitroglycerin in these patients. My view is that this additional off-loading therapy is beneficial and is used in place of the somewhat cumbersome nitroprusside. My standard approach to the hospitalized Stage C patient includes administration furosemide (IV or IM bolus or CRI), enalapril, and pimobendan, with oxygen (in most), dobutamine, digoxin (if in atrial fibrillation) and nitroglycerine added as patient needs dictate.

Stage C – outpatient/chronic (Cc ) CCVHD

CONSENSUS: Consensus was reached by the panel on the use of oral furosemide, an ACE-Inhibitor11-16, and pimobendan17 (“triple therapy”) for Stage C patients after release from the hospital. The panel also unanimously recommends that Beta-blockers not be instituted in Stage C dogs exhibiting signs of heart failure.

MAJORITY: The majority of panelists recommended the use of the aldosterone receptor blocker, spironolactone, for chronic Stage C patients. Likewise, the majority of panelists advocated the use of twice daily enalapril if this is the ACE-Inhibitor being used or an equivalent dosage of another agent. In the face of atrial fibrillation, the majority of panelists advocate the use of digoxin to support cardiac function and to slow the ventricular response to atrial fibrillation.

Author’s Comment: It is noteworthy that the Consensus Report was prepared prior to the publication of a placebo-controlled, double blind study demonstrating the positive impact achieved with the addition of spironolactone to standard therapy in dogs in heart failure.18 While it cannot be said with certainty, the panel may well have reached consensus on the use of spironolactone in Stage C dogs had this information been available during the panel’s deliberations. As mentioned above, the argument for adding spironolactone is strengthened by the study from the author’s laboratory demonstrating early “aldosterone escape” with ACE-inhibition in a model of heart failure therapy, indicating that an ACE-Inhibitor alone may not adequately suppress the circulating RAAS.6

CCVHD, if of sufficient severity, is in actuality a “surgical” disease. To date, unfortunately, efforts at valve repair or replacement have not been met with adequate success. Recently published case series of surgical mitral valve repair have provided disappointing results with high peri-operative mortality with valve repair19 and post-operative thrombus formation with valve replacement20, although some individual successes have been achieved. These results are certainly due, in part, to the fact that surgical correction is delayed until heart failure has ensued. Nevertheless, because of the cost, small numbers of participating centers and limited success, surgical correction of CCVHD is not currently practical, leaving this as a “medically-managed disease” in veterinary patients for the time being.

Consensus statements by their very nature represent a compromise of positions, regardless of the subject under discussion. The ACVIM Consensus Statement on Canine Chronic Valvular Heart Disease is no different.
The very act of compromising creates a safer, less daring approach to cardiac therapeutics that most can agree upon. It takes out of the mix, the more aggressive, less well-proven approaches that might be part of the next consensus statement, but reduces the risk of partaking in such practices. It should be noted that this paper reviews only a portion of the consensus statement and I recommend that the whole document be read for the recommendations on diagnosis in CCVHD, for subtle nuances in treatment approaches, drug dosages, and recommendations for diagnosis and management of refractory heart failure.

Abbreviations: ACE – Angiotensin Converting Enzyme; ACVIM – American College of Veterinary Internal Medicine; CCVD – Canine Chronic Valvular Disease; CRI – Continuous Rate Infusion; IM – Intramuscular; ISACHC – International Small Animal Cardiac Health Council; IV – Intravenous; MR – Mitral Regurgitation; NYHA – New York Heart Association; RAAS – Renin-Angiotensin-Aldosterone System.

Figure 1. The American College of Veterinary Internal Medicine (ACVIM) Classification of cardiac disease.