Abstract O-055 Table 1 Results of receiver operating characteristics analysis to estimate out come with FA in WM and MD in thalami and cortex. SE–standard error, CI–confidence intervals

	AUC	SE	Significance	95% CI
White matter FA	0.859	0.057	0.000	0.747-0.970
Thalami MD	0.775	0.077	0.003	0.625-0.926
Cortex MD	0.803	0.069	0.001	0.667-0.939

have an unfavourable outcome. Cortical, thalamic and WM tissue labels were generated by neonatal atlas-based automated segmentation of the T2-weighted images [1]. Tissue labels were propagated onto the diffusion maps. FA and MD values were determined. Linear regression was performed to assess the correlation between FA/MD and DQ. Estimation of unfavourable outcome with FA/MD in WM and GM was examined using receiver operating characteristic (ROC) analysis.

Results Following correction for multiple comparisons and age at scan significant correlation was found between DQ and FA in WM ($p = 0.0002$), and MD in thalami ($p = 0.0002$) and cortex ($p = 0.005$). ROC analysis to estimate unfavourable outcome showed larger area under the curve (AUC) for FA in WM, than MD in GM (Figure and Table).

Conclusion These data show that FA in WM and MD in GM may be used as biomarkers of outcome following HIE.

REFERENCES

1 Makropoulos *et al*. 2013

O-056 DOCOSAHEXANOIC ACID (DHA) GIVEN AFTER NEONATAL HYPOXIA-ISCHEMIA ATTENUATES LIPID PEROXIDATION AND BRAIN DAMAGE IN BOTH CORTICAL- AND WHITE MATTER TISSUES

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Background and aims Docosahexanoic acid (DHA) is a major component of membrane phospholipids and critical for fetal neuro-development. It accumulates during late pregnancy and may protect against oxidative damage to biomembranes. Isoprostanes, neuroprostanes, and neurofurans have all become attractive biomarkers of oxidative damage and lipid peroxidation in brain tissues. Lately also F_2-dihomo-isoprostanes have emerged as an *in vivo* biomarker of free radical damage to myelin in white matter.

Methods Global hypoxia was induced in newborn piglets (age 12–36 h) until Base Excess -20 mmol/L or mean arterial blood pressure <20 mmHg. One group (n = 11) was resuscitated with ambient air and another (n = 10) received in addition DHA 5 mg/kg 4 h after start of resuscitation. The piglets were followed for 9½ h after end of hypoxia.

Results Treatment with 5 mg/kg DHA 4 h after severe hypoxia significantly attenuated lipid peroxidation in tissues from cortex and hippocampus. There were less Isoprostanes in cortex and hippocampus in compared with reoxygenation with air (21%) alone, $p = 0.041$ in cortex and $p = 0.006$ in hippocampus. Neuroprostanes were lower in cortex in the DHA treated group, $p = 0.047$. F_2-dihomo-Isoprostane, an indicator of white matter damage, was significantly lower in tissue from hippocampus in the DHA treated group, $p = 0.035$.

Conclusions Treatment with DHA after severe neonatal hypoxia attenuates lipid peroxidation and brain damage in both grey- and white matter tissues. These novel findings add new knowledge on oxidative injury and points at a possible therapeutic intervention after perinatal asphyxia or severe hypoxia in both term and preterm babies.

Neonatal Brain and Development, Intervention and Outcome

O-057 MELATONIN AS A NOVEL NEUROPROTECTANT IN PRETERM INFANTS – A DOUBLE BLINDED RANDOMISED CONTROLLED TRIAL (MINT STUDY)

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Background Experimental studies suggest that melatonin is neuroprotective. Preterm infants are deprived of thenormal intrauterine exposure to maternal melatonin and may benefit from supplementation to adult physiological levels.

Aim To prove that melatonin supplementation to adult concentrations decreases prematurity associated white matter injury assessed by tract based spatial statistics at term equivalent age.

Methods The study was a phase 2 exploratory; multi-centre double-blinded randomised placebo-controlled 2-arm trial, evaluating the neuroprotective effect of melatonin in preterm infants less than 31 weeks gestation. The 2 study drugs, melatonin (active) and normal saline (placebo) were given as an intravenous infusion once a day for 7 days starting by 48 h after birth. The dose of melatonin (0.1 mcg/kg/hr for 2 h) was derived from our previous pharmacokinetic study. Analysis was by intention to treat. Magnetic resonance imaging (MRI) was done at term corrected age. A 5% difference in the fractional anisotropy (FA) on MRI was taken as the primary endpoint.

Results Fifty-eight preterm infants participated in the study; 30 received melatonin and 28 received saline. Four babies died in each group. The 2 groups did not show any differences inthe demographic data or in the short term adverse events. Seventeen infants from the melatonin group and 19 from the placebo group had MR images which were analysed. There was no difference in the FA in the 2 groups.

Conclusions Melatonin supplementation to adult physiological levels during the first week after birth did not alter FA in the preterm white matter at term equivalent age.

O-058 BRAIN MORPHOMETRY IN YOUNG ADULTS BORN SMALL-FOR-GESTATIONAL-AGE AT TERM

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