**Supplementary File 1**

*Patient characteristics*

Maternal and neonatal data included gestational age (full weeks of gestation), BW (grams), small for gestational age, sex, multiple birth, mode of delivery, Apgar Score, antenatal steroid use, need for postnatal surfactant treatment, duration of ventilation (hours), need for supplemental oxygen at day 28 and 36 weeks postmenstrual age, postnatal steroid use, timing of rupture of membranes, diagnosis of early- and late-onset sepsis, patent ductus arteriosus, surgical ligation of a patent ductus arteriosus, catecholamine treatment, retinopathy of prematurity, necrotizing enterocolitis and duration of parenteral nutrition. Cranial ultrasound was performed regularly during the initial hospital stay and the diagnosis of intraventricular haemorrhage, cystic periventricular leukomalacia and cerebellar haemorrhage were recorded for all infants.

NEC was defined according to Bell’s criteria [[1](#_ENREF_1)] and was classified as medical (clinical symptoms and signs plus evidence of pneumatosis on abdominal x ray) or surgical (histological evidence of NEC on surgical specimens of intestine). ICH was classified according to the method of Papile et al. [[2](#_ENREF_2)]. A diagnosis of early-onset (<72 hours after birth) or late-onset (>72 hours) sepsis required signs of generalized infection, a positive blood culture and antibiotic therapy for five or more days [[3](#_ENREF_3)]. Infants were discharged home when they demonstrated cardiorespiratory stability and when feeding patterns were established (without need for gavage feeding). Length of stay and age at discharge were recorded for all survivors.

In the case of surfactant administration immediately after birth infants received either no analgesia or single doses of ketamine (1-2mg/kg) or fentanyl (1-3µg/kg) +/- lorazepam (0.05-0.1 mg/kg) or midazolam (0.05-0.1 mg/kg). For infants receiving analgesia beyond the first six postnatal hours cumulative doses of morphine (mg/kg), ketamine (mg/kg) and fentanyl (µg/kg) were calculated by adding all doses (adjusted for daily weight) from birth to discharge.

Growth charts developed by Fenton et al. were used to classify infants as small for gestational age defined as a birth weight below the 10th centile for sex and gestational age [[4](#_ENREF_4)].

*Magnetic resonance imaging procedure and imaging details*

All MRI scans were performed at the local Department of Neuroradiology with a 3.0 T Siemens Magnetom Verio (Siemens, Erlangen, Germany) as described previously [[5](#_ENREF_5)].

As a correlation between brain volume and linear measurements was previously shown, we used a two-dimensional metric for cerebellar size in this study, since this method is much easier to apply than volumetric measurements and would be routinely useable for all infants with MRI scan at TEA [[6](#_ENREF_6)]. We do not routinely acquire T2 images in the coronar plane, but only in the axial plane. To validate the comparability of our measures on coronal T1 with Kidokoro’s measures on coronal T2 we compared the TCD measured in T1 and T2 on axial images which with have acquired in both sequences (for 20 infants). We found that there was no significant difference between TCD measured on T1 axial images and T2 axial images (54.4 ±2.0 vs. 54.1 ±2.1, p 0.565). The intraclass correlation coefficient was 0.977. Based on these results we decided that the use of the cut-off values published by Kidokoro et al for coronal images are useable for our study [[7](#_ENREF_7)].

*Outcome measures*

Neurodevelopmental outcome at a corrected age of two years was quantified using the Bayley Scales of Infant Development , second edition (Bayley-II) for infants born between June 2010 and December 2013, and Bayley Scales of Infant and Toddler Development, third edition (Bayley-III) for infants born from January 2014 [[8](#_ENREF_8),[9](#_ENREF_9)]. For Bayley-III German norms were used [[10](#_ENREF_10)]. In contrast do US norms for Bayley-III, which are known to underestimate developmental delay, it has been shown that very preterm infants achieved significantly lower scores when using German as compared to the US norms [[11](#_ENREF_11),[12](#_ENREF_12)]. In Bayley-II assessment, psychomotor (PDI) and mental (MDI) developmental indices were obtained. In Bayley-III assessment the mental score is divided into cognitive and language scales. For this study the mean between cognitive and language composite score was taken and equated with the former MDI as described before [[13](#_ENREF_13)]. Abnormal psychomotor and mental development were defined as PDI and MDI <85.

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