The SafeBoosC RCT Using Cerebral Oximetry to Reduce Brain Injury

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Dr. Gorm Greisen is a Clinical Professor of Pediatrics at the Institute for Klinisk Medicine and consultant neonatologist at the Department of Neonatology at the Juliane Marie Centre, Rigshospitalet. Dr. Greisen’s program of research focuses on the causes of brain injury in preterm infants, cerebral blood flow and cerebral oxygenation as well as neurodevelopmental outcomes in preterm infants for thirty years. Recent publications have focused on the impact of vasopressors on cerebral oxygenation in the piglet model. He is currently engaged in an A phase II randomized clinical trial on cerebral near-infrared spectroscopy plus a treatment guideline versus treatment as usual, for extremely preterm infants during the first three days of life (SafeBoosC).

Annual Quality Congress Plenary Session, Saturday, October 3, 2015
The SafeBoosC RCT Using Cerebral Oximetry to Reduce Brain Injury

Objective: Discuss the rationale of the SafeBoosC phase-II trial and the perspectives of its results.
Stabilizing Cerebral Oxygenation - The SafeBoosC Trial

Disclosures

I have
- no financial interest in any medical equipment
- a long-standing research interest in near-infrared spectroscopy and cerebral circulation and oxygenation in the preterm newborn infant
- coordinated of the SafeBoosC trial that was fully financed by the Danish Strategic Research Council

Near infrared tissue oximetry:

- Repeatability (precision) = 5.2%
  (Sorensen J Biomed Opt 2006)

Cerebral oxygenation in term infants after CS from min 3 to 10 min

- but SRS oximeters are CE-marked and marketed
Pulseoximeters are not fantastic either - but still useful

… we do not want to disturb unless necessary

Examine the clinical benefits and harms of cerebral oximetry

The SafeBoosC consortium (www.safeboosc.eu)
(Copenhagen, Utrecht, Madrid, Zurich, Leuven, Lyon, Milan, Cork, Cambridge, Tubingen, Graz, Groningen)

The safe level of cerebral oxygenation in the newborn? (piglet)

The burden of hypo- (and hyperoxia): Depends on time and degree

The accumulated burden in infants < 28 weeks from 0-72 hours of life

Physiology-based interventions to stabilise cerebral oxygenation

When cerebral $S_tO_2$ is low, please consider:
- Increase $pCO_2$
- Vasopressor
- Inotrope
- Erythrocyte transfusion
- Adjust airway pressure
- Increase $FiO_2$
- Close a D& P

When cerebral $S_tO_2$ is high, please consider:
- Decrease $FiO_2$
- Decrease $pCO_2$
- Treat low blood glucose

Modified from Lemmers 2010 (thesis)

Kurth JCBFM 2002
Stabilizing Cerebral Oxygenation - The SafeBoosC Trial
Gorm Greisen DrMedSci

The phase-II randomised controlled trial
- cerebral oximetry (visible screen)
  + treatment guideline
  + standard care
vs
- cerebral oximetry (black screen)
  + standard care

In extremely preterm infants during the first 72 hours of life
Primary outcome: accumulated burden of hypo- and hyperoxia
Infants enrolled from June 2012 to Dec 2013
Clinical trial number: NCT01590316

Primary outcome: accumulated burden of hypo- and hyperoxia

Infants enrolled in:
- Lyon
- Madrid
- Copenhagen
- Cork
- Utrecht
- Milan
- Cambridge

(Nyten-Sørensen et al Trials 2013)

<table>
<thead>
<tr>
<th>Exp</th>
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<tbody>
<tr>
<td>Summary</td>
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<tr>
<td>All cause mortality at 36 weeks</td>
<td>129/114</td>
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<tr>
<td>Neonatal mortality</td>
<td>21/65</td>
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<tr>
<td>P &lt; 0.0001</td>
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<td>6-month mortality</td>
<td>60/83</td>
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<tr>
<td>6-month mortality</td>
<td>12/61</td>
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'Bright areas': 4 vs 12 (p=0.03)

(SafeBoosC-II)

Biomarkers of early brain injury

SafeBoosC-III with a clinically relevant outcome
38% death or severe brain injury
Reduction to 30%
N = 800 + 800
applying for EU-funding
92 NICUs in 17 countries
using CE-marked, calibrated oximeters
25,000 extremely preterm births annually in Europe
2000 more survivors without severe brain injury

October 3, 2015
Requirements for hospital participation

- 10 pts / 2 y
- cUS for central reading
- On-line, real-time recording of vital signs
- Equipoise (until end of recruitment)

... the end