PS-014 MEASUREMENT OF TISSUE-DOPPLER-DERIVED STRAIN AND STRAIN RATE IN VERY LOW BIRTH WEIGHT PRETERM INFANTS WITHIN THE FIRST 28 DAYS OF LIFE

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Background Preterm infants and especially very low birth weight (VLBW) preterms are prone to suffer from cardiac stress due to bronchopulmonary dysplasia (BPD) or hemodynamically significant patent ductus arteriosus (hsPDA). Tissue-Doppler-imaging (TDI) based strain and strain rate measurements are ultrasound techniques that so far have not been used to assess cardiac function in this population.

Aim of this study was to assess TDI based strain and strain rate by in VLBW infants and their correlations with the infants' clinical courses within the first 28 days of life.

Methods We conducted ultrasonic measurements on days 1, 7, 14 and 28 of life in 119 preterm infants with a birth weight below 1500 g. We assessed peak systolic strain (PSS) and strain rate (PSSR) and compared these parameters depending on weight, weight at examination and heart rate as well as the presence of a PDA or development of BPD.

Results PSS and PSSR of only the right ventricle increased during the first 28 days of life. Infants with hsPDA showed significantly lower values for left wall PSS on days 14 that only increased insignificantly after closure of the PDA. Incipient BPD was associated with significantly lower PSS in the right wall on days 14 and 28 of life.

Discussion Although BPD and hsPDA are highly intercorrelated with decreased PSS. Benefits of clinical applications, however, remain to be assessed.

PS-015 TISSUE DOPPLER ASSESSMENT OF MYOCARDIAL FUNCTION IN HYPOTENSIVE PRETERM INFANTS

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Background Sick preterm neonates may have significant cardiac dysfunction. Blood pressure (BP) may be a surrogate marker however mean BP alone does not indicate the nature of myocardial dysfunction.

Aim To analyse biventricular myocardial velocities and myocardial performance indices (MPI) using tissue Doppler imaging (TDI) in preterm neonates <30 weeks gestation, with and without hypotension, in the first 24 h of life.

Methods 25 preterm neonates were recruited: 15 were normotensive and 10 were hypotensive. The hypotensive group (HT) received between 1 and 5 interventions (fluid and inotropes) till 9 days of age. Forty-two infants had cTNT measured at two weeks of age. Fourty-two infants had cTNT measured at two weeks of age.

Results The left ventricular (LV) MPI was significantly higher in the HT compared to the normotensive group (p = 0.01) suggesting left ventricular dysfunction. Biventricular MPIs decreased significantly when hypotension was corrected, indicating an improvement in myocardial function (RV p = 0.01, LV p = 0.05). Trans-mitral E' also showed an improvement following intervention for HT suggesting improvement in left ventricular relaxation (p = 0.02).

Conclusion Although our study is small we have demonstrated that hypotensive preterms have impaired left ventricular function. Myocardial function improved after intervention in the hypotensive group. More studies are needed to investigate the application of TDI as an adjunct in clinical decision making when managing preterm babies with hypotension.
of life (range 11–18 days). Wilcoxon signed rank-test was used to test for differences in cTnT between the different time-points.

**Results** Mean gestational age was 26.1 weeks (range 23.0–27.9) and mean birth weight 838 g (438–1287 g). At postnatal day 3, median cTnT was 148 ng/l (range 82–386). cTnT decreased between day 3 and day 7 to 96 ng/l (68–214) (p < 0.001). Between one and two weeks of age, cTnT increased again to 144 ng/l (95–338) (p = 0.001). Thirty-four infants (57%) were treated for a hemodynamically significant PDA (hsPDA) at a mean age of 8 days (SD 3.3). Twenty-three received only pharmacological treatment, 9 had surgery after pharmacological treatment and 2 had primary surgery. cTnT did not differ at any of the three time points between infants treated for hsPDA and infants not treated. Five infants who later died had significantly higher cTnT at 7 days of age than the 35 survivors (median 175 ng/l, compared to 94 ng/l) (p = 0.01).

**Conclusion** cTnT levels in extremely preterm infants are tenfold higher than reference values in adults. We did not find any relation between cTnT and need for PDA-treatment in this study.

**PS-018**  
**EVOLUTION OF SPECKLE TRACKING DERIVED 2-D STRAIN PARAMETERS IN VERY LOW BIRTH WEIGHT INFANTS WITH AND WITHOUT BRONCHOPULMONARY DYSPLASIA DURING THE NEONATAL PERIOD**

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**Background and aims** In preterm infants, postnatal myocardial adaptation may be influenced by bronchopulmonary dysplasia (BPD). We aimed to describe the development of left ventricular function by serial 2D-Doppler, and speckle tracking echocardiography (2D-STE) in infants with and without BPD during the neonatal period in comparison to anthropometric and conventional haemodynamic parameters.

**Methods** Prospective echocardiography on day of life (DOL) 1, 7, 14, and 28 in 119 preterm infants <1500 g birth weight, of whom 36 developed BPD (oxygen supplementation at 36 gestational weeks). Non-BPD and BPD infants differed significantly in median[IQR] gestational age (23.3[21–26.5] weeks vs. 29[27–30] weeks, p < 0.001) and birth weight (661[552–871] g vs. 1100 [890–1290] g, p < 0.001).

**Results** The rapid growth of length and body weight during the first 4 weeks of life was not matched by increased speckle tracking parameters. Infants with BPD differed significantly (p < 0.001) from those without BPD firstly, for all anthropometric parameters and conventional haemodynamic parameters except heart rate and secondly, for 2D-STE parameters global longitudinal systolic strain rate (GLSSR) and longitudinal systolic strain (LSSR) at the left free midwall segment. In infants with BPD, GLSSR (p < 0.001) and LSSR (p < 0.01) were significantly higher during the first week of life after which the differences disappeared. Low intra- and inter-observer variability was seen for longitudinal systolic strain and strain rate mid septum with a median coefficient of variation <4.6%.

**Conclusions** Reproducible 2D-STE measurements are possible in preterm infants <1500 g. There are early (DOL 1 and 7) ventricular changes (GLSSR and LSSR) in very low birth weight infants who develop BPD.