PREGNANCY

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Defining the normal QTc interval in newborns; data from a large prospective general population study

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Background: Analyses of electrocardiograms (ECG's) in newborns are important for the diagnosis of inherited arrhythmia syndromes and drug side effects. However, due to the high heart rate in newborns, the commonly used formulas for QT corrections may not be adequate. A large, unselected reference study is needed to map the normal QT intervals in newborns.
Methods: The Baby Heart Study is an ongoing population-based, prospective study offering inclusion of all newborns in our catchment area. Participating newborns are offered electro- and echocardiograms at the age of 0–28 days. The ECG is recorded with extremity leads, V1, and in most cases also V6. ECG intervals are determined using proprietary software and manual validation was performed to ensure data quality.
Results: For the present study we included 10.530 newborns (52% male) with ECGs available. The mean heart rate in the entire cohort was 145±22 beats per minute (bpm) with a mean heart rate of 128 bpm ± 21 between age 0–6 days (n=2.153), 147 bpm ± 20 between age 7–13 days (n=5.515), 151 bpm ± 19 between age 14–20 days (n=1.857), and 153 bpm ± 19 between age 21–28 days (n=1.005). The uncorrected QT, QTcB (Bazett's correction) and QTcF (Fridericia's correction) intervals of the entire cohort were 276, 424 and 367 ms, respectively. Analyzing subgroups defined by age we observed a discrete increase in QTcB interval as a function of age, with uncorrected QT, QTcB, and QTcF intervals of respectively 291, 421 and 372 ms between age 0–6 days, 271, 422 and 364 ms between age 7–13 days, 273, 430 and 370 ms between age 14–20 days, and 273, 431 and 370 ms between age 21–28 days. Grouped by gender the QT, QTcB, and QTcF were 275, 425 and 367 for boys and 276, 426 and 368 ms for girls.
Conclusions: We provide data from a large general population study on normal QT intervals in newborns, corrected and uncorrected values are given. These data are expected valuable for clinical QT assessments, i.e. for diagnosing conditions associated with an abnormal QT interval in newborns.

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The pregnancy outcomes and delivery in women with Eisenmenger's syndrome

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Background: Maternal mortality in the presence of Eisenmenger syndrome is reported as 30–50% and pregnancy should be avoided. In the event of a strong desire of pregnancy a management is not currently standardized between centers and specific guidelines are lacking.
Methods: We report the outcomes of 13 pregnancy in women Eisenmenger syndrome at our center between 2010 and 2017.
Results: All pts recieved sildenafil therapy in the antenatal period. All patients had preterm delivery: cesarean section was performed between 26 to 34 weeks as a result of worsening maternal or fetal clinical condition during the second or third trimester of gestation. Pts underwent epidural regional anaesthesia and were monitored peri-delivery with arterial and central venous access. In all pts after delivery were decompensation of the state with the increase of pulmonary hypertension, progression of right ventricular failure. In 4 cases, a transfer to mechanical ventilation was required. Intensive therapy included a combined use of vasodilators, the use of inotropes, the prevention of thromboembolic complications. 3 women died within 6 months of delivery (9, 14 and 15 days post-delivery). 11 children were discharged from the hospital in a satisfactory condition.
Conclusion: Eisenmenger syndrome is a condition that still leads to high maternal and perinatal risks. Critical decisions, rapid escalation of the PAH therapy, and the use of an experienced multidisciplinary team led to a successful delivery, minimizing complications for the mother or baby. Registry of women with PH and pregnancy is necessary to make more robust management recommendations.

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Influence of Bisoprolol Fumarate on fetoplacental hemodynamics in pregnant women with arterial hypertension

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Background: Arterial hypertension in pregnant women is the most frequent and clinically significant type of chronic extragenital pathology, complicating the course of about 10% of pregnancies. Hemodynamic disorders in hypertension are often accompanied by a decrease in blood flow in the uterus and placenta with a decrease in utero-placental perfusion, leading to chronic hypoxia and fetal hypotrophy and a high level of perinatal morbidity. One of the leading places in the treatment of hypertension in pregnant women are cardioselective, acting primarily on β1-receptors, beta-adrenoblockers (BAB). BAB - effective antihypertensive drugs with proven safety in randomized clinical trials. They do not have a teratogenic effect and are used in the II and III trimesters of pregnancy.
Purpose: To assess the influence of cardioselective BAB (Bisoprolol Fumarate) on fetoplacental hemodynamics.
Methods: 33 pregnant women in gestational age 35–37 weeks with mild and moderate hypertension were treated. Bisoprolol in a daily dose of 2.5 - 5 mg was assigned to them. Phytoplacental hemodynamics was assessed using ultrasound dopplerography of the umbilical arteries with the calculation of a systolic-diastolic coefficient (SDC). SDC is the ratio of the maximum blood flow velocity in the systole to the minimum velocity of blood flow to the diastole. SDC increases as peripheral vascular resistance increases. As a standard, SDC for the gestation period of 35–37 weeks was 2.40. The perinatal status of newborns was determined by the Apgar score and the adaptation in the early postnatal period.
Results: Stabilization of blood pressure at a normal level was performed in all cases using Bisoprolol. The initial (before the use of Bisoprolol) index of SDC in the umbilical arteries was 2.98±0.07, which reflected violations of the fetoplacental blood circulation. After normalization of blood pressure with the use of Bisoprolol, there was a significant (p<0.01) improvement in blood circulation in the umbilical arteries - the SDC index decreased to a level of 2.46±0.06. The umbilical vessels do not have nerves innervation and their tone is determined by the influence of biologically active substances including catecholamines. This is the point of action of Bisoprolol. Also, Bisoprolol did not have a negative impact on the fetus. All women gave birth to full-term infants with no signs of morphofunctional immaturity. The state of newborns on the Apgar scale was 8–9 points in 26 mothers, 7 points - in 7 women. There was no pathological hemorrhage in childbirth in any case.
Conclusion: The use of Bisoprolol in pregnant women with arterial hypertension and fetoplacental insufficiency is safe for the mother and fetus. Bisoprolol has a positive effect on the systemic hemodynamics of mothers and on the blood circulation in the placenta-fetus system.

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Normal levels of heart bio-markers during and after pregnancy in healthy women

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Introduction: Cardiac output increase during pregnancy and hematocrit, erythrocyte volume fraction (EVF), decreases by hemodilution; factors that may affect levels of heart bio-markers. N-terminal Brain Natriuretic Peptide (NT-proBNP) is used as a bio-marker for ventricular wall tension and for monitoring patients with heart failure. Troponin T (TNT) is a bio-marker of cardiac myocyte damage and even minor elevations are associated with worse outcome in a wide variety of patients and increased risk of cardiovascular events also in healthy individuals. However, both markers may increase as a result of physiological loading and stress. Normal levels of these bio-markers during pregnancy and in the peri-partum period are not well known.
Purpose: To establish normal values for NTpro-BNP and TNT and describe the individual variation during and after pregnancy in healthy women.
Methods: Blood samples were collected on four occasions; in the first trimester (gestational week 11 (range 7–14), in the second trimester (gestational week 22 (range 18–32), peri-partum (range 6–168 hours post-delivery) and post-partum (range 6–14 months). Healthy women were recruited from four primary maternal care centers in the first trimester and blood samples and biometric data were collected. In 2nd trimester an ECG and a standard echocardiography were added to the blood samples. Peri-partum blood samples and data on complications and medication were collected at the obstetric hospital. Post-partum, samples and examinations were repeated at our research unit as at the 2nd trimester visit. The blood samples were analyzed for hemoglobine, EVF, creatinine, NT-proBNP and TNT and a urine dipstick screening for proteins.
Results: 199 healthy women were recruited. 11 were excluded from subsequent analysis due to miscarriage. Mean age was 30.7 years (20–41) and mean Body Mass Index was 24.7 (16–42). Echocardiography at 2nd trimester calculated a 30% higher cardiac output than post-partum levels. Hematocrit (EVF) was 12% lower at 2nd trimester than post-partum. Boxplot values of NT-pro BNP are shown in the Figure. In 2.5% of the women the peri-partum NTpro-BNP levels were above our institutions upper limit of normal of <400 ng/L, while 1st and 2nd trimester and post-partum levels were below. The hematocrit adjusted NTpro-