Degenerative mitral valve disease in dogs attending UK practices

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Background

Degenerative mitral valve disease (DMVD) is the most common cardiac disease in dogs (1), yet optimum management of affected animals remains a challenge. The prognostic value of cardiac biomarkers and clinical measurements has been demonstrated in dogs with DMVD monitored by veterinary cardiologists (2,3). Further research is required to evaluate whether these findings translate to the wider population of primary-practice attending dogs with DMVD.

Aims & Objectives

This study aims to document the prevalence of degenerative mitral valve disease (DMVD), evaluate the survival characteristics of dogs at various stages of disease progression and to determine the prognostic value of clinical and biochemical indicators in the primary care setting.

M&M

Retrospective study

The electronic patient records of dogs attending primary-care veterinary practices in the UK were shared with the Veterinary Companion Animal Surveillance System (VetCompass) (4). Data collected included demographic (breed, date of birth, sex, neuter status, insurance status) and clinical information (free-text clinical notes, VeNom summary diagnosis terms (5) and prescribed treatments). Cases were defined as dogs with a veterinary diagnosis of DMVD (or synonym) recorded in their clinical notes or VeNom summary terms between January 01 2010 and December 31 2011. Dogs with a documented heart murmur not inconsistent with a diagnosis of DMVD were classified as possible cases. Chi squared, t-tests and Mann Whitney U tests compared the characteristics of veterinary diagnosed DMVD cases with possible DMVD cases. Descriptive statistics were generated using SPSS statistics 20.

Prospective study

Veterinary surgeons working in primary-care practices in the UK were invited to participate in a prospective study via letters and articles published in veterinary journals and magazines. Veterinary organisations promoted the study to their members.

Veterinary surgeons working at collaborating primary-care practices are recruiting a cohort of dogs with DMVD into this study, At the time of study entry, veterinary surgeons record baseline clinical measurements (Figure 1) and submit EDTA plasma to Idexx laboratories to measure the levels of NT-pro-BNP and cardiac troponin I. Cardiac death and all-cause mortality events will be identified from clinical note data shared with VetCompass. Cox proportional hazards models will evaluate associations between the explanatory variables and survival. Ethical approval was granted by the RVC Ethics and Welfare Committee (URN 2012 1144).

Results

Prevalence estimate

The denominator population consisted of 111,967 dogs attending 93 veterinary clinics in England between January 01 2010 and December 31 2011. Four hundred and five dogs were identified as having a veterinary diagnosis of DMVD (apparent prevalence: 0.36%, 95% confidence intervals: 0.33 – 0.40%). A further 3513 dogs were recorded as having a heart murmur not inconsistent with DMVD within their EPRs. A total of 3918 dogs had possible or veterinary confirmed DMVD (apparent prevalence: 3.50%, 95% confidence intervals: 3.39 – 3.61%).

Retrospective study population

The mean age at which DMVD was diagnosed or the presence of a heart murmur was first recorded in incident cases (n = 116) was 9.51 years (standard deviation 3.22 years).

Two hundred and fifty-two (62.2%) dogs with DMVD were male, 292 (92.7%) were neutered and 274 (69.5%) were insured. The median (IQR, range) maximum weight recorded was 11.3kg (8.4 - 16.3kg, 1.32 – 44.0kg). The most common breed diagnosed with DMVD was the Cavalier King Charles spaniel (n = 131, 32,3%).

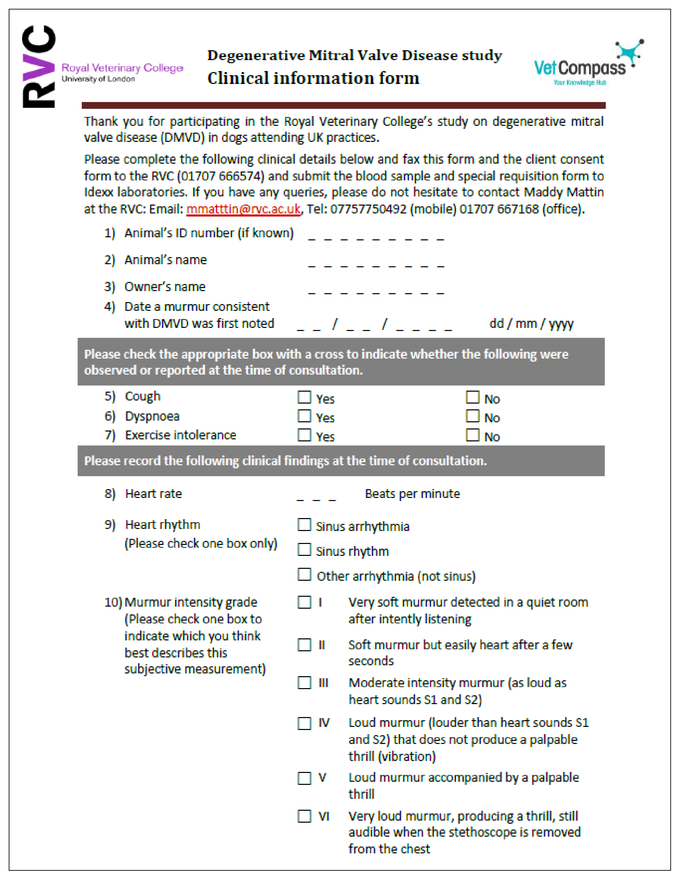
Veterinary surgeons recorded heart rate at least once in 331 (81.7%) of dogs diagnosed with DMVD. Heart murmur intensity was graded (I-VI) in 360 (88.9%) dogs with DMVD. NT-pro-BNP was measured in 52 (12.8%) cases. Echocardiography was performed in 245 cases (60.5%) and thoracic radiographs were taken in 160 (39.5%) dogs with DMVD. Sixty (40.8%) dogs with DMVD had electrocardiograms performed.

Two hundred and ninety (71.6%) dogs received at least one treatment for cardiac disease: ACE inhibitor (n = 218, 53.8%), frusemide (n = 216, 53.3%), pimobendan (n = 210, 51.9%), spironolactone (n = 108, 26.7%), amlodipine (n = 18, 4.4%), amilozide hydrochlorothiazide (n = 11, 2.7%), digoxin (n = 9, 2.2%), beta-blocker (n = 2, 0.5%), aspirin (n = 1, 0.2%), heparin (n = 1, 0.2%), mexiletine (n = 1, 0.2%), nitroglycerin cream (n = 1, 0.2%).

The median (IQR, range) follow up time per dog was 22.0 months (10.4 – 34.7, 0.0 – 57.4). Two hundred and twelve (52.4%) dogs with DMVD died during follow-up. Eighty four (39.6%) deaths were primarily due to cardiac disease. Forty-three (20.3%) deaths occurred due to multiple causes including cardiac disease and 42 (19.8%) deaths occurred due to non-cardiac causes. In 43 (20.3%) cases, cause of death was not recorded. Euthanasia accounted for 159 (75%) deaths.

Table 1. Descriptive statistics of dogs with possible or veterinary diagnosed degenerative mitral valve disease

	Veterinary diagnosed DMVD	Possible DMVD cases*	P-value
Mean (s.d.) age at last record (years)	11.40 (2.91)	11.58 (3.65)	0.257
Male (n (%))	252 (62.2)	1897 (54.0)	0.002
Maximum body weight (kg, IQR)	11.3 (8.4 – 16.3)	11.9 (8.3 – 21.0)	0.02
Neutered (n (%))	292 (92.7%)	2441 (93.6%)	0.524
Insured (n (%))	274 (69.5)	1385 (40.3)	<0.001



Royal Veterinary College, University of London — Degenerative Mitral Valve Disease study — Clinical information form — VetCompass Your Knowledge Hub

Thank you for participating in the Royal Veterinary College's study on degenerative mitral valve disease (DMVD) in dogs attending UK practices.

Please complete the following clinical details below and fax this form and the client consent form to the RVC (01707 666574) and submit the blood sample and special requisition form to Idexx laboratories. If you have any queries, please do not hesitate to contact Maddy Mattin at the RVC: Email: mmatttin@rvc.ac.uk, Tel: 07757750492 (mobile) 01707 667168 (office).

1) Animal's ID number (if known) _ _ _ _ _ _ _ _ _
2) Animal's name _ _ _ _ _ _ _ _ _
3) Owner's name _ _ _ _ _ _ _ _ _
4) Date a murmur consistent with DMVD was first noted _ _ / _ _ / _ _ _ _ dd / mm / yyyy

Please check the appropriate box with a cross to indicate whether the following were observed or reported at the time of consultation.

5) Cough ☐ Yes ☐ No
6) Dyspnoea ☐ Yes ☐ No
7) Exercise intolerance ☐ Yes ☐ No

Please record the following clinical findings at the time of consultation.

8) Heart rate _ _ _ Beats per minute
9) Heart rhythm (Please check one box only) ☐ Sinus arrhythmia ☐ Sinus rhythm ☐ Other arrhythmia (not sinus)
10) Murmur intensity grade (Please check one box to indicate which you think best describes this subjective measurement)
☐ I Very soft murmur detected in a quiet room after intently listening
☐ II Soft murmur but easily heart after a few seconds
☐ III Moderate intensity murmur (as loud as heart sounds S1 and S2)
☐ IV Loud murmur (louder than heart sounds S1 and S2) that does not produce a palpable thrill (vibration)
☐ V Loud murmur accompanied by a palpable thrill
☐ VI Very loud murmur, producing a thrill, still audible when the stethoscope is removed from the chest

Figure 1: Data collection form for prospective study

Discussion

DMVD typically affected geriatric small to medium sized dogs in this population of dogs attending primary-care practices. Heart murmurs were commonly detected within this population, although the primary underlying cause was frequently not recorded. Approximately one fifth of dogs were documented to have died primarily of cardiac causes, accounting for 39.6% of deaths. The prospective study will identify factors associated with survival of dogs with DMVD in the primary-care setting.

References

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