Short term variation of the fetal heart rate: normal values for 2 different computational algorithms

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Objective: Computerised analysis of the CTG (cCTG) constitutes a pivotal element in the monitoring of high-risk pregnancies, especially those complicated with IUGR. In this context, the most important parameter of the cCTG is the short term variation of the fetal heart rate (STV). Currently, the gold standard for the computation of the STV is the algorithm developed by Dawes-Redman (Sonicaid Fetalcare by Huntleigh Healthcare), where the STV is measured by dividing each minute into 16 segments (STV16). A new algorithm has been developed (Intellispace perinatal by Philips Medical), which measures the STV by dividing each minute into 240 segments (STV240), thus approximating the beat-to-beat variation. Lack of reference values for the STV240 hinders its implementation in the clinical praxis. The objective of our study was to develop reference values for the STV240 and compare them to the existing ones for the STV16.

Methods: This was a single-centre, prospective, observational study of normal pregnancies (fetuses appropriate for gestational age with normal fetal and maternal Doppler parameters and no complications such as Diabetes mellitus, hypertensive disease of pregnancy or IUGR). CTG traces starting from 24.0 until 33.6 weeks of gestation were collected and subsequently analysed with both algorithms (STV240 and STV16). In order to be able to calculate a satisfactory 95% confidence interval, a minimum of 20 CTG traces per week of pregnancy was required.

Results: 228 CTG traces from 94 uncomplicated pregnancies were collected and analysed. The 95% confidence interval was calculated for both algorithms and diagrams with the normal ranges for both the STV240 (Figure 1) and STV16 (Figure 2) per week of pregnancy were drawn. The normal values of the STV240 were significantly lower in comparison to the ones of the STV16. Not only the mean values but also the 95th Percentile of the STV240 lie beneath the existent cut-off value of 3ms for the STV16.

Conclusion: The development of a new algorithm for the calculation of any clinical parameter leads to the problem of lacking reference values for the named parameter. Every clinician using cCTG should be, in advance, aware of the algorithm implemented in her/his CTG monitors, as the normal values for the STV240 lie beneath the, up until now, established cut-off values for the STV16.