Boehringer Ingelheim

Canine Cardiology - From the Basics to What's New

What should I do when I hear a murmur?

Walt Ingwersen DVM, DVSc, DACVIM
Specialist, Pet Technical Services

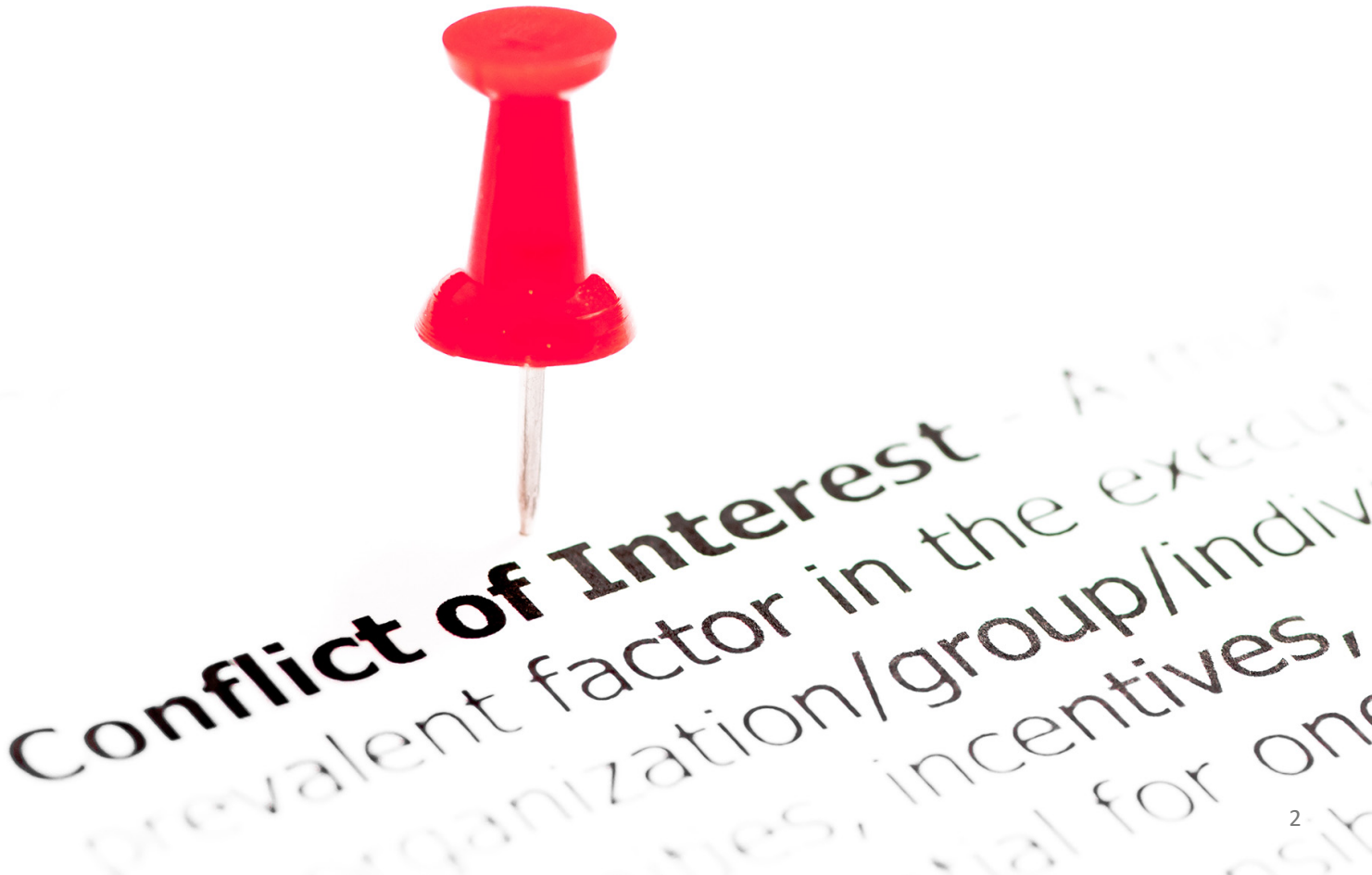
Brought to you by

vetmedin®

More than medicine.

Conflict of Interest Declaration

Presented by Boehringer Ingelheim Animal Health



Overview

- Murmurs
  - Why & staging
- Heart dz staging
  - Common language & therapy guidelines
- Diagnostic opportunities and dilemmas
  - BNP? Echo?
  - VHS & RRR
- Current standards of treatment
  - DCM
  - MVD
- Client education and follow-up

Your Goals?

- How many have clinic protocols?
- Screening protocols?
- What happens when hear a murmur?
- When to initiate treatment?
- First-line therapy vs second vs third, etc?
- Mono-modal vs dual or triple therapy?

The Real World—Ipsos Survey of DVMs 2016

Euthanasia %:

Mild CHF cases:

- **8% with no therapy**
- 12% after poor response to 1st therapy

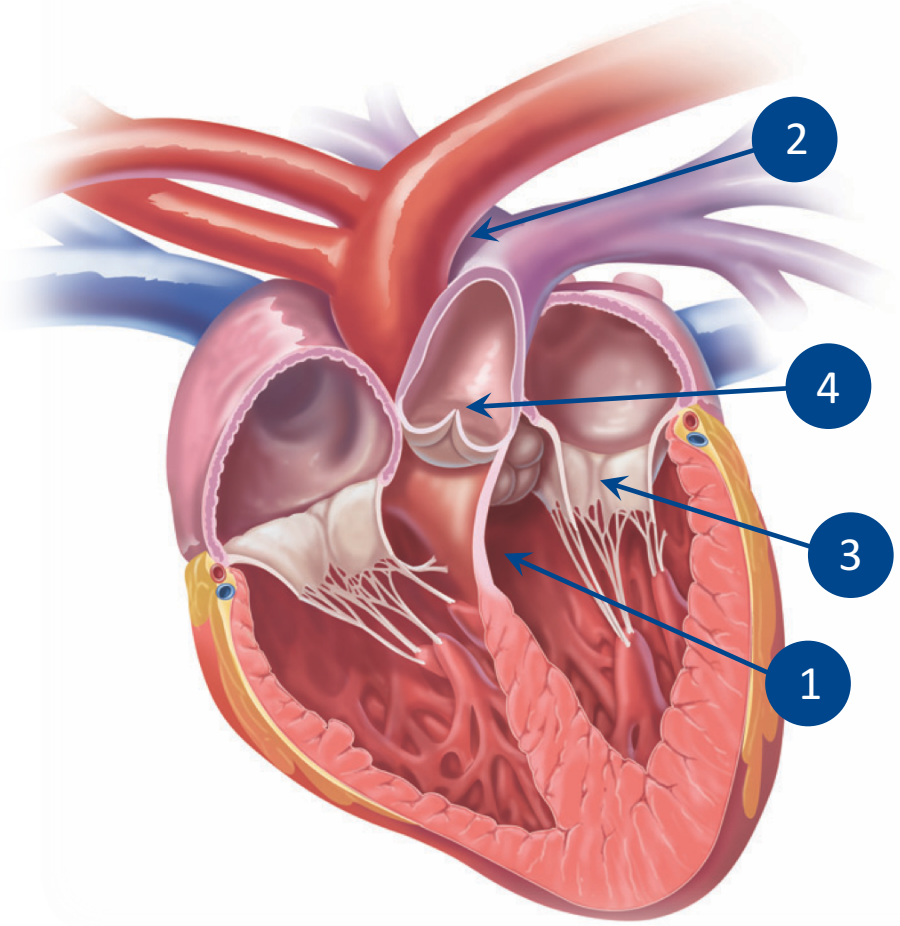
Advanced cases:

- **32% with no therapy**
- 39% after poor response to 1st therapy

% VETMEDIN® use in CHF:

- 53% of mild CHF
- 88% of advanced CHF

Causes of murmurs in dogs



Turbulence creates murmurs when normal blood flow is disrupted.

1. Opening between chambers (VSD)
2. Opening between great vessels (PDA)
3. Insufficient “leaky” valves (AVVI or DCM)-acquired murmur
4. Abnormal narrowing —valve or vessel (PS)

Types of canine heart disease

AVVI

- Heart valves degenerate
- fail to properly close and start to “leak”
- Leak results in audible murmur
- Volume overload
- Contractility impaired
- Disease progresses slowly

DCM

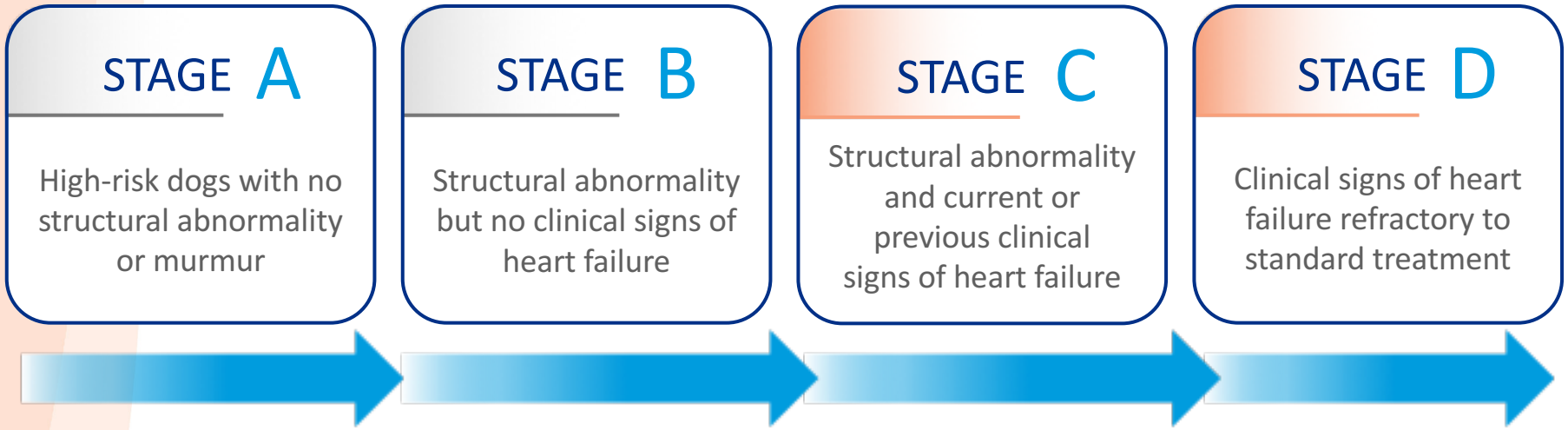
- Heart muscle cells do not function properly
- Heart dilates secondary to decreased function
- Dilation of valve annulus causes leak at the mitral valve resulting in audible murmur
- Disease progresses quickly

Cardiac Murmurs: Simplified

- Don’t stress out over murmur intensity - simplify it:
  - **Grades 1 and 2/6:** hard to hear - you need to work hard to hear
  - **Grades 3 and 4/6:** easy to hear - you don’t need to work to hear
  - **Grades 5 and 6/6:** have a palpable thrill - you hear it easily and feel it

ACVIM classification of CHF

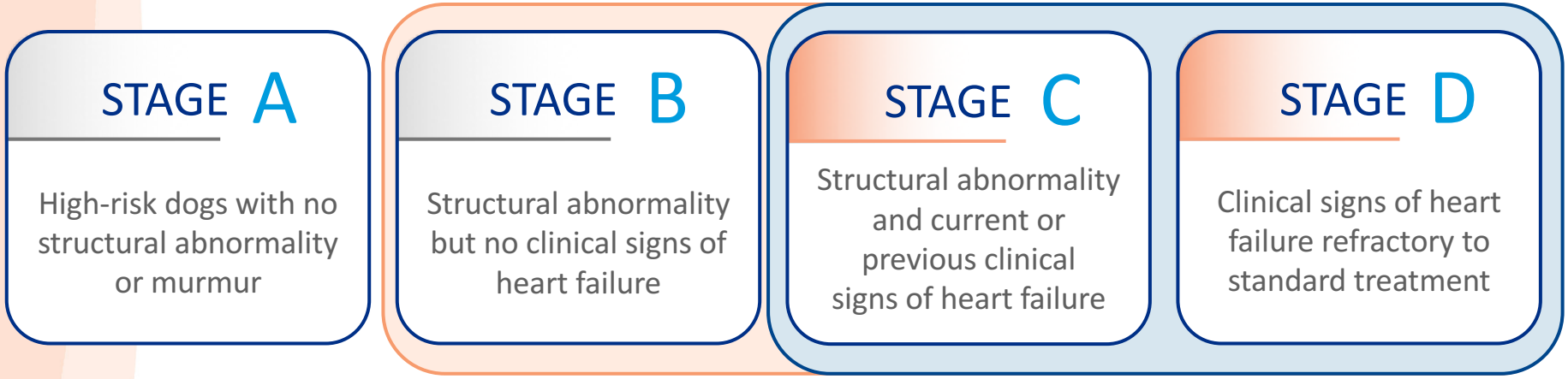
- 2009 Guidelines—Specialty of Cardiology Consensus Panel of the ACVIM



http://onlinelibrary.wiley.com/doi/10.1111/j.1939-1676.2009.0392.x/abstract

ACVIM classification of CHF (cont'd)

- 2009 Guidelines—Specialty of Cardiology Consensus Panel of the ACVIM



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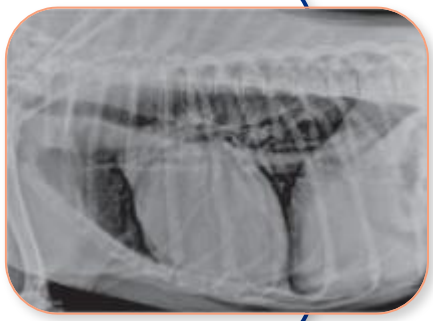
ACVIM classification of CHF (cont'd)

STAGE B

Dogs with structural disease that have not yet developed clinical signs of CHF

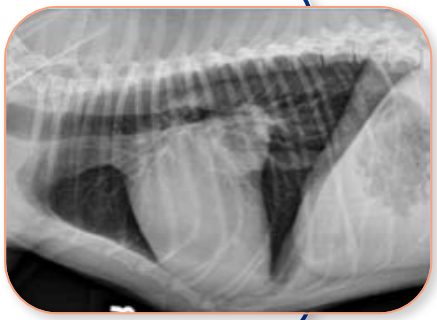
STAGE B1

No cardiac enlargement



STAGE B2

Cardiac enlargement present



Diagnostic recommendations

STAGE B

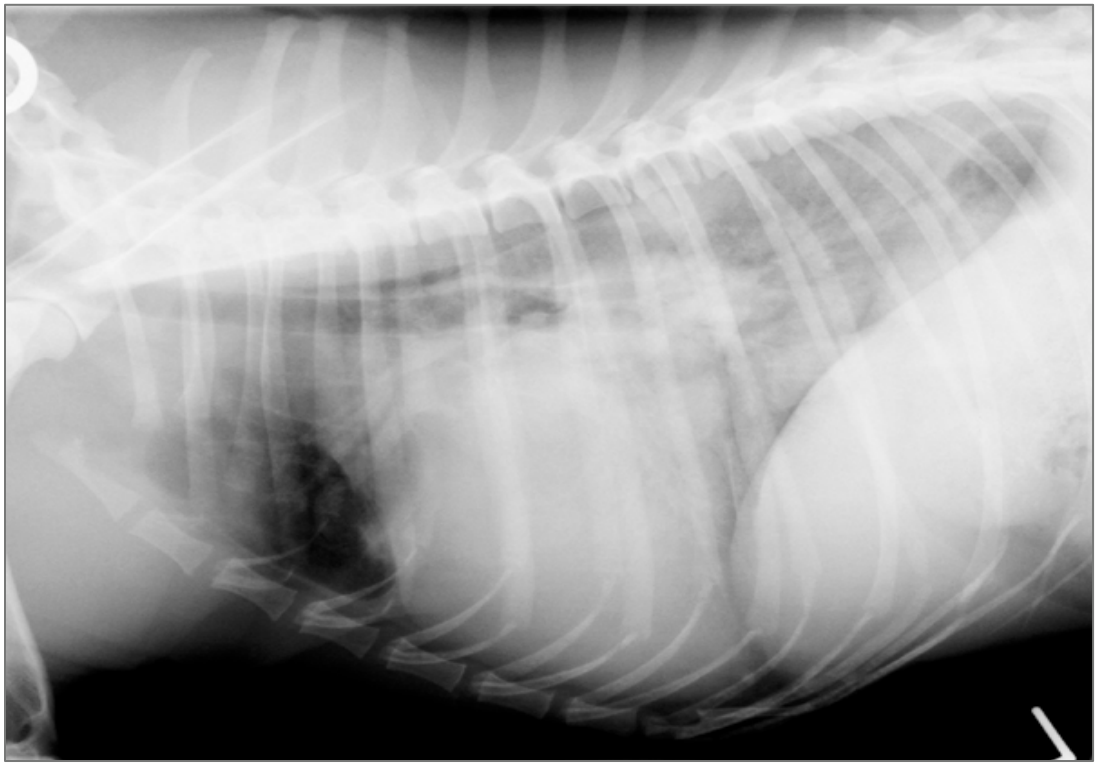
Dogs with structural disease that have not yet developed clinical signs of CHF

- Essential diagnostics:
  - Baseline radiograph with VHS
  - Baseline blood work

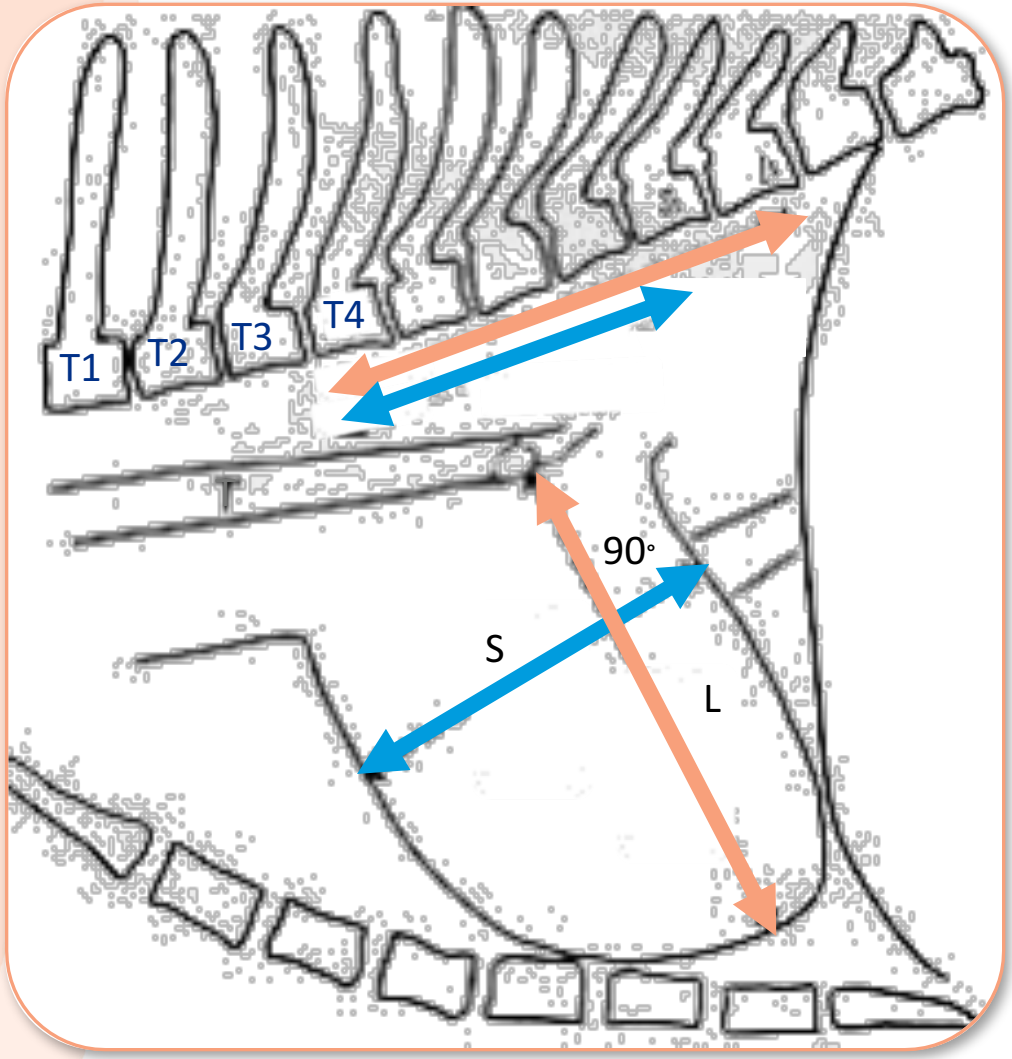
CHF DX: Thoracic Radiography

The Big 3

- Cardiomegaly = Increased VHS
- Pulmonary venous congestion
- Pulmonary edema



Vertebral heart score (VHS)



CANINE VERTEBRAL HEART SCORE

VHS = L + S
VHS = 6 + 4.5 = 10.5
Normal = 8.5–10.5

The VHS

VHS = Long + short axis

Normal VHS = 8.5–10.5

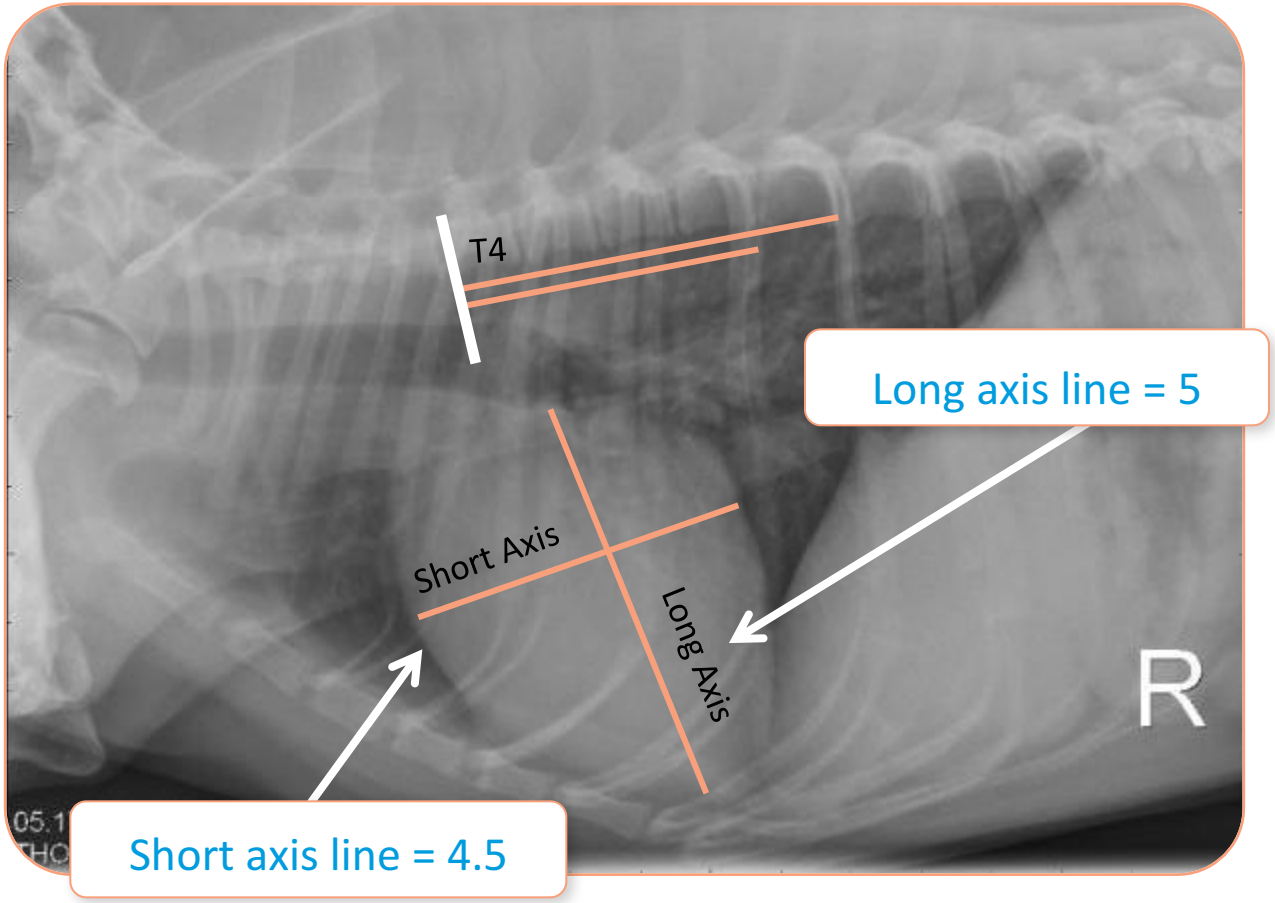
This example

VHS =

L + S =

5 + 4.5 =

9.5 = Normal



The VHS (cont'd)

VHS = Long + short axis

Normal VHS = 8.5–10.5

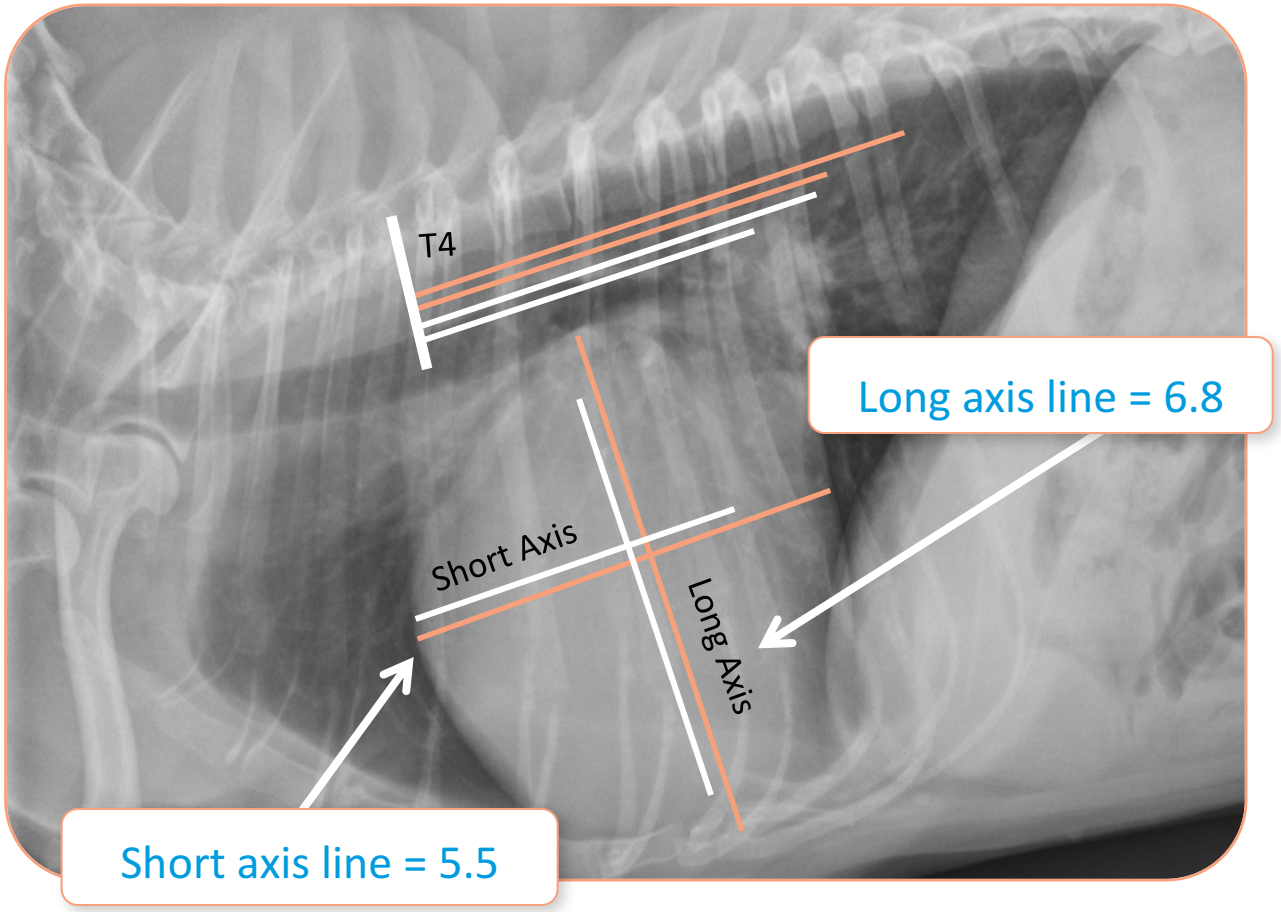
This example

VHS =

L + S =

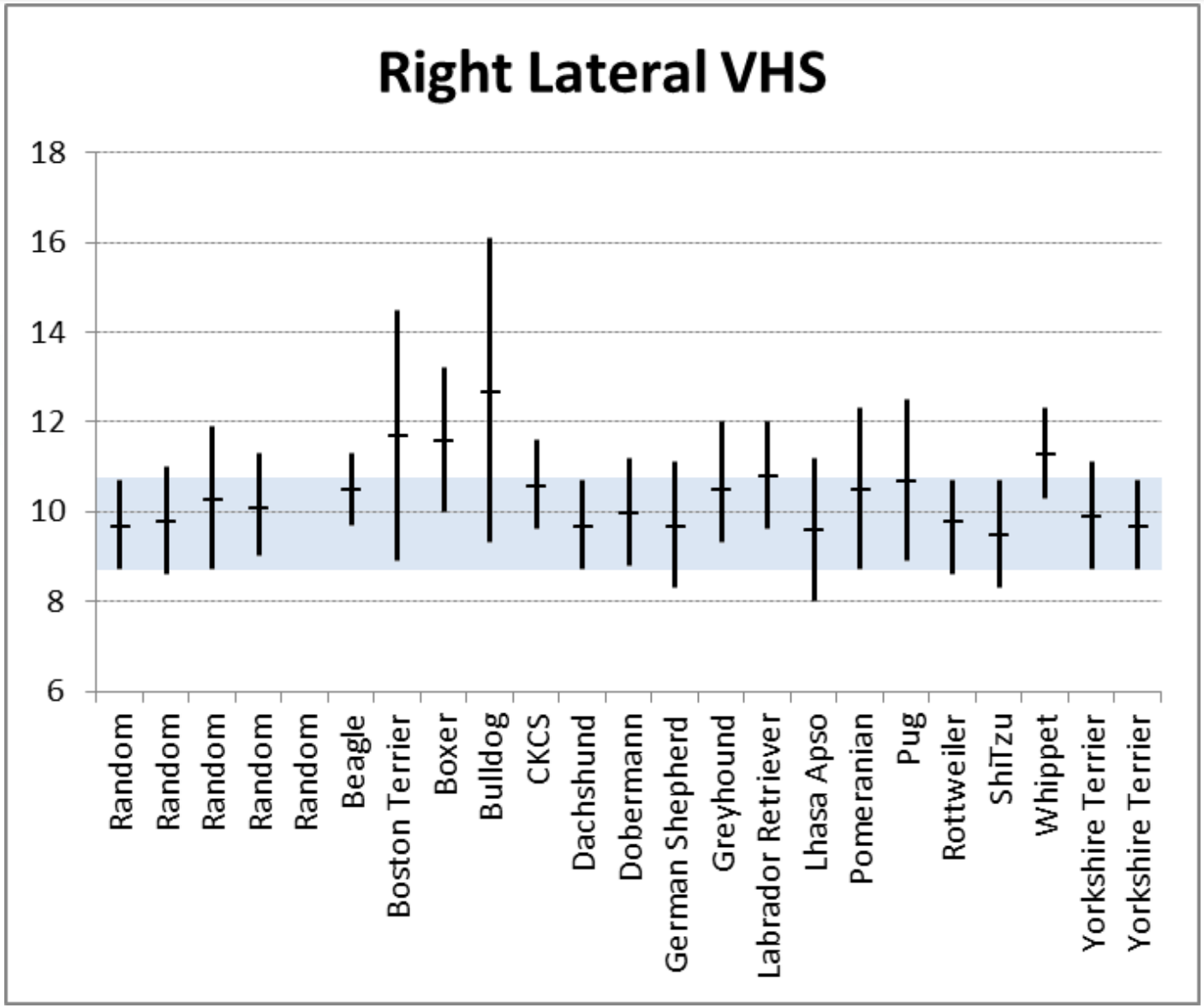
6.8 + 5.5 =

12.3 = Enlarged



VHS breed variability

From Vertebral Heart Size – VIN Medical FAQ; Mark Rishniw; last updated 7/6/17



Diagnostic recommendations

STAGE B

Dogs with structural disease that have not yet developed clinical signs of CHF

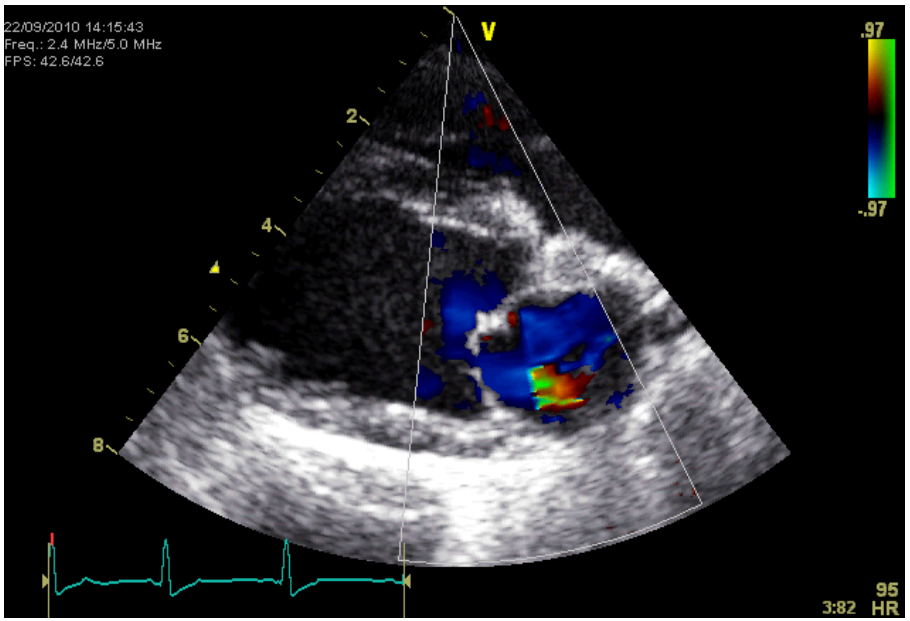
- Essential diagnostics: Baseline radiograph with VHS
  Baseline blood work

Baseline blood work

- Basic laboratory work includes a minimum of:
  - Hematocrit
  - Total protein concentration
  - Serum creatinine concentration
  - Urinalysis
- Baseline parameters
  - Give you a reference point for hydration and renal function
    - Concurrent diseases and therapy may effect these values
      - For example, diuretics and specific gravity
- BNP?

Echocardiography recommendations

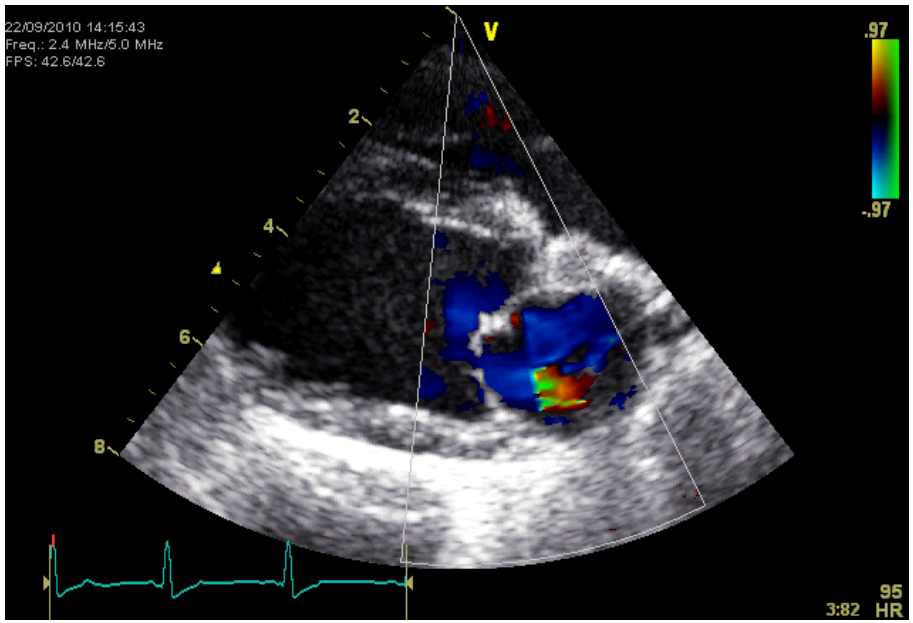
- According to the ACVIM consensus statement, an echocardiogram is recommended to answer specific questions regarding either cardiac chamber enlargement or the cause of the murmur if those questions are not adequately answered by thoracic radiography



http://onlinelibrary.wiley.com/doi/10.1111/j.1939-1676.2009.0392.x/abstract

Echocardiography recommendations (cont'd)

- Adjunct diagnostic tool for B2 dogs to:
  - Confirm the stage of heart disease and
  - Identify structural or functional complications
- Medium to large breed dogs
  - Rule out DCM vs. AVVI
- Not all images are created equal
  - Cardiologists are the best resource for diagnostic testing and cardiac case management



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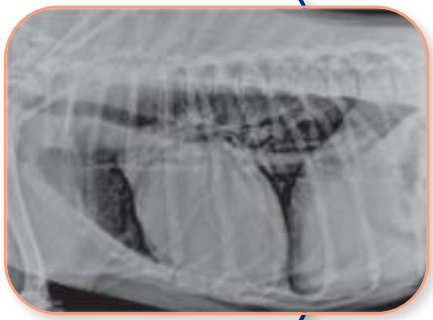
Diagnostic and management recommendations

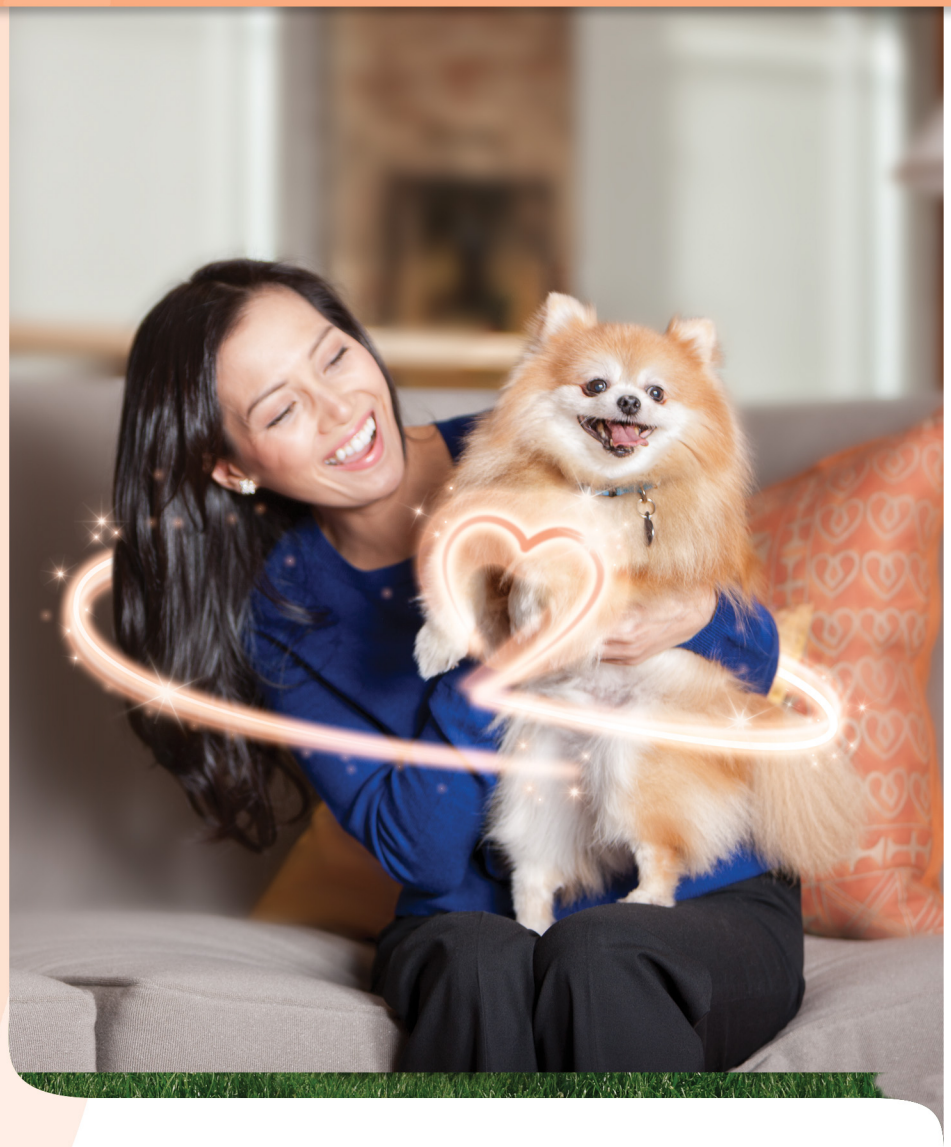
STAGE **B1**

No cardiac enlargement



- Diagnostics: Thoracic radiographs & lab work
- Treatment: No treatment; ensure appropriate life-stage diet
- Client education and set expectations—RRR or SRR; inform client what will happen if reach stage B2 and C
- Reevaluate within 12 months

Client education



- Educate the client about:
  - Heart disease and disease progression
  - Importance of follow-up
  - Identifying early warning signs

Client education: Early warning signs

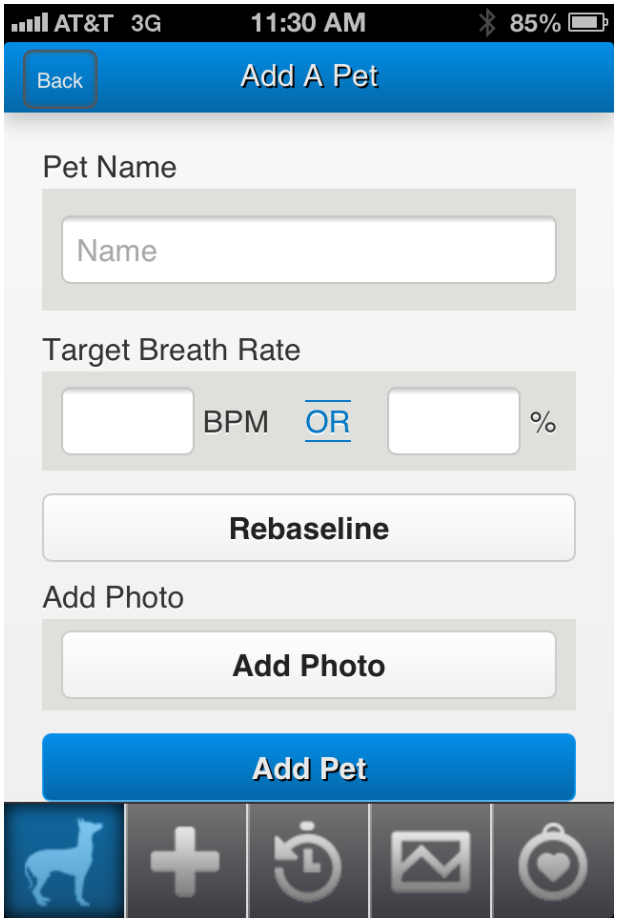
- Coughing
- Changes in breathing
  - Difficulty breathing
  - Shortness of breath
- Changes in behaviour
  - Lack of energy/tires easily/lethargy
  - Exercise intolerance / fainting
  - Restlessness, especially at night
- Changes in appetite
- Increase in Resting (or Sleeping) Respiratory Rate

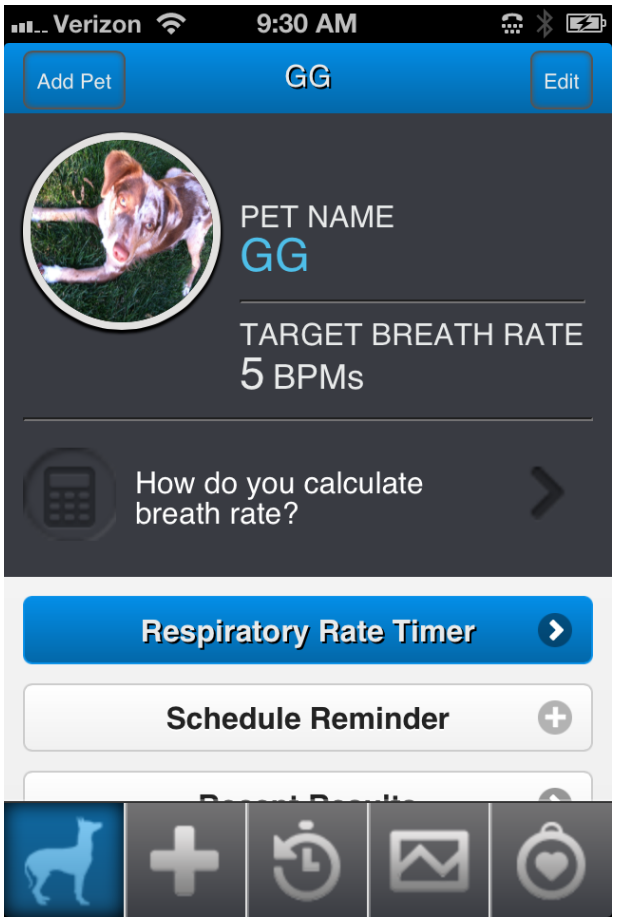
Monitor Resting Respiratory Rate (RRR)

- Have client measure (at rest or sleeping) over 3-4 days and note average RRR for their individual dog

- Monitor once weekly forever
- Increase in RRR (consistent 20% increase) should prompt visit to clinic and recheck thoracic radiographs
- Check VHS and look at vessels

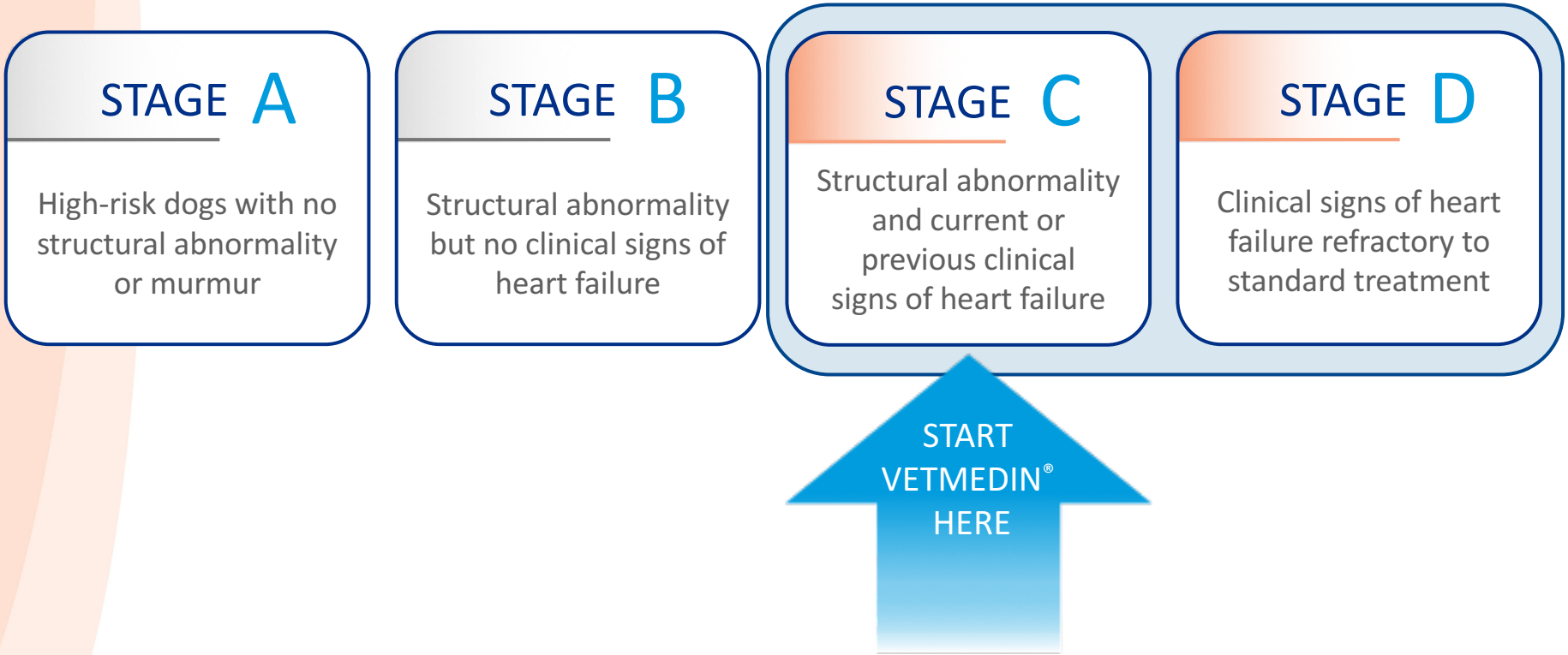
RRR app – Add a pet





ACVIM recommendations

- 2009 Guidelines—Specialty of Cardiology Consensus Panel of the ACVIM



J Vet Intern Med 2008;22:897-904

Effect of Pimobendan on Case Fatality Rate in Doberman Pinschers with Congestive Heart Failure Caused by Dilated Cardiomyopathy

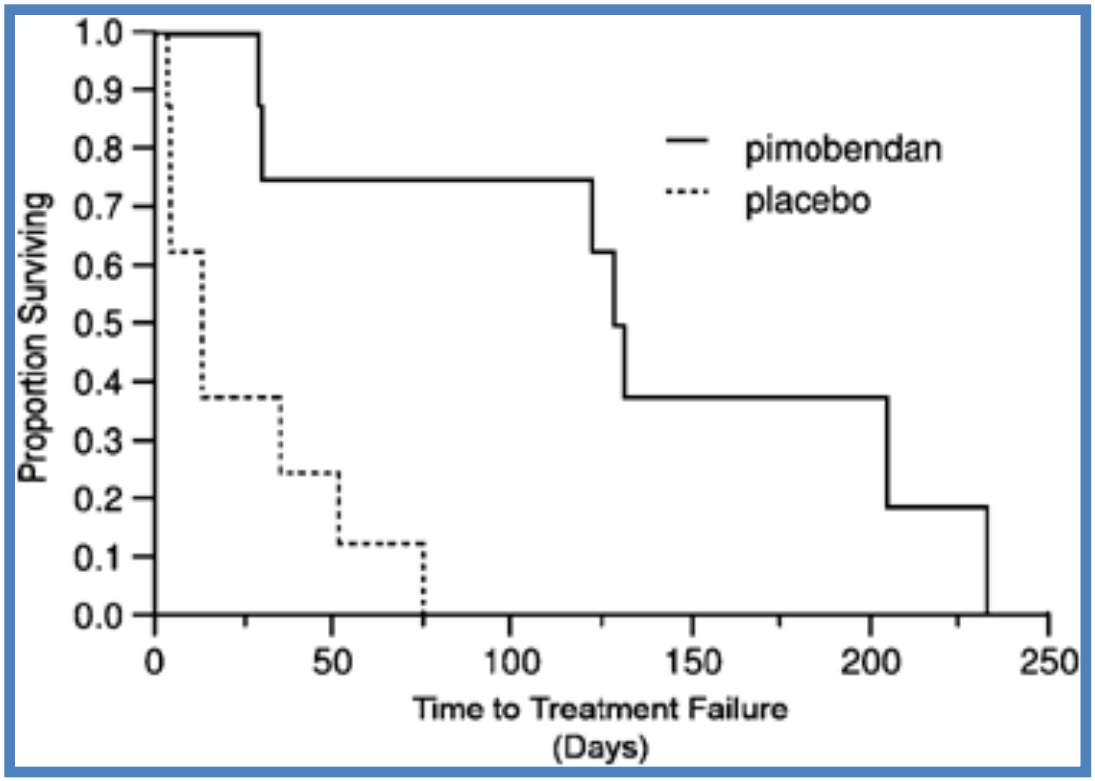
- Prospective, randomized, double-blinded, placebo-controlled
- Background of furosemide & benazepril; VETMEDIN® vs placebo
- Primary end-point = time to treatment failure
- Secondary end-point = QoL
- Survival: VETMEDIN® median 130.5 days; placebo median 14 days (p=0>0.002)
- Study terminated prematurely due to ethical concerns
- QoL impossible to assess due to short life span of placebo group

M.R. O'Grady, S.L. Minors, M.L. O'Sullivan, and R. Horne

J Vet Intern Med 2008;22:897-904

Effect of Pimobendan on Case Fatality Rate in Doberman Pinschers with Congestive Heart Failure Caused by Dilated Cardiomyopathy

- Pimobendan (n=8) median survival time 130.5 days
- Placebo (n=8) median survival time 14 days



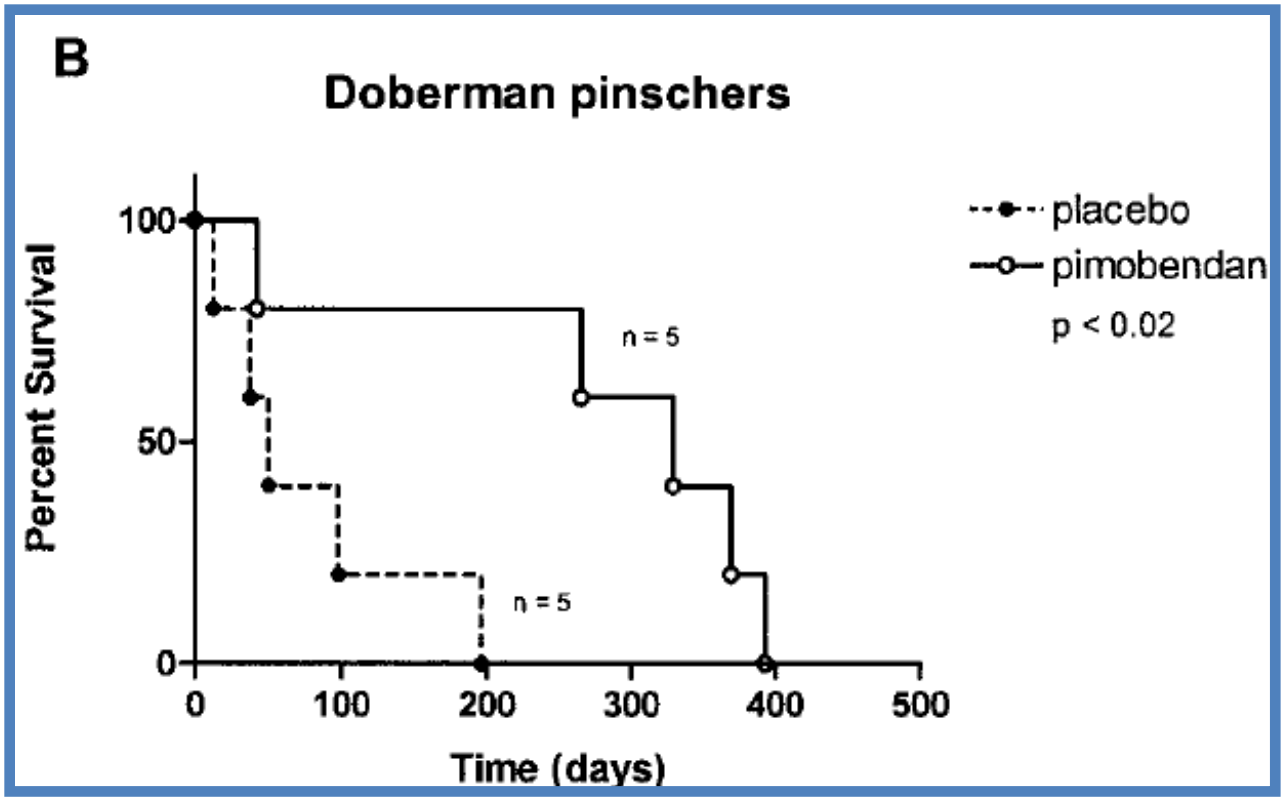
P = 0.002

M.R. O'Grady, S.L. Minors, M.L. O'Sullivan, and R. Horne

J Vet Intern Med 2002;16:255-261

A Double-Blind, Randomized, Placebo-Controlled Study of Pimobendan in Dogs with Dilated Cardiomyopathy

- Pimobendan – median survival time 329 days
- Placebo – median survival time 50 days



Virginia Luis Fuentes, Brendan Corcoran, Anne French, Karsten E. Schober, Rainer Kleemann, and Claus Justus

J Vet Intern Med 2008;22:1124-1135

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.

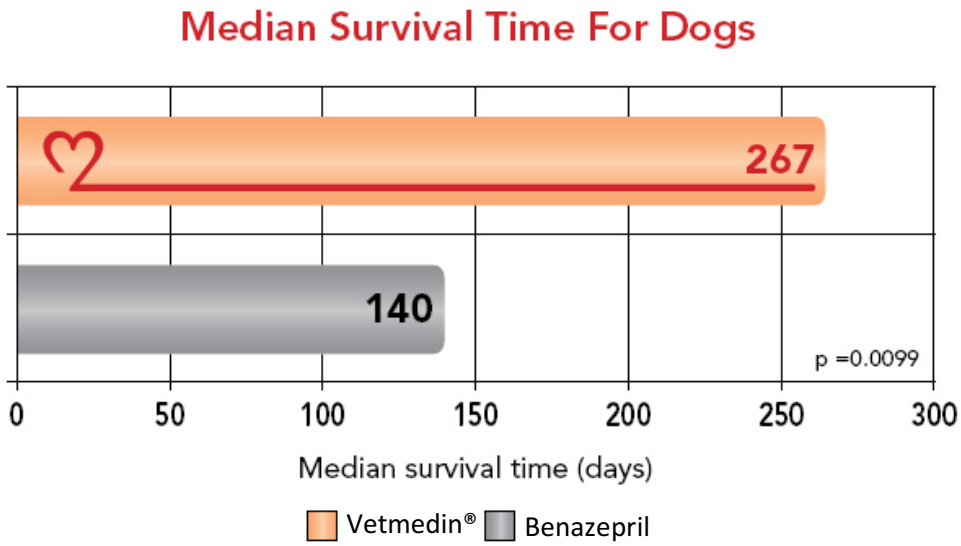
- The **QUality of Life and Extension of Survival Time (QUEST) trial is the largest prospective** trial in canine cardiology history:
  - **Independent** study design, statistical analysis and publication
  - Guaranteed right to publish regardless of outcome
  - 28 centres across 11 countries; 32 Cardiologist investigators
  - Compared the effects of a combination therapy with **VETMEDIN® and furosemide** to an ACE inhibitor and furosemide
  - randomized, prospective, positive-controlled
  - 260 dogs suffering from CHF secondary to MVD
  - Dogs were followed until time of treatment failure, sudden death or euthanasia due to uncontrolled cardiac disease

Häggström J, Boswood A, O'Grady M, et al.

QUEST

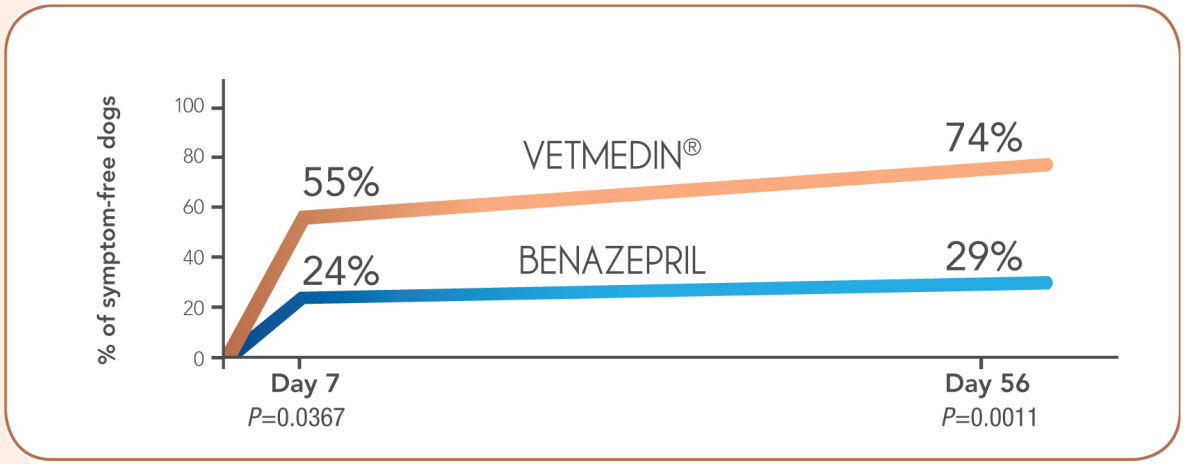
Study: Survival results

- The QUEST study found that dogs receiving **VETMEDIN® plus furosemide had a median survival* which was almost twice as long (91% longer; 267 days),** when compared to dogs receiving benazepril plus furosemide (140 days).



VetSCOPE

- Rapidly improved quality of life in dogs with CHF due to valvular disease—VetSCOPE



The most common side effects associated with VETMEDIN® include decreased appetite, lethargy, diarrhea, dyspnea, azotemia, weakness, and ataxia.

Lombard CW, Jöns O, Bussadori CM. Clinical Efficacy of Pimobendan Versus Benazepril for the Treatment of Acquired Atrioventricular Valvular Disease in Dogs. *J Am Anim Hosp Assoc* 2006;42 (4); 249-261

Canine CHF – Quality vs Quantity

- 86% willing to trade quality for survival
- 52% willing to trade 6 months
- Respiratory difficulty, fainting, anorexia, weakness, recurrent CSs

All demonstrated to be both positively & persistently affected by VETMEDIN®.

Oyama MA, Rush JE, O'Sullivan ML, et al. **Perceptions and priorities of owners of dogs with heart disease regarding quality versus quantity of life for their pets.** *JAVMA 2008;223:104-108.*

Mallery KF, Freeman LM, Harpster NK, Rush JE. **Factors contributing to the decision for euthanasia of dogs with congestive heart failure.** *JAVMA 1999;214:1201-1204.*

Guidelines for the treatment of canine myxomatous valve degeneration

Heart Disease - Years

CHF - Weeks to months

Stage A	Stage B1	Stage B2	Stage C	Stage D
Predisposed breed without heart murmur	Mitral regurgitation with normal or equivocally enlarged LA	Mitral regurgitation with clearly enlarged LA	Mitral regurgitation, current or previous congestive heart failure	Mitral regurgitation and refractory congestive heart failure

QUEST

1. Furosemide
2. VETMEDIN® (consensus)

3. ACE-inhibitor (consensus)

4. Spironolactone (consensus)

Mild dietary sodium restriction

Modest dietary sodium restriction

Modest dietary sodium restriction

Atkins C. et al. Guidelines for the diagnosis and treatment of canine chronic valvular heart disease. JVIM 2009;23:1142-1150.

Evidence Based Medicine

Finding the right evidence-based treatment for a dog with CHF has become relatively easy and should consist of a first-line combination of VETMEDIN® + furosemide.

*"What it boils down to is, if you are faced with a choice between whether to administer pimobendan (**VETMEDIN®**) **or an ACE-inhibitor in conjunction with** diuretics for the treatment of dogs with heart failure secondary to mitral valve disease, **then the preferred drug would be pimobendan (VETMEDIN ®).**"*

Professor Adrian Boswood MA VetMB MRCVS DVC
(Member of the QUEST scientific committee)

Heart dz vs Congestive Heart Failure (CHF)

Disease Progression

Heart Disease - Years

Asymptomatic or Preclinical (Occult) Stage

CHF - Weeks to months

CHF treatment

Death

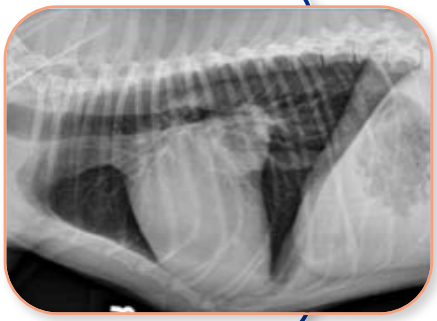
Mechanical or functional aberrancy

Onset of Clinical signs

Diagnostic and management recommendations

STAGE **B2**

Cardiac enlargement present



- Diagnostics: Thoracic radiographs, blood pressure, Lab work
  - +/- Echocardiogram
- Treatment: No consensus among experts (2009)
- PROTECT (2012) and EPIC (2016)
- Dietary: Mild sodium restriction
- Client education and set expectations
- Reevaluate within 6 months

J Vet Intern Med 2012 Nov; 26(6): 1337–1349.

Efficacy of Pimobendan in the Prevention of Congestive Heart Failure or Sudden Death in Doberman Pinschers with Preclinical Dilated Cardiomyopathy (The PROTECT Study)

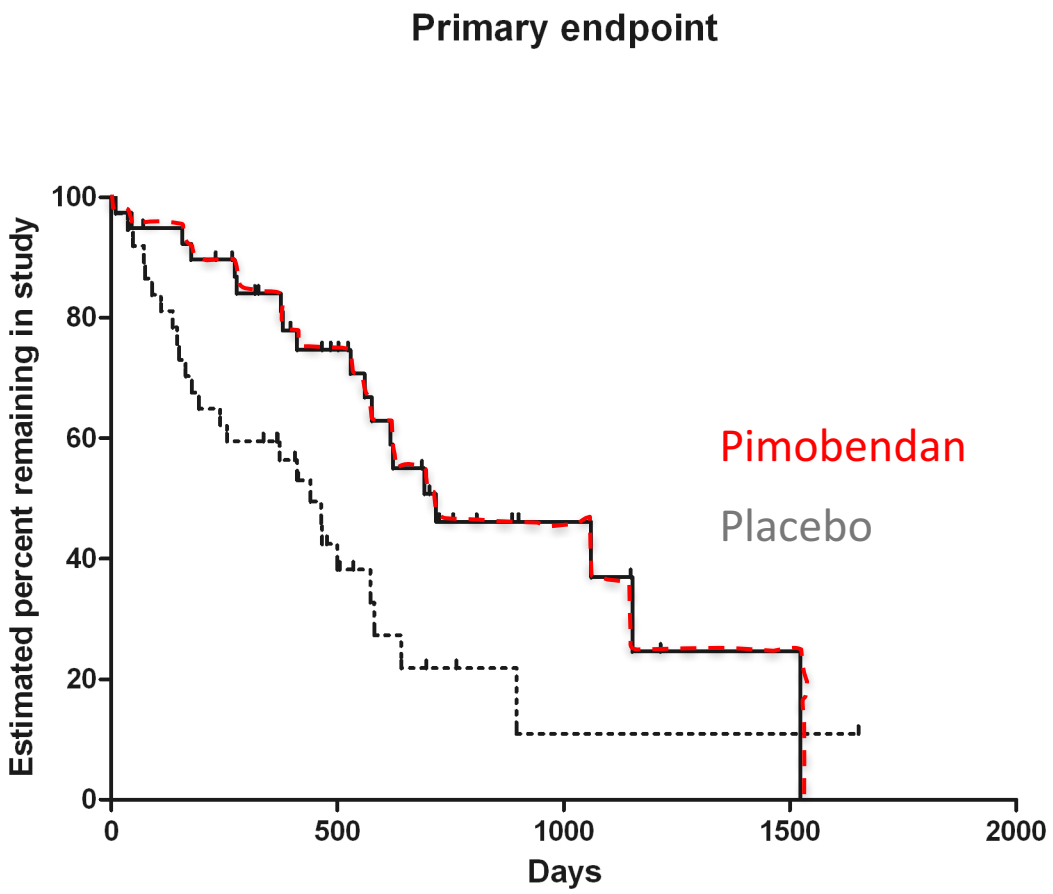
- **PROTECT study Pimobendan Randomized Occult DCM Trial to Evaluate Clinical Symptoms and Time to Heart Failure**
  (Summerfield NJ, et al JVIM 2012)
- Dobermans in “preclinical DCM” (Stage B2)
- VETMEDIN® vs Placebo (76 dogs)—primary end point onset of CHF or sudden death
- Primary end point VETMEDIN® 718 days vs placebo 441days
- Strongly statistically significant increase in time till end points with VETMEDIN®
- Now licensed for this use in many countries
- (Study confirming benefit in Irish Wolfhounds published)

N.J. Summerfield, A. Boswood, M.R. O’Grady et al

PROTECT

J Vet Intern Med 2012 Nov; 26(6): 1337–1349.

Efficacy of Pimobendan in the Prevention of Congestive Heart Failure or Sudden Death in Doberman Pinschers with Preclinical Dilated Cardiomyopathy (The PROTECT Study)



	Median	IQR
Pimobendan	718.0	(441 – 1152)
Placebo	441.0	(151 – 641)

277 days; Log-rank p = 0.0088

N.J. Summerfield, A. Boswood, M.R. O'Grady et al

PROTECT

Additional EBM DCM

Journal of Veterinary Internal Medicine
ACVIM
Open Access

J Vet Intern Med 2016;30:553–559

Long-term Outcome of Irish Wolfhound Dogs with Preclinical Cardiomyopathy, Atrial Fibrillation, or Both Treated with Pimobendan, Benazepril Hydrochloride, or Methyldigoxin Monotherapy

A.C. Vollmar and P.R. Fox

Background: Dilated cardiomyopathy (DCM) is a common cause of morbidity and mortality in the Irish Wolfhound (IW). However, the benefit of medical treatment in IW dogs with preclinical DCM, atrial fibrillation (AF), or both has not been demonstrated.

Objectives: Compare the time to develop congestive heart failure (CHF) or sudden death in IW dogs with preclinical DCM, AF, or both receiving monotherapy with pimobendan, methyldigoxin, or benazepril hydrochloride.

Animals: Seventy-five client-owned IW dogs.

Methods: Irish Wolfhound dogs were prospectively randomized to receive pimobendan (Vetmedin®)[a], benazepril HCl (Fortekor®)[b], or methyldigoxin (Lanitop®)[c] monotherapy in a 1:1:1 ratio in a blinded clinical trial. The prospectively defined composite primary endpoint was onset of CHF or sudden death. To assure stringent evaluation of treatment effect, data from dogs complying with the study protocol were analyzed.

Results: Sixty-six IW fulfilling the study protocol included 39 males, 27 females; median (interquartile range) age, 4.0 years (3.0–5.0 years) and weight, 70.0 kg (63.0–75.0 kg). Primary endpoint was reached in 5 of 23 (21.7%) IW receiving pimobendan, 11 of 22 (50.0%) receiving benazepril HCl, and 9 of 21 (42.9%) receiving methyldigoxin. Median time to primary endpoint was significantly longer for pimobendan (1,991 days; 65.4 months) compared to methyldigoxin (1,263 days; 41.5 months; $P = .031$) or benazepril HCl-(997 days; 32.8 months; $P = .008$) treated dogs.

Conclusions and Clinical Importance: In IW dogs with preclinical DCM, AF or both, pimobendan monotherapy significantly prolonged time to onset of CHF or sudden death than did monotherapy with benazepril HCl or methyldigoxin.

Key words: Dog; Heart disease; Heart failure; Occult cardiomyopathy; Survival; Treatment.

Label claim

For Dogs

Description

The active ingredient in VETMEDIN® is pimobendan. VETMEDIN® 1.25 mg capsule contains 1.25 mg pimobendan. VETMEDIN® 2.5 mg capsule contains 2.5 mg pimobendan. VETMEDIN® 5.0 mg capsule contains 5.0 mg pimobendan.

Pimobendan, a benzimidazole-pyridazinone derivative, is a non-sympathomimetic, non-glycoside inotropic drug with vasodilatory properties.

Therapeutic Class

Positive Inotropic vasodilator

Indications: Dogs

1. For the treatment of congestive heart failure originating from dilated cardiomyopathy or valvular insufficiency. It is recommended that the diagnosis of congestive heart failure be confirmed by radiographs or diuretic responsiveness.

Treatment should be initiated only in symptomatic cases which will benefit from increased myocardial contractility (positive inotropy).

2. To delay the time of onset of congestive heart failure or sudden death in Doberman Pinscher dogs with clinically asymptomatic dilated cardiomyopathy.

Clinically asymptomatic dilated cardiomyopathy is characterized by an increase in left ventricular end-systolic and end-diastolic diameter and should be diagnosed by means of a comprehensive cardiac examination (including echocardiographic examination and possibly Holter monitoring).

Dosage and administration

VETMEDIN® capsules should be administered orally at a dose range of 0.2 mg to 0.6 mg pimobendan/kg body weight per day. The preferable daily dose is 0.5 mg pimobendan/kg body weight. The dose should be divided into two administrations (0.25 mg/kg each), one half of the dose in the morning and the other half approximately 12 hours later. Each dose should be given approximately one hour before feeding.

VETMEDIN® capsules may be combined with a diuretic treatment such as furosemide in dogs with pulmonary edema and/or ascites associated with congestive heart failure.

Contraindications

VETMEDIN® capsules should not be used in cases of hypertrophic cardiomyopathies or clinical conditions where an augmentation of cardiac output is not possible for functional or anatomical reasons (e.g. aortic stenosis).

DCM screening

Signalment (breeds at risk & history)

- Doberman Pinscher: 30% likelihood will develop DCM if > 5 yrs; family tree history of DCM/sudden death: 60% in Dobermans
- History of syncope and/or recent onset exercise intolerance with no other medical explanation

General physical examination:

- Heart murmur (soft systolic murmur consistent with MVD)
- Elevated resting respiratory rate with no evidence of primary respiratory disease
- Rhythm disturbances on 3-5 minute thoracic auscultation:
- Periodic VPC (missed beat – any in 3-5 minutes): highly suggestive in Dobermans
- Rapid irregular rhythm (atrial fibrillation): highly suggestive in Dobermans & Irish Wolfhounds

Additional in-clinic testing:

- EKG
  - Rhythm disturbances on GPE (confirmed on EKG)
    - Periodic VPC (missed beat – any in 3-5 minutes): highly suggestive in Dobermans
    - Rapid irregular rhythm (atrial fibrillation): highly suggestive in Dobermans & Irish Wolfhounds
  - Evidence of chamber enlargement on EKG (tall R wave, wide QRS complex, tall or wide P waves): suggestive
- Elevated NT pro-BNP: > 500 pmol/L high probability in Dobermans; > 900 in other at-risk large breed dogs; < 457/<900 indicates low probability of DCM in Dobermans/large-breed dogs, respectively. Trending ideal.
- Increased VHS (>10.7) on thoracic radiology: suggestive

EARLY DETECTION OF HEART DISEASE IN LARGE-BREED DOGS.

Created in consultation with:

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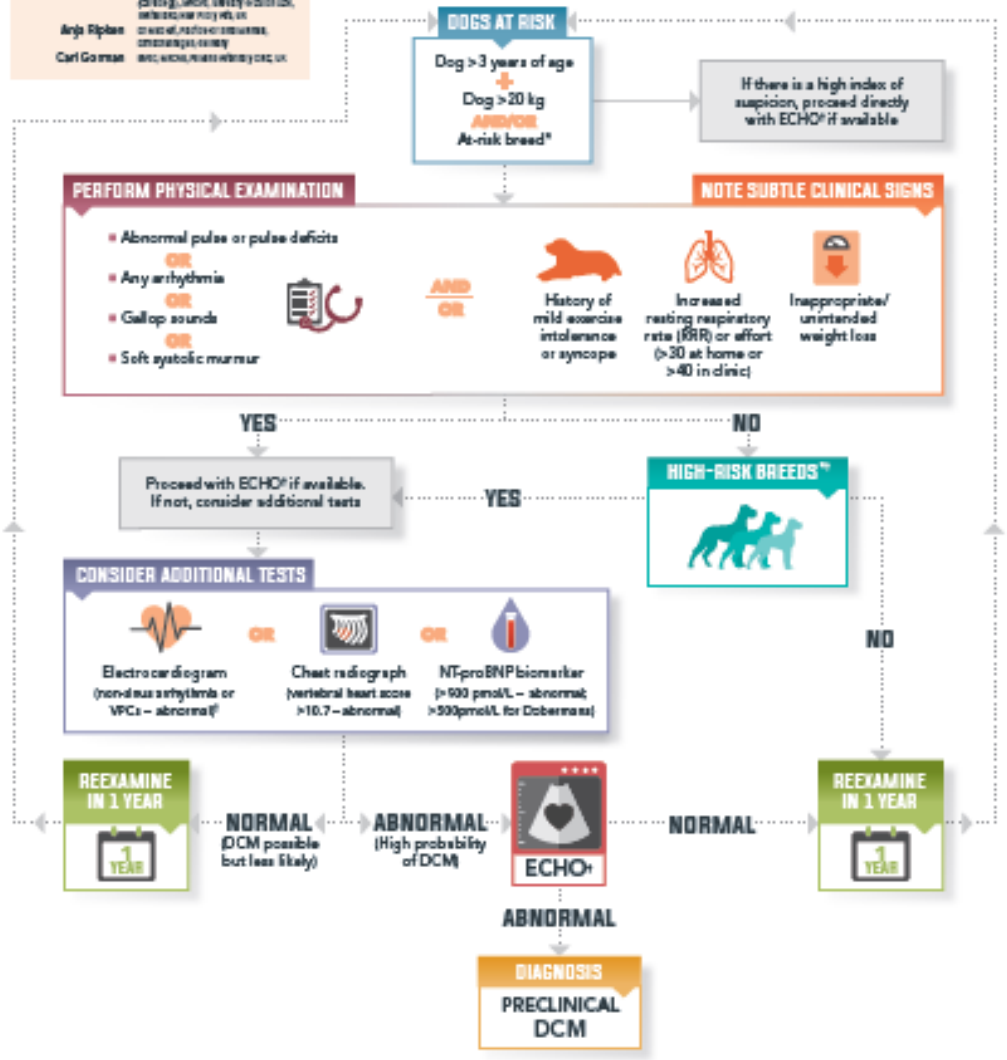
Anja Ripken

Carl Gorman

Identifying dogs with dilated cardiomyopathy (DCM) that are not yet showing obvious clinical signs can be challenging. A diagnosis can be made with echocardiography, but screening every at-risk dog with an echocardiogram (ECHO) is impractical.

Follow this simple screening process to determine which large-breed dogs have early evidence suggestive of DCM and are appropriate for further screening.



Occult/asymptomatic MVD – what about ACEis?

MVD – EBM for ACEi

- Haggstrom, *et al.* SVEP trial
  - European multicentre trial
  - 229 CKCS - enalapril vs placebo over 4 years
  - *Use of enalapril did not slow progression of disease*
- Atkins CE, *et al.* VETPROOF Trial
  - multicentre, US-based study
  - 139 dogs - enalapril versus placebo over 5 years
  - *No significant difference between groups*
- Pouchelon, et al. Effect of benazepril on survival and cardiac events in dogs with asymptomatic MVD: A retrospective study of 141 cases.
  - No survival benefits for primary outcome parameter

J Vet Intern Med 2016 Nov-Dec; 30(6): 1765–1779.

Effect of Pimobendan in Dogs with Preclinical Myxomatous Mitral Valve Disease and Cardiomegaly: The EPIC Study—A Randomized Clinical Trial

EPIC Study

- Largest cardiology study performed in veterinary medicine
- **E**ffect of **P**imobendan **I**n Dogs With Preclinical Myxomatous Mitral Valve Disease And **C**ardiomegaly: The EPIC Study—A Randomized Clinical Trial (Boswood A, et al JVIM 2016)
- 36 centres; 11 countries, 360 dogs
- Any breed dog 4.1kg-15 kg with a murmur ≥ 3/6
- Cardiomegaly: LA:AO ≥ 1.6:1; LVIDD (normalized) ≥ 1.7; VHS>10.5
- Primary End Points:
  - Stage C (CHF)
  - Cardiac related death
  - Euthanasia

EPIC

A. Boswood, J Häggström, S.G. Gordon et al

Asymptomatic Heart Disease: MVD

EPIC study

- Median time to primary endpoint was 1228 days (95% CI: 856-NA) in the pimobendan (VETMEDIN®) group and 766 days (95% CI: 667-875) in the placebo group (P=0.0038).
- This translates into an average of 462 additional symptom-free days or approximately 15 months to develop CHF or die as a result of MMVD vs no VETMEDIN®.

Boehringer Ingelheim

NEWS & VIEWS

October | 2016

The EPIC Study-A review

Boswood A, *et al.* Effect of Pimobendan in Dogs with Preclinical Myxomatous Mitral Valve Disease and Cardiomegaly: The EPIC study – A Randomized Clinical Trial, JVIM. September. 2016

"EPIC" is an acronym for: Evaluating Pimobendan in Cardiomegaly

Hypothesis
Administration of pimobendan* (0.4-0.6 mg/kg divided BID) to dogs with increased heart size secondary to preclinical myxomatous mitral valve disease (MMVD), not receiving other cardiac medication, will delay the onset of signs of congestive heart failure, cardiac related death, or euthanasia.

Animals
360 client-owned dogs > 4.1 kg and < 15kg, median age was 9 years of age (range 7-11 years of age), with MMVD with cardiomegaly.

The restricted weight range of dogs recruited to the study reflected the weight range for which appropriate study medication was available and was not because of any hypothetical limited weight range in which the treatment effect was to be seen. The lead investigators therefore believe that it is likely that the conclusions of this study can be extrapolated to dogs of any body weight with preclinical MMVD.

Locations
36 study centers, 11 countries on 4 continents (including 1 study center in Canada and 18 study centers in the USA)

Methods
The trial was a prospective, blinded (investigators, owners, study monitors, statisticians and sponsor), placebo-controlled, multicenter, randomized clinical trial. Dogs were allocated in a 1:1 ratio to receive pimobendan (n=179, not 180 because one dog was never treated) or visually identical placebo (n=180). Primary outcome variable was time to a composite of the onset of CHF, cardiac related death, or euthanasia.

Results
Study started in 2010 and was terminated before its planned endpoint in March 2015 following a preplanned interim analysis. At that time, 80% of the anticipated study period was complete.

Note: The interim analysis was justified by the long study time and significant study size to evaluate the safety and efficacy of the trial medication at an advanced stage in the clinical trial. The study was terminated due to the overwhelming efficacy. It was considered unethical to continue and deny the placebo dogs an effective treatment.

KEY POINTS

- Administration of pimobendan to dogs with MMVD and the resulting cardiomegaly is safe in the preclinical period.
- Dogs included in this study had grade ≥ 3/6 systolic murmur and vertebral heart scores > 10.5 and echocardiographic evidence of MMVD and cardiac enlargement.
- Dogs treated with pimobendan had **60% more time** or **15 extra months** without the debilitating signs of congestive heart failure or dying as a result of their disease.
- 60% more time in the preclinical phase is the equivalent of 10% of their life without the CHF signs that would otherwise impact their quality of life.

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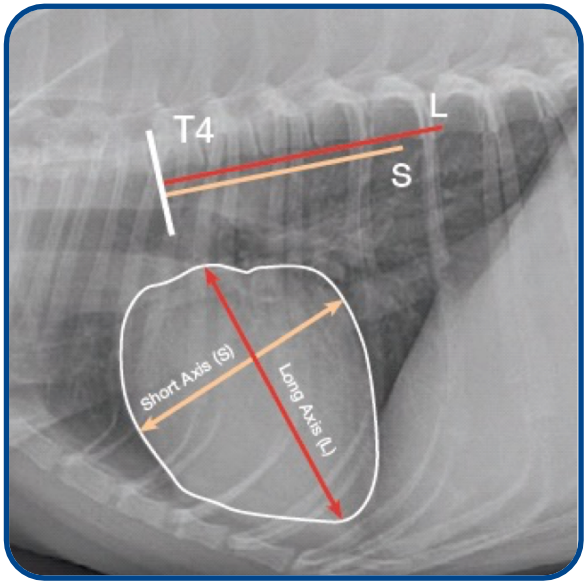
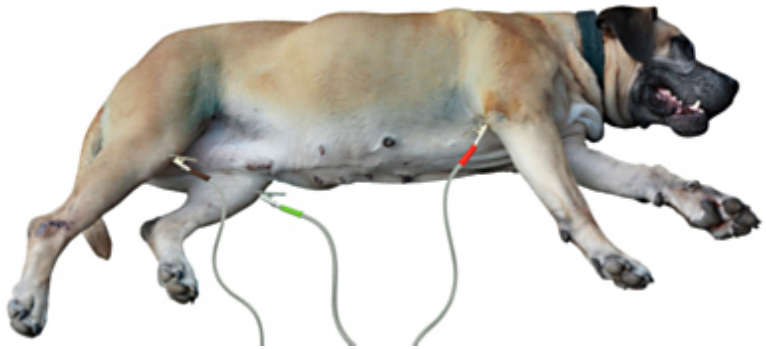
ACVIM Forum 2017: The VALVE Study – Is triple therapy superior to dual tx for CHF due to MVD/endocardiosis

- **Preliminary data – in process of peer review**
  - Single blinded positive controlled prospective study
  - Pimobendan at 0.4-0.6 mg/kg/day; ramipril at 0.125 - 0.25 mg/kg/day
  - Composite end point = time to cardiac death, treatment failure, euthanasia
  - 158 dogs: 77 pimo + furosemide & 79 dogs pimo + furosemide + ramipril
  - 87% event rate
  - No difference between groups (median survival time ☺ dual =-223 days; triple 179 days (p=0.218)

Building an effective protocol in your practice

- History and physical exam
- Diagnostics
  - Radiographs
  - Lab work
  - +/- ECG, NT-proBNP, echocardiogram
- Treatment
- Client education
- Client follow-up





Developing protocols - B2: PROTECT and EPIC

- Large breed dogs:
  - Murmurs
  - Rhythm disturbances
  - Exercise intolerance
- Stage further:
  - Echocardiogram
  - Monitor RRR weekly
- We can hopefully increase life-span

- Small breed dogs
- Stage:
  - Radiograph q6 months
  - Measure RRR weekly
  - VHS >11.5/increase of 0.5 within past 6 months?
- We can hopefully increase life-span

At the first clinical sign of CHF (stage C), use VETMEDIN®

VETMEDIN® is recommended by the ACVIM for dogs with CHF due to AVVI at the onset of clinical signs.

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More than medicine.

Why VETMEDIN®?

- The standard of care for dogs with clinical signs of CHF, according to ACVIM
- Improved survival time in clinical trials in Stage B2
- Improved quality of life and quantity of life in Stage C
- Identify disease
- Stage disease
- Help your patient!!!

vetmedin®

More than medicine.

VETMEDIN® : Inodilator

Works 2 ways:

- Increases cardiac output
- Without increasing oxygen or energy consumption

- Potent balanced vasodilator
- Simultaneously dilates veins and arteries
- Vasodilation reduces preload and afterload

Based on the Canadian VETMEDIN® label

vetmedin®
More than medicine.

VETMEDIN® is well tolerated

- Has a wide safety margin
- Most common diarrhea and vomiting

Based on the Canadian VETMEDIN® label

vetmedin®
More than medicine.

The Real World—Ipsos Survey of DVMs 2016

Euthanasia %:

Mild CHF cases:

- **8% with no therapy**
- 12% after poor response to 1st therapy

Advanced cases:

- **32% with no therapy**
- 39% after poor response to 1st therapy

% VETMEDIN® use in CHF:

- 53% of mild CHF
- 88% of advanced CHF

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Any questions?

Thank you!