Heart rate turbulence in healthy dogs and dogs with dilated cardiomyopathy

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Abstract

Heart rate turbulence (HRT) is modulated by the baroreceptor reflex and it was suggested that it could be used as a measure of autonomic dysfunction. Impaired HRT is of a significant prognostic value in humans after myocardial infarction, suffering from dilated cardiomyopathy and patients with heart failure. So far no studies were performed assessing the importance of HRT in dogs. The aim of this study was to prospectively evaluate the HRT turbulence onset (TO) and the turbulence slope (TS) in healthy dogs and in dogs with DCM and to compare the HRT in dogs with DCM that died during the first 30 days of observation and dogs with DCM that survived the first 30 days after the HRT analysis. The current study was aimed at determining reference value of the TO and TS of HRT in healthy dogs (control group) and dogs with dilated cardiomyopathy (DCM group). The tests were carried out on 30 healthy dogs and 30 dogs with DCM composed of Boxers, Doberman pinschers and Great Danes, of different sexes and body weights from 22 to 72 kg, aged between 1.5 and 11.5 years, submitted to the 24-hour Holter monitoring. HRT parameters were calculated using an HolCard software algorithm. TO is a percentage difference between the heart rate immediately following ventricular premature complex (VPC) and the heart rate immediately preceding VPC. TS corresponds to the steepest slope of the linear regression line for each sequence of five consecutive normal intervals in the local tachogram. The average TO in healthy dogs was determined as -13.55 ± 11.12%, TS was 21.33 ± 9.66 ms/RR. TO in dogs with DCM was determined as – 2.61 ± 2.1% and TS was 6.15 ± 3.86 ms/RR. Parameters of HRT were statistically significantly decreased (p<0.01) in dogs with DCM. HRT TO and TS were statistically significantly decreased in dogs with DCM. Dogs with DCM that survived more than 30 days of observation had HRT statistically significantly decreased in comparison to dogs with DCM that died after the 30'th day of observation. Decreased HRT parameters in dogs with DCM suggest an autonomic neuropathy which principally consists of the withdrawal of the cardiac parasympathetic tone. The more the autonomic neuropathy is advanced the faster the death of the dog with DCM might occur, with no correlation with the level of the heart failure.

Key words: dogs, dilated cardiomyopathy, heart rate turbulence, baroreceptor reflex.