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Congenital heart defects in cats: a retrospective study of 162 cats (1996–2013)

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KEYWORDS

Feline;
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Abstract *Objective:* To study the prevalence and distribution of congenital heart defects in cats presented at two referral centers in Sweden between 1996 and 2013.

Animals: 162 client-owned cats with congenital heart defects.

Methods: Case records of cats diagnosed with congenital heart disease were reviewed retrospectively.

Results: The overall prevalence of congenital heart disease was 0.2% of the total number of patient cats, and 8% of cats diagnosed with heart disease. A total of 182 heart defects were identified as 16 cats were diagnosed with more than one defect. Ventricular septal defect (VSD) was most prevalent, found in 50% of cats, followed by tricuspid valve dysplasia (11%), pulmonic stenosis (10%), atrial septal defect (10%), aortic stenosis (9%), mitral valve dysplasia (9%), tetralogy of Fallot (5%), patent ductus arteriosus (3%), common atrioventricular canal (2%), and the following defects that each accounted for 0.6% of cats: double chamber right ventricle, double outlet right ventricle, endocardial fibroelastosis, dextroposition of the aorta, persistent right aortic arch, and pulmonary atresia.

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Conclusion: The prevalence of congenital heart disease was 0.2% of the total number of patient cats, and 8% of cats diagnosed with heart disease. Ventricular septal defect was the most common congenital heart defect in this study.

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Abbreviations

2D	two-dimensional
AS	aortic stenosis
ASD	atrial septal defect
AV	atrioventricular
HCM	hypertrophic cardiomyopathy
MD	mitral valve dysplasia
MS	mitral valve stenosis
PDA	patent ductus arteriosus
PS	pulmonic stenosis
TD	tricuspid valve dysplasia
TOF	tetralogy of Fallot
TS	tricuspid valve stenosis
VSD	ventricular septal defect

Introduction

Congenital heart defects, defined as developmental defects of the heart present at birth, are generally much less common than acquired heart disease in cats.¹ A study over a 10 year period (1986–1996) at the University of California, Davis, USA, reported a prevalence of congenital heart disease of 5% in cats with heart disease.^{2,3} A more recent study (1998–2005) in Switzerland reported that 12% of 408 cats with heart disease had congenital heart defects.⁴ In Asia, Europe and the United States, ventricular septal defect (VSD), tricuspid valve dysplasia (TD) and mitral valve dysplasia (MD) are the most frequently diagnosed congenital heart defects in cats.^{2–5} Depending on the study referenced, the frequency of atrial septal defects (ASD) in cats varies.^{4,6–8} Less commonly reported are pulmonic stenosis (PS), aortic stenosis (AS), patent ductus arteriosus (PDA), tetralogy of Fallot (TOF), common atrioventricular (AV) canal, double chamber right ventricle, double outlet right ventricle, cor triatriatum sinister and dexter, and vascular ring abnormalities.^{4,8} The diagnosis of AS poses a diagnostic challenge in that hypertrophic cardiomyopathy (HCM), systemic hypertension of various etiologies, and hyperthyroidism can cause concentric hypertrophy of the left ventricle similar to that observed with aortic stenosis.^{1,9}

The purpose of this report was to study the prevalence and distribution of congenital heart defects in a large number of cats presented at two referral centers in Sweden.

Materials and methods

Case records of cats presented at Albano Animal Hospital, Stockholm or the University Teaching Hospital, Uppsala between 1996 and 2013, and diagnosed with congenital heart disease, were reviewed retrospectively. The prevalence of heart disease and of congenital heart disease was calculated. As information regarding the total number of patient cats was unavailable before 1999 at Albano, the prevalence was calculated between 1999 and 2013 at Albano, whereas the entire study period was included at Uppsala. Information regarding breed, sex, and age at presentation and findings on echocardiographic and Doppler examination or post mortem examination was obtained. Two-dimensional (2D) and M-mode echocardiographic and Doppler examinations were performed with 7.0–12 MHz transducers. Cats were examined in left and right lateral recumbency during echocardiographic examinations. Congenital heart disease was classified according to previously published studies.^{10–13} The diagnosis of stenotic semilunar valve lesions was based on thickened valvular leaflets or the presence of a subvalvular ridge or a supra-valvular narrowing, as well as a sudden increase of blood flow velocity and turbulent flow at the site of the narrowing. Atrial and ventricular septal defects were diagnosed using 2D echocardiographic imaging and Doppler examination to identify abnormal flow across the lesion. Contrast echocardiography was not routinely used to diagnose or exclude ASD. Mitral or tricuspid valve dysplasia was diagnosed based on the presence of valvular insufficiency confirmed by color flow and continuous wave Doppler examination. When suspected on 2D echocardiography and color flow Doppler examination, mitral valve stenosis (MS) was identified using spectral Doppler demonstrating a prolonged time for the diastolic pressure gradient to decrease across the valve.³ All

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