Diagnostic aids in myxomatous mitral valve disease – which tests to use and when.

Thank you for logging on onto the CPD Solutions webinar yesterday – I hope you found it interesting and most of all useful to help you manage your MMVD cases in practice. Thank you to CEVA for sponsorship.

I wanted to update people with the latest ACVIM consensus on managing MMVD, but also identify which bits are most essential and plot a practical way for people to manage these cases within budget and focusing on where the strongest evidence lies. A lot of this is relatively new because of the seminal EPIC trial which has changed what we do. As I pointed out, I think there are geographic difference in approach; unlike mainland Europe and the US, the vast majority of vets in the UK now have access to ultrasound. I want people to feel confident enough or keen to train to use echocardiography, because that is what will give the best information and help us manage our patients for the best outcome. Our approach has to be practical and affordable otherwise it won't happen, and the wrong corners can get cut to the detriment of the patient. Much of the webinar was about my approach; which is pretty similar to my HeartVets colleagues and many other specialists; but not all cardiologists do things the same way.

I am not a big believer in strict protocols, but I do believe that the advice below gives a structure which its really helpful for all members of a practice to follow. Of course also record the key physical findings too: respiratory and heart rate, intensity of murmur, presence or absence of gallop sound, split S2 or arrhythmia, apex beat and heart sound intensity, arterial pulse quality, MM CRT and colour, jugular distension, respiratory pattern and sounds, +/- abdominal distension body weight and condition and demeanour. Physical exam remains the key diagnostic skill.

Stage A of the ACVIM classification identifies dogs at high risk for developing heart disease but that currently have no identifiable structural disorder of the heart (eg, every Cavalier King Charles Spaniel or other predisposed breed without a heart murmur).

Stage B identifies dogs with structural heart disease (eg, the typical murmur of MR, accompanied by some typical valve pathology, is present), but that have never developed clinical signs caused by heart failure. In a change from the 2009 recommendations, strong evidence now supports initiating treatment to delay the onset of clinical signs of heart failure in a subset of stage B patients with more advanced cardiac morphologic changes (EPIC trial).

Stage B1 describes asymptomatic dogs that have no radiographic or echocardiographic evidence of cardiac remodeling in response to their MMVD, as well as those in which remodelling changes are present, but not severe enough to meet current clinical trial criteria that have been used to determine that initiating treatment is warranted.

Stage B2 refers to asymptomatic dogs that have more advanced
MMVD that is hemodynamically severe and long-standing enough to have caused radiographic and echocardiographic findings of LA and LV enlargement that meet clinical trial criteria of murmur intensity ≥3/6; echocardiographic LA : Ao ratio in the right-sided short axis view in early diastole ≥1.6 Left ventricular internal diameter in diastole, normalized for body weight (LVIDDN) ≥1.7 and breed-adjusted radiographic VHS >10.5.

Stage C denotes dogs with either current or past clinical signs of heart failure caused by MMVD.

Stage D refers to dogs with end-stage MMVD, in which clinical signs of heart failure are refractory to standard treatment (Stage D dogs thus require more than a total daily dosage of 8 mg/kg of furosemide or the equivalent dosage of torsemide, administered concurrently with standard doses of the other medications thought to control the clinical signs of heart failure (eg, pimobendan, 0.25-0.3 mg/kg PO q12h, a standard dosage of approved ACEI, and 2.0 mg/kg of spironolactone daily).

Currently, we can't use proBNP values to define the stages.

For my approach, I recommend these diagnostic tests as the minimum:

Stage A educate the client as to the timeline, likely diagnostics and treatment outcomes, and breeding advice.

Stage B when murmur reached grade 3/6, echo is needed to see if criteria listed above are met. If criteria are not met repeat scan in 3-12 months case depending on severity and costs. If criteria are met (ie B2) start treatment with pimobendan. I personally don't take chest radiographs or measure blood pressure in most cases that fulfil the echo criteria because it won't change my treatment. But I often take bloods when treatment is started as a baseline. If echo can't be done then use VHS of 11.5 as a cut off. If echo parameters are net v likely VHS is > 10.5 and no need for rads. Better still train to be able to reliably measure the two echo parameters required. The ACVIM guidelines has table and a tool at https://www.heartvets.co.uk/epic-trial can be used to calculate LVDDN.

Stage B2 become stage C at the onset of CHF. CHF is defined by radiographic evidence of pulmonary oedema along with a raised sleeping respiratory rate (compare with normal SRR for that dog). Usually SRR falls after treatment with frusemide. Owner identification of raised SRR is therefore crucial and requires education. I like to get baseline bloods when adding frusemide, spironolactone and an ACE inhibitor when dogs develop CHF. Blood tests, echo and blood pressure all useful. Regular check-ups with repeat bloods, +/- rads, echo and blood pressure can also be useful. But defining the onset of CHF does not need these tests.

Stage C becomes Stage D when management become difficult. Multiple diagnostic tests will be required.

Please take the chance to look at the original papers listed below. They are all available as open access so you can just google them or use Pubmed. I have also put links to other useful resources.

Key references

- Häggström, J. *et al.* (2008) Effect of pimobendan or benazepril hydrochloride on survival times in dogs with congestive heart failure caused by naturally occurring myxomatous mitral valve disease: The **QUEST** study. *J. Vet. Intern. Med.* 22:1124-35
- Boswood, A. *et al.* (2016) Effect of Pimobendan in Dogs with Preclinical Myxomatous Mitral Valve Disease and Cardiomegaly: The **EPIC** Study—A Randomized Clinical Trial. J Vet Intern Med. 30:1765-1779
- Atkins, C. *et al.* (2009) **Guidelines** for the diagnosis and treatment of canine chronic valvular heart disease. *J. Vet. Intern. Med.* 23:1142-1150
- Keene, B et al. (2019) **ACVIM consensus guidelines** for the diagnosis and treatment of myxomatous mitral valve disease in dogs: J Vet Intern Med. 33: 1–14.

Useful websites:

http://cardiaceducationgroup.org/resource/videos/
https://www.heartvets.co.uk/

useful tools for measuring Sleeping respiratory rate

Apple OS https://apps.apple.com/bf/app/cardalis/id569166179
Android https://play.google.com/store/apps/details?id=com.ceva.cardalisv2&hl=en_GB
https://www.heartvets.co.uk/info-sheets