consider it unlikely that a larger dose of this surfactant would have produced more dramatic changes, as 25 mg is far in excess of that required for a monolayer throughout the lung. The initial Crs values in the surfactant treated babies were marginally higher than those in the control group, reflecting perhaps the fact that the group as a whole was relatively more mature. Both groups showed a trend towards improved compliance after the instillation, probably representing improved aeration and clearance of alveolar fluid.

We conclude that giving artificial surfactant at birth does not have any immediate, dramatic effect on lung mechanics of preterm babies. The two treatment groups had similar subsequent courses, but it is not possible to state in this small series whether surfactant has a prophylactic value in IRDS in some infants.

We thank Dr Colin Morley, New Addenbrooke's Hospital, Cambridge, who provided us with the surfactant powder. This work was funded by a grant from the Medical Research Council.

Febrile convulsions: electroencephalographic changes related to rectal temperature

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SUMMARY Nine children had simultaneous continuous electroencephalographic monitoring and temperature recording immediately after febrile convulsions. Background electroencephalographic rhythms did not alter with temperature and with one exception, seizure discharges occurred only during sustained high pyrexia.

The relation between electroencephalographic and electrocardiographic changes and body temperature over periods up to 25 hours starting as soon as possible after febrile convulsions is examined. The findings are related to short term outlook.

Patients and methods

Nine children admitted to hospitals in Cardiff after febrile convulsions during 1982 were studied. All had had generalised fits that lasted less than 10 minutes and none had received diazepam.

References


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added to the chart. All the children were examined
again between three and 10 months (mean 4.6
months) later.

Results
No child had a frank convulsion during the record-
ing. In 8 patients the temperature on hospital
admission was between 38° and 39.5°C and one child
was apyrexial. In all children temperature was raised
during recording—6 had a low grade fever (max-
imum 38°C, pyrexial for less than 30% of recording)
and the remainder had a high grade fever (maximum
39.5° to 40°C, pyrexial for more than 40% of
recording).

The features of the recordings are summarised in
the Table. No consistent pattern emerged to suggest
a relation between the frequencies of the back-
ground activity and the grade of fever (Figure).
Assessment of trends on individual charts did not
produce further evidence for a relation between the
degree or progress of the pyrexia and the basic
rhythms. In no case did asymmetry show any
relation to temperature. Six children had runs of
high voltage slow activity, three while pyrexial and
three while apyrexial.

Epileptic activity was seen in the electro-
encephalographs of four children. Intermittent
spikes occurred in all three children with high grade
fever once the pyrexia was sustained, but they did
not show as the temperature was rising. In two of
the three, the spikes persisted for one and three
hours after the temperature settled. One child,
whose parents both had histories of seizures, sus-
tained only a low grade fever but spikes and spike
and wave activity were seen when she was apyrexial.
A further two children had bursts of spike and wave
activity during high grade fever.

Table  Grade of fever and features of electroencephalographic (EEG) recordings in 9 children after febrile convulsions

<table>
<thead>
<tr>
<th>Case No</th>
<th>Grade of fever</th>
<th>Symmetry</th>
<th>EEG findings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>High voltage</td>
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<td></td>
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<td>slow</td>
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<tr>
<td>1</td>
<td>L</td>
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<tr>
<td>2</td>
<td>L</td>
<td>S</td>
<td>+</td>
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<td>3</td>
<td>L</td>
<td>A/S S'</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>L</td>
<td>S</td>
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<td>5</td>
<td>H</td>
<td>A/S</td>
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<tr>
<td>6</td>
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<tr>
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<td>H</td>
<td>S</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>H</td>
<td>S</td>
<td>+</td>
</tr>
</tbody>
</table>

L = low grade (temperature <38°C, pyrexial <30% of recording).
H = high grade (temperature ≥38°C, pyrexial >40% of recording).
S = symmetrical.
A/S = asymmetrical.
*Initially asymmetrical becoming symmetrical after five hours.
+Poor contact on one electrode.

Figure  Background electroencephalographic rhythm and
temperature chart from 4.5 hours after a febrile
convulsion.

Sharp activity was observed in two patients while
apyrexial, in recordings which were otherwise free
from abnormalities. In the three children with high
grade fever sharp activity was observed during rising
temperature, sustained fever, and falling tempera-
ture.

The electrocardiographs showed occasional sinus
or nodal ectopic beats, but no dysrhythmias. In
particular, no episodes of asystole were observed at
any time.

During follow up, although four of the 9 children
had further febrile illnesses, only one had a subse-
quent febrile convulsion. She had had a low grade
fever during the first illness, with no epileptic
activity shown on the electroencephalograph. All
children were considered neurologically within nor-
mal limits when examined at follow up.
Discussion

Although several predisposing factors have been identified, the trigger for febrile convulsion remains elusive. Previous studies have shown slowing of background rhythms during and after pyrexial illnesses and during artificially induced fever. The background rhythms in the present study were generally slower than expected for the children’s ages but no fluctuation with temperature was detected, suggesting the slowing is caused by an effect of the infection other than fever.

It has been suggested that fever precipitates reflex anoxic seizures that progress to typical febrile convulsions. None of the present children had asystole, and seizure activity occurred independently of cardiac rhythm. We are unable to exclude asystole as the final precipitating event for clinically observable seizures, but seizure activity in this study could not be attributed to anoxia. Our findings did not help to predict early recurrences of febrile convulsion.

Weight as the best standard for glomerular filtration in the newborn

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We thank Miss J Gibbs for technical assistance and Miss M Chilcott for secretarial assistance.

References


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SUMMARY The relation between surface area and body weight changes dramatically in infancy. In 31 healthy infants of 27 to 40 weeks’ gestation, variations in glomerular filtration rate were reduced more than twofold by choosing glomerular filtration rate/kg body weight rather than glomerular filtration rate/m². The former provides the most useful and practical index of renal function in the neonate.

Although the use of surface area for standardising glomerular filtration rate minimises age and weight dependent variations in children and adults, this has never been tested in infancy, when surface area:weight changes most dramatically. We have, therefore, tested glomerular filtration rate data from preterm and term babies to find which standard reduces the variation most effectively.

Patients and methods

Thirty one well babies of 27 to 40 weeks’ gestation weighing 0-68 to 3-7 kg were studied between 2 and 7 days of age. Twenty five (81%) of the infants were below the 50th centile for weight and 11 (35%) were below the 10th. Glomerular filtration rate was measured by the 24 hour constant inulin infusion method on average three times for each baby, and the mean value taken. Surface area was estimated by Boyd’s formula and a weight index was calculated as weight:50th centile weight. The study had the approval of the local ethical committee, and informed parental consent was obtained.

Results

Glomerular filtration rate values varied more than 10 fold between babies (0-50 to 5-71 ml/min), but only fivefold when expressed per unit surface area (4-5 to 22-6 ml/min/m²) and less than threefold when expressed per unit body weight (0-59 to 1-56 ml/min/kg). Glomerular filtration rate/m² and glomerular filtration rate/kg were each positively correlated with weight (P<0.001), gestational age (P<0.001), and weight index (P<0.05). Multiple