The ECG in the Normal Human Pregnancy

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Aims: There have been very few, if any, studies using automated 12-lead ECG measurement in uncomplicated human pregnancy. This pilot study aimed to address the shortcoming by (a) assessing a sizeable cohort of women in a cross-sectional manner to evaluate the effect of gestation and maternal characteristics, notably booking body mass index (BMI), on the ECG; (b) evaluating how ECG measures in pregnancy differ from pre-established age and gender-matched reference values; (c) assessing a subgroup of women longitudinally to determine the impact of delivery on the ECG.

Methods: Women with singleton pregnancies across varying stages of gestation, aged between 18 to 45 years, were recruited from Glasgow Royal Infirmary and assessed cross-sectionally. Patients with co-morbid cardiovascular disease were excluded. A small subset was studied before and after delivery. An Atria 6100 ECG machine and its integrated Glasgow Program were used to record and analyse ECGs. Maternal baseline characteristics, including booking BMI, were also recorded.

Results: 138 women were recruited. 50% were overweight or (morbidly) obese. Univariate analysis demonstrated a negative correlation between gestational age and the T axis ($r= -0.34$, $P < 0.001$). BMI was found to be an independent predictor of the QRS axis and the T axis when specified within a general linear model ($p=0.006$ and 0.023 respectively). The QRS axis was more superiorly directed in pregnancy at 35 degrees in the third trimester compared to 51 degreesin an age/sex matched control population ($p<0.001$). 18 women were studied longitudinally. P, QRS and T axes demonstrated a significantly more inferior direction following delivery with QRS shifting from 30 to 35 degrees ($p<0.01$) and T from 13 to 25 degrees ($p<0.001$).

Conclusions: This pilot study demonstrated that certain ECG measures are altered by pregnancy and subsequent delivery. These findings suggest that a larger longitudinal study is merited.