Beat to Beat Fetal heart rate variability during pregnancy and labor using non-invasive fetal ECG

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Objective: The objective of the study was the examination of fetal heart rate variability measures during pregnancy and labor using non-invasive fetal ECG.
Study Design: This was a retrospective observational study of a non-invasive fetal ECG using 5 abdominally sited electrodes (via the Monica AN24) of 68 patients. Data were analyzed in 5 minute epochs only when at least 500 fetal heart beats were identified for data integrity purposes. The evaluation of fetal heart rate measures were either based on beat-to-beat-intervals using standard deviation (SD) and root mean square of successive differences (RMSSD) or based on 3.75 s time intervals using the short time variation (STV) of Dawes/Redman.
Results: Antenatally SD and STV correlate weakly with gestational weeks (r=0.66 and 0.59), whereas RMSSD shows no correlation (r=0.03). The inclusion of sub partum further reduces the correlation in both cases. With regards to CTI antenatally a weak correlation was found with SD (r=0.63), a stronger correlation with STV (r=0.73). Most importantly there was limited correlation between RMSSD and STV (r=0.54).
Conclusion: The beat to beat generated by the Monica AN24 allows true beat to beat analysis. It should be noted that the Doppler CTG only produces a 3.75 second average fetal heart rate and does not allow true beat to beat analysis. Hence the Doppler CTG is highly inappropriate for such measurements. The clinical importance of these beat to beat parameters for fetal assessment is the subject of further studies.

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