Blood lead level survey

Sir,

In response to concern about possible lead pollution due to heavy traffic on a narrow eastern part of the A2 in Greenwich (Rochester Way) a small survey of the blood lead levels in preschool children living on or near the route was undertaken in October 1978. This concern had not been alleviated by the knowledge that an estimation of lead in air at this point, based on detailed studies of kerbside pollution from motor vehicles in 5 cities—including London, was between 2 and 4 μg/m³, probably in the lower half of this range. The GLC guideline for air quality is 3 μg/m³ (lead in suspension) over a 3-month period (Greater London Council, 1975). Topographical and traffic analysis showed that this road carried 35 000 slow-moving vehicles a day, 30% of them using diesel fuel, and many of them being of the heavy goods type. The widths of the carriageway and street were 8 and 24 m respectively, the flanking houses being of two storeys, and the road direction being east to west with a one in 40 upwards gradient towards the east.

41 children were chosen from health visitors' records and eventually 35 of them attended a clinic for venepuncture. One child withdrew before the test, and the test on one other child was abandoned for technical reasons. Analyses on these 33 blood samples were carried out at the department of chemical pathology at Great Ormond Street Children's Hospital. Subsequently another child, absent on holiday, gave a sample of blood which was tested at the chemical pathology department of the Brook Hospital laboratory.

The overall geometric mean of these results was 16.3 μg/100 ml, on a near-normal distribution, the highest reading recorded being 26.9 μg/100 ml. The normal reference range of the EEC directive on biological screening for lead is 0.3–1.8 mmol/l (approximately 6 to 37 μg/100 ml) and by this standard the levels were considered to be satisfactory. It is of interest that this mean differs only slightly from the mean of 15 μg/100 ml used by the Environment Protection Agency in the United States for setting a national ambient air quality standard for lead (final results and proposed rule making, October 1978).

There are slight variations near the mean for the subgroups and these are set out in the Table, the actual numbers being given in parentheses for each group.

These results have been interpreted as natural variations without any pattern or relationship to age, site, or residence, and there is no suggestion of statistical significance about them. There is an overlap of the 95% confidence limits for another value between the various groups in the Table. The children had lived on Rochester Way long enough to have absorbed any lead from vehicle exhausts and for it to have been fully reflected in their blood lead readings. There was no evidence of ill health attributable to the ingestion of lead among the children examined by the medical officer at the school. It was concluded that, whatever undesirable effects of traffic there may be on Rochester Way, the inclusion among them of lead pollution was not supported.

<table>
<thead>
<tr>
<th>Table Blood lead levels in 33 children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean result (µg/100 ml)</td>
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<td>------------------------</td>
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<tr>
<td>Children attending a nursery school on Rochester Way and living on Rochester Way (n = 2)</td>
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<td>Children attending a nursery school on Rochester Way and living off Rochester Way (n = 4)</td>
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<tr>
<td>Children living on Rochester Way west of Well Hall roundabout</td>
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<td>(n = 11)</td>
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<tr>
<td>Children living on Rochester Way east of Well Hall roundabout</td>
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<tr>
<td>(n = 11)</td>
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<tr>
<td>Children living near Rochester Way (n = 5)*</td>
</tr>
</tbody>
</table>

*The child (aged 6 years) tested at the Brook Hospital laboratory, living near Rochester Way, had a blood level of 18.6 µg/100 ml. 18 of these children lived on the narrow part of the road and their mean result was 15.1 µg/100 ml, their average age being 2 years 7 months with an average length of residence of 2 years 4 months.

Not far away, preschool children in another recent survey carried out near a lead smelter were found to have a mean level of 21 µg/100 ml (Millar, 1978).

It is important at this present time to be clear about the biological relationships with lead in the environment. Lead at low levels in blood is being associated with malfunctions which on the evidence are as likely to have other parallel and independent associations. At these levels blood lead variations would reflect environmental variations and all the differences could be significant, yet without dysfunction of any kind, or with dysfunctions otherwise explained. On the other hand, the practice of environmental evaluation and lead hazard abatement near and above the upper end of the EEC reference range is clearly indicated (Center for Disease Control, 1978).

References


I. B. MILLAR
District Community Physician,
Greenwich Health District,
Morgan Grampian House (2nd floor),
Calderwood Street,
London SE18 6RB

Cefuroxime plasma and CSF levels in children with meningitis

Sir,

Kuzemko and Walker recently reported their experience with cefuroxime in meningitis (Archives, 1979, 54, 235).
We gave cefuroxime to 17 patients aged between one month and 10 years. Six of them had meningitis, the others had severe pneumonia or laryngitis. The patients with meningitis were initially treated with ampicillin, chloramphenicol, or a combination of ampicillin and gentamicin. Cefuroxime was given before the final lumbar puncture when the patient had recovered, generally after 8 days of treatment. Cefuroxime 25 mg/kg was given intravenously by 30-min infusion every 6 hours. The organisms responsible for the meningitis in 3 patients were Neisseria meningitidis, Haemophilus influenzae, and Klebsiella pneumoniae. In the other 3 patients with meningitis the organism could not be identified because the patients had been treated with antibiotics before admission to hospital. In the patient with N. meningitidis, the MIC for cefuroxime was <0.03 µg/ml. Lumbar puncture was performed 30 to 120 minutes after the end of the infusion by which time the child had received cefuroxime treatment for 24 hours. At that time, blood samples were taken 4 or 5 times from 30 to 180 minutes after the end of the infusion by an indwelling IV catheter at a site different from that of the infusion.

The resistance of Klebsiella to other antibiotics in a child with ventriculitis and meningomyelocele led to treatment being increased from 25 mg cefuroxime every 4 hours to 50 mg every 4 hours. The presence of an indwelling intraventricular reservoir allowed the level of the drug to be estimated in the ventricular fluid after the intravenous administration, and later after parenteral and 10 mg intraventricular administration.

All samples were assayed biologically. Adequate plasma cefuroxime concentrations ranging from 23 to 115 µg/ml were obtained throughout. The concentration in the spinal fluid (Figure) ranged from 0.2 to 1.2 µg/ml with a dosage of 25 mg/kg 6-hourly. In the child with ventriculitis, ventricular fluid concentrations were between 3.6 to 7.6 µg/ml with 25 mg/kg 4-hourly, and 16.8 µg/ml with 50 mg/kg 4-hourly; intraventricular administration resulted in very high concentrations of 26 µg/ml on the left side and 89 µg/ml on the right. The higher values found in the patient with ventriculitis are presumably due to the better penetration of the drug through the inflamed meninges. No toxic side effects were observed. These results corroborate the findings of Kuzemko and Walker.

A cefuroxime dosage of at least 25 mg/kg 4-hourly seems suitable and should be adapted according to the MIC of the micro-organism and the level of the drug in the CSF.

We thank Mr W. Ryngaert of Glaxo, Belgium for the cefuroxime supply.

L. CORBEEL, G. VAN ACKER, R. ECKELS, J. VANDEPITTE, AND L. VERBIST
University of Leuven, Hereestraat 49, 3000 Leuven, Belgium
Cefuroxime plasma and CSF levels in children with meningitis.

L Corbeel, G Van Acker, R Eeckels, J Vandepitte and L Verbist

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