Left Ventricular Eccentricity Index for Assessment of Precapillary Pulmonary Hypertension in Dogs

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M. Lekane[1]; A.C. Merveille[1]; K. Gommeren[1]; K. Mc Entee[2]

[1]Department of Veterinary Clinical Sciences, University of Liège, Liège, Belgium; [2]Laboratory of Physiology and Pharmacology, Free University of Brussels, Brussels, Belgium

Ventricular septal flattening, frequently present in pulmonary hypertension (PH) can be quantified using the eccentricity index (EI), an index of left ventricular (LV) shape and septal curvature, reflecting the interaction between the two ventricles. In human medicine, EI correlates with invasive pulmonary pressure measurements and can accurately define patients with clinically important PH.

The aim of this study was to evaluate whether in dogs, EI is a quantitative marker of PH and correlates with other variables indicative of PH.

In this retrospective study, dogs with measurable tricuspid regurgitation (TRPG) or pulmonic insufficiency (PRPG), without evidence of right ventricular obstruction and in the absence of increased LA size, were included.

Dogs were divided into 4 classes (absent, mild, moderate and severe PH), according to TRPG (<30, 31–50, 51–75, >75 mm Hg) and/or PRPG (<19,5, 20–25, 25–35, >35 mm Hg), respectively. Quantitative parameters of right heart remodelling including right ventricular (RV) internal diameter (RVIDd/Ao), RV free wall (RVFWd/LVFWd), presence of interventricular septal flattening, right atrial size (RAD/LAD), main and right pulmonary artery size (MPA/Ao; PV/PA), pulmonary flow profile (AT/ET), RV function (TAPSE) were documented. Left ventricular end-diastolic (EId) and end-systolic (EIs) EI were measured at the mid-ventricular level from a parasternal short-axis view as the ratio of the latero-lateral and cranio-caudal LV cavity dimensions. Data were expressed as median and range [minimum–maximum].

Ninety-seven dogs were included: 29 absent, 13 mild, 25 moderate and 30 severe PH. EId and EIs were significantly higher in severe (1.51 [1.05–2.96]; 2.57 [1.25–9.72]) compared to absent (1.12 [0.94–1.30]; 1.11 [0.92–1.26]), mild (1.12 [1.01–1.28]; 1.17 [0.99–1.38]) and moderate (1.19 [1.02–1.72]; 1.21 [0.95–2.34]) PH ($P<0.0005$). EIs was also significantly higher in moderate compared to absent PH ($p<0.01$). All variables were significantly associated with EI. EIs was moderately associated with TRPG ($r=0.62$), Eid ($r=0.56$) RAD/LAD ($r=0.54$) and PV/PA ($r=0.45$) ($p<0.0001$). EId was moderately associated with TRPG ($p<0.0001$). Remaining variables were weakly associated with EI ($r<0.40$; $p<0.01$). Area under the receiver-operating characteristic curve for EId and EIs were 0.78 and 0.87 respectively. Optimal cut-off values were 1.24 and 1.34, discriminating moderate to severe PH from absent and mild PH with a sensitivity of 60% and 67% and a specificity of 90% and 95%, respectively.

EI increased with severity of precapillary PH. EIs appears to be more sensitive and specific than Eid, possibly due the right ventricular pressure overload mechanism and may be useful for assessment of moderate to severe precapillary PH in dogs.

Disclosures
No disclosures to report.

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M. Lekane
Department of Veterinary Clinical Sciences
University of Liège
Liège, Belgium

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