Low soluble FcRIII receptor demonstrates reduced neutrophil reserves in preterm neonates

EDITOR,—Studies of human neonate granulopoiesis have been hampered by the lack of a marker of overall neutrophil cell mass. Assumptions about neonate granulopoiesis have therefore largely been extrapolated from rat data. Direct measurement of total neutrophil cell mass (in terms of neutrophils per g body weight) in newborn rats has shown that they have about one quarter the neutrophil mass of adult animals and that their neutrophil mass increases at a slower rate than in adult animals.1 In addition, newborn rodents do not have the reserve pool of quiescent granulocyte progenitors, as found in adults, to recruit into production during sepsis. Circumstantial evidence for a similar immaturity of neutrophil reserves in human neonates comes from the low proportion of quiescent progenitors in cord blood2 and the frequent occurrence of postnatal neutropenia in preterm infants. Some additional insight comes from a study of mid-trimester abortuses,3 which showed minimal numbers of neutrophils in haemopoietic tissue before 24 weeks gestation.4 Until now, direct quantification of total body neutrophil cell mass in human neonates between 24 weeks and term has remained elusive.

In 1992 we reported5 that preterm neonates born before 32 weeks gestation have very low plasma concentrations of the soluble FcRIII receptor (sFcRIII), sFcRIII is the plasma form of the neutrophil membrane receptor FcγRIII which, together with other membrane receptors, is responsible for binding sites during phagocytosis. We observed that, between 24 and 32 weeks gestation, sFcRIII concentrations are about 15% of normal adult values (mean (SE) 15.3 (1.3)%), while sFcRIII concentrations in fetal samples collected between 19 and 23 weeks are even lower (mean (SE) 8.3 (1.4)%). Between 33 and 36 weeks in utero, sFcRIII increases rapidly so that by term concentrations are similar to adults. In babies born before 32 weeks, sFcRIII concentrations increase gradually after birth to achieve adult concentrations by the fourth week of postnatal life. At the time, we interpreted these data to indicate reduced FcRIII production by individual cells and thus immaturity of neutrophil function.

Since we published these data, further work has clarified the origins and significance of plasma sFcRIII. These studies have shown that sFcRIII is derived from apoptotic neutrophils, and its concentration in plasma reflects the total body neutrophil cell mass as well as the overall production of neutrophils in the bone marrow.6 This new understanding of sFcRIII alters the interpretation of our original observation. It is now apparent that our data confirm what we previously suspected: preterm human infants of less than 32 weeks gestation have reduced neutrophil production and a reduced total neutrophil cell mass at birth. Our data also show that neutrophil reserves remain low for about three years after preterm birth. Term infants, by contrast, have hyperglycaemia, which persisted, requiring insulin drip. At the same time, his hypernatraemia was corrected with extra sodium supplementation. On day 11, he was noted to have a murmur, which later was confirmed by echocardiography as patent ductus arteriosus. Table 1 summarises the events.

The case clearly indicates a need for a conservative approach to hypernatraemia in preterm infants, as "chasing" it may lead to fluid retention and development of patent ductus arteriosus.

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Suxamethonium is safe in safe hands; mivacurium should also be considered

EDITOR,—We thank Whyte et al 7 for detailing the premedication protocols for intubation in United Kingdom neonatal units. There is a wide disparity in both the type and dosage of drugs.

Whyte et al mention that, as a muscle relaxant, suxamethonium, has important safety benefits. It has a very rapid onset and offset of action, and therefore there is a “get out clause” for the difficult intubation or intubation by an inexperienced operator. However, other considerations need to be taken into account when suxamethonium is used.

Firstly, intravenous premedication is contraindicated in conditions known to be associated with difficult intubations, such as the Pierre Robin sequence. Further, suxamethonium is a depolarising muscle relaxant and therefore can cause sinus bradycardia. Atropine can be given in an attempt to avoid this.

Suxamethonium causes depolarisation at the neuromuscular junction, rarely leading to hyperkalaemic induced cardiac arrest.2 Undiagnosed myopathic conditions were found in a number of affected children, and paediatric licensing for this drug was therefore removed in the United States. However, no other very rapidly acting drug has been manufactured, and, because of its popularity, suxamethonium is reinstated. Before its use, a detailed family history for myopathic conditions must be taken. In our neonatal unit, we have started to use fentanyl, an opioid, with mivacurium as the muscle relaxant.3 The disadvantage of mivacurium is that it is only a rapidly acting muscle relaxant.4 Its major advantage is that it is a non-depolarising muscle relaxant and therefore carries no risk of life threatening arrhythmias. The routine use of atropine is not necessary.

Table 1 Summary of the events

<table>
<thead>
<tr>
<th>Day no</th>
<th>Total fluids (ml/kg)</th>
<th>Urinary output (ml/kg)</th>
<th>Sodium input (mmol/day)</th>
<th>Serum sodium (mmol/l)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>217</td>
<td>7</td>
<td>3</td>
<td>124</td>
<td>860</td>
</tr>
<tr>
<td>7</td>
<td>248</td>
<td>7.8</td>
<td>7</td>
<td>120</td>
<td>860</td>
</tr>
<tr>
<td>8</td>
<td>233</td>
<td>7</td>
<td>10</td>
<td>128</td>
<td>870</td>
</tr>
<tr>
<td>9</td>
<td>214</td>
<td>7.9</td>
<td>1</td>
<td>134</td>
<td>900</td>
</tr>
<tr>
<td>10</td>
<td>203</td>
<td>5.3</td>
<td>15</td>
<td>131</td>
<td>900</td>
</tr>
<tr>
<td>11</td>
<td>206</td>
<td>6.1</td>
<td>15</td>
<td>136</td>
<td>940 (PDA)</td>
</tr>
</tbody>
</table>

PDA, patent ductus arteriosus.
We agree that a randomised trial needs to be undertaken to prove that premedication has the desirable end point of reducing neonatal morbidity, particularly intraventricular haemorrhage.

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Premedication for intubation in neonates

EDITOR.—We were very interested in the recent papers by Bhuta et al1 and Whyte et al2 on the use of premedication for selective intubation in neonates. It is now well accepted that term and preterm neonates tolerate awake intubation poorly, often exhibiting hypoxia, bradycardia, and systemic and intracranial hypertension during nasotracheal or orotracheal intubation.1,3 Analgesia and sedation are still used infrequently in nurseries for intubation and other “routine”, but invasive, therapeutic or diagnostic procedures.3

We recently performed a randomised, double blind, placebo controlled trial to assess whether sedation with midazolam in premature infants would improve physiological stability and the success rate of endotracheal intubation. Eight premature infants underwent 16 intubation procedures after being randomly assigned to one of three groups: I (n = 3), the control group, received placebo only; II (n = 6) received atropine and placebo; III (n = 7) received atropine and midazolam. Infants could be randomised again to a different group after completion of each intubation procedure. Heart rate, blood pressure, and oxyhaemoglobin saturation were recorded at 10 minute intervals for each infant. The study was terminated when data were reviewed early because of concerns over adverse events. The number of episodes of oxyhaemoglobin desaturation around the time of intubation was significantly greater in group III (86%) than in group I (0%), p < 0.01. Cardiopulmonary resuscitation was required in 29% of group III compared with 0% of group II (p = 0.16).

In our trial, premature infants who received midazolam were at increased risk of oxyhaemoglobin desaturation during tracheal intubation. There was also a trend toward an increased need for cardiopulmonary resuscitation in these infants. Although regrettably underpowered, in the cause of early termination, our study indicates caution in the use of midazolam as routine premedication for tracheal intubation in premature infants. Further investigation with a larger number of infants is needed to clarify its safety and efficacy profile.

Although we agree that an important goal in neonatal medicine is to minimise pain and stress, more information is needed on the effects of intravenous anaesthetic agents, such as thiopental and methohexitol, in both stable and unstable preterm neonates before these medications can be recommended for routine use. Further randomised controlled trials are needed to help formulate specific premedication guidelines for the variety of noxious procedures that infants undergo in neonatal intensive care units.

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Incidence of severe retinopathy of prematurity

EDITOR.—We were interested to read the article of Vyas et al3 on the incidence of severe retinopathy of prematurity (ROP) in 11 neonatal units in five cities in England in 1994. We have published similar data from eight neonatal units in five cities in England NSW Australia in 1994.4 These data were prospectively collected in the NSW Neonatal Intensive Care Unit’s data collection and is stored and maintained in the NSW Centre for Perinatal Health Services Research, University of Sydney, NSW.

For infants of <29 weeks gestation, there was no significant difference in severe ROP (stage 3) between the five cities in England and NSW (table 1).

Unlike Vyas et al,4 we could not find an association between improved survival and the development of severe ROP. In six of the neonatal units in our study (two have been excluded from this analysis as they are children’s hospitals and have very few small premature infants), survival in infants of <27 weeks gestation ranged from 51.3% to 68.8%. The percentage with severe ROP for the two units with the lowest and highest survival was 15 (3/20) and 24 (5/21) respectively, while the range of severe ROP in the six neonatal units was 15% (3/20) to 36% (9/25).

In infants of 27–28 weeks gestation, survival ranged from 85.1% to 96.7% and the percentage with severe ROP for the two units with the lowest and highest survival was 7 (4/56) and 3 (2/58) respectively, while the range of severe ROP in this group of infants was 2% (1/50) to 7% (4/56) (unpublished observations). We have also shown that, despite an increase in survival of preterm infants following the introduction of surfactant, there was no significant impact on the incidence or severity of ROP.

In infants of 29–31 weeks gestation, six of 443 infants (1.4%) developed severe ROP and one required Cryo/Laser treatment.2 This infant was 30 weeks gestation with a birth weight of 1300 g. We therefore agree with Vyas et al that there should be no reduction in the upper limit of gestation or birth weight for screening for ROP.

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Blood pressure standards for very low birthweight infants

EDITOR.—Based on careful invasive blood pressure measurements in a cohort of 61 very low birthweight (VLBW) infants followed up to 12 hours of life, Lee et al4 report on blood pressure standards in this population. The quality of the blood pressure readings was assessed using continuous video recordings of the first week. The inclusion of a relatively large number (n = 28) of extremely low birthweight infants is another strength of this study.

In an attempt to define normal blood pressure values in populations that by definition is not “normal”, the authors have excluded very ill infants and infants requiring inotropic support. They have also excluded infants who developed intraventricular haemorrhage (IVH) grades III and IV during this first week of life. They suggest that the lower limits of mean arterial blood pressure (MAP) for infants between 26 and 32 weeks of gestation are numerically similar to the gestational ages. With the exclusion of infants who developed severe IVH, it became impossible to detect any association between blood pressure and IVH. Decreases in cerebral blood flow may play an important role in the pathogenesis of IVH, and, although we are not a reliable parameter to assess cerebral blood flow,5 at least two published studies6,7 have shown that the incidence of IVH was higher in infants with lower MAP. Perhaps the authors could indicate how many infants

Table 1 Incidence of severe retinopathy of prematurity (ROP) in five cities in England and in New South Wales (NSW), Australia

<table>
<thead>
<tr>
<th>Gestation</th>
<th>Free cities in England</th>
<th>NSW Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;27 weeks</td>
<td>20/95 (21.0)</td>
<td>44/157 (28.0)</td>
</tr>
<tr>
<td>27–28 weeks</td>
<td>5/162 (2.6)</td>
<td>15/269 (5.6)</td>
</tr>
</tbody>
</table>

Data are expressed as number with severe ROP number examined with the percentage in parentheses. The differences are not statistically significant.
chronic lung disease, pneumothorax rates, and cerebral ultrason abnormalities. In addition, because of an increased trend toward a higher pneumothorax rate, Baumer concludes that, at present, PTV delivered by either the SLE 2000 or the Dräger babylog 8000 is not recommended for infants of less than 28 weeks gestation with respiratory distress syndrome (RDS).

However, we are concerned that this may be an overreaching conclusion given the significant difference in PTV delivered by the two main ventilators used and the potential heterogeneity of clinical practice within the different centres involved, despite agreed ventilation protocols. Dimitriou et al showed that neonates and infants trigger a significantly lower proportion of breaths using the SLE 2000, an airway pressure triggered ventilator that provided synchronised intermittent positive pressure ventilation (SIPPV). Attempts to optimise the trigger rate of the SLE 2000 ventilator by increasing pressure sensitivity often results in an unsafe mode of ventilation discussed by Baumer. Therefore the PTV modes of the two ventilators are substantially different. This prompts us to ask whether the findings of this multicentre study are only applicable to PTV provided by one particular make of ventilator? Would there have been a different outcome if all the triggered babies had received SIPPV?

It is not known how many of the 40/213 babies of less than 28 weeks gestation who had pneumothoraxes were receiving SIPPV. As only 11% (52/465) of all triggered babies ever received SIPPV, we surmise that very few of the 40 were ventilated in this way. Is it fair to conclude that the Dräger babylog 8000 has a trend to pneumothorax compared with SIPPV?

In a separate smaller study, Baumer also reports 120 patients in three centres randomly assigned to either the Dräger babylog 8000 or the SLE 2000 ventilator, and found a non-significant trend to higher pneumothorax rate, chronic lung disease, and death for patients ventilated with another. A logistic regression analysis determined that cerebral blood flow was independent of blood pressure in preterm infants, but again the selection of a mean arterial pressure of 30 mm Hg as the cut point. It is conceivable that cerebral vascular resistance in sick preterm infants differs from that in the study patients, and consequently the application of the suggested blood pressure standards to sick preterm infants would result in different—and possibly inadequate—cerebral blood flows.

The data presented add to our knowledge on blood pressure in VLBW infants, but do not allow the conclusion that the suggested blood pressure standards are safe for all VLBW infants.

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Drs Juin, Rajadurai, and Wee respond:

We would like to thank Dr Berger for his comments. Our objective was to define the normal range of blood pressures for very small infants and this would logically exclude those with IVH and those on inotropes, both of which could affect blood pressure.

We did not compare infants with and without IVH because that was not our aim. There may very well be a correlation between hypocapnia and IVH but studies looking at this association were not original because there is controversy as to what constitutes hypotension. We hope that our standards will provide norms for such studies. Blood pressure, PVR, and the practical surrogate for cerebral blood flow because with present technology we cannot continuously monitor the latter by the bedside. Tyszczuk et al determined that cerebral blood flow was independent of blood pressure in preterm infants, but again the selection of a mean arterial pressure of 30 mm Hg as the cut off is open to debate. We think that choosing such an arbitrary number was not appropriate and more such studies are needed with particular attention being paid to the very different normal blood pressures among preterm infants with various birth weights and gestational ages.


Patient triggered ventilation in neonatal respiratory distress syndrome

EDITOR,—Baumer reports the results of a large multicentre study comparing the effects of patient triggered ventilation (PTV) with conventional ventilation (IMV). 1 There appears to be no benefit from PTV compared with IMV in death rate, development of chronic lung disease, pneumothorax rates, and cerebral ultrason abnormalities. In addition, because of an increased trend toward a higher pneumothorax rate, Baumer concludes that, at present, PTV delivered with either the SLE 2000 or the Dräger babylog 8000 is not recommended for infants of less than 28 weeks gestation with respiratory distress syndrome (RDS).

However, we are concerned that this may be a premature conclusion given the significant difference in PTV delivered by the two main ventilators used and the potential heterogeneity of clinical practice within the different centres involved, despite agreed ventilation protocols. Dimitriou et al showed that neonates and infants trigger a significantly lower proportion of breaths using the SLE 2000, an airway pressure triggered ventilator that provided synchronised intermittent positive pressure ventilation (SIPPV). Attempts to optimise the trigger rate of the SLE 2000 ventilator by increasing pressure sensitivity often results in an unsafe mode of ventilation discussed by Baumer. Therefore the PTV modes of the two ventilators are substantially different. This prompts us to ask whether the findings of this multicentre study are only applicable to PTV provided by one particular make of ventilator? Would there have been a different outcome if all the triggered babies had received SIPPV?

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The data presented add to our knowledge on blood pressure in VLBW infants, but do not allow the conclusion that the suggested blood pressure standards are safe for all VLBW infants.

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The interest displayed in the trigger ventilation trial by Burmester and Petro is welcome. Their letter raises questions about the interpretation of the performance of the Dräger babylog 8000, which was used in a minority of infants in the study.

The trigger sensor device is different, and we agree with their implied statement that, as each trigger ventilator performs differently, results obtained using one ventilator cannot be extrapolated to another. However, both ventilators were in PTV mode (sometimes referred to as synchronous intermittent positive pressure ventilation, assist control, or synchronised assisted ventilation in infants), with the ventilator set to trigger at each inspiratory effort. No infants in this study were ventilated with IMV or IMV with an intermittent mandatory ventilation) where the baby's breaths, selected during a "time window", trigger the ventilator with the preset number of breaths per minute.

The results were reported in the way that they were for a reason. The original study design allowed a four way randomisation between the two makes of ventilator and the two modes of ventilation. Only three centres had enough of both ventilators to allow this to occur. Other centres ventilating infants with the Dräger babylog had a two way randomisation between PTV and IMV.

Therefore the possibility of confounding by differences in practice between centres needed to be excluded. If the centres using the Dräger as well as the SIPPV ventilators to allow this to occur. Other centres ventilating infants with the Dräger babylog had a two way randomisation between PTV and IMV.

Therefore the possibility of confounding by differences in practice between centres needed to be excluded. If the centres using the Dräger as well as the SIPPV ventilators were simply compared with those being ventilated with another. A logistic regression model was therefore used to allow for possible centre effects (as well as other significant factors such as gestation).

With that caveat, I have extracted the numbers from the database giving details of the crude observed rates of pneumothorax in the infants of less than 28 weeks gestation, separately reported for the two makes of ventilator (table 1).

The observed rate of pneumothorax was substantially (but not significantly, χ² 2.8, p > 0.05 = 0.1) higher in the infants ventilated in PTV mode than in IMV mode using the SLE 2000. Although the numbers are small, the observed pneumothorax rate was higher in infants ventilated with the Dräger babylog 8000 than in those ventilated with the IMV ventilator. It therefore seems somewhat illogical to recommend caution in using...
PTV, patient triggered ventilation; IMV, intermittent mandatory ventilation.

<table>
<thead>
<tr>
<th>Mode of Ventilation</th>
<th>PTV</th>
<th>IMV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dräger without pneumothorax</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>SLE without pneumothorax</td>
<td>154</td>
<td>114</td>
</tr>
<tr>
<td>SLE with pneumothorax</td>
<td>35</td>
<td>14</td>
</tr>
</tbody>
</table>

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Given that none of these differences were statistically significant, no clear recommendation can be given. This is why the wording used in the publication was “it might be prudent to avoid . . .”.

As regards the number of infants departing from their assigned mode of ventilation, several points should be emphasised. The study protocol permitted changing the mode of ventilation at the discretion of the attending clinicians. This was inevitably interpreted differently by each clinical team. Departure from the assigned mode of ventilation was not an intended outcome, and it is evident that this occurred more commonly in the more immature infants and those that subsequently died. High rates of departure from the assigned mode cannot therefore readily be interpreted as evidence of failure of the assigned mode. Table 2 shows the numbers of infants of all gestations departing from their assigned mode of ventilation.

There was therefore a higher crude rate of departure from the assigned mode of ventilation in infants ventilated with the Dräger babylog 8000, with a similar proportion being trigger ventilated using the Dräger ventilator.

It would be difficult to interpret the pneumothorax rates for infants who were actually being ventilated with their assigned mode of ventilation. Some infants were switched to another mode of ventilation after sustaining their pneumothorax. Most of the pneumothoraces occurred while infants were receiving their assigned mode of ventilation, and this included infants being trigger ventilated using the Dräger ventilator.

Burbester and Petros ask whether centres contributing few patients may have higher morbidity rates, correcting for potential confounding factors by using a logistic regression model. The pneumothorax rate from centres contributing less than 20 patients was the same as the centres contributing more infants.

We have used a model to identify outcome differences in infants randomised within three months of the first infant being entered into the study, correcting for individual centre effects, gestation, birth weight, and mode of ventilation. There was no significant difference in rates of death and chronic lung disease, abnormal cranial ultrasound scan, or duration of ventilation. However, an appreciable and statistically significant difference was found for pneumothorax rates. The 139 infants randomised within three months had a pneumothorax rate of 5% compared with a rate of 13% for those randomised more than three months into the trial (odds ratio 0.30; 95% confidence intervals 0.12 to 0.74; p = 0.009). This was seen equally for both modes of ventilation.

This finding suggests that the initial educational visit by the trial coordinator had a beneficial effect on ventilator management which disappeared as infants continued to be enrolled.

In summary, there is no evidence from this study of any trend towards better outcomes with the Dräger babylog 8000 ventilator, although the small numbers enrolled make any conclusions less robust. There is evidence that suggests there may have been a short term reduction in pneumothorax rates from the educational package offered at the start of the trial.

In conclusion, there was no convincing evidence of a beneficial effect of a policy of using PTV in preterm infants with RDS with the ventilators used. Regular attention to staff education on ventilator techniques is recommended.

I would like to use this opportunity to pay tribute to the two trial coordinators (Sue Ellis and Tom Mill), to the trial statistician (David Wright), and to the data monitoring committee (David Field and Diana Elbourne) whose detailed and dedicated involvement was invaluable. The trial coordinators, the trial statistician and the data monitoring committee are acknowledged for their contributions.

**Pyridoxine dependent epilepsy: a suggestive electroclinical pattern**

**EDITOR,—**There are several problems with describing the electroclinical pattern in pyridoxine dependent seizures. One is defining the electroclinical features. Until now all published reports (including four of the five cases of Nabbout and colleagues) have described the electroencephalogram (EEG) in neonates who have received other anticonvulsants before-hand. It is possible that anticonvulsants could affect the EEG, as suggested by the infant with the most pronounced burst suppression pattern in the paper of Nabbout and colleagues. This second method of assessing the electrical pattern is on withdrawal, when we, like others, found that a continuous or intermittent high volt slow wave pattern with or without spikes was typical. It would be very useful to know the EEG features of the patient who did not receive any other drugs before pyridoxine, as this would be the first description of the true electroclinical pattern in pyridoxine dependent seizures.

This study is limited by the use of EEGs in neonatal units. Very few of the neonates reported in the literature or in the UK study had EEGs before receiving pyridoxine. Presumably this reflects difficulties in obtaining EEGs out of hours or that there is no facility attached to the neonatal unit, as well as the desire to treat without delay. As a result, for some neonatal units it may be difficult to detect a specific electroclinical pattern.

A second difficulty is that the clinical features are not very specific. The neonatal presentation can be as: an acute encephalopathy, followed by later seizures; as seizures accompanied by encephalopathy (both of which introduce a wide differential diagnosis); as seizures alone; or, more unusually, as apparent acute abdominal obstruction or respiratory distress, usually accompanied by irritable behaviour, again followed by seizures. In some reports, seizures have been precipitated by sudden sounds or movements, although some of these could be an exaggerated startle response. Although we too found that a variety of seizures, especially generalised tonic and generalised clonic, occurred in most of our cases, some only had one or two seizure types. In the UK study, five of the 20 definite and probable cases with an early onset were reported to have a single seizure type (unpublished data).

The third concern is that Nabbout and colleagues did not include later presenting cases (older than 28 days) in their report. These also appear to be pyridoxine dependent as judged by trials of withdrawal and occurrence in siblings. They accounted for three of the 23 definite and probable cases in the UK population study, although a further five had early seizures that responded to routine anticonvulsants and then remained seizure free for several weeks. In these, both the clinical and electrical features can differ from neonates. For example, the inter-ictal EEG can be normal, or show focal or generalised spikes or sharp waves with or without high voltage slow wave activity. The clinical features include recurrent episodes of status and less varied seizure types. Concentrating on a possible neonatal pattern risks overlooking such cases.

As Nabbout and colleagues emphasise, there needs to be a high index of suspicion. Clinically it is important that pyridoxine dependency should be considered in all early childhood seizures, because (a) other conditions may be misleading and (b) early treatment does appear to be beneficial.

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**Parental visiting in neonatal units**

**EDITOR,—**We read with interest the paper by Cottini et al. Although policy on parental visiting is an easier issue to evaluate, parental participation in decision making, particularly in decisions with strong ethical overtones, is much more complex. It is difficult to evaluate with accuracy, and by its nature is much more controversial. The paper does not stress that data collected from each participating unit, through a structured questionnaire completed by the unit coordinator, represent policies—that is, the intention and stance of each unit towards the particular issue for evaluation. Data collected through questionnaires and interviews involving both unit staff and parents would have provided a better understanding of the actual practice of each participating unit.

No unit from Greece took part in the study by Cottini et al., but Greece is briefly mentioned in the Discussion, using results from a previous study in which, in a sample

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**Table 1** Rates of pneumothorax in infants of less than 28 weeks gestation using two different makes of ventilator

<table>
<thead>
<tr>
<th>Mode of Ventilation</th>
<th>PTV</th>
<th>IMV</th>
</tr>
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<tbody>
<tr>
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<td>35</td>
<td>14</td>
</tr>
</tbody>
</table>

PTV, patient triggered ventilation; IMV, intermittent mandatory ventilation.

---

**Table 2** Numbers of infants of all gestations departing from the assigned mode of ventilation

<table>
<thead>
<tr>
<th>Mode of Ventilation</th>
<th>PTV</th>
<th>IMV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dräger not departing</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>Dräger departing</td>
<td>16 (31%)</td>
<td>15 (27%)</td>
</tr>
<tr>
<td>SLE not departing</td>
<td>303</td>
<td>274</td>
</tr>
<tr>
<td>SLE departing</td>
<td>107 (26.1%)</td>
<td>47 (14.6%)</td>
</tr>
</tbody>
</table>

PTV, patient triggered ventilation; IMV, intermittent mandatory ventilation.

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**Table 3** Rates of departure from the assigned mode of ventilation

<table>
<thead>
<tr>
<th>Mode of Ventilation</th>
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</tbody>
</table>

PTV, patient triggered ventilation; IMV, intermittent mandatory ventilation.

---

**Table 4** Numbers of infants of all gestations departing from the assigned mode of ventilation

<table>
<thead>
<tr>
<th>Mode of Ventilation</th>
<th>PTV</th>
<th>IMV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dräger not departing</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>Dräger departing</td>
<td>16 (31%)</td>
<td>15 (27%)</td>
</tr>
<tr>
<td>SLE not departing</td>
<td>303</td>
<td>274</td>
</tr>
<tr>
<td>SLE departing</td>
<td>107 (26.1%)</td>
<td>47 (14.6%)</td>
</tr>
</tbody>
</table>

PTV, patient triggered ventilation; IMV, intermittent mandatory ventilation.

---

**Table 5** Rates of departure from the assigned mode of ventilation

<table>
<thead>
<tr>
<th>Mode of Ventilation</th>
<th>PTV</th>
<th>IMV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dräger without pneumothorax</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>SLE without pneumothorax</td>
<td>154</td>
<td>114</td>
</tr>
<tr>
<td>SLE with pneumothorax</td>
<td>35</td>
<td>14</td>
</tr>
</tbody>
</table>

PTV, patient triggered ventilation; IMV, intermittent mandatory ventilation.
of 38 units from 11 European countries, it was shown that the nine units that imposed visiting restrictions were in France, Greece, Italy, and Portugal.

We would like to provide further information on visiting policy in Greek neonatal intensive care units (NICUs). There are 15, two of which are private; 12 are attached to maternity hospitals and the remaining three are in children’s hospitals and accept distant referrals. In all but one (Aglaia Kyriakou Children’s Hospital), visiting restrictions are imposed. These allow parents only, and the usual practice is 30 minutes to one hour visiting time in the morning and afternoon (except mothers). The most common reasons given for imposing restrictions are increased danger of infection and a disruptive effect on the unit.

We conducted a survey, through questionnaire and interview, of parents with a baby who had been cared for in another NICU that imposed visiting restrictions before it was transferred to our NICU and/or parents who had had a previous baby in another NICU that imposed restrictions. The overwhelming majority (98.6%) said that they preferred our liberal policy on visiting. One mother of a preterm baby with bronchopulmonary dysplasia said that “if I had delivered at term I would be with my baby; if I had not delivered prematurely I would also be with my baby (in my womb); now that I have delivered prematurely why can’t I be with my baby?”

We conclude that in Greece there is a demand for unrestricted parental visiting, but most Greek NICUs do not meet this demand for reasons not based on medical or sociological evidence.

It is worth noting that, in Greece, infants beyond the neonatal period have been admitted to children’s wards with their mothers for more than 20 years.

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Ureaplasma colonisation and chronic lung disease in neonates

EDITOR.—We read the article by Hannaford et al with interest. We would like to point out that in our recent retrospective analysis, we found a significantly lower incidence of respiratory distress syndrome (RDS) in singleton infants compared with twins. We postulate that the low grade inflammatory effect of ureaplasma colonisation on the lungs of affected infants and acknowledge that our hypothesis is unsubstantiated. The possibility that a subacute uterine infection could stimulate endogenous surfactant production is a plausible explanation for the significantly lower incidence of respiratory distress syndrome (RDS) in these infants. The fact that intrauterine infection is low grade, may also mean that delivery is delayed for long enough for exogenous steroids to take effect.

The development of chronic lung disease (CLD) is dependent on many factors, and, in our study, it correlated less closely with ureaplasma colonisation than did RDS. We assume that other effects of multiple gestation outweighed those of ureaplasma infection on the development of CLD in twins. Presumably, the lower rate of RDS in ureaplasma-infected singleton infants reduced their risk of CLD, directly or indirectly. If so, there must be other respiratory insults severe enough to offset this effect. We were unable to identify factors associated with CLD apart from RDS and ureaplasma infection. In particular, the incidence of PDA did not differ between infants with and without CLD.

We postulate that the low grade inflammatory effect of intrauterine ureaplasma infection could cause significant irreversible lung damage and predispose to CLD, as well as stimulating the production of surfactant. The outcome is unlikely to be affected by erythromycin therapy after birth, except in the minority of infants in whom there is frank pneumonitis, with progression after birth.

We have not studied the effects of postnatal steroids, but this is unlikely to be a significant confounding factor, given that the time the study was done, steroid therapy was not given until about four weeks of age, when CLD was already established.

Although we agree that further research is needed to confirm our findings, we believe that the inverse relationship between ureaplasma colonisation and RDS was too strong to be dismissed as a statistical aberration.

Dr Gilbert et al respond:

EDITOR.—We thank Drs Bhandari and Hussein for their interest in our paper. We too were intrigued by the apparently contradictory effects of ureaplasma colonisation on the lungs of affected infants and acknowledge that our hypothesis is unsubstantiated. The possibility that a subacute intrauterine infection could stimulate endogenous surfactant production is a plausible explanation for the significantly lower incidence of respiratory distress syndrome (RDS) in these infants. The fact that intrauterine infection is low grade, may also mean that delivery is delayed for long enough for exogenous steroids to take effect.

The development of chronic lung disease (CLD) is dependent on many factors, and, in our study, it correlated less closely with ureaplasma colonisation than did RDS. We assume that other effects of multiple gestation outweighed those of ureaplasma infection on the development of CLD in twins. Presumably, the lower rate of RDS in ureaplasma-infected singleton infants reduced their risk of CLD, directly or indirectly. If so, there must be other respiratory insults severe enough to offset this effect. We were unable to identify factors associated with CLD apart from RDS and ureaplasma infection. In particular, the incidence of PDA did not differ between infants with and without CLD.

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CORRECTION

The authors of the paper “Risk adjusted and population based studies of the outcome for high risk infants in Scotland and Australia.” Arch Dis Child Fetal Neonatal Ed 2000;82:118–123 have asked us to publish the following corrected version of table 6. The authors apologise for the error.

Table: 6 Relative risk of neonatal death for very low birthweight infants in Scotland and England and Wales compared with Australia

<table>
<thead>
<tr>
<th></th>
<th>Relative risk of neonatal death</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>500–999 g</td>
<td>1.24</td>
<td>1.09–1.42</td>
</tr>
<tr>
<td>1000–1499 g</td>
<td>1.20</td>
<td>0.85–1.93</td>
</tr>
<tr>
<td>500–999 g</td>
<td>1.48</td>
<td>1.35–1.63</td>
</tr>
<tr>
<td>1000–1499 g</td>
<td>1.34</td>
<td>1.09–1.65</td>
</tr>
<tr>
<td>500–999 g</td>
<td>1.42</td>
<td>1.24–1.64</td>
</tr>
<tr>
<td>1000–1499 g</td>
<td>1.43</td>
<td>1.18–1.77</td>
</tr>
</tbody>
</table>

Scotland vs Australia 1993–94 1.24 1.09–1.42 1.20 0.80–1.61 1.22 1.08–1.39
Scotland vs Australia 1993–94 1.48 1.35–1.63 1.34 1.09–1.65 1.30 1.18–1.42
England vs Wales 1993–96 1.15 1.07–1.24 1.18 1.01–1.39 1.17 1.09–1.25
England vs Wales 1993–96 1.25 1.19–1.32 1.23 1.09–1.39 1.22 1.16–1.28
Ureaplasma colonisation and chronic lung disease in neonates

VINEET BHANDARI and NAVEED HUSSAIN

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doi: 10.1136/fn.83.2.F160i

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