A renal scan continued to show a non-functional right kidney.

Discussion

Renal artery thrombosis with renin induced hypertension is a recognised complication of umbilical artery catheterisation. Although renin concentrations were not measured, confirmed renal artery thrombosis with failure to respond to other antihypertensives and prompt response to captopril make renin mediated hypertension most likely.

Hypertension in neonates has been described as blood pressure greater than 90/60 mm Hg in term infants and 80/45 mm Hg in premature infants. Cardiorespiratory symptoms and congestive heart failure are the most common symptoms of neonatal hypertension. The degree of hypertension necessary to produce congestive heart failure may vary with individual neonates. The maximum pressure of 123/81 recorded in our patient was moderate. A very limited myocardial contractile reserve in response to increased afterload has been shown in newborn lambs. Inotropes have limited effects on contractility in newborn rabbits and lambs. Limited myocardial reserve may explain why congestive heart failure is often the dominating picture in neonatal hypertension.

Hypersensitivity to captopril, manifesting in some adults as hypertensive crisis, has not been reported in neonates.

We have shown by echocardiography that adequate treatment of hypertension rapidly reverses severe myocardial dysfunction caused by neonatal hypertension. We suggest that echocardiography may be helpful to document the cardiac effects of neonatal hypertension and to determine the need for and response to treatment.

References

Correspondence to Dr M A Beaudry, Division of Neonatology, 3A3 Walter Mecklenburg Health Sciences Center, University of Alberta, Edmonton, Alberta T6G 2B7, Canada.

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Anticonvulsant drugs, growth, and development

B M MACARDLE, M E L MCGOWAN, S A GREENE, AND C S MILLER

Departments of Paediatrics and Radiology, Guy's Hospital, and Departments of Neurology and Child Health, King's College Hospital, London

SUMMARY Height and stage of puberty of 67 children with epilepsy were measured before beginning treatment with anticonvulsant drugs and annually to a maximum five years' treatment. Blood concentrations of the drugs used (phenytoin, sodium valproate, carbamazepine, ethosuximide, and phenobarbitalone) were monitored throughout. No significant deviation in growth patterns was detected.

Anticonvulsant drugs administered during pregnancy have been postulated to retard fetal growth and head circumference. In vitro studies have shown that phenytoin and sodium valproate reduce the thickness and cellularity of epiphyseal and articular cartilage in rats. Round described a group of children with chronic epilepsy who failed to reach predicted adult height and attributed this to an early growth spurt and lower than normal growth velocity. Robinson found premature epiphyseal fusion in a group of short children with epilepsy treated medically.

In a study of adults with epilepsy McGowan identified three groups who seemed to be short: (1) males with partial seizures beginning before 18 years of age, (2) females who had taken phenytoin before...
the onset of puberty, and (3) males who were on
phenytoin before 10 years. Interpretation of these
studies is difficult, however, as many of the patients
had chronic epilepsy treated with anticonvulsant
polytherapy, without access to monitoring of drug
concentrations, and many of these children were
educated in a residential setting. We have therefore
prospectively investigated growth in a group of
children with newly diagnosed epilepsy from the
beginning of treatment.

Patients and methods

The 67 children included in our study were already
participating in a large comparative monotherapy
study of children with newly diagnosed epilepsy who
had had regular measurements of anticonvulsant
concentrations. Of the 67, 34 were boys (mean age
7-9 years, range 3-1-15-2 years) and 33 girls (mean
age 10-9 years, range 4-0-15-0 years) and 58 were
white and nine Afro-Caribbean. The average duration
of follow up was 3-1 years (range 0-9-5-4 years). Thirty
three children had primary generalised epilepsy and 34 had partial seizures. Children were
in accordance with the study protocol. Treatment began with a single drug in a fairly low
dose calculated according to body weight, with
subsequent increases until control of seizures was
obtained or the anticonvulsant concentration
reached the upper limit of the defined therapeutic
range (Table 1). Children who failed to achieve
control of seizures on treatment with a single drug
were placed on polytherapy.

A standardised measure of height by two observ-
ers (BM and MM) and pubertal staging was
recorded before treatment was begun (initial) and
then at annual intervals; the most recent measure-
ments have been taken as the end point for analysis
(final).

Height data are presented in terms of standard
deviation score (SDS), using known population
measurements. This gives an indication of the
stature of the subject relative to a normal population
of that age, a value of 0 being average and + and –
values representing degrees of tallness and short-
ness, respectively.

Skeletal maturity in 31 children (13 girls and 18
boys) was determined by one of us (CM) from
radiographs of the left hand and wrist before
treatment was begun and in 20 children at 12
months, 16 at 24 months, 11 at 36 months, seven at
48 months, and three at 60 months.

Statistical analysis of the height SDS at initial and
final measurement was by comparison of mean
values and 95% confidence intervals. Results are
expressed as mean (SD).

Results

Height SDS. The height SDS for boys and girls at the
initial and final examinations are shown in Table 2.
There was no significant difference in these
measurements compared with those of the normal
population. The mean difference between initial and
final height SDS for boys was 0-04 (95% confidence
limits −0-12 to 0-19, t=0-47, df=33, p=0-64) and
for girls was −0-07 (95% confidence limits −0-29 to
0-15, t=0-643, df=32, p=0-52).

Table 2 Height standard deviation scores (SDS) for
boys and girls with epilepsy treated with anticonvulsant
drugs at initial and final examinations. Values are
mean (SD)

<table>
<thead>
<tr>
<th>Height SDS</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>At initial examination</td>
<td>0-02 (1-1)</td>
<td>−0-03 (1-1)</td>
</tr>
<tr>
<td>At final examination</td>
<td>0-06 (1-2)</td>
<td>−0-10 (0-9)</td>
</tr>
<tr>
<td>△</td>
<td>0-04 (0-44)</td>
<td>−0-07 (0-6)</td>
</tr>
</tbody>
</table>

Table 1 Treatment protocol for administration of anticonvulsant
drugs to children with epilepsy

<table>
<thead>
<tr>
<th>Drugs given</th>
<th>No of patients</th>
<th>Drug dosage (mg/kg)</th>
<th>Drug concentration (mg/ml)</th>
<th>Therapeutic range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>patient(s)</td>
<td>Initial Increment</td>
<td>Mean during treatment</td>
<td></td>
</tr>
<tr>
<td>Carbamazepine (CMZ)</td>
<td>21</td>
<td>8</td>
<td>4</td>
<td>5.8</td>
</tr>
<tr>
<td>Phenytoin (DPH)</td>
<td>19</td>
<td>5</td>
<td>2</td>
<td>7-1</td>
</tr>
<tr>
<td>Sodium Valproate (SV)</td>
<td>9</td>
<td>15</td>
<td>5</td>
<td>53</td>
</tr>
<tr>
<td>Ethosuximide (ESM)</td>
<td>3</td>
<td>15</td>
<td>5</td>
<td>32</td>
</tr>
<tr>
<td>Phenobarbitone (PB)</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>13-4</td>
</tr>
<tr>
<td>Patients on polytherapy</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SV+CMZ</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SV+CMZ+DPH</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SV+ESM</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SV+ESM+CMZ</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMZ+DPH+Clofazam</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sexual maturity.

**Girls**
Of the 33 girls, seven had their menarche before starting medication (mean age 12.0 years, range 9.9–14.1 years), 11 girls were prepubertal, and the remaining 15 had their menarche while on treatment (mean age 13.4 years, range 11.3–15.3 years). The normal mean age for menstruation is 13.0 years. The pubertal ratings as determined at the last visit did not deviate from the normal pattern.

**Boys**
In the group of 34 boys, four were in puberty before starting treatment, 14 were prepubertal, 16 entered puberty while on treatment (mean age for penis stage II 11.3 years, range 8.5–14.3 years; mean for population 12.0 years; and mean age for pubic hair stage II 13.1 years, range 11.3–14.2 years; mean for population 12.5 years).

Skeletal maturity
There was a trend for girls to show slightly earlier skeletal maturity than is normal, although the maturity scores were still within normal limits. The skeletal maturity in boys was normal.

Discussion
These results show that children with epilepsy on anticonvulsant drugs for a mean of three years (range 0.9–5.4 years) grow and mature normally. We found no significant difference from the normal timing of the menarche or of onset of puberty.

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There was a trend towards earlier skeletal maturity in the girls, but this did not influence final height. Separate examination of children with partial seizures, those taking monotherapy, children with persistent seizures, and a small number on polytherapy, again produced no evidence of deviant growth patterns.

Some of the previously reported findings were possibly related to adverse environmental factors, high seizure frequency, or subclinical drug toxicity.

We thank Dr E H Reynolds and Dr B Neville for allowing us to study their patients.

References

Correspondence to Dr B M MacArdle, Newcomen Centre, Guy's Hospital, St Thomas' Street, London SE1 9RT.

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Age distribution of anginose mononucleosis

Z SPIRER, M HOLTZMAN, I MELAMED, AND I SHALIT

Department of Paediatrics, Rokach Hospital, and Department of Paediatric Immunology, Tel-Aviv University, Tel-Aviv, Israel

**SUMMARY** The age distribution of anginose infectious mononucleosis in children was analysed retrospectively for the years 1966–85. During that period the disease became significantly more common in children of a young age and less common in older children. This shift could not be attributed either to socioeconomic conditions or to the diagnostic methods used.

The clinical and epidemiological range of infectious mononucleosis (IMN) has been appreciated only in the past decade, since the introduction of specific serological tests. Infection during infancy and childhood is usually subclinical, whereas the classical clinical manifestations are common among adolescents and young adults. It has been reported that infection generally occurs at an earlier age in low socioeconomic groups, where overcrowding and poor hygiene prevail.

One of the clinical presentations of IMN is the anginose type. Although this is said to be more prevalent in older children and adolescents, we have
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B M Macardle, M E McGowan, S A Greene and C S Miller

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