Background and aims The adaptive changes of the fetal heart in fetal growth restriction (FGR) could persist into childhood and be responsible for the increased cardiovascular mortality rate in adulthood. The aim of the study was to assess cardiac morphology and function in newborns with FGR.

Methods FGR was defined as a birth weight centile ≤ 10 . Prospective study of 50 neonates, 25 with FGR and 25 with normal intrauterine growth and weight at birth (Table 1). Comprehensive echocardiographic study was performed assessing cardiac morphology, systolic and diastolic function.

Results Compared with controls, neonates with FGR had more globular cardiac ventricles (Table 1), lower systolic excursions of the tricuspid and mitral valvular plane and lower values of the s' in the lateral and septal mitral annulus in the tissue Doppler imaging (TDI) study ($p < 0,05$). The e' at the tricuspid, lateral and septal mitral annulus together with the E wave of tricuspid inflow were significantly reduced in the FGR group; and tricuspid deceleration time showed a trend to increase without reaching statistical significance.

Conclusions Newborns with FGR manifest cardiac shape changes, reduced systolic values of the TDI at the left heart and lower values of diastolic function more pronounced at the right heart compared with neonates with normal intrauterine growth.

PS-021 ELECTRICAL CARDIOMETRY STROKE VOLUME EVALUATION IN NICU: COMPARISON WITH FUNCTIONAL ECHOCARDIOGRAPHY

¹A Boet, ²G Jourdain, ³A Capderou, ⁴O Grollmuss, ¹P Labrune, ¹D De Luca, ⁴S Demontoux. ¹Pediatrics and Neonatal Critical Care, CHU Antoine Bécère South Paris University Hospital, Clamart, France; ²Pediatrics and Neonatal Critical Care Pediatric S. M. U. R, CHU Antoine Bécère South Paris University Hospital, Clamart, France; ³INSERM 999, South Paris University Hospital, Le Plessis Robinson, France; ⁴Centre Chirurgical Marie Lannelongue, South Paris University Hospital, Le Plessis Robinson, France

10.1136/archdischild-2014-307384.317

Background Evaluation of cardiac output in neonates might be difficult because of the complexity and risks of invasive classical procedures. New systems like electrical cardiometry (EC: Osypka Medical, Berlin, Germany and La Jolla, California, USA) have been proposed but few data are available in neonates. We investigated stroke volume (SV) using EC in term and preterm infants.

Methods Eligible patients were neonates admitted to the NICU and undergoing echocardiography for any clinical reasons, without congenital heart disease. We measured SV with EC and echocardiography, within 10 min. Measurements were repeated 6 times by the same operator to calculate repeatability before and after echocardiography. Data have been compared with correlation and Bland-Altman analysis.

Results 59 neonates were enrolled, allowing 150 paired measurements. Mean gestational age and birth weight were 33.9 ± 3.4 wks and 1988 ± 823 g, respectively.

Results of Pearson correlation and Bland-Altman analysis for the whole population were ($r = 0.611$; $p < 0.001$) and (mean error [echo-EC] -1.35 mL [95% CI: -6.55 mL ± 3.85 mL]), respectively.

Correlation is maintained even with PDA ($r = 0.627$; $p < 0.001$).

Gestational age seems to do not influence the correlation between EC and echo (Partial correlation coefficient $r = 0.36$; $p < 0.0001$).

Repeatability (coefficient of variation) was 46% for EC and 52% for echocardiography. There was no difference in SV

measured by EC after 10 min ($3.76 \pm SD$ vs $3.78 \pm SD$; $p = 0.56$, Wilcoxon test).

Conclusions EC is feasible, reproducible and quick. It could be an useful tool for continuous monitoring and haemodynamic evaluation in neonates. EC is particularly interesting for the clinical management of preterm neonates.

PS-022 WITHDRAWN

Congenital Heart Disease

PS-023 THE PREVALENCE AND SPONTANEOUS CLOSURE RATE OF ISOLATED VENTRICULAR SEPTAL DEFECT IN NEWBORNS BY ECHOCARDIOGRAPHIC SCREENING

E Feil. Paediatric Cardiology, Marien Hospital Darmstadt, Darmstadt, Germany

10.1136/archdischild-2014-307384.318

Aims Evaluation of the prevalence and spontaneous closure rate of the most common congenital heart defect (CHD) – the ventricular septal defect (VSD) – in one maternity clinic, using colour flow Doppler echocardiographic screening (ECHO).

Methods Over a period of 7 years ECHO was offered to all babies who were born at the Marien hospital in Darmstadt. An experienced paediatric cardiologist performed the ECHO using a 10 MHz transducer within the first 72 h of neonatal life. The prevalence of different types of VSD and their outcome were evaluated.

Results 8082 neonates were screened. 399 cases (49/1000) of CHD were detected by ECHO. VSD was found in 320 neonates (40/1000) (137 male, 183 female): 4 perimembranous, 24 multiple and 292 muscular VSD. 2 major, 16 hemodynamically significant and 304 minor VSD. 46 had a typical murmur (14%), 274 were without clinical sign (including 1 major VSD). In the follow-up (3 month to 6,7 years) 280 could be included: the 2 major VSD had to be closed interventionaly and surgically within the first year of life. The spontaneous closure rate was 89% after 0,2–4,5 years (average 0,6) (hemodynamically significant: 50%, minor VSD: 93%). All VSD without spontaneous closure after 1 year (22 cases) had a typical murmur.

Conclusions The prevalence of VSD is considerably high in neonates when ECHO is performed. There are slightly more female neonates with this diagnosis. The spontaneous closure rate is high regarding minor VSD. Auscultation is insufficient to diagnose VSD in neonatal period but is excellent in the follow-up to detect VSD without spontaneous closure.

PS-024 NEURODEVELOPMENTAL EXAMINATION BY BAYLEY SCALE OF INFANT DEVELOPMENT-II IN CHILDREN WITH CYANOTIC CONGENITAL HEART DISEASE

Zi Yilmaz, F Genel, E Ozbek, B Erdur, T Mese, U Karaaslan. Department of Pediatrics, Dr. Behcet Uz Children's Hospital, Izmir, Turkey

10.1136/archdischild-2014-307384.319

Background and aims The aim of the study was to make the neurodevelopmental evaluation of the children with cyanotic congenital heart disease.

Methods Children between the age of six to fourty-two months were included in the study and were evaluated in three groups

(two patient groups and control group). In group A patients with isolated cyanotic congenital heart disease were enrolled. Group B consisted of the patients with cyanotic congenital heart disease with other concomitant diseases. Group C included the healthy control group. For the neurodevelopmental evaluation Bayley Scale of Infant Development- II was used.

Results Thirty eight patients (32 in group A and 6 in group B) and 33 healthy subjects in group C were included in the study. Mean age of the patient group was $22,5 \pm 11,2$ months. In group A the mental developmental index (MDI) ($82,5 \pm 14,7$) was significantly lower than group C ($92,3 \pm 6,9$) ($p = 0,001$). Similarly the psychomotor developmental index (PDI) in group A ($82,0 \pm 18,2$) was found significantly lower than group C ($92,5 \pm 7,4$) ($p = 0,003$). When group A and B were compared, mean MDI and PDI scores were lower in group B, but the difference was not statistically significant. For group A, according to the psycomotor development index 48,6% of the patients were found mild to severe retarded. In terms of the mental development index, 34,4% of the pateints were with moderate or mild retardation.

Conclusions Mental-motor retardation is frequently encountered in children with cyanotic congenital heart disease. For this reason, these children have to be under regular follow up for neurodevelopmental status.

PS-025 ESTIMATION OF USEFULNESS OF NON-INVASIVE CARDIOVASCULAR DIAGNOSTIC SCREENING METHODS IN EARLY DETECTION OF CRITICAL CONGENITAL HEART DEFECTS IN NEWBORNS

¹W Blaz, ²W Kawalec, ¹E Homa, ¹A Szadkowska, ²A Turska-Kmiec, ²M Zuk. ¹Neonatology and NICU, Provincial Hospital, Rzeszów, Poland; ²Cardiology, Children's Memorial Health Institute, Warszawa, Poland

10.1136/archdischild-2014-307384.320

Prevalence of critical congenital heart defects (CCHD) is 1.5–3/1000 newborns. Early discharge from nurseries may postpone CCHD detection. There is a search for additional screening modalities for early diagnosis of CCHD.

Aim 1. Estimation of usefulness of physical examination (PE), pulse oximetry (POX) and echocardiography (ECHO) in CCHD screening detection

2. Evaluation of parents' attitude to POX as CCHD diagnostic screening modality

Methods PE, POX, ECHO were done in all well newborns born during two year period in one hospital. PE was performed routinely, POX was done > 24th hour of life (cut-off < 95%). ECHO was carried out before discharge in asymptomatic newborns or after abnormal PE or POX. Statistical analysis was performed.

Results Among 4589 babies, 311 were excluded. CHD was diagnosed in 103 newborns. CCHD was detected in 10 newborns (2.3/1000) based on: PE in 5, POX in 9, and ECHO in 10. Pulse oximetry approval questionnaire showed that 95% of mothers

participated in the study without hesitation and more than 99% approved the idea of implementing population pulse oximetry screening.

Conclusions

1. PE supported by POX provide optimal early neonatal CCHD detection screening.
2. Screening ECHO detects insignificant cardiovascular problems, leading to unnecessary follow-up.
3. POX as the CCHD screening test is unanimously accepted by parents.

PS-026 CEREBRAL AND RENAL OXYGEN SATURATION AND EXTRACTION IN NEONATES WITH LEFT VENTRICULAR OUTFLOW TRACT OBSTRUCTION

¹MJ Mebius, ¹ME van der Laan, ²MTR Roofthoof, ²RMF Berger, ¹AF Bos, ¹EMW Kooi. ¹Department of Neonatology, Beatrix Children's Hospital/University Medical Center Groningen, Groningen, Netherlands; ²Department of Pediatric Cardiology, Beatrix Children's Hospital/University Medical Center Groningen, Groningen, Netherlands

10.1136/archdischild-2014-307384.321

Background and aim Neonates with left ventricular outflow tract obstruction (LVOTO) are at risk of developing brain damage, due to either ischemia or hypoxemia. Our aim was to explore the differences in cerebral and renal tissue oxygen saturation (rSO₂) and extraction (FTOE) between neonates with LVOTO with or without compromised antegrade ascending aortic flow.

Methods We included fourteen neonates with LVOTO and categorised them into neonates with compromised antegrade ascending aortic flow (hypoplastic left heart syndrome (n = 6)) and neonates without compromised antegrade ascending aortic flow (coarctatio aortae (n = 7)/non-critical aortic valve stenosis (n = 1)). We measured cerebral and renal rSO₂ using near-infrared spectroscopy during 72 h. Simultaneously, we measured predudctal arterial oxygen saturation (SpO₂) and calculated FTOE.

Results On day 1, neonates with compromised antegrade ascending aortic flow had lower cerebral rSO₂ than neonates without compromised antegrade ascending aortic flow (median rSO₂ 68.5% vs. 79.4%, p-value = 0.032). Furthermore, cerebral FTOE tended to be higher in neonates with compromised antegrade ascending aortic flow on day 1 (median FTOE 0.30 vs. 0.14, p-value = 0.086). Significant differences in cerebral rSO₂ and FTOE disappeared the following days. There were no differences in SpO₂, renal rSO₂ and FTOE between both groups.

Conclusions Because there were no differences in SpO₂ between both groups, and cerebral FTOE tended to be higher in neonates with compromised antegrade ascending aortic flow, the lower cerebral oxygen saturation might be due to ischemia rather than hypoxemia. Furthermore, in neonates with antegrade ascending aortic flow, cerebral oxygenation might be spared.

PS-027 STRATIFICATION OF COMPLEXITY IN CONGENITAL HEART SURGERY: COMPARISON BETWEEN RACHS-1 (RISK ADJUSTMENT FOR CONGENITAL HEART SURGERY), ARISTOTLE AND STS-EACTS METHODS

PE Ferraz Cavalcanti, MPBO Sá, CA Santos, IM Esmeraldo, ML Chaves, RFA Lins, RC Lima. Cardiovascular Surgery, Pronto Socorro Cardiológico de Pernambuco, Recife, Brazil

10.1136/archdischild-2014-307384.322

Abstract PS-025 Table 1 Statistical comparison of screening modalities

	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	LR+	LR-	ROC AUC
PE	50	100	100	98,8	-	0,5	0,74
POX	90	99,9	69,2	99,9	900	0,1	0,95
ECHO	100	100	100	100	-	0	0,98