ROYAL CANIN STUDENT AWARD

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Background: Differentiating innocent cardiac murmurs from murmurs caused by congenital cardiac anomalies can be challenging with auscultation alone in asymptomatic puppies.

Hypothesis: Plasma N-terminal pro-B-type natriuretic peptide (NT-proBNP) concentrations and phonocardiograms recorded by an electronic stethoscope can differentiate innocent cardiac murmurs from pathological ones.

Animals: 186 client-owned asymptomatic dogs: 135 cairn terriers (age: 45-124 days), 20 adult cairn terriers (age: 7.5 months to 13.5 years) and 31 puppies of various breeds (age: 29-396 days).

Methods: Each dog was auscultated and when a cardiac murmur was heard, a phonocardiogram was recorded and an echocardiogram was performed. Plasma NT-proBNP concentrations were measured by a single laboratory using an ELISA assay.

Results: No significant difference in plasma NT-proBNP levels was found between puppies without a murmur and puppies with an innocent murmur, and between clinically healthy adult cairn terriers and cairn terrier puppies. Plasma NT-proBNP levels in puppies with a congenital heart disease were significantly higher than those in puppies with innocent murmurs. However, puppies with severe pulmonic stenosis did not have elevated plasma NT-proBNP levels. Phonocardiographic characteristics of innocent cardiac murmurs are significantly different from those of pathologic murmurs. Innocent murmurs are shorter than 80% of the systole and have a lower amplitude compared related to the first cardiac sound.

Conclusions and clinical importance: Plasma NT-proBNP concentrations within the reference range do not rule out a congenital cardiac anomaly. Murmurs longer than 80% of the systole are most likely pathologic, whereas murmurs shorter than that could be either innocent or pathologic.

Keywords: auscultation, biomarker, dogs, echocardiography, functional murmurs