Reliability of a smartphone application and a heart rate sensor to measure heart rate in dogs

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OBJECTIVES

Heart rate (HR) is a critical physiological variable. Home monitoring of HR by owners can be useful in clinical decision making but requires training. HR sensors are cheap and widely used for human fitness. The aim of the current study was to examine if a commercially available HR monitor and a free smartphone application could accurately measure HR in unclipped dogs. The hypothesis was that this new method can provide an accurate but also simple, further economical and accessible technique to measure HR in dogs for veterinary surgeons by owners at home.

METHODS

Fourteen adult dogs were included based on a good demeanour, non auscultable arrhythmia and matching pulses. None of the dogs were clipped, ultrasound gel was used to promote conductivity. The measurement procedure was standardized, undertaken simultaneously with the device and a femoral pulse rate in a blinded manner. Twenty-eight measurements were obtained, two from each subject. The measurements were analysed for correlation and agreement by Pearson product-moment correlation coefficient and Bland-Altman respectively.

RESULTS

Readings were easily achieved in all dogs using the HR monitor. There was a significant correlation between pulse rate and the sensor measurement ($r=0.98$, $p<0.01$). Bland-Altman plots demonstrated good agreement between methods and variation was within a clinically acceptable limit (standard error of mean = 0.68 beats per minute).

STATEMENT

This simple, truly economical and feasible method measures reliably the HR of dogs in a smartphone application, allowing HR assessment for veterinary surgeons by owners at home.

Tissue Doppler imaging at the mitral annulus for prediction of new-onset atrial fibrillation

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OBJECTIVES

Echocardiographic predictors of atrial fibrillation (AF) are lacking in veterinary medicine. Prolongation of time from onset of ECG P wave to peak of left atrial (LA) lateral wall A' wave velocity (P-PA') from pulsed-wave tissue Doppler imaging (PW-TDI) can predict new-onset AF in humans. This study investigated echocardiographic variables (including P-PA') which may identify dogs which developed AF within 6 months.

METHODS

A review of dogs with underlying cardiac disease was done and split into two groups; those which developed AF within 6 months after echocardiography (AF Group) and those which did not (non-AF group). Cases were selected to have had complete echocardiogram, and similar body weights and atrial dilatation (2D LA:Ao ratio) between groups. 2D, M-Mode and PW-TDI values were compared between the 2 groups. Durations of P-PA' on the ventricular septal (P-PA'_{septal}) and lateral mitral annulus (P-PA'_{lateral}) PW-TDI were measured.

RESULTS

64 dogs were included (21 AF; 43 non-AF). Risk of developing AF was not associated with gender or underlying cardiac disease.

The AF group had significantly greater left-ventricular (LV) end-diastolic (ED) and end-systolic (ES) volumes, M-Mode LV ED and ES diameters, LV ED diameter indexed for body weight, LA maximal diameter, PW-TDI_{lateral} E' velocity, and P-PA'_{lateral} and P-PA'_{septum} durations.

P-PA'_{lateral} duration was superior to other echo variables at predicting AF development within 6 months (AUC: 0.856; cut-off >81.1 ms: specificity 86%; sensitivity 73.7%).

STATEMENT

Duration of P-PA'_{lateral} can identify dogs at risk of new-onset AF. The obtained cut-off warrants confirmation in a prospective study.