Non-invasive measurements of hemodynamic transition directly after birth

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Objective: To assess the hemodynamic changes in newborns delivered by caesarian section in the first 10 minutes after birth using non-invasive techniques. Study design: In 24 term newborns, heart rate (HR) and preductal blood pressure (BP) was measured non-invasively at 2, 5 and 10 minutes after birth. An echocardiographic examination was performed at the same intervals to monitor left ventricular dimensions and function. Results: Mean (SD) HR and mean BP did not change in time (HR: 157 (21) bpm at 2 minutes, 154 (17) bpm at 5 minutes and 155 (14) bpm at 10 minutes; mean BP: 51.2 (15.4) mmHg at 2 minutes, 50.5 (11.7) mmHg at 5 minutes and 49.6 (9.5) mmHg at 10 minutes; ns). Left ventricular end diastolic diameter (LVedd) increased from 2 to 5 minutes (14.3 (1.3) mm vs. 16.3 (1.7) mm) (p<0.001) and remained stable with 16.7 (1.4) mm at 10 minutes. Left ventricular output (LVO) increased between 2- and 5 minutes (151 (47) vs. 203 (55) mL/kg/min (p<0.001)) and remained stable at 201 (45) mL/kg/min at 10 minutes. The increase in LVO was significantly correlated with left ventricular stroke volume (LVSV; r = 0.94, p= 0.01), but not with HR (r = 0.37, ns). Conclusion: The most significant hemodynamic change occurs within the first 5 minutes after birth with an increase in LVedd and LVSV causing a significant increase in LVO, whereas blood pressure is stable during the 10 minutes after birth.