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 were 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 in VLBW preterms, we were able to show that increased afterload due to BPD and increased preload due to PDA are associated with decreased PSS. Benefits of clinical applications, however, remain to be assessed.