106

NEONATAL MAGNETIC RESONANCE IMAGING IN EXTREMELY LOW GESTATIONAL AGE INFANTS AND OUTCOME AT 30 MONTHS

B. Skiöld¹, B. Vollmer¹, B. Böhm¹, B. Hallberg², S. Horsch^{2,3}, M. Mosskin⁴, H. Lagercrantz¹, U. Ådén¹, M. Blennow¹

¹Dept of Women's and Children's Health, Karolinska Institutet, ²Inst CLINTEC, Karolinska Institute, Stockholm, Sweden, ³Dept of Neonatology, Erasmus MC/ Sophia Children's Hospital, Rotterdam, The Netherlands, ⁴Dept of Neuroradiology, Karolinska University Hospital, Stockholm, Sweden

Aim: To examine associations of structural brain abnormalities, in particular diffuse excessive high signal intensities (DEHSI), assessed by visual inspection of neonatal magnetic resonance images (MRI) with neurodevelopmental outcome at age 30 months corrected in a 3 year cohort of extremely low gestational age (ELGA) infants.

Methods: 109 infants born < 27 weeks of gestation underwent conventional MRI at term-equivalent age. Images were analysed using an established scoring system (Inder et al 2003). At age 30 months corrected the infants were assessed using the Bayley Scales of Infant and Toddler Development.

Results: No or mild white matter abnormalities (WMA) were seen in 86% of infants. In 14% moderate or severe WMA, and in 5% grey matter abnormalities (GMA) were detected. DEHSI were seen in 56%. Outcome data were available for 72% of the cohort. Mean composite scores were 95 (SD±10) for cognitive scales, 97 (SD±14) for language scales, and 103 (SD±14) for motor scales. Six percent of the infants had cerebral palsy. Significant associations were seen between moderate-severe WMA and/or GMA and cognitive scores (Mann-Whitney U-test, $p < 0.05$) as well as language scores ($p < 0.05$). No significant associations were seen between MRI findings and motor scores. DEHSI were not associated with performance on the Bayley Scales.

Conclusion: In our cohort of ELGA infants, moderate-severe brain abnormalities on neonatal MRI were associated with impaired cognitive and language outcome at age 30 months corrected. The incidence of DEHSI was high, but the presence of DEHSI was not associated with adverse outcome.

107

COMPUTERIZED COGNITIVE TRAINING IMPROVES WORKING MEMORY AND LEARNING IN EXTREMELY LOW BIRTH WEIGHT (ELBW) ADOLESCENTS

G.C. Løhaugen^{1,2}, I. Antonsen³, A. Gramstad⁴, T. Vik², A. Håberg^{3,5,6}, A.-M. Brubakk^{2,7}, J. Skranes^{1,2}

¹Dept of Pediatrics, Sørlandet Hospital, Arendal, ²Dept of Lab Medicine, Children's and Women's Health, ³Dept of Circulation and Medical Imaging, Norwegian University of Science and Technology, Trondheim, ⁴Dept of Psychology, University of Bergen, Bergen, ⁵Dept of Neuroscience, Norwegian University of Science and Technology, ⁶Dept of Diagnostic Imaging, MR Center, ⁷Dept of Pediatrics, St Olav's University Hospital, Trondheim, Norway

Background and aims: Being born preterm with ELBW (birth weight < 1000g) constitutes an increased risk of learning disabilities and psychiatric symptoms, including attention deficit and working memory (WM) problems. WM is our ability to hold visual and/or verbal information online while manipulating it (i.e. doing mental arithmetic). Aim of study was to evaluate the effect of daily use of a computerized WM training program (Cogmed RM) in ELBW adolescents compared to controls. We assessed verbal and visual aspects of WM as well as generalizing effects on learning.

Methods: Sixteen ELBW and 19 controls age 14-15 participated in a study from St.Olav's University Hospital in Trondelag, Norway. The control group consisted of term born children with normal birth weight. An extensive neuropsychological assessment was performed prior to, immediately after training, and at 6 months follow up. Participants used the Cogmed RM computer program at home for 30 minutes a day, 5 days a week in 5 weeks.

Results: Before training the ELBW subjects obtained lower IQ scores and lower scores on visual WM, as well on delayed memory for a verbal story. Both groups significantly improved their WM results on visual and verbal WM tasks, and obtained better results on non-trained tasks measuring learning ability for verbal material. After training there were no significant differences between groups on any outcome measurements. Six months follow up showed sustained effects of training.