

## MP2-19

### The Effect of Gender and Heart Rate on 2-dimensional Speckle-Tracking derived Strain and Strain Rate in Children and Young Adults

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Introduction: Speckle Tracking is of great interest in research and is playing an increasing role in clinical practice. The aim of this study was to determine the influence of gender, age, body surface area (BSA) and heart rate (HR) on 2-dimensional speckle-tracking derived strain and strain rate in children and young adults.

Methods: 66 healthy subjects (52% female) with a mean age of  $16.5 \pm 6.40$  years (range 5 to 28 years), mean BSA of  $1.56 \pm 0.38$  m<sup>2</sup> and mean HR of  $73.4 \pm 12.5$  /min were recruited. Global longitudinal and global circumferential strain and strain rate (GSL, GSrL, GSC and GSrC) as well as segment-derived average radial strain and strain rate (AvSR, AvSrR) were measured in the apical four-chamber or parasternal short axis view with dedicated software (EchoPAC, GE).

Results: Measurements of longitudinal parameters were feasible in 58 subjects, whereas circumferential and radial parameters could be measured in 40 cases: GSL  $-20.3 \pm 1.8\%$ , GSC  $-19.8 \pm 3.1\%$ , AvSR  $51.2 \pm 13.1\%$ , GSrL  $-1.11 \pm 0.12/s$ , GSrC  $-1.27 \pm 0.22/s$  and AvSrR  $1.94 \pm 0.33/s$ . GSL was significantly higher in female than male subjects ( $-21.0 \pm 1.6\%$  vs.  $19.5 \pm 1.6\%$ ;  $p < 0.001$ ). This gender difference was present in minors ( $< 18$  years) and young adults ( $\geq 18$  years) ( $-20.7 \pm 1.5\%$  vs.  $-19.3 \pm 1.6\%$  and  $-21.4 \pm 1.8$  vs.  $-19.9 \pm 1.6\%$ ;  $p < 0.05$ ). No other strain or strain rate was affected by gender. All Strain Rates (GSrL, GSrC and AvSrR) were influenced by heart rate; strain rate increased as heart rate increased. The influence was less in global strain rates obtained with Lagrangian Strain (GSrL and GSrC both  $R^2 = 0.15$ ,  $p < 0.05$ ) than in averaged segmental Strain Rate obtained with Natural Strain (AvSrR  $R^2 = 0.26$ ;  $p < 0.005$ ). Linear regression showed no influence of age or BSA on measurements ( $p > 0.05$ ).

Conclusions: This is the first study showing that GSL is significantly higher in girls than boys. Until now this was only known for the adult population. These results underline the importance of sex-matched groups in clinical studies and the need for the use of gender specific reference values. The influence of HR on Strain Rate should be kept in mind when interpreting results.