ID: 232

TITLE: COMPARISON OF SURVIVAL AND NEONATAL COMPLICATIONS, IN EXTREMELY PREMATURE NEONATES 22+0 - 27 +0 WEEKS OF GESTATION, OVER THREE CONSECUTIVE TIME PERIODS.

AUTHORS: Kapetanaki A.1, Dritsakou K.2, Salvanos I. 3., Karanasiou E.4., Tzaki M 5

AFFILIATIONS: 1,3,4,5 Neonatal Intensive Care Unit, General Hospital “Elena Venizelou”, Athens, Greece
2Department of Quality Control, Research and Continuing Education, General Hospital “Elena Venizelou”, Athens, Greece

CONTENT:

Background: Life support of extremely premature infants increases the chance of survival without increasing the rate of neonatal morbidity. The incidence of short term major neonatal complications remained stable. A significant number of extremely premature neonates presented neurosensory disabilities at 18-30 months corrected age. The aim of the study is to compare survival and neonatal complications in extremely premature neonates from 22+0 to 27+0 weeks of gestational age during three time periods, 2001-2005, 2008-2012 and 2013-2017.

Methods: All neonates with gestational age 22+0-27+0 w. GA., born at our hospital during the above periods were included. Total No=288 babies. In electronic file we recorded: Survival or death, Gestational age, birth weight, clinical characteristics, neonatal complications such as intraventricular hemorrhage, intraventricular hemorrhage > III grade, periventricular leukomalacia, bronchopulmonary dysplasia, retinopathy of prematurity, laser photocoagulation, necrotizing enterocolitis, and data from the follow up clinic, as far as neurosensory outcome is concern, (blindness, hearing loss, diplegia, hemiplegia, quadriplegia) at 18 months corrected age. Statistical analysis: t-test, X2test, Fisher exact test, Logistic regression analysis.

Results: Survival rate was stable (47% vs 45.5% vs 40.9%). Survivors were significantly more mature, (25.4± 1.03 vs 24.2±1.3), p= < 0.001 and heavier (813.7± 131 vs 693.06± 278 ) p = < 0.001, in comparison with non survivors. Gestational age was (24.8± 1.34 ) consecutively smaller but not statistically significant between the three time periods. Birth weight (743.3±231gr) was significantly smaller in the third time period (p= 0.002). Table 1, Neonatal complications in all three time periods are stable as shown. In follow up an increasing rate (93.10%, (p= 0.003) ) of babies in the third period were followed. Neurosensory disability in the third period was blindness 0%, hearing loss 3.7%, diplegia 7.4% and total neurological disability 11.1% (p=0.035).

Conclusion: In our population survival rate was stable and the birth weight (743.3±231gr) of survivors was significantly smaller in the third time period (p= 0.002). Neonatal complications were not significantly reduced but the rate of NEC was very low in all time periods. Neurological disability in the 3d period was improved.

IMAGES: 
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=123be746c7b79982c4e7fddd2ef3a27-MjAxOS0wNSM1Y2UyNjY2YzA2YWFI

Short-term complications and neurosensory complications in all three time periods

COI: NONE DECLARED
**ID:** 235  
**TITLE:** ACCELEROMETRY ASSESSED PHYSICAL ACTIVITY AS A RESILIENCE FACTOR FOR MENTAL HEALTH AND WELLBEING IN PRETERM BORN EARLY ADOLESCENTS  
**AUTHORS:** Asteria Brylka 1; Dieter Wolke 1; Sebastian Ludyga 2; Anna Gkiouleka 1; Markus Gerber 2; Serge Brand 2,3,4; Natalie Ufer-Maurer 5; Alexander Grob 5; Peter Weber 6; & Sakari Lemola 1  
**AFFILIATIONS:** 1 Department of Psychology, University of Warwick, Coventry, United Kingdom  
2 Department of Sport, Exercise and Health, Sport Sciences Section, University of Basel, Basel, Switzerland  
3 Psychiatric Clinics, Center for Affective, Stress, and Sleep Disorders, University of Basel, Basel, Switzerland  
4 Sleep Disorders Research Center, Kermanshah University of Medical Sciences (KUMS), Kermanshah, Iran  
5 Department of Psychology, University of Basel, Basel, Switzerland  
6 University Children's Hospital Basel, Division of Neuropediatrics and Developmental Medicine, Basel, Switzerland  

**CONTENT:**

Preterm birth increases the risk of later mental health problems. The objective of the current study is to examine whether physical activity is a promotive factor that protects equally preterm and full-term adolescents from negative outcomes or whether it is a resilience factor that benefits especially those born preterm. In particular, we investigate the relationship between objectively assessed physical activity (measured with accelerometry) and self- and parent-reported emotional and behavioral problems and well-being.

Physical activity was measured with accelerometry for 7 consecutive days. Emotional and behavioral problems (emotional problems; hyperactivity/inattention; conduct problems; peer problems) were assessed with the Strengths and Difficulties Questionnaire, and wellbeing (physical wellbeing; psychological wellbeing; moods and emotions; self-perception; social support; school environment; social acceptance/peer bullying) was assessed with the Kidscreen-52 Questionnaire answered by the adolescents and both their parents. Hierarchical regression analyses were used to predict emotional and behavioral problems and wellbeing with physical activity, preterm status, and their interaction (physical activity × preterm status) controlling for sex, age, ethnic background, and parental education.

A sample of 109 adolescents between 11 and 15 years of age from the Basel Study of Preterm Children (BSPC) was studied including 44 children born at 32 weeks of gestation or earlier and 65 term-born controls (age M=12.3 years, SD=1.1). Physical activity was significantly associated with higher levels of child- and parent-reported overall wellbeing, pleasant moods and emotions, and more social acceptance/less bullying by peers among preterm adolescents. Furthermore, we found that higher levels of physical activity were associated with less parent-reported overall mental health problems, lower levels of hyperactivity and inattention, and higher levels psychological well-being and more positive self-perception among preterm adolescents. No significant relationship between physical activity and emotional and behavioral problems and wellbeing emerged for term-born adolescents.

The study shows that physical activity associates with positive mental health and wellbeing in preterm born adolescents suggesting that it may act as a resilience factor particularly for this group. A mediating mechanism could be related to improved self-image and better peer acceptance. Intervention research is needed to elucidate causality and to inform about the relevant mediating mechanisms.

**COI:** None declared
ID: 251  
TITLE: COGNITIVE TRAJECTORIES OF ADULTS BORN VERY PRETERM AND SMALL FOR GESTATIONAL AGE  
AUTHORS: Robert Eves 1; Marina Mendonça 1; Peter Bartmann 2; Dieter Wolke 1,3  
AFFILIATIONS: #1: Department of Psychology, University of Warwick, University Road, Coventry, CV4 7AL, United Kingdom  
          #2: Department of Neonatology, University Hospital Bonn, Bonn, Germany  
          #3: Division of Mental Health & Wellbeing, University of Warwick, University Road, Coventry, CV4 7AL, United Kingdom  

CONTENT:  
Very preterm or very low birthweight (<32 weeks gestation/ <1500g; VP/VLBW) infants have been found to be at sustained risk of cognitive deficits into adulthood. Additional risk factors, such as being born small for gestational age (SGA) are debated, partially due to differences in method of classification. VP/VLBW infants are less likely to be classified SGA when using neonatal rather than ultrasound-based references. In addition, social environmental factors such as socioeconomic status (SES) or the parent-infant relationship have largely been overlooked in the VP/VLBW literature. Thus, the aim of this study was to determine longitudinal effects of these early risk factors on cognition.  

217 VP/VLBW and 197 term born participants from the prospective Bavarian Longitudinal Study were assessed with developmental and IQ tests from 5 months to 26 years of age. At birth, participants were classified as SGA if they weighed below the 10th percentile for their gestation; determined either by a German neonatal birth database or an ultrasound-based reference. Linear mixed models were used to determine the cognitive trajectories of participants. Analyses were performed using both references for classifying SGA. Effects of VP/VLBW, SGA and social environmental factors were considered as fixed effects. Final models included interactions between VP/VLBW, SGA and time.  

Classifying SGA upon the neonatal and ultrasound reference resulted in 61 (28%) and 117(54%) VP/VLBW participants determined to be SGA respectively. In the linear mixed models, VP/VLBW participants performed poorer on cognitive tests than term born participants at all time points. In comparison to participants born at appropriate weight for gestational age, SGA participants classified by neonatal and ultrasound references were determined as having an average deficit of 7.37 and 8.45 IQ points respectively (both p<0.05). No interactions were found, indicating the persistence and main effects of VP/VLBW and SGA over time. High parental SES was associated with an increase of 14 IQ points as compared to low parental SES in both SGA models (p<0.001). A poor parent-infant relationship was associated with an IQ deficit of 10 points in both SGA models (p <0.001).  

Different references result in large disparities in the number of VP/VLBW participants classified as SGA. However, this does not appear to change the conclusions that SGA is a sustained risk factor on cognition. Importantly, more modifiable social environmental risk factors were found to have larger effects on cognitive function than SGA, with implications for interventions.  

COI: None declared
ID: 280

TITLE: VISUAL PERCEPTION, FINE MOTOR, AND VISUAL MOTOR SKILLS IN VERY PRETERM AND TERM BORN CHILDREN BEFORE SCHOOL ENTRY

AUTHORS: Anne-Kathrin Dathe 1
Julia Jaekel 2
Ursula Felderhoff-Mueser 3
Britta Huening 4

AFFILIATIONS: 1, 3, 4 Department of Pediatrics I, Neonatology, Intensive Care and Pediatric Neurology, University of Duisburg-Essen, Germany
2 Department of Child and Family Studies, University of Tennessee Knoxville, USA

CONTENT:

Survival rates of very preterm [VP] infants have increased over past decades. While prevalence of severe disabilities has decreased, VP children are still at risk of developmental delay in visual perception, fine motor, and visual-motor skills (Geldof, et al., 2016; Hitzert, et al., 2014; Thomas, et al., 2017). We hypothesized that VP children born after 2010 would show lower average performance and higher rates of developmental delay in visual perception, fine motor, and visual-motor skills than term born controls.

A sample of n = 60 very preterm children (<32 weeks gestation; mean [M] age 5.9 years, standard deviation [SD] = 0.3; 50% females) and n = 60 matched term-born control children (M age 5.9 years, SD = 0.3; 50% females) were examined with the Movement Assessment Battery for Children – 2 (M-ABC-2) and the Developmental Test of Visual Perception (DTVP-2). Multiple and logistic regressions were run to test differences between groups in performance and rates of clinically diagnosed developmental delay in visual motor skills, fine motor skills, and visual perception. Socioeconomic status (SES) and sex were added as covariates.

Very preterm children were less skilled in visual motor tasks (β = -0.461; p < .001), fine motor tasks (β = -0.435; p < .001), and visual perception Tasks (β = -0.249; p = .006) than term born controls. The risk for clinically diagnosed developmental delay (> - 1 SD) was higher among VP children in visual motor skills (OR = 13.4; 95% confidence interval [4.1 – 43.9]), fine motor skills (OR = 6.2 [2.4-16.0]) and visual perception (OR = 3.4 [1.1-10.6]) than in term born controls. The effects persist after adjusting for family SES and child sex.

These results confirm that infants born VP today are at significantly increased risk for subtle and clinically relevant developmental delays in visual perception, visual motor and fine motor skills. Even minor problems may have a negative influence on daily functioning and school readiness. Thus, VP children should be followed up at least until preschool age to identify potential problems early on. Studies are needed to evaluate interventions.

COI: None declared
ID: 301

**TITLE:** SOCIO-CULTURAL DETERMINANTS OF VALUATION OF LIFE WITH DISABILITY: A CROSS-CULTURAL COMPARISON

**AUTHORS:** Kathryn C. Nesbit 1; Elizabeth Spiegel 2; Ketly Altenor 3; Holly Martin 2; Hoa Thi Nguyen 4; Ly Tran 4; Angela Quiñonez Hermosa 5; Julia von Oettingen 6; Emily Treleaven 7; John Colin Partridge 2 for the Utilities Study Group.

**AFFILIATIONS:** 1 Graduate Program in Physical Therapy, University California San Francisco/San Francisco State University, San Francisco, CA, USA; 2 Department of Pediatrics, University of California San Francisco, San Francisco, CA, USA; 3 Kay Mackenson Clinic for Children with Chronic Diseases, Saint-Marc, Haiti; 4 Neonatology Department, Vietnam National Children’s Hospital, Ha Noi, Viet Nam; 5 Universidad Catolica Santa Maria, Arequipa, Peru; 6 Department of Pediatrics, McGill University, Montreal, QC, Canada; 7 Population Studies Center, University of Michigan, Ann Arbor, MI, USA.

**CONTENT:**

An estimated 93 million children worldwide live with significant disability. The majority live in under-resourced countries, and the burdens of lifelong disability are likely disproportionately worse where disabled persons are perceived as a burden on the family, receive little support services, fall victim to discrimination, or are in other ways stigmatized or marginalized. There are no data on what socio-cultural variables are associated with perceptions of lifelong disability. We assessed societal correlates of adults' valuation of lifelong disability in 3 developing countries (Vietnam, Peru, Haiti). We hypothesized that there would be culture-specific predictor correlates of utility scores.

We previously reported valuations of disability, quantified as utilities, for 4 disability outcomes (mild, moderate, severe, profound) in Haiti, Peru, and Vietnam using time trade-off methods. For this analysis of the same sample of 150 participants in each country, we gathered socio-cultural data including: age, gender, religion, educational attainment, disability in child/participant/household, mode of transportation to primary care, distance from primary care, family empowerment, instrumental support, emotional support, and wealth quintile. Variables were compared across countries using ANOVA, t-test and Chi-Square test with significance as p<0.05. Predictive models for utilities were examined using multiple linear regression analysis of utilities for each disability outcome by country.

Overall, the sample participants (n=450) were 33.6 (±11.6) yrs old, 38% male, 86% married, 75% parents, 16% disabled, 72% urban dwellers, 18% with < a secondary education, 47% in the lowest 3 wealth quintiles. Significant differences across countries were found in 27 of 31 socio-cultural variables (p<0.05). Significant associations were found between socio-cultural variables and utility scores (Table). Models with a good fit in Vietnam were identified for Moderate, Severe, and Profound disability outcomes; in Peru, models were identified for Mild, Moderate, Severe, and Profound disability outcomes; and in Haiti, they were found for Moderate disability outcomes (F(4,143) = 2.607, p=0.038; F(6,114) = 2.556, p=0.023; F(3,116) = 3.488, p=0.018; F(4,11) = 5.275, p=0.001; F(3,146) = 3.951, p=0.010; F(6,94) = 2.517, p=0.026; F(6,92) = 3.969, p=0.001; and F(4, 37) = 2.863, p=0.037; respectively).

Education, number of children, experience with disability, religion, access to care, wealth quintiles and perceived rejection are associated with valuations of quality of life with disability. Variations in the correlates of utilities within and across countries suggest that sociocultural context differentially shapes local valuations of life with disability. Data on local preferences for disability can be a metric for health policy decisions.

**IMAGES:**

https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=4bf1fb879a337419a160d526949329aa-MjAxOS0wNSM1Y2UyNjY2YzIoOTE4

Table. Sociocultural correlates of utilities for 4 disability outcomes significant at p<0.05.

**COI:** None declared
ID: 480

TITLE: EXECUTIVE FUNCTION TRAINING IN VERY PRETERM CHILDREN: A RANDOMIZED CONTROLLED TRIAL

AUTHORS: Carolien A. van Houdt, 1,2; Aleid G. van Wassenaer-Leemhuis, 1; Jaap Oosterlaan 3,4; Marsh Königs 2; Corine Koopman-Esseboom 5; A.R. Céleste Laarman 6; Anton H. van Kaam 1,6; Corneliene S.H. Aarnoudse-Moens 1,2,4,7

AFFILIATIONS: 1 Emma Children’s Hospital, Department of Neonatology, Amsterdam UMC, University of Amsterdam, Noord-Holland, The Netherlands
2 Emma Children’s Hospital, Emma Neuroscience Group, Amsterdam UMC, University of Amsterdam, Noord-Holland, The Netherlands
3 Department of Pediatrics, Emma Neuroscience Group at Emma Children's Hospital, Amsterdam Reproduction & Development, Amsterdam UMC, University of Amsterdam, Noord-Holland, The Netherlands
4 Clinical Neuropsychology Section, Vrije Universiteit Amsterdam, Noord-Holland, The Netherlands
5 Department of Neonatology, University Medical Center Utrecht, Utrecht, The Netherlands
6 Emma Children’s Hospital, Department of Neonatology, Amsterdam UMC, Vrije Universiteit Amsterdam, Noord-Holland, The Netherlands
7 Emma Children’s Hospital, Psychosocial Department, Amsterdam UMC, University of Amsterdam, Noord-Holland, The Netherlands

CONTENT:

Very preterm (VP) children show deficits in attentional, academic, behavioral and emotional functioning compared to term-born peers. Executive function (EF) problems are thought to underlie the deficits in these domains. Therefore, computerized EF training programs may improve these outcomes in VP children. Aim of the current study was to examine effects of a computerized, game-formatted EF training (BrainGame Brian) on attentional, executive, academic, behavioral and emotional functioning and self-perceived competence in VP children.

In our multi-center, double-blind, placebo and waitlist controlled randomized trial, VP children (< 30 weeks of gestation) aged 8 to 12 years with parent rated attention problems were eligible for inclusion. Children were randomized to EF training, placebo training or waitlist. EF and placebo training comprised of 25 sessions played in 6 weeks. Outcome measures were assessed at baseline, at the end of the training program and five months after finishing the training. Outcome measures were parent and teacher rated attentional, executive, behavioral and emotional functioning, neuropsychological tests of attentional, executive and academic functioning and self-perceived competence as rated by children themselves. Data were analyzed on intention-to-treat basis with linear mixed model analyses.

A total of 85 children were included in the trial, of which 29 were randomized to the EF training, 26 to the placebo training and 30 to the waitlist. Twelve infants withdrew from the study before the first follow-up assessment and another four before the second follow-up assessment. Thus, 69 children (81%) completed all assessments. Basic characteristics at the start of the study did not differ between the groups. For children in the EF training group, significant improvements were found across training sessions in the EF training tasks. Despite these improvements, we found no significant differences in improvement over time between the EF training, placebo training and waitlist for any of the outcome measures.

This study does not support the use of computerized EF training programs in VP children to improve attentional, executive, academic, behavioral or emotional functioning or self-perceived competence. Future studies should investigate whether more ecologically valid, real-world like EF training can be effective in very preterm children.

COI: None declared
ID: 522
TITLE: OUTCOMES OF A CONSISTENTLY ACTIVE APPROACH TO INFANTS BORN AT 22-24 WEEKS OF GESTATION
AUTHORS: Fanny Söderström 1; Erik Normann 2; Johan Ågren 3
AFFILIATIONS: 1-3 Department of Women's and Children's Health, Uppsala University, Uppsala, Sweden

CONTENT:

While survival rates of extremely preterm infants are improving, active perinatal management of the most immature infants remains controversial due to a perceived risk for poor outcomes. On the other hand, the attitude towards active treatment might in itself influence outcome. The objective of this study was to evaluate survival, short-term hospital outcomes, and long-term neurodevelopmental outcomes in infants born at a center where all mother-infant dyads are provided active perinatal care irrespective of gestational age at birth.

Single center, retrospective cohort study including all infants born at 22-24 weeks during 2006-2015. Data on survival and short-term outcomes (retinopathy of prematurity, ROP; necrotizing enterocolitis, NEC; patent ductus arteriosus, PDA; intraventricular hemorrhage, IVH; bronchopulmonary dysplasia, BPD), and neurodevelopmental outcomes (cerebral palsy, CP; visual and hearing impairment; psychomotor delay) at 2.5 years were collected through chart review. For psychomotor evaluation, a full clinical assessment was used when data from formal testing were unavailable.

A total of 222 infants born at 22-24 weeks were included. Overall survival was 143 (64%): 23/44 (52%) at 22 weeks, 56/87 (64%) at 23 weeks, and 64/91 (70%) at 24 weeks. Among hospital outcomes, ROP and BPD were more common at 22 than at 23 and 24 weeks. Follow-up data at 2.5 years were available in 133 infants of whom 45 (34%) had adverse outcome. Psychomotor delay was found in 27%, and was more common in infants born at 22 weeks. No infants were blind, and visual impairment was less common in 24 week infants. While 2 needed hearing aid, no children were deaf. Ten children were diagnosed with CP of whom 3 were non-ambulant.

A consistently active approach to all infants irrespective of gestational age leads to survival rates that are not distinctly different across the gestational ages of 22-24 weeks. More than half of the infants were unimpaired at 2.5 years, suggesting that active management and increased survival do not result in higher rates of long-term adverse neurological outcome.

IMAGES:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=88894ec61fe33b489df492a9b781f-MjAxOS0wNSM1Y2UyNjY2YzgwNmM5

Table 1. Survival, hospital outcomes, and long-term neurodevelopmental outcomes.

COI: None declared.
ID: 601
TITLE: LONG-TERM EFFECTS OF NEONATAL COMPLICATIONS ON BRAIN GROWTH AT 10 YEARS OF AGE IN CHILDREN BORN EXTREMELY PRETERM
AUTHORS: Hedvig Kvanta 1; Carmen Jimenez-Espinoxa 2; Nelly Padilla 3; Ulrika Ådén (4)
AFFILIATIONS: Dept of Women’s and Children’s Health, Karolinska Institutet, Stockholm, Sweden. Dept of Neonatology, Karolinska University Hospital, Stockholm, Sweden.

CONTENT:

Previous studies indicate that preterm children with surgery treated patent ductus arteriosus, IVH grade I-II and the lowest gestational ages have smaller brain volumes at term age (Lemmers 2016, Padilla 2015, Filian 2012). There is little known about the long term effect of these neonatal risk factors. The aim of this study was to investigate whether the volumetric differences seen at term age persisted when children were scanned with magnetic resonance imaging (MRI) at 8-11 years.

51 eligible extremely preterm (EPT) children born before week 27+0 in Stockholm between 2004 to 2007 successfully underwent MRI at age 8-11 (mean age 10.33). We excluded children with intraventricular haemorrhage (IVH) grade 3-4, periventricular leukomalacia at term age, severe white matter abnormalities and focal brain lesions. Scans were performed on a 3.0 Tesla General Electric system. T1-weighted images were pre-processed, automatically segmented into grey matter (GM), white matter (WM) and cerebrospinal fluid (CSF). We also calculated cerebral parenchyma (CPAR=GM+WM) and intracranial volume (ICV=WM+GM+CSF). Volumes in cm3 were calculated for each tissue class. Groups were compared with Student t tests and multivariate general models for normally distributed variables.

Brain volumes for WM, GM, CSF, CPAR and ICV for children with IVH grade 1-2 (n=16) and no IVH (n=35) were compared considering relevant covariates, there were no differences in brain volumetry, see table 1.

Brain volumes for WM, GM, CSF, CPAR and ICV between children with PDA ligation (n=16) and no PDA (n=15) were compared considering relevant covariates. We found significantly smaller brain volumes for ICV, WM and CSF for children with PDA ligation, when controlling for gestational age only the difference in CSF persisted, see table 1.

Brain volumes for WM, GM, CSF, CPAR and ICV between children born 26 (n=25) were compared, there were no significant differences between groups, see table 1.

Considered covariates for each group analysis were age at scan, weight at 12, length at 12, head circumference at 12, gestational age and sex.

EPT born with perinatal risk factors associated with smaller brain volumes at term age showed no significant brain volume loss on a global level difference at 8-11 years when correcting for relevant covariates. This indicates compensation for volumetric brain loss along childhood. This does not rule out the presence of differences in brain organization, which requires other methods to be demonstrated.

IMAGES:
https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=1c7997de53a7d8e0b2bea6c9ba1d483f-MjJaOSwNNSM1Y2UyNyY2ExOWJm

Table 1: Brain volumes for extremely preterm children with and without perinatal risk factors.

COI: None declared
ID: 602

**TITLE:** BRAIN GROWTH IN EXTREMELY PRETERM CHILDREN SCANNED AT TERM AGE AND AT LATE CHILDHOOD COMPARED WITH FULL TERM CONTROLS

**AUTHORS:** Hedvig Kvanta 1; Carmen Jimenez-Espinoza 2, Nelly Padilla 3; Ulrika Ådén 4

**AFFILIATIONS:**
1 Dept of Women’s and Children’s Health, Karolinska Institutet, Stockholm, Sweden.
2 Dept of Neonatology, Karolinska University Hospital, Stockholm, Sweden.

**CONTENT:**

Preterm born children have different brain growth patterns than full term born children. Extremely preterm children (EPT) have smaller grey matter brain volumes compared to full term controls at term age on a global and regional level (Padilla 2015). In very preterm born scanned at age 7 these volumetric losses persisted, the loss was most pronounced in the grey matter (Monson 2016). There is to our knowledge no study investing the global brain growth over time specifically in EPT children. We aimed to investigate whether the growth pattern in brain volumes is similar in EPT children compared with very preterm born over childhood.

51 EPT children born before week 27+0 in Stockholm between 2004 to 2007 underwent MRI at age 8-11 (mean age 10.33). 38 full term born were also included. We excluded children with intraventricular haemorrhage (IVH) grade 3-4, periventricular leukomalacia at term age, severe white matter abnormalities quantitatively defined and focal brain lesions. Scans were performed on a 3.0 Tesla General Electric system. T1-weighted images were pre-processed and then automatically segmented into grey matter (GM), white matter (WM) and cerebro-spinal fluid (CSF). We also calculated the volumes for cerebral parenchyma (WM+GM) and intracranial volume (WM+GM+CSF). Volumes in cm3 were calculated for each tissue class. We compared brain volumes of EPT children with full term controls.

Groups were compared using Student t tests and multivariate general models for normally distributed variables. Cohen’s effect size was calculated. 0.2 is considered a small effect size, 0.5 a medium effect size and 0.8 a large effect size. At term age brain volumes were smaller in EPT born than in controls and the difference was predominantly found in the GM (171 cm3 for EPT children and 177 cm3 for controls). At late childhood EPT children had significantly smaller brain volumes in the WM, CPAR and ICV. When adjusting for ICV we still found significant volume loss in WM. Cohen’s effect size was calculated at term age and at late childhood, see fig 1. The percentage growth from term age to late childhood for GM was equal in EPT children and controls (338 vs 337%) but percentage growth for WM was smaller in the EPT group compared to controls (203 vs 215%).

Our results suggest that brain growth over childhood is affected in extremely preterm children and that in late childhood, white matter substance is more affected than grey matter.

**IMAGES:**

https://www.eiseverywhere.com/eselectv3/v3/events/351149/submission/files/download?fileID=28c14e91b030e938761d7506c58cf26a-MjAxOS0wNSM1Y2UyNjY2Y2EyNTc1

Fig 1: Effect size calculations at term age and late childhood for loss of white and grey matter volumes in extremely preterm born vs full term controls. There is a medium effect size of volume loss in white matter at late childhood for children born extr

**COI:** None declared
ID: 616

TITLE: LONG TERM NEURODEVELOPMENTAL OUTCOME OF ACUTE SYMPTOMATIC PERINATAL STROKE IN NEONATES

AUTHORS: Eszter Vojcek 1,2; Marianne Berényi 3; Anna László 4; Krisztián Kállay 5; István Seri 1,6

AFFILIATIONS: 1 1st Department of Pediatrics, Semmelweis University, Budapest, Hungary
2 Szent János Hospital and North Buda Unified Hospitals, Budapest, Hungary
3 Neurodevelopmental Department of Saint Margaret Hospital, Budapest, Hungary
4 Department of Biometrics and Agricultural Informatics, Szent István University, Budapest, Hungary
5 Department of Pediatric Hematology and Stem Cell Transplantation, Central Hospital of Southern Pest – National Institute of Hematology and Infectious Diseases, Budapest, Hungary
6 Children's Hospital Los Angeles, University of Southern California, Los Angeles, California, United States

CONTENT:

With an estimated incidence of 1/1600-3000 live births, perinatal stroke is the leading cause of hemiparetic cerebral palsy in childhood and thus contributes to lifelong disabilities. A better understanding of the relationship between the risk factors and outcome is therefore a major interest. Accordingly, our goal was to analyze patient characteristics of different clinical subgroups of term and late-preterm neonates diagnosed with perinatal stroke at Level III Neonatal Intensive Care Units in Budapest, Hungary.

We conducted a retrospective analysis enrolling 225 term (37-41 weeks of gestation) and late preterm (31-36 weeks of gestation) neonates with the diagnosis of perinatal stroke confirmed by MRI between 2007-2017. The Bayley Scales of Infant Development-II, the Brunet-Lézine test and the Binet Intelligence scales-V were used for follow-up at a mean age of 60 months (range 18-138 months, unless died earlier). Follow-up was available in 174 infants. Logistic regression models and Fisher exact tests were applied to test the associations between the outcome and a set of explanatory variables (late-preterm neonates, in utero stroke, cerebral sinovenous thrombosis (CSVT), congenital heart disease (CHD), mild-to-moderate asphyxia and infection).

Mean (±SD) Apgar scores at 1 and 5 minutes were 7.2±2.6 and 8.5±2.1, respectively. There was a male predominance (60%). Genetic or acquired thrombophilia was detected in 27 (38%) out of 71 screened neonates. Normal neurodevelopmental outcome was recorded in 39% of the infants. CSVT was a dependent predictor of death (odds ratio (OR) [95% confidence interval (CI)] = 18.2 [3.2,104.3]; p=0.001). Asphyxia (OR [95%CI] = 41.5 [3.0;567.2]; p=0.005) and infection (OR [95%CI] 12.3 [1.1;134.2] p=0.040) were significantly related to hearing impairment. In utero stroke was associated with the need for ventriculoperitoneal shunt placement (p=0.027), while infection was related to cognitive deficit (p=0.01). CHD had a significant association with death (p<0.001) and behavioral deficit (p=0.031). Finally, late-preterm neonates developed hemorrhagic stroke more frequently (86% vs. overall 54%; p<0.001).

Perinatal stroke adversely affects neurodevelopmental outcome in the majority of cases. Our findings suggest that a better understanding of the relationship among the risk factors, findings of imaging studies and long-term neurodevelopmental outcome may improve the potential for prevention, accuracy of diagnosis and the timely initiation of treatment and rehabilitation of neonates with perinatal stroke.

COI: None declared.
ID: 853
TITLE: NEURODEVELOPMENTAL OUTCOMES IN EXTREMELY LOW BIRTH WEIGHT (<500GRAMS) PRETERM INFANTS
AUTHORS: Gayatria Athalye-Jape 1; Mei’En Lim 2; Mary Sharp 3
AFFILIATIONS: 1 Neonatal Follow-up Program, King Edward Memorial Hospital, Perth, Western Australia, Australia
2 Centre for Neonatal Research and Education, School of Paediatrics and Child Health, University of Western Australia, Perth, Western Australia, Australia

CONTENT:

Survival of extremely preterm infants has significantly improved with advances in contemporary neonatal care; however, survival and outcomes of infants born with birth weight <500 grams remain poor. We aimed to review short and long term outcomes in preterm infants born with a birth weight of <500 grams. This retrospective study from Western Australia’s sole tertiary perinatal centre included all preterm infants born at 22 weeks gestation or more and weighing 500g or less between January 2001-December 2017 and admitted to the NICU at King Edward Memorial Hospital, Perth, Western Australia (WA).

Short term outcomes such as prematurity related complications (NEC, ROP, IVH, PVL, sepsis, epilepsy), mortality and long term follow up data (up to 5 years of age) were reviewed. Cognitive levels 2-3 or >3 Standard Deviations (SDs) were assigned moderate or severe disability. The most recent assessment was used for cognitive outcomes (Griffiths Scales of Child Development, Bayley Scales of Infant and Toddler Development, Wechsler Preschool and Primary Scale of Intelligence). Cerebral palsy (CP) assessed by Gross Motor Function Classification System (GMFCS) level greater than 2 was included in moderate to severe disability. Hearing loss requiring amplification bilaterally was assigned moderate disability and vision worse than 6/60 in best eye severe disability.

There were 92 admissions to neonatal intensive care and of these, 78/92 (84.7%) were small for gestational age. Survivors (46/92, 50%) to age five had median gestation of 24 weeks (22-30) and median birth weight of 427.5 (380-500) grams. Prematurity related complications were common, with only one infant who survived without any medical complications. Follow-up was available from 41 of 46 (89%) infants. At a median age of 5.06 years, standardized cognitive assessments showed that (29/41) 70% scored <1SD below the mean; 12/41 (29%) scored 1-2SD below mean, 9/41 (22%) scored 2-3SD, and 8/41 (20%) scored 2. One had moderate hearing loss requiring hearing aids in both ears and none were blind. Most remained with weight (32/41 infants, 78%) and height (27/41 infants, 66%) <2 SD below normal.

Half of infants with a birthweight under 500g admitted to NICU survived. Almost all survivors had medical complications in the NICU. However, 54% were free from moderate to severe disability as defined at up to 5 years. Growth remains a concern and needs further monitoring.

COI: None declared.