



## **Echocardiographic assessment of equine left ventricular function: tissue Doppler versus 2-dimensional strain analysis**

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### **Background:**

Quantification of left ventricular (LV) myocardial function by tissue Doppler imaging (TDI) and 2D speckle tracking (2DST) echocardiography is a recent development in equine cardiology. Both techniques seem promising to follow up cardiac function in equine athletes.

### **Aims:**

To compare feasibility, results and reliability of TDI- and 2DST-derived measurements of LV deformation (strain).

### **Material and methods:**

Peak values and timing of radial myocardial strain (SR) and strain rate (SrR) were quantified in multiple LV segments (4 in TDI, 6 in 2DST) in 10 untrained trotter horses. Repeated echocardiographic examinations were performed from right and left parasternal short-axis views at chordal level (GE Vivid 7 Pro). Analyses were performed off-line (GE EchoPAC 7.1.2). Intra- and interobserver within- and between-day coefficients of variation (CV) were determined as measures of reliability.

### **Results:**

Acceptable image quality for strain analysis was obtained in all segments using TDI, except in the LV caudal wall which was excluded from further analysis because of poor image quality, and in 96% of segments using 2DST. Both TDI- and 2DST-derived SR and SrR values were higher in the LV free wall segments compared to the septum ( $p < 0.001$ ).

Reliability was high for all SR timing measurements ( $CV < 15\%$ ). Peak SR and SrR values could be reliably characterized by TDI in the septal and left region of the LV wall. Reliability of 2DST-derived peak values was low in all segments ( $CV > 20\%$ ) but improved by averaging to a global SR value ( $CV 10.4-13.2\%$ ).

### **Conclusions:**

To our knowledge, this study is the first to compare TDI en 2DST-derived SR and SrR measurements in horses. Several peak strain and strain rate values and their timing can be reliably measured by both techniques. Further investigation is required to evaluate if both techniques also perform equally in clinical settings.