INTERNATIONAL JOURNAL OF HEALTH & ANIMAL SCIENCE & FOOD SAFETY

Keywords

Electrocardiography, Dog, Heart, Rhythm, Arrhythmia

CORRESPONDING AUTHOR

Alice Savarese
alice.savarese@unimi.it

JOURNAL HOME PAGE

riviste.unimi.it/index.php/haf

UNIVERSITÀ DEGLI STUDI DI MILANO
DIPARTIMENTO DI SCIENZE VETERINARIE PER LA SALUTE, LA PRODUZIONE ANIMALE E LA SICUREZZA ALIMENTARE

Comparative analysis of a portable smartphone-based electrocardiograph (D-Heart®) versus standard 6-leads electrocardiograph in the canine patient

Alice Savarese[1*], Chiara Locatelli[1], Niccolò Maurizi[2,3], Nicolò Briante[3], Paola G. Brambilla[1]

[1]*University of Milan, Department of Veterinary Medicine, Italy*

[2]*University of Florence, Dept. of Clinical and Experimental Medicine, Italy*

[3] *D-Heart srl, Genova, Italy*

Abstract

D-Heart® is a portable, smartphone-based device, which streams tracing via Bluetooth, enabling multiple leads electrocardiograms (ECGs) acquisition, currently used in human cardiology (Maurizi *et al*. 2017).

The aim was to determine the accuracy of D-Heart® compared with the gold standard non-portable 6-lead electrocardiograph in the evaluation of cardiac rhythm in dogs.

Standard 6-lead and D-Heart® ECGs were acquired in conscious dogs. Concordance between methods was assessed by weighted k Cohen index, with its relative significance, taking as end point variable standard 6-lead ECG group. Bland - Altman method (95% confidence level) was applied for P, PR, QRS, T and QT. Since differences didn't follow a normal distribution, a non-parametric approach was used to determine limits of agreement. P was significant when < 0.05 (Maurizi *et al*. 2017). Amplitude of waves was not considered because currently the software doesn't allow voltage variation.

115 dogs of different weights and breeds admitted to the Cardiology Service of DIMEVET were enrolled. Mean age was 7,5±4 years. Most were intact males (45%, n=51). The most represented breed was mongrel (27%, n=32).

Weighted Cohen's kappa test demonstrated excellent concordance in the evaluation of the heart rhythm (0.989, p<0.001), for ST segment morphology (0.991, p<0,001) and for T wave morphology (0.838, p=0.040). There was a 100% concordance in P morphology determination. P, PR, QRS, T and QT intervals comparison with Bland-Altman showed an extremely good concordance for D-Heart® measurements (95% limit of agreement ±0.9 ms for P, ±10 ms for PR, ±35 ms for QRS, ±5 ms for T wave). Less concordance resulted for QT (±80 ms).

In Conclusion, D-Heart® proved effective accurate recording of ECG comparable to standard 6-lead electrocardiographs, opening new perspectives to improve diagnostic tools in veterinary cardiology. Future perspective will be the development of a telecardiology network and to improve arrhythmia's diagnosis in small animal practice (Bruining *et al*., 2014; Haberman *et al*., 2015).

ISSN: 2283-3927

References

Bruining, N., et al., 2014. Acquisition and analysis of cardiovascular signals on smartphones: potential, pitfalls and perspectives: by the Task Force of the e-Cardiology Working Group of European Society of Cardiology. European Journal of Preventive Cardiology. 21(2 Suppl), 4-13

Haberman, Z.C., et al., 2015. Wireless Smartphone ECG Enables Large-Scale Screening in Diverse Populations. Journal of Cardiovascular Electrophysiology. 26(5), 520-6

Maurizi, N., et al., 2017. Cardiovascular screening in low-income settings using a novel 4-lead smartphone-based electrocardiograph (D-Heart®). International Journal of Cardiology. 236, 249-252

 ISSN: 2283-3927