

Cardiac Interventions in Small Animals

Areas of Uncertainty

Brian A. Scansen, DVM, MS

KEYWORDS

• Canine • Feline • Veterinary • Stent • Balloon • Cardiac catheterization

KEY POINTS

- Advanced therapies, such as high-pressure balloon dilation, cutting or scoring balloon dilation, or stent implantation, may play a role in interventional therapies for pulmonary valve stenosis.
- Cutting or high-pressure balloon dilation may play a role in palliating subaortic or valvar aortic stenosis in dogs.
- Transvenous coil embolization using controlled delivery coils may offer interventional closure to animals too small for transarterial device occlusion of patent ductus arteriosus.
- In rare cases of cyanotic heart disease, ductal stenting may improve pulmonary blood flow and provide a minimally invasive alternative to surgical placement of an aortopulmonary shunt.
- Strategies to avoid surgical exposure of blood vessels for vascular access in dogs include ultrasound guidance and vascular closure devices.

INTRODUCTION

The number of diseases afflicting dogs and cats that are amenable to treatment by a minimally invasive, transcatheter approach continues to expand. Cardiac interventions that are commonly performed in small animals include balloon dilation of congenitally stenotic valves,^{1,2} coil or device occlusion of anomalous vessels,^{3–5} extraction of parasites or foreign material from the heart and vasculature,⁶ and pacing for symptomatic bradycardia.^{7–9} Rarely, device closure of septal defects, intracardiac stents, and transcatheter valve implantation are also performed in veterinary patients. Cardiac interventions have been described and performed in animals for more than 30 years.^{10,11} In that time, broad

Disclosure Statement: The author has received speaking fees, travel reimbursement, or products at no cost for development/preclinical evaluation from the following companies relevant to this publication: Infiniti Medical, LLC; Avalon Medical, Inc; and Dextronix, Inc.

Cardiology and Cardiac Surgery, Department of Clinical Sciences, Colorado State University, Campus Delivery 1678, Fort Collins, CO 80523, USA

E-mail address: Brian.Scansen@colostate.edu

Vet Clin Small Anim ■ (2018) ■–■

<https://doi.org/10.1016/j.cvs.2018.05.003>

0195-5616/18/© 2018 Elsevier Inc. All rights reserved.

vetsmall.theclinics.com

advancements in both equipment and technique have occurred in the human medical arena that have been variably adopted by the veterinary community. Although interventional procedures are now standard of care for animals with some forms of heart disease, there remain areas of uncertainty in optimal technique, preferred candidates for intervention, and expected outcome. This article is not intended to provide definitive answers to these uncertainties, but rather to highlight issues currently in need of study and to offer the author's opinion and experience. Specific items to be addressed include variants of pulmonary valve anatomy and alternatives to conventional balloon dilation for pulmonary valve stenosis (PS), patient selection for cutting or high-pressure balloon dilation of aortic valvar or subaortic stenosis (SAS), occlusion of patent ductus arteriosus (PDA) in small dogs, ductal stenting in conditions with reduced pulmonary flow, and alternative considerations for vascular access and closure.

PULMONARY VALVE STENOSIS

Congenital PS was originally reported as the third most commonly diagnosed congenital heart defect of dogs in North America,¹² although more recent reports suggest it is the most common canine congenital heart defect.^{13,14} Without therapy, dogs with PS are at risk for symptoms including exercise intolerance, syncope, sudden cardiac death, congestive heart failure, and cyanosis from a right-to-left shunt.^{15,16}

There is evidence that balloon pulmonary valvuloplasty (BPV) improves the outcome of human and canine patients with PS, reducing clinical signs and improving survival.^{15,17,18} The procedure is now routinely performed in clinical canine practice with low morbidity and mortality for those animals with a severe gradient or the presence of clinical signs referable to their disease. For a stepwise description of this interventional procedure, please see other resources.^{1,19}

Is the Correct Term Pulmonary Valve Stenosis or Pulmonic Stenosis?

Veterinary cardiologists differ in terminology when referring to the semilunar valve that separates the right ventricle from the pulmonary trunk. The veterinary cardiology literature often ascribes the term pulmonic valve to describe this structure, yet the *Nomina Anatomica Veterinaria* term for this valve is *valva trunci pulmonalis*, which when anglicized becomes the valve of the pulmonary trunk.²⁰ In *Miller's Anatomy of the Dog*, the anatomic term given is pulmonary valve.²¹ One of the first published descriptions of the disease in humans was provided by Arthur Keith²² in the Hunterian Lectures on the Malformations of the Heart, in which the term pulmonary stenosis was used. The International Nomenclature and Database Conference for Pediatric Cardiac Surgery defines the disease as pulmonary stenosis with intact ventricular septum, and then subdivides these into subvalvar, valvar, and supra-valvar sites of stenosis.²³ Within the veterinary literature, David Detweiler's article on heart disease in the second edition of *Canine Medicine* describes the condition as common in the dog and uses the nomenclature pulmonary stenosis.²⁴ Last, in the seminal description of the disease in the beagle dog by Don Patterson and colleagues,²⁵ based on the breeding colony at the University of Pennsylvania, both pulmonary stenosis and dysplasia of the pulmonary valve are the terms ascribed to the condition. It is the author's opinion that the correct term for this condition in animals is pulmonary stenosis and, for most cases in small animals, the site of obstruction is at the pulmonary valve.

Which Valve Morphology Is Amenable to Balloon Pulmonary Valvuloplasty?

PS in dogs has variable features, several of which impact the potential for a successful intervention. Transthoracic echocardiography with Doppler is the current standard of

Download English Version:

<https://daneshyari.com/en/article/8504565>

Download Persian Version:

<https://daneshyari.com/article/8504565>

[Daneshyari.com](https://daneshyari.com)