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ASSESSING AORTIC REGURGITATION SEVERITY BY TISSUE DOPPLER IMAGING IN HORSES

Introduction: Aortic regurgitation (AR) can cause left ventricular (LV) eccentric hypertrophy, arrhythmia and heart failure. The aim of this study was to detect alterations in radial myocardial wall motion by tissue Doppler imaging (TDI) in horses with AR.

Methods: Standard 2D, M-mode and TDI echocardiography was performed in 32 healthy horses (8±4 years, 563±49 kg) and 46 horses with AR (17±6 years, 522±87 kg) divided in three groups (mild, moderate and severe AR). From right parasternal short-axis TDI images at chordal level, velocity and strain rate (at peak systole, early diastole and atrial contraction), pre-ejection period, ejection time and strain of the LV free wall and the interventricular septum (IVS) were measured. From left parasternal short-axis TDI images the same values were measured from the left (LLV) and right (RLV) part of the LV free wall.

Results: In horses with moderate or severe AR all segments, except RLV, showed a significantly ($p<0.05$) higher velocity during systole. During early diastolic filling, horses with severe AR had a significantly ($p<0.001$) lower LV free wall velocity, whereas LLV velocity was significantly ($p=0.043$) higher in horses with moderate AR and no difference was found in IVS. During atrial contraction, a significantly ($p<0.05$) higher velocity and strain rate could be seen in LV, IVS and LLV in horses with AR. In the IVS a significantly shorter pre-ejection period in horses with severe AR was found ($p=0.024$), but not in the other segments. Maximal strain was in all segments highest in horses with moderate AR, but the difference was not always significant.

Conclusions: TDI can detect changes in radial LV myocardial wall motion in horses with AR. A higher systolic velocity of the myocardial walls was the most obvious finding. Further research is needed to investigate alterations in longitudinal function of the myocardium.