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DOES SILDENAFIL PROTECTS THE DEVELOPING BRAIN FROM HYPOXIA-INDUCED CELL DEATH?

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Sildenafil is a selective inhibitor of phosphodiesterase 5 resulting in arterial vasodilation. Previous studies showed that oral sildenafil may act as a potential therapy in infants with severe PPHN. However, very little is known on the adverse effects of sildenafil, specifically on the CNS. Its administration enhances functional recovery and increases neurogenesis and vasculogenesis in the adult rat after stroke. The effects of sildenafil on the developing brain remain unknown.

Aim: To determine the effect of sildenafil on apoptotic cell death after hypoxic injury in a rat pup model.

Methods: At P10, sixteen male Wistar rat pups were randomized to receive Sildenafil 5 mg/kg/day or water three hours before being subjected to hypoxemic conditions. All animals were subjected to FiO2 of 10.4% for 10 minutes. On P25 animals were euthanized, brains removed, fixed, and embedded in paraffin. Immunofluorescence TUNEL staining using an apoptosis detection kit with dual labelling was performed. Results were expressed as mean ±SD.

Results: All animals survived the experimental conditions. There was no significant difference in the number of double-labelled cells between the control and the sildenafil-treated group (93 ±21 cells vs. 114 ±17 cells, respectively)

Conclusions: In our animal model of hypoxemic injury of the developing brain, sildenafil does not seem to have a significant effect on apoptotic cell death, detected by TUNEL staining technique. Evaluation of apoptosis at different times after the experimental treatment are needed to further deterrmine the effect of sildenafil on hypoxia-induced neural cell death.

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NATIONAL UK SURVEY OF NEONATAL CEREBRAL FUNCTION MONITORING AND COOLING FACILITIES

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Background & aims: Many reports show the benefits of routine cerebral function monitoring (CFM) in neonatal encephalopathy, and mounting recent data support the use of hypothermia therapy for perinatal asphyxia. Information is lacking regarding the current UK availability of equipment for neonatal brain monitoring and active hypothermia therapy. We aimed to survey current facilities available for brain monitoring and hypothermia therapy in UK neonatal units.

Methods: Telephone survey of all 214 UK neonatal units in July - November 2009.

Results: Responses were obtained from 214/214 (100%) of units. Results are summarised by country (Table 1)

	England	Scotland	Wales	N.Ireland
Available CFM	41% (73/179)	47% (7/15)	30% (4/13)	57% (4/7)
Cooling Equipment	27% (48/179)	40% (6/15)	23% (3/13)	42% (3/7)

*[Table 1: National availability of CFM and cooling]*and designation level of neonatal units (Table 2)

	Level 1	Level 2	Level 3
Available CFM	13% (8/62)	33% (32/97)	87% (48/55)
Cooling equipment	3% (2/62)	15% (15/97)	78% (43/55)

[Table 2: Comparison across levels of neonatal unit]

In total 88/214 (41%) UK units have CFM available and 60/214(28%) have dedicated cooling equipment. Of tertiary neonatal intensive care units, 7/55(13 %) presently do not have available CFM equipment, and 12/55 (22%) are not able to offer active hypothermia therapy.

Conclusion: Despite compelling evidence of the worth of cotside continuous electrical brain

monitoring and hypothermia therapy in asphyxiated neonates, most level 2 units do not currently offer CFM, and a significant minority of tertiary level UK neonatal units do not currently offer brain monitoring or hypothermia therapy.

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CORRELATION BETWEEN AMPLITUDE-INTEGRATED EEG (AEEG) AND GENERAL MOVEMENTS (GMS) IN PRETERM INFANTS

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Since today the correlation between background cerebral electrical activity at aEEG and brain injury in preterm is unknown. The aim of the present study is to correlate the background activity at aEEG to the patterns of General Movements at writhing age and to avaluate if aEEG is predictive for cerebral palsy.

Methods: 17 preterms between 27 and 31 weeks of gestational age with normal head ultrasound were included. The aEEG were recorded during the first 24 hours of life for 60 minutes. The averaged signals were analysed off-line. Background activity was classified into three patterns categories: discontinous low-voltage pattern (minimal amplitude < 3μV), discontinous high voltage pattern (minimal amplitude between 3 and 5 μV) and continous pattern. General movements were performed during the first 24 hours of life and weekly during writhing age.

Results: A background low-voltage pattern correlates positively with Cramped Synchronized General Movements (R: 0.74, p = 0.004), on the other way a high voltage pattern and a continous pattern correlates with normal General Movements (R: 0.67, p=0.006).

Conclusions: A discontinous low voltage pattern at aEEG in preterm could be expression of cerebral injury and/or altered maturation. In fact this aEEG pattern highly correlates with pathological Cramped Synchronized General Movements leading to the hypotesis of a similar strong correlation between discontinous low voltage pattern and cerebral palsy in this range of gestational age.

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NEUROSONOGRAPHY AND HEMOSTASIS DATA IN PREMATURE NEWBORNS WITH HYPOXIC-ISCHEMIC ENCEPHALOPATHY

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Aim: Hypoxic - ischemic damages of the brain in preterm newborns is the significant current problem of neonatology.

Materials and methods: 140 newborns of 28-36 weeks gestation with 820-2650 gr. have been investigated. The 1st group included children with intra - and - periventricular I, II, III degree bleedings. The 2nd group included patients with I, II, III degree hypoxic - ischemic damages of CNS. The 3rd group included so called *healphy* children without clinical and ultrasound signs of brain damage. Para-clinical methods included haemostasis condition on 1st, 3rd, 5th, 7th days of life. Being correlated to disturbances of hemo-liguorodynamic data and ventriculometry.

Results: On the 3rd day of life 5,1% decrease of fibrinogen count in blood serum have been noted. Increase of thrombocites (10.4%) and simultaneous decrease of APTT (7.3%) in 1st group children in comparison to control group have been revealed. In the 2nd group the spread and duration of celebral ischemia were accompanied with fibrinogen increase (7.1%), thrombocytes (9.2 %) and APTT - 13.7% in comparison to control group have been noted.

Conclusion: Complex study of haemostasis system and neurosonography data were associated with different clinical manifistations. Peri - and - intraventricular bleedings were accompanied with thrombocytes count decrease and plasma - coagulation increase. Hypoxic - ischemic brain damages were accompanied with thrombocytes count increase and plasma - coagulation haemostasis decrease. So the combination of neurosonography and haemostasis investigation on 1st - 7th days of life are effective and significant in diagnostics of celebral pathology in preterm newborns.