aEEG and Prediction of Outcome in HIE
• 171 babies with HIE were studied
• Median time intervals from birth to onset of SWC were significantly different in babies with mild, moderate or severe HIE
• Good neurodevelopmental outcome was associated with an onset of SWC before 36 hours of age (sensitivity 8%, specificity 66.7%, PPV 92%, NPV 48%)

Seizure discharges did not preclude the development of SWC (P/H11005.18, Fisher's exact test). Although seizure discharges can disrupt SWC, SWC with simultaneous seizure discharges was seen in 4 patients. Newborns without seizure discharges showed normal SWC significantly more often than those with seizure discharges (P/H11021.001, Fisher's exact test).

The following anticonvulsive drugs were used (the numbers in parentheses represent the percentage of newborns treated with the respective drug): phenobarbital (94.1%), lidocaine (58.8%), midazolam (43.1%), clonazepam (39.2%), phenytoin (35.3%), and pyridoxine (2.0%). Many newborns were treated with 1 drug simultaneously or in succession. In the newborns with good outcome, there were no significant differences in the time intervals from birth to onset of SWC between newborns who were not treated with anticonvulsive drugs and those who were treated with 1 or 2 anticonvulsive drugs (P/H11005.9 and .3, respectively; Mann-Whitney test). There was a significant delay in SWC onset in newborns treated with 3 anticonvulsive drugs, compared with newborns not treated with anticonvulsive drugs (P/H11021.001, Mann-Whitney test; Fig 4).

Prediction of Outcome in the Surviving Newborns

An earlier onset of SWC was related to a better outcome. Each increase in time interval from birth to onset of SWC for 1 hour was associated with a 0.96-fold decrease in the odds of a good outcome (95% confidence interval: 0.938–0.981; P/H11021.001, logistic regression). Area under receiver operator characteristic curve for prediction of outcome by the time of onset of SWC was 0.79. Likewise, an inverse-linear relationship was found between the time interval from birth to emergence of SWC and the Griffiths' developmental quotient only (P/H11005.012, linear regression). When the cutoff point of the SWC onset was

Fig 2.

A, Box plot of time intervals from birth to onset of SWC with regard to the grades of HIE. The horizontal line indicates the median; box, 25th and 75th percentiles; limit lines, the range. B, Relationship between the quality of SWC and the grade of HIE. II-G indicates newborns with HIE grade II and good outcome; II-P, newborns with HIE grade II and poor outcome; NOR, normal SWC; ABN, abnormal SWC; A:N, transition from abnormal to normal SWC.

Fig 3.

Relationship between the quality of SWC and the outcome of newborns. NOR, normal SWC; ABN, abnormal SWC; A:N, transition from abnormal to normal SWC.

Fig 4.

The differences in time intervals from birth to onset of SWC in newborns with good outcome, with regard to the number of anticonvulsive drugs administered. Newborns who were treated with 3 anticonvulsive drugs developed SWC with a significant delay.
30 newborns with HIE were studied during first 72 hours after birth and their aEEG tracings were assessed by pattern recognition.

The course of the aEEG pattern was examined in relation to neurologic outcome at 24 months of age.

Continuous normal voltage (CNV) or discontinuous normal voltage (DNV) prior to 48 hours of life are predictive of normal outcome.
were admitted before 12 h after birth. In outcome. Aative value of abnormal and normal aEEG traces for neurologic likelihood ratios (LR phenomena.

Spikes and sharp waves were considered to be epileptic when there was a repetitive character or when they charged. Spikes and sharp waves were classi

The cut-off point was between 12 and 48 h after birth (Table 3).

Figure 2. Longitudinal course of aEEG patterns in 30 term asphyxiated neonates, during the first 72 h of life, grouped according to their neurologic outcomes. [ ], CNV-S; [ ], CNV; [ ], DNV; [ ], CNV/DNV + EA; [ ], BS; [ ], BS + EA; [ ], SE; [ ], CLV; [ ], CLV + EA; [ ], FT.
SPSS (Chicago, IL) was used.

Range, range) as appropriate. SPSS 16

Descriptive data are presented as

Mean

Hours were used in all calculations.

Affect the results. Traces of 3 to 6

For these 7 infants did not significantly

The 0- to 3-hour or 3- to 6-hour traces

Abnormal to normal in 4 infants; in 3

Infants, the aEEG trace deteriorated

6-hour traces were available for all in-

The 0- to 3-hour aEEG traces were avail-

Plots were also used; however, this did

Between individuals, Kaplan-Meyer survival

Differences in median

Statistical analysis

Compared between pattern recognition

Value by using 3- to 6-hour traces was

The predictive

Pattern changed from abnormal to nor-

Severely abnormal voltage trace (CNV or DNV pattern at 3–6 h, %

Assisted ventilation at 10 min of age, %

Seizures at any time, %

Receiving anticonvulsant drugs (up to 3

Moderately abnormal voltage trace (BS, LV, or FT pattern at 3–6 h, %

Normal voltage trace (BS, LV, or FT pattern at 3–6 h, %

Variables

Demographic and Clinical

RESULTS

Normal voltage traces

BS, LV, or FT pattern at 3–6 h, %

CNV or DNV pattern at 3–6 h, %

Seizures and

PPV of an abnormal trace (BS, LV, or FT) to predict poor outcome (death/disability) in hypothermia-

FIGURE 2

Table 1 shows similar severities of

Variables

Demographic and Clinical

E134

Normal voltage trace (BS, LV, or FT pattern at 3–6 h, %

CNV or DNV pattern at 3–6 h, %

Seizures and

PPV of an abnormal trace (BS, LV, or FT) to predict poor outcome (death/disability) in hypothermia-

FIGURE 2

Table 1 shows similar severities of

Variables

Demographic and Clinical

E134

Normal voltage trace (BS, LV, or FT pattern at 3–6 h, %

CNV or DNV pattern at 3–6 h, %

Seizures and

PPV of an abnormal trace (BS, LV, or FT) to predict poor outcome (death/disability) in hypothermia-

FIGURE 2

Table 1 shows similar severities of

Variables

Demographic and Clinical

E134

Normal voltage trace (BS, LV, or FT pattern at 3–6 h, %

CNV or DNV pattern at 3–6 h, %

Seizures and

PPV of an abnormal trace (BS, LV, or FT) to predict poor outcome (death/disability) in hypothermia-

FIGURE 2

Table 1 shows similar severities of

Variables

Demographic and Clinical

E134

Normal voltage trace (BS, LV, or FT pattern at 3–6 h, %

CNV or DNV pattern at 3–6 h, %

Seizures and

PPV of an abnormal trace (BS, LV, or FT) to predict poor outcome (death/disability) in hypothermia-

FIGURE 2

Table 1 shows similar severities of

Variables

Demographic and Clinical

E134

Normal voltage trace (BS, LV, or FT pattern at 3–6 h, %

CNV or DNV pattern at 3–6 h, %

Seizures and

PPV of an abnormal trace (BS, LV, or FT) to predict poor outcome (death/disability) in hypothermia-

FIGURE 2

Table 1 shows similar severities of

Variables

Demographic and Clinical

E134

Normal voltage trace (BS, LV, or FT pattern at 3–6 h, %

CNV or DNV pattern at 3–6 h, %

Seizures and

PPV of an abnormal trace (BS, LV, or FT) to predict poor outcome (death/disability) in hypothermia-

FIGURE 2

Table 1 shows similar severities of

Variables

Demographic and Clinical

E134

Normal voltage trace (BS, LV, or FT pattern at 3–6 h, %

CNV or DNV pattern at 3–6 h, %

Seizures and

PPV of an abnormal trace (BS, LV, or FT) to predict poor outcome (death/disability) in hypothermia-

FIGURE 2

Table 1 shows similar severities of

Variables

Demographic and Clinical

E134

Normal voltage trace (BS, LV, or FT pattern at 3–6 h, %

CNV or DNV pattern at 3–6 h, %

Seizures and

PPV of an abnormal trace (BS, LV, or FT) to predict poor outcome (death/disability) in hypothermia-

FIGURE 2

Table 1 shows similar severities of
Effect of hypothermia on aEEG

- 74 babies enrolled and their aEEG recordings were recorded for 72 hours and correlated with Bayley II at 18 months
- The PPV at 3-6 hours was 84% for normothermia and 59% for hypothermia
- The recovery time to normal background was the best predictor of poor outcome 96% in hypothermia and 91% in hypothermia
- Infants with good outcome had normal background pattern by 24 hours when treated with normothermia and by 48 hours when treated with hypothermia

Case study

- Full term infant with cord prolapse
- Cord venous gas 6.8 50 20 8 -25
- Apgar scores 1¹ and 3⁵
- Transferred for therapeutic hypothermia