Preface: Conversations in Veterinary Cardiology
João S. Orvalho

Asymptomatic Canine Degenerative Valve Disease: Current and Future Therapies
Sonya G. Gordon, Ashley B. Saunders, and Sonya R. Wesselowski

Degenerative valve disease (DVD) is the leading cause of heart disease and congestive heart failure (CHF) in the dog. The first published consensus statement provided guidelines for the diagnosis and treatment of DVD. Although treatment was not recommended in stage B1 DVD, consensus was not reached regarding evidence-based recommendations for treatment of stage B2 DVD. This article addresses the impact of new evidence on historical recommendations for stage B DVD and gives the reader a glimpse into possible future therapies. Management of common sequelae of DVD that can result in clinical signs that are not attributable to CHF is also discussed.

Atrial Fibrillation: Current Therapies
Romain Pariaut

A rate control, or a rhythm control, strategy can be applied to the management of atrial fibrillation. Rate control of atrial fibrillation consists of decreasing the ventricular response rate by limiting the number of supraventricular impulses that can travel through the atrioventricular node. The goal of decreasing heart rate in dogs with atrial fibrillation is usually achieved with a combination of the calcium channel blocker diltiazem and digoxin. Rhythm control of atrial fibrillation encompasses pharmacologic and nonpharmacologic methods to terminate the arrhythmia and restore sinus rhythm. Transthoracic synchronized electrical cardioversion is commonly used to stop atrial fibrillation.

Right Ventricular Function: Imaging Techniques
Lance C. Visser

Functional assessment of the right ventricle (RV) is challenging and has been understudied compared with the left ventricle. However, advances in echocardiographic assessment of RV function permit the quantitative assessment of RV performance via numerous modalities. Many RV function indices have now been studied in large samples of healthy dogs, and studies suggest a clinical benefit to echocardiographic RV function assessment in dogs and cats. This article reviews relevant RV anatomy and physiology and highlights numerous indices of RV function assessment for dogs and cats. Imaging techniques, advantages and disadvantages, and clinical impact of these indices are discussed.
Real-time Three-Dimensional Echocardiography: From Diagnosis to Intervention

João S. Orvalho

Echocardiography is one of the most important diagnostic tools in veterinary cardiology, and one of the greatest recent developments is real-time 3-dimensional imaging. Real-time 3-dimensional echocardiography is a new ultrasonography modality that provides comprehensive views of the cardiac valves and congenital heart defects. The main advantages of this technique, particularly real-time 3-dimensional transesophageal echocardiography, are the ability to visualize the catheters, and balloons or other devices, and the ability to image the structure that is undergoing intervention with unprecedented quality. This technique may become one of the main choices for the guidance of interventional cardiology procedures.

Interventional Cardiology: What’s New?

Brian A. Scansen

Interventional cardiology in veterinary medicine continues to expand beyond the standard 3 procedures of patent ductus arteriosus occlusion, balloon pulmonary valvuloplasty, and transvenous pacing. Opportunities for fellowship training; advances in equipment, including high-resolution digital fluoroscopy, real-time 3-dimensional transesophageal echocardiography, fusion imaging, and rotational angiography; ultrasound-guided access and vascular closure devices; and refinement of techniques, including cutting and high-pressure ballooning, intracardiac and intravascular stent implantation, septal defect occlusion, transcatheter valve implantation, and hybrid approaches, are likely to transform the field over the next decade.

Asymptomatic Hypertrophic Cardiomyopathy: Diagnosis and Therapy

Virginia Luis Fuentes and Lois J. Wilkie

Hypertrophic cardiomyopathy (HCM) affects 15% of cats, and prevalence increases with age. Although many cats with HCM have normal life expectancy, some cats die suddenly, or develop congestive heart failure or arterial thromboembolism (ATE). High-risk cats can be recognized by left atrial enlargement on echocardiography, which can be missed on physical examination, as a heart murmur is often absent. Alternatively, plasma biomarkers can be measured as an initial screening test; echocardiography is indicated in cats with plasma NT-probrain natriuretic peptide concentrations exceeding 100 pmol/L. High-risk cats should be treated with clopidogrel to reduce the risk of ATE.

Feline Congestive Heart Failure: Current Diagnosis and Management

Etienne Côté

Congestive heart failure (CHF) is a well-known disorder in feline practice, having been recognized as the most common clinical syndrome in cats with hypertrophic cardiomyopathy, for example. This article identifies the reasons why an accurate diagnosis of CHF is important and the means by which to obtain one; pharmacologic and nonpharmacologic methods
for controlling signs of CHF; and recommendations for follow-up evaluations, monitoring, and troubleshooting.

**Feline Cardiogenic Arterial Thromboembolism: Prevention and Therapy**

Daniel F. Hogan

Feline cardiogenic arterial thromboembolism (CATE) is a devastating disease whereby 33% of cats survive their initial event, although approximately 50% of mortality is from euthanasia. Short-term management focuses on inducing a hypocoagulable state, improving blood flow, and providing supportive care. Ideally, all cats should be given 72 hours of treatment to determine the acute clinical course. Preventive protocols include antiplatelet and/or anticoagulant drugs, with the only prospective clinical trial demonstrating that clopidogrel is superior to aspirin with a lower CATE recurrence rate and longer time to recurrent CATE. Newer anticoagulant drugs hold great promise in the future of managing this disease.

**Cardiorenal Syndrome: Diagnosis and Management**

João S. Orvalho and Larry D. Cowgill

Cardiorenal syndrome (CRS) has not been well characterized in veterinary medicine, yet an accurate appreciation of the kidney and the cardiovascular system and their interactions may have practical clinical implications. A consensus for cardiovascular-renal axis disorders of dogs and cats was recently attempted. The outcome of patients with CRS is likely to improve with the increasing awareness and ability to identify and understand the pathophysiologic characteristics of CRS. The utilization of existing and emerging organ-specific biomarkers with greater sensitivities than conventional diagnostics forecast new opportunities to diagnose and manage cardiac disease.

**Arrhythmogenic Right Ventricular Cardiomyopathy in the Boxer Dog: An Update**

Kathryn M. Meurs

Arrhythmogenic right ventricular cardiomyopathy is an inheritable form of myocardial disease characterized most commonly by ventricular tachycardias, syncope, and sometimes systolic dysfunction and heart failure. A genetic mutation in the striatin gene has been identified in many affected dogs. Dogs with only one copy of the mutation (heterozygous) have a variable prognosis, with many dogs remaining asymptomatic or being successfully managed on antiarrhythmic drugs for years. Dogs that are homozygous for the mutation seem to have a worse prognosis.

**Status of Therapeutic Gene Transfer to Treat Cardiovascular Disease in Dogs and Cats**

Meg M. Sleeper

Gene therapy is a procedure resulting in the transfer of a gene into an individual’s cells to treat a disease. One goal of gene transfer is to express a functional gene when the endogenous gene is inactive. However, because heart failure is a complex disease characterized by multiple abnormalities
at the cellular level, an alternate gene delivery approach is to alter myocardial protein levels to improve function. This article discusses background information on gene delivery, including packaging, administration, and a brief discussion of some of the candidate transgenes likely to alter the progression of naturally occurring heart disease in dogs and cats.