

About the Cardiac Education Group (CEG)

The Cardiac Education Group is a group of board-certified veterinary cardiologists from both academia and private practice that offers independent recommendations for the evaluation and treatment of canine heart disease. The group is committed to providing resources and information on the diagnosis, treatment and management of heart disease and heart failure in dogs in order to promote detection and diagnosis with greater accuracy and confidence.

The CEG Mission

The CEG offers educational recommendations and resources that will help veterinarians diagnose, treat and manage heart disease and heart failure in dogs, improving the lives of dogs with heart disease.

The CEG promotes and facilitates:

- Educational activities to increase veterinarians' skills and confidence in diagnosing, treating and managing heart disease and heart failure.
- Tools and resources to help veterinarians detect and diagnose heart disease earlier and with greater accuracy.
- Recommendations to ensure dogs with heart failure receive optimal care and treatments to promote longevity and quality of life.
- On-line resources for veterinarians.
- Collaboration among pet owners and veterinarians pertaining to canine heart health.

Initial Treatment of Life Threatening Congestive Heart Failure (CHF)

Initial treatment of acute CHF should include furosemide, oxygen and isotoprenalol infusion if needed. Administer prazosin if the patient can tolerate oral medication. These patients require 24-hour care and may benefit from specialty referral. Stabilize the patient before transport is considered.

Complicating Airway Disease

The presence of severe respiratory conditions may complicate identification of dogs with heart disease. This is especially problematic in distinguishing class II from class C dogs. Collapsing trachea, moderate-to-severe bronchospasm due to left atrial enlargement, chronic bronchitis or pulmonary hypertension may cause symptoms similar to those of congestive heart failure. These include coughing, tachypnea or symptoms related to airway obstruction. These patients may require additional diagnostic testing and/or therapeutic trials. See www.CanineEducationGroup.org for additional details.

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CANINE CARDIAC DIAGNOSTIC SCHEME
ABCDs of Canine Cardiology

Cardiac Education Group
Canine Cardiology Specialists
www.CanineEducationGroup.org

Helping cardiologists improve

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The CEG promotes and facilitates:

- Educational activities to increase veterinarians' skills and confidence in diagnosing, treating and managing heart disease and heart failure.
- Tools and resources to help veterinarians detect and diagnose heart disease earlier and with greater accuracy.
- Recommendations to ensure dogs with heart failure receive optimal care and treatments to promote longevity and quality of life.
- On-line resources for veterinarians.
- Collaboration among pet owners and veterinarians pertaining to canine heart health.

The CEG is sponsored by a non-directed educational grant from Boehringer Ingelheim Vetmedica, Inc. and IDEXX Laboratories

Initial Treatment of Life Threatening Congestive Heart Failure (CHF)

Initial treatment of acute CHF should include injectable furosemide, oxygen and butorphanol sedation if needed. Administer pimobendan if the patient can tolerate oral medication. These patients require 24-hour care and may benefit from specialty referral. Stabilize the patient before transport is considered.

Complicating Airway Disease

The presence of some respiratory conditions may complicate classification of dogs with heart disease. This is especially problematic in distinguishing class B2 from class C dogs. Collapsing trachea, mainstem bronchial compression due to left atrial enlargement, chronic bronchitis or pulmonary hypertension may cause symptoms similar to those of congestive heart failure. These include coughing, tachypnea or symptoms related to airway obstruction. These patients may require additional diagnostic testing and/or therapeutic trials. See www.CardiacEducationGroup.org for additional details.

Canine CardiaC diaGnOSTiC SCHeMe

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Cardiac Education Group www.CardiacEducationGroup.org

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www.CanineHeartFailure.com		
HEART FAILURE STAGE	DIAGNOSTICS	CEG RECOMMENDATIONS
A Dogs with no structural disease but high risk for developing heart disease	<ul style="list-style-type: none"> • Truely auscultation • Screening programs for selected dogs 	<ul style="list-style-type: none"> • No treatment • Client education • Annual re-evaluation
B Dogs with structural heart disease that have not yet developed clinical signs of heart failure  B1: No cardiac enlargement B2: Cardiac enlargement is present	<ul style="list-style-type: none"> • Patient history* • Cardiac and pulmonary auscultation • Thyroid radiographs** • Blood pressure • Electrocardiogram (ECG) when cardiac arrhythmia is evident during clinical examination • ECG** • Echocardiography for definitive diagnosis of underlying structural heart disease* • 24-hour ambulatory (Holter) electrocardiogram (ECG) for evaluation of heart rhythm disturbances** • Ambulatory event monitor electrocardiogram (ECG) for evaluation of syncope** • Clinical lab tests: serum biochemistry, PCV/Ts (or CBC) and urinalysis (prior to initiating any therapy) 	<ul style="list-style-type: none"> • No specific dietary changes or exercise restrictions at this stage • Manage systemic hypertension if present • ACEI* – No treatment • CCM* – Since optimal therapy is uncertain, consulting a cardiologist may be useful in these patients • ACEI* – ACEI* in patients with severe cardiac enlargement • CCM* – CCM* in patients with confirmed cases and consult a cardiologist regarding use of Beta Blockers or other treatment*
C Dogs with past or current clinical signs of heart failure 	<ul style="list-style-type: none"> • Patient history* • Cardiac and pulmonary auscultation • Thyroid radiographs** • Blood pressure • Electrocardiogram (ECG) when cardiac arrhythmia is evident during clinical examination • ECG** • Echocardiography for definitive diagnosis of underlying structural heart disease* • 24-hour ambulatory (Holter) electrocardiogram (ECG) for evaluation of heart rhythm disturbances** • Ambulatory event monitor electrocardiogram (ECG) for evaluation of syncope** • Clinical lab tests: serum biochemistry, PCV/Ts (or CBC) and urinalysis (prior to initiating any therapy) 	<ul style="list-style-type: none"> • Standard Treatment: Furosemide, Pimobendan, ACEI • Spirinololone is commonly administered long-term therapy • Atoral Maltolololone* – digoxin** and/or diuretics • Ventricular arrhythmias* – substrate for emergency therapy of ventricular tachycardia • Dietary changes: avoid excessive sodium intake and maintain adequate protein and caloric intake • Exercise: as tolerated, avoid prolonged strenuous activity
D Dogs with end-stage disease with clinical signs of heart failure refractory to standard therapy 	<ul style="list-style-type: none"> • Patient history* • Cardiac and pulmonary auscultation • Thyroid radiographs** • Blood pressure • Electrocardiogram (ECG) when cardiac arrhythmia is evident during clinical examination • ECG** • Echocardiography for definitive diagnosis of underlying structural heart disease* • 24-hour ambulatory (Holter) electrocardiogram (ECG) for evaluation of heart rhythm disturbances** • Ambulatory event monitor electrocardiogram (ECG) for evaluation of syncope** • Clinical lab tests: serum biochemistry, PCV/Ts (or CBC) and urinalysis (prior to initiating any therapy) 	<ul style="list-style-type: none"> • Standard Treatment: Furosemide, Pimobendan, ACEI & Spironololone • Digoxin if not contraindicated** • Atoral Maltolololone* – digoxin** and/or diuretics • Ventricular arrhythmias* – substrate for emergency therapy of ventricular tachycardia • Other therapies may be helpful but consultation with a cardiologist is strongly recommended • Dietary changes: avoid excessive sodium intake and maintain adequate protein and caloric intake • Exercise: as tolerated, avoid prolonged strenuous activity
<p>KEY: Red text : ESSENTIAL diagnostic procedures Black text : Diagnostic procedures to consider</p> <p>* Essential ** Consider</p>		

A

C

Dogs with no structural disease but high risk for developing heart disease

B

Dogs with past or current clinical signs of heart failure

D

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

B1: No cardiac enlargement B2: Cardiac enlargement is present

Dogs with end-stage disease with clinical signs of heart failure refractory to standard therapy

KEY: Red text : ESSENTIAL diagnostic procedures Black text : Diagnostic procedures to consider

- **Yearly auscultation**
- **Screening programs for selected dogs**
- **Patient history¹**
- **Cardiac and pulmonary auscultation**
- **Thoracic radiographs^{2, 3}**
- Blood pressure
- Electrocardiogram (ECG) when cardiac arrhythmia is evident during clinical examination
- NT-proBNP⁴
- Echocardiography for definitive diagnosis of underlying structural heart disease⁵
- 24 hour ambulatory (Holter) electrocardiogram (ECG) for evaluation of heart rhythm disturbances^{5, 6}
- Ambulatory event monitor electrocardiogram (ECG) for evaluation of syncope^{5, 7}
- Clinical lab tests: serum biochemistries, PCV/ TS (or CBC) and urinalysis (prior to initiating any therapy)
- No specific dietary changes or exercise restrictions at this stage
- Manage systemic hypertension if present

B1: MMVD* – No treatment

DCM* – Since optimal therapy is uncertain, consulting a cardiologist may be useful in these patients

B2: MMVD – ACEi* in patients with severe cardiac enlargement

DCM – ACEi in patients with confirmed cases and consult a cardiologist regarding use

of Beta blockers or other treatments⁸

- **Patient history¹**

- **Cardiac and pulmonary auscultation**

- **Thoracic radiographs^{2, 3}**

- Blood pressure
- Electrocardiogram (ECG) when cardiac arrhythmia is evident during clinical examination
- NT-proBNP⁴
- Echocardiography for definitive diagnosis of underlying structural heart disease⁵
- 24 hour ambulatory (Holter) electrocardiogram (ECG) for evaluation of heart rhythm disturbances^{5, 6}
- Ambulatory event monitor electrocardiogram (ECG) for evaluation of syncope^{5, 7}
- Clinical lab tests: serum biochemistries, PCV/ TS (or CBC) and urinalysis (prior to initiating any therapy)

- **Patient history¹**

- **Cardiac and pulmonary auscultation**

- **Thoracic radiographs^{2, 3}**

- Blood pressure
- Electrocardiogram (ECG) when cardiac arrhythmia is evident during clinical examination
- NT-proBNP⁴
- Echocardiography for definitive diagnosis of underlying structural heart disease⁵
- 24 hour ambulatory (Holter) electrocardiogram (ECG) for evaluation of heart rhythm disturbances^{5, 6}
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- Clinical lab tests: serum biochemistries, PCV/ TS (or CBC) and urinalysis (prior to initiating any therapy)

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- No treatment

- Client education
- Annual re-evaluation
- **Standard Treatment: Furosemide, Pimobendan, ACEi**
- Spironolactone is commonly added to long-term therapy
- Atrial fibrillation⁸– digoxin⁹ and/or diltiazem
- Ventricular arrhythmias⁸ – lidocaine for emergency therapy of ventricular tachycardia
- Consider dietary changes: avoid excessive sodium intake and maintain adequate protein intake
- Exercise as tolerated, avoid prolonged strenuous activity
- **Standard Treatment: Furosemide, Pimobendan, ACEi & Spironolactone**
- Digoxin if not contraindicated⁹
- Atrial fibrillation⁸ – digoxin⁹ and/or diltiazem
- Ventricular arrhythmias⁸ – lidocaine for emergency therapy of ventricular tachycardia
- Other therapies may be helpful but consultation with a cardiologist is strongly recommended
- Dietary changes: avoid excessive sodium intake and maintain adequate protein and caloric intake
- Exercise as tolerated, avoid prolonged strenuous activity

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