# Cooling treatments can reduce brain damage caused by birth asphyxia

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Professor Marianne Thoresen

(PhysOrg.com) -- Brain damage caused by lack of oxygen at birth could be avoided for over 100 babies a year in the UK if infants are given cooling treatment within the first six hours of life, according to the largest study of its kind by scientists from the University of Bristol and colleagues from across the UK.

Birth asphyxia occurs when a baby's brain and other vital organs are starved of oxygen or blood at or around the time of birth. In the UK approximately 1,400 infants a year, two in every thousand full-term births, are affected. Asphyxia can be difficult to detect before a baby is born and can cause serious brain damage, severe cerebral palsy and even death in around half of the most affected cases.

The Total Body Hypothermia for Neonatal Encephalopathy Trial (TOBY) involved 325 infants affected by birth asphyxia, many of whom were recruited from the neonatal intensive care units at St Michael's and Southmead Hospitals in Bristol.

To be eligible, each baby had to show poor condition at birth, abnormal neurological signs and abnormal electroencephalogram (EEG). Half the newborn babies had their body temperature reduced to 33.5°C (total body hypothermia) for 72 hours followed by gradual re-warming in intensive care. The other half remained at normal temperature: 37°C.

At the age of 18 months, 71 out of 163 (44 per cent) of cooled infants survived without any neurological abnormality as against 45 out of 162 (28 per cent) in the non-cooled group. Scores for mental development and motor development at 18 months were also significantly better in the cooled children.

The research, funded by the Medical Research Council (MRC), builds on work begun by Professor Marianne Thoresen in Norway in 1992. She was the first investigator to show in the laboratory that mild cooling reduces injury in the newborn brain after hypoxia. Now Professor of Neonatal Neuroscience at the University of Bristol, she and Andrew Whitelaw, Professor of Neonatal Medicine at the University of Bristol, moved from Oslo to Bristol and started clinical trials cooling babies in 1998.

Professor Thoresen said: "The initial trials using selective cooling of the head reported evidence of brain protection. However, cooling the whole body to 33 degrees is a much simpler technique than head cooling and that led to the MRC providing almost £1million in funding for the TOBY trial which is published today in the *New England Journal of Medicine*."

The TOBY trial was coordinated from Imperial College, London and Oxford University with Professor Thoresen at St Michael's Hospital (University Hospitals Bristol NHS Trust) and Professor Whitelaw at Southmead Hospital (North Bristol NHS Trust) as principal investigators. The research also involved colleagues from Leeds University and Belfast University. Forty-two hospitals in the UK, Hungary, Sweden, Israel and Finland took part.

Professor Thoresen continued: “Taken together with the evidence from the two previous smaller trials, we now have consistent evidence of the effectiveness and safety of cooling full-term infants after hypoxia.

“Cooling to hypothermia was introduced as standard of care in the two Bristol neonatal intensive care units in December 2006 and there is now a fast and efficient service to transfer babies from Swindon, Gloucester, Cheltenham, Taunton, Yeovil and Bath to Bristol with cooling during transport. Cooling is arguably the most important advance in neonatal intensive care in the last decade.”

The TOBY trial findings have been passed to the National Institute of Clinical Excellence (NICE) to consider for implementation across hospitals.

Professor Thoresen, supported by the research charity SPARKS, is now planning to research the effect of treating affected newborns with the inhaled gas xenon as well as hypothermia to see if that will give added brain protection.

Hypothermia is not a treatment that is suggested for premature babies as they differ in many important ways from sick babies born at term.

Provided by University of Bristol (news : web)