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Survival time with pacemaker implantation for dogs diagnosed with persistent atrial standstill

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Abstract *Objectives:* To evaluate survival time in dogs with persistent atrial standstill after pacemaker implantation and to compare the survival times for cardiac-related vs. non-cardiac deaths. Secondary objectives were to evaluate the effects of breed and the presence of congestive heart failure (CHF) at the time of diagnosis on survival time.
Animals: Twenty dogs with persistent atrial standstill and pacemaker implantation.
Methods: Medical records were searched to identify dogs diagnosed with persistent atrial standstill based on electrocardiogram that underwent pacemaker implantation. Survival after pacemaker implantation was analyzed using the Kaplan—Meier method.
Results: The median survival time after pacemaker implantation for all-cause mortality was 866 days. There was no significant difference (p=0.573) in median

Data previously presented at ACVIM Forum 2014.
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survival time for cardiac (506 days) vs. non-cardiac deaths (400 days). The presence of CHF at the time of diagnosis did not affect the survival time (P=0.854). No difference in median survival time was noted between breeds (P=0.126).
Conclusions: Dogs with persistent atrial standstill have a median survival time of 866 days with pacemaker implantation, though a wide range of survival times was observed. There was no difference in the median survival time for dogs with cardiac-related deaths and those without. Patient breed and the presence of CHF before pacemaker implantation did not affect median survival time.

Abbreviations

CHF	congestive heart failure
MST	median survival time
PAS	persistent atrial standstill

Introduction

Persistent atrial standstill (PAS) is an arrhythmia characterized by the absence of electrical and mechanical activity in the atria, resulting in the development of an escape rhythm from the atrioventricular junction or subsidiary ventricular pacemaker cells [1,2]. Persistent atrial standstill in dogs develops secondary to an atrial myopathy, an idiopathic cardiomyopathy wherein there is a progressive destruction of the atrial myocardium, with potential extension to the ventricles [1—5]. Clinical signs occur consequent to the bradyarrhythmia, and pacemaker implantation is recommended [6]. Prognosis in humans with PAS is variable and rapid disease progression is noted in individuals affected by underlying cardiac conditions, such as myocarditis. Congestive heart failure (CHF) is cited frequently as the cause of death for people with this finding [7]. Prognosis for dogs with PAS has historically been regarded as poor, with a proposed median survival time (MST) of 12—18 months [2,8—10]. As a consequence of the historically poor prognosis associated with PAS, it has been suggested that dogs with this condition are less ideal candidates for pacemakers than those affected by other bradyarrhythmias [11]. Some reports have evaluated pacemaker implantation in a small number of dogs with PAS, but such data were combined within a larger series of dogs receiving pacemakers for other bradyarrhythmias [6,12,13]. One such study reported highly variable survival times in six dogs with PAS, with survival times spanning from less than 12 months in three dogs to one dog surviving 52 months [12]. Two recent case reports have also documented the potential for extended survival by reporting on three dogs with PAS surviving greater than 7 years following pacemaker implantation [14,15]. However, no specific studies assessing the survival time of dogs with PAS following pacemaker implantation have been performed.

The objectives of this retrospective study were to evaluate survival time in dogs with PAS after pacemaker implantation and to compare the survival times for cardiac-related vs. non-cardiac deaths. Secondary objectives were to evaluate the effect of patient breed and the presence of CHF at the time of diagnosis on survival time. We hypothesized that the MST of dogs with PAS following pacemaker implantation is longer than previously proposed and that the presence CHF does not affect survival time post pacemaker implantation. We also hypothesize the presence of a breed-related effect on survival with Labrador retrievers surviving longer than other breeds.

Animals, materials and methods

Inclusion criteria

Medical records at the University of Minnesota Veterinary Medical Center, University of Missouri Veterinary Medical Teaching Hospital, The Ohio State University Veterinary Medical Center, and the University of Wisconsin Veterinary Care were searched. Dogs diagnosed with PAS based on a surface electrocardiogram between June 1, 2002 and September 23, 2013 that underwent pacemaker implantation were included in this retrospective study. Diagnosis of PAS required an electrocardiogram with the hallmark findings of atrial standstill—absence of P waves, regular escape rhythm, and bradycardia—with a normal serum potassium concentration [1,2,16]. Echocardiographic reports and data were not evaluated. Weight, breed, sex, age at diagnosis, age at