Chronic valvular heart disease (CVHD) and dilated cardiomyopathy (DCM) are the most common canine heart diseases that cause congestive heart failure (CHF).

**DISEASE PROGRESSION**

**Chronic Valvular Heart Disease**
Small-breed dogs with CVHD typically exhibit slow disease progression, with CHF often developing years after initial detection of an audible left apical systolic murmur. In comparison, CVHD in large-breed dogs may show more rapid disease progression.¹

**Dilated Cardiomyopathy**
In general, dogs with DCM are large or giant breeds that progress from an occult stage to clinical signs of CHF. The rate of progression is less well-defined in most breeds, and the occult stage is more difficult to diagnose because of lack of a typical heart murmur. The occult stage in affected Doberman pinschers generally lasts 2 to 4 years.²

**TREATMENT**
The 2009 ACVIM Consensus Statement provides guidelines for diagnosing and treating canine CVHD. With stage C CVHD (ie, dogs with past or current clinical signs of CHF), consensus recommendations for chronic medical therapy include oral furosemide, pimobendan, and an angiotensin-converting enzyme inhibitor (ACEI).³ A structured home-care program is also recommended to provide client support and facilitate owner monitoring of body weight, appetite, respiratory rate, and heart rate. The ultimate goals of treatment are resolving signs of CHF and maintaining an optimal quality as well as quantity of life for the patient.

**Therapeutic Benefits of Pimobendan**
Pimobendan approval in the United States includes use in dogs with CHF caused by CVHD or DCM. Now considered a standard component of CHF therapy in dogs, pimobendan has been shown in multiple veterinary studies to benefit survival time and quality of life.⁴⁻⁶

As an inodilator, pimobendan exerts both positive inotropic and vasodilatory effects. Positive inotropic effects are achieved through sensitization of the cardiac contractile apparatus (troponin C complex) to existing levels of intracellular calcium. Enhanced contractility appears to occur without increases in intracellular calcium, limiting myocardial oxygen consumption and arrhythmogenic side effects. Vasodilation occurs with the inhibition of phosphodiesterase (PDE) III and V on vascular smooth muscle.

Pharmacodynamic results include improved left ventricular systolic function, decreased systemic vascular resistance, and decreased left atrial and ventricular

**KEY POINTS**
- Regardless of whether CVHD or DCM is the underlying cause of CHF, clinical signs include exercise intolerance, coughing, increased respiratory rate and effort, inappetence, and weight loss.
- The interval between diagnosis and clinical onset varies widely.
- Optimal management should resolve clinical signs and improve quality of life.
- Quality of life is enhanced when owners participate in the treatment and monitoring of their pet through a structured home-care program.

ACEI = angiotensin-converting enzyme inhibitor, CHF = congestive heart failure, CVHD = chronic valvular heart disease, DCM = dilated cardiomyopathy

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pressures. Pimobendan may also benefit dogs with pulmonary hypertension secondary to CVHD, although it is unclear whether the benefit relates to pulmonary vasodilation or decreased left atrial pressure; however, this application constitutes off-label use of pimobendan.7

**HomE-Care Program: A Key Component**

The goals of CHF therapy include controlling clinical signs while prolonging survival and maintaining quality of life. Pet owners who work with their family veterinarian or veterinary cardiologist to develop an individualized recheck program that assesses ongoing treatment regimen have a better chance of early detection and resolution of CHF signs or undesirable treatment effects.

Pet owners can play a significant role in the management of their pet through a structured home-care program that includes monitoring the pet’s heart rate, respiratory rate, body weight, appetite, and medication intake. Parameters should ideally be recorded and transmitted to the veterinarian or cardiologist for objective comparisons between outpatient visits.

**Quality of Life: Coordinated Team Effort**

The North Carolina State University Cardiology Care Network (cardiologycarenetwork.org) exemplifies how a coordinated, multidisciplinary team of veterinary professionals can assist owners in helping their pet enjoy a better quality of life while improving management of its heart disease. The following key components are emphasized:

- Daily review of patient parameters
- Owner callback when entries warrant concern
- Adjusting medication doses or diet as warranted by weight loss or inappetence; note that cardiac cachexia (unintentional loss of more than 5% to 7% of body weight) is a poor prognostic indicator, regardless of underlying disease
- Consultation from nutrition specialist

Because the heart and respiratory rates of dogs with CHF can often increase by 20% or more on consecutive days before clinical signs worsen, careful monitoring may allow more timely adjustment of medications and avoid hospitalization. With detection of subtle changes alerting the owner and veterinarian of the need for assessment, an optimal CHF treatment regimen coupled with a structured home-care program can lead to pets living longer. Regardless of the eventual outcome, though, clients value the concern and dedication of veterinarians who convey conscientious follow-up care.

**Research Studies**

- The Quality of Life and Extension of Survival time (QUEST) study showed that dogs with CVHD survived an average of 4 months longer when they received pimobendan (0.4–0.6 mg/kg PO q24h) than did dogs receiving benazepril and standard diuretic therapy.6
- Also in the QUEST study, median time to endpoint for dogs treated with pimobendan was significantly greater as compared with dogs receiving benazepril (267 vs 140 days, respectively).6
- In a separate study of Doberman pinschers with CHF caused by DCM, adding pimobendan to diuretic and ACE inhibitor therapy significantly improved quality-of-life scores and increased survival time compared with placebo-treated dogs (130.5 vs 14 days, respectively).5
- In a different study of Doberman pinschers, adding pimobendan (0.3–0.6 mg/kg PO q24h) to standard CHF treatment protocol significantly decreased heart failure class and increased median survival time as compared with placebo-treated dogs (329 vs 50 days, respectively).6

**Improving Patient Quality of Life**

- Obtain an accurate diagnosis of underlying heart disease by understanding its role in the genesis of your patient’s clinical signs.
- Set realistic goals and expectations.
- Provide personalized client education to promote participation in the diagnosis, treatment, and monitoring of the pet’s condition.
- Use current guidelines for treating CHF and seek advice when response to treatment fails to meet expectations.
- Schedule regular clinic visits to monitor heart and respiratory rates, body weight, renal function, and packed cell volume.
- Arrange regular telephone or internet-based patient monitoring to avoid major health problems and hospitalization.
- Offer the treatment options available at each CHF stage by maintaining a productive referral relationship with specialty centers.

**References**