



## **Canine Cardiomyopathy**

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- Cardiomyopathy is a common cardiac disease in dogs
  - Cardiac disease due to an abnormality inherent to the myocardium
  - Can be left or right circulation
  - Eccentric hypertrophy is present (hypertrophic cardiomyopathy is rare in dogs)
  - Diagnosis based on ventricular dilation with decreased contractility (myocardial failure)
  - Associated with neurohormonal activation and arrhythmias
- Types of cardiomyopathy are:
  - Dilated cardiomyopathy
  - Arrhythmogenic right ventricular cardiomyopathy
  - Tachycardia-induced cardiomyopathy
  - Nutritional cardiomyopathy
  - Myocarditis
  - Ischemic cardiomyopathy
  - Toxin-induced cardiomyopathy
  - Hypertrophic cardiomyopathy
  - Restrictive cardiomyopathy
- Clinical phases
  - Occult
    - Cardiomyopathy can be detected on diagnostic testing, but clinical signs are absent
    - Variable in progression
    - Sudden death is possible due to ventricular fibrillation
  - Overt
    - Clinical signs are present

- Congestive heart failure
  - Arrhythmias
  - Treatment is indicated
  - Death due to arrhythmias, refractory heart failure or poor quality of life is common, with median survival time of around 6 months.
- Dilated cardiomyopathy
  - Genetic, acquired disease
  - Breeds
    - Doberman
      - Prevalence 45-63%
      - Ventricular arrhythmias common (90%)
      - Sudden death common
      - Survival time < 1 year
    - Great Dane
    - Irish wolfhound
    - Other giant breeds
      - Sudden death is possible, but less common (10%)
      - Congestive heart, atrial fibrillation are common
  - Diagnosis is based on signalment, family history and exclusion of other causes of myocardial disease
- Arrhythmogenic right ventricular cardiomyopathy
  - Inherited disease
    - Boxers, Bulldogs
  - Replacement of myocardium with fat and fibrous tissue
  - Arrhythmias are common
  - Congestive heart failure can occur
  - Sudden death is common
- Nutritional cardiomyopathy
  - Taurine deficiency
    - Systolic function can improve with supplementation in some of these cases
    - Mostly seen in golden retrievers and cocker spaniels
    - Can measure blood level
    - Treat with taurine supplementation in addition to other medical therapy

- Current research is investigating whether dogs with myocardial disease have an improvement on diet that is not high in legumes
- Myocarditis
  - Infectious or immune disease of myocardium
  - Usually the infectious agent is not identified
  - Known causes
    - Physical – radiation, heat stroke, hyperthermia
    - Viral – Parvo
    - Protozoal – *Trypanosoma cruzi*, toxoplasma, neospora
    - Bacterial – sepsis, *Borrelia burgdorferi*, Bartonella spp.
- Anthracycline cardiotoxicity
- Tachycardia-induced cardiomyopathy
  - Some damage may be reversible with rate/rhythm control
- Ischemic cardiomyopathy
  - Rare in dogs, but could occur in hypercoagulable patient
- Occult cardiomyopathy
  - Screening
    - Echocardiogram
    - ECG
    - Holter monitor
    - NT-proBNP
  - Treatment
    - Pimobendan
    - Consider ACE inhibitor, beta-blocker, spironolactone
    - Anti-arrhythmic therapy if ventricular tachycardia, supraventricular tachycardia, atrial fibrillation
- Symptoms of cardiomyopathy
  - Syncope, tachypnea, dyspnea, cough, exercise intolerance, ascites, weight loss, lethargy, sudden death
- Physical examination findings
  - Cachexia, jugular vein distension/pulsation ascites, elevated heart rate, irregular rhythm and premature beats, systolic murmur, gallop sound, increased respiratory sounds, weak femoral pulses and pulse deficits, cool extremities
- Work-up for symptomatic patient

- Consider for all dogs
  - Echocardiogram
  - Thoracic radiographs
  - Blood pressure
  - ECG
  - Holter monitor
  - CBC and chemistry panel
- Consider case by case
  - Cardiac troponin I
  - Infectious testing
  - Blood taurine level
  - Abdominal ultrasound
  - Myocardial biopsy
- Treatment
  - Acute congestive heart failure
    - Furosemide, pimobendan, oxygen.
  - Chronic cardiomyopathy therapy
    - Furosemide, pimobendan
    - Consider ACE inhibitor, spironolactone, beta-blocker
  - Ventricular tachycardia
    - Acute: lidocaine, procainamide
    - Chronic: sotalol, mexiletine, amiodarone
  - Atrial fibrillation
    - Rate control
      - Diltiazem
      - Diltiazem + digoxin
      - Atenolol

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