A national review of neonatal resuscitation programmes for midwives

Editor—A considerable number of babies with no obstetric or neonatal at risk factors require help in establishing respiration at birth. Resuscitation training was compulsory for midwives in 132 (67%) units. Midwives are reassessed on average every 9.2 (5.8) months (range 6–24), with 148 (86%) units holding a logbook of attendance. There are regional differences in the availability of resuscitation programmes (range 77–100%), existence of standards of achievement (range 1–50%), and existence of compulsory resuscitation programmes (range 50–92%). Overall, North West hospitals have high scores in the above three categories stated. Currently, no individual region has the highest scores for all the categories stated.

This is the first national survey examining neonatal resuscitation programmes for midwives. Most (88%) of the 196 maternity units that responded have some form of resuscitation programme available for midwives. However, the programme in 42% of these units does not directly follow the Neonatal Life Support Course guidelines recommended by the UK Resuscitation Council. Moreover, 67% of programmes have no established standards. The average period of reassessment in these units is nine months. This interval may be too long because subtle skill retention has been shown to be lost within six months of a neonatal resuscitation programme.

The specific needs of UK midwives to provide basic neonatal life support have not been objectively evaluated, in contrast with the United States and Canada. In addition, there is a collective call for consistent skills attainment, nationally and internationally. The availability of midwives and personnel may contribute to regional differences in resuscitation programmes. Continued structural differences in neonatal resuscitation programmes will further exaggerate differences in local and national practices. Midwives must establish uniform standards in neonatal resuscitation and for mandatory hospital trust support not only in organising suitable resuscitation programmes, but also in ensuring compulsory attendance by midwives at these essential training sessions. Encouragingly, 84% of units currently not following the UK Resuscitation Council guidelines expressed a desire to change accordingly.

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Table 1 Clinical details of five neonates presenting with hypernatraemic dehydration

<table>
<thead>
<tr>
<th>Infant</th>
<th>Maternal parity</th>
<th>Birth weight (kg)</th>
<th>Day next weighed</th>
<th>Weight loss (%)</th>
<th>Plasma sodium</th>
<th>Plasma urea</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>3.430</td>
<td>8</td>
<td>25</td>
<td>168</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>2.120</td>
<td>7</td>
<td>24</td>
<td>172</td>
<td>34.8</td>
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<tr>
<td>3</td>
<td>6</td>
<td>5.769</td>
<td>6</td>
<td>19</td>
<td>158</td>
<td>48.1</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>3.630</td>
<td>6</td>
<td>20</td>
<td>150</td>
<td>10</td>
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<tr>
<td>5</td>
<td>3</td>
<td>2.420</td>
<td>4</td>
<td>13</td>
<td>157</td>
<td>6.1</td>
</tr>
</tbody>
</table>
Placement of neonatal central venous catheter tips in the right atrium: a practice to be avoided?

EDITOR.—Following the recent media interest in pericardial tamponade complicating the use of percutaneous central venous catheters in neonatal patients, we wish to alert readers to our experience. Our previous policy was to accept right atrial placement of percutaneous central venous catheter tips. This was in line with published recommendations and is still considered acceptable practice in some units in the United Kingdom, in contrast with practice in the United States. Between 1994 and 1997, we had five cases of neonatal pericardial tamponade, three of which resulted in death. All were associated with right atrial tip positioning, followed by angulation, curvature, or looping of the line. We have now changed our unit policy to avoid placement of catheter tips in the right atrium, and instead place them in the superior or inferior vena cava. In addition, to allow for the possibility of catheter migration, we recommend that catheter tips should lie at least 0.5 cm outside the cardiac outline on chest radiograph in small infants, or 1.0 cm outside in larger infants. Although the right atrial position carries a small risk of thrombosis or hydrothorax, these complications are more benign than pericardial tamponade, which has a mortality of 65%. We recommend that placement of a percutaneous central venous catheter tip in the right atrium should not be accepted in addition. We suggest that catheters that display angulation, curvature, or looping within the right atrium carry a particularly high risk of pericardial tamponade and demand urgent action. Although this issue has been the subject of correspondence in the RCPCH email discussion list, where the consensus was to avoid right atrial tip position, we believe there is a strong need for a wider debate about current practice in the United Kingdom.

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Newborns have unique confounding factors regarding the TTR-F ratio

EDITOR.—Sweet et al investigated the serum transferrin receptor (STIR) and, for the first time in neonates, transferrin receptor-log ferritin (TTR-F) ratio in a prospective series of cord blood taken from term infants and their mothers. They are to be congratulated on completing another piece of the complex jigsaw that is fetal and neonatal iron metabolism.

STIR and TTR-F were increased in iron deficient mothers, but not in their infants. The authors discussed at some length the translational (not transcriptional as stated in the discussion) control of intracellular ferritin synthesis. They measured serum ferritin, which is a glycosylated form of L-ferritin, and has been shown to correlate with intracellular iron in the absence of confounding factors. However, serum ferritin is secreted in response to a wide variety of stimuli, including, for example, inflammation and shows gender differences in newborns. Of these confounding factors, serum ferritin may not accurately represent tissue iron stores.

It has already been reported that STIR does not correlate with other measures of iron metabolism in the newborn. These discrepancies, serum ferritin may not accurately represent tissue iron stores.

The high sensitivity and specificity of the TTR-F ratio in adults is based upon their relationship in iron deficiency in the absence of factors that might otherwise elevate STIR levels. With both variables subject to these confounding factors in the neonate, I do not agree with the author’s assertion that the TTR-F “gives us a measure of iron requirements in relation to iron availability” in this unique population.

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Reply

EDITOR.—We thank Peter Reynolds, but feel that our use of the term post-transcriptional is not the best way to describe the regulation of intracellular iron metabolism was correct. Iron regulatory elements (IREs) are stem cell loop structures of several key messenger RNA (mRNA) encoding proteins of iron metabolism. IREs can be located in the 5′ region—for example, ferritin, or 3′ region—for example, transferrin receptor, of the untranslated region of the mRNA. In relative iron deficiency, interaction of the IREs in iron responsive proteins, transferrin uptake increases because the transferrin receptor mRNA is stabilised, whereas ferritin storage of iron decreases because translation of ferritin mRNA is blocked. These are clearly post-transcriptional, not post-translational events. The reciprocal regulation of the transferrin receptor and ferritin have recently been expertly reviewed by Hentze and Kuhn.

We agree that serum ferritin is increased in response to inflammation but the infants that we studied were born at term following normal pregnancies. All the babies were born healthy and did not require neonatal care. We think that it is unlikely that inflammation or other stimuli affected our serum ferritin values. Furthermore, in this study and in our previous study of preterm infants we found no gender differences in contrast to the results published by Tamura et al. Our figure for cord ferritin levels at term (listed first as mean ± SD) in female infants is almost identical to Tamura et al (164 ± 106 μg/l ± 166 ± 110 μg/l), but our value for male infants is higher (160 ± 97 μg/l ± 123 ± 71 μg/l). We doubt if there are real gender differences in ferritin levels. Therefore, we are still of the opinion that TTR-F index is a measure of iron requirements in relation to iron availability in the fetus and newborn in as adults and children.

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1 Hentze MW, Kuhn LC. Molecular control of vertebrate iron metabolism: mRNA-based regulatory circuits operated by iron, nitric oxide and oxidative stress. Pro Natl Acad Sci USA 1996;93:8175–82.

Changes in plasma creatinine in first 72 hours of life

EDITOR.—Recently, Miall et al have reported a rapid rise in serum creatinine in the first 48 hours of life in neonates. But we have noticed in our clinical day to day practice that this rise is transient and may not be clinically significant. To confirm this we looked at the initial serum creatinine levels on a stable group of term neonates admitted to the neonatal intensive care of King Fahd Hospital of the University, Al-Khobar, Saudi Arabia.

Neonates with congenital anomalies, perinatal asphyxia, and those requiring ventilatory support were excluded. The serum creatinine levels were measured together with electrolytes by using an automatic analyser (Dimension, Delaware, USA), which were relayed by the reporting computer system (Ulti-view, Los Angeles, USA). Serum creatinine was available for the first 72 hours on a limited number of neonates as most of the selected babies were stable within the first 48 hours of life and there was need for extra serum electrolyte and creatinine measurements. Out of all the newborns admitted during the three month study period who fulfilled the inclusion criteria, 13 neonates had serum creatinine measurements available for the first 72 hours. These readings were noted down and were analysed using the SPSS version 10. The data were expressed as mean, standard deviation and statistical significance.

Out of thirteen neonates, seven (53.8%) had an increase in their plasma creatinine on the second day while four (30.7 %) had a
Haemoglobinopathy as a cause of nucleated red cells in the fetus and neonate

**Editor,—** We are interested in the article by Hermansen on the causes of peripheral nucleated red cells in newborn children and would add another differential diagnosis to this finding. In the last decade, we have discovered two families affected by haemoglobin disorders where the diagnosis was suspected by the presence of high numbers of nucleated red cells in neonatal blood tests. In neither family was the potential for significant haemoglobin disorders suspected. The families concerned were Indian in origin and the marriages were consanguineous. The children now present with thalassaemia intermedia, but because of the difficulty in predicting the clinical course of these disorders, it is not yet clear whether they will become transfusion dependant, although this is highly likely for two individuals, one in each family.

The first recognised child in Family 1 was born in 1991. A blood test performed because of jaundice on the third day of life showed 160NRBC/100WBC. Other causes of erythroblastosis were excluded. Haemoglobin analyses on the parents showed that the mother was heterozygous for Indian inversion/ deletion db-thalassaemia. The father was a compound heterozygote for db-thalassaemia and Haemoglobin Headington. This child and two other children are homozygous for db-thalassaemia. The eldest child seems more severely affected and has been transfused twice, following infections.

The second family presented in 1996 when their first son was found at birth to have 2000NRBC/100 WBC. Other causes having been excluded, haemoglobin studies revealed only the existence of b-thalassaemia trait (codon 166B) in the father. The boy is now anaemic, has thalassaemia bocca of the skull and sphenomegaly, and looks as if he will need a transfusion programme. His brother, born in 1999, had 983NRBC/100WBC in his initial blood test, and has also inherited his father’s haemoglobin pattern. It is likely that this family is showing dominant b-thalassaemia, although recent studies suggest there may be a co-inherited aldolase deficiency, akin to aldolase, from the mother. (J Porter, personal communication).

We hope this report may help in the investigation of other families.

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**Neonatal paroxetine withdrawal syndrome or actually serotonin syndrome?**

**Editor,—** We would like to comment on the article “Neonatal paroxetine withdrawal syndrome” in the March 2001 issue of the journal. The authors describe what they have called “neonatal paroxetine withdrawal syndrome”. However the syndrome reported in the 4 neonates appears to be more consistent with serotonin toxicity, rather than withdrawal of paroxetine.

The literature to date contains one large series, two similar case reports with fluoxetine and two case reports with paroxetine.

In the fluoxetine cases the syndrome was not described as a withdrawal phenomenon. In the first, a neonate born to a mother on fluoxetine had jitteriness, irritability, tachypnoea, temperature instability, tremors, increased muscle tone, and a hyperactive Moro reflex. All except the last of these are clinical features seen in serotonin toxicity in adults using selective serotonin uptake inhibitors (SSRIs) therapeutically or in overdose.

The neonate in this case had fluoxetine levels that were measurable initially and which fell as symptoms resolved.

In the two case reports with paroxetine, the syndrome is referred to as withdrawal phenomenon. However the time course and symptoms were similar to serotonin toxicity.

In the cases reported by Stiksil et al the neonates developed the features soon after birth and they resolved over a period of days. In case 2 an increased serum paroxetine level was reported in the infant. The level was too low to detect by day 15, supporting a toxicity syndrome, rather than a withdrawal phenomenon. Similarly, in case 4 there was a raised serum paroxetine level at the time of the adverse effects. Serum paroxetine levels have been positively related to serotonin toxicity in adults.

The features of case 4 may also have been exacerbated by the use of opioids in the delivery room. Pethidine is a well recognised cause of serotonin toxicity in conjunction with a serotoninergic agent.

By March 2001, there were 13 reports to the Australian Drug Reaction Advisory Committee classified as “withdrawal syndrome...
neonatal” in conjunction with maternal use of an SSRI. However, on perusal, many appear to describe serotonin toxicity. We have also been involved with the management of a neonate, born to a mother following a sertraline overdose, who exhibited features of serotonin toxicity. In this case there was a single maternal ingestion 1 hour before delivery and therefore no earlier foetal exposure to cause withdrawal. We are concerned about the increasing use of the term “neonatal withdrawal syndrome” in symptomatic neonates being born to mothers on SSRIs. This may prompt the use of SSRIs themselves to treat the condition with the potential to increase toxicity. The condition should be correctly referred to as “neonatal serotonin toxicity” or, less specifically, poor neonatal adaptation secondary to serotonergic agents.

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Authors’ response

Editor,—Isbister and colleagues point out important issues in defining the syndrome we and others described.1 2 Their argument is that the described syndrome is due to a hyper serotoninergic state, rather than a lack of serotonin effect, as the term “withdrawal” suggests. We agree that this issue must be clearly solved because of the significant implications in the clinical management of some of the patients, especially concerning the role of continued breast feeding. At the same time, we are unsure whether we have sufficient data to declare that this is a hyper serotoninergic condition. When we started summarising our experience as a report, we debated what terminology should be used to describe our patients. The term “SSRI discontinuation syndrome” was considered as it simply describes the temporal relationship between the dose and the syndrome. However, we opted for “withdrawal” because of its common use in similar cases in the literature. For example, a report by Kent and Laidlaw describes a full term healthy boy born to a mother on sertraline who was breast fed for three weeks. A day after weaning he developed agitation, poor feeding, constant crying, insomnia, and an enhanced startle reaction.

These effects intensified over 48 hours then subsided. The time course in this case strongly suggests a withdrawal reaction. Our 2 patients had therapeutic serum concentrations of the drug. However, we do not know the concentrations prior to the presentation, hence the interpretation of the data is not as simple as Isbister and the colleagues indicate.

We think that the conditions we described resulted from a hypo-serotonergic state due to withdrawal. However, the possibility of functional excess of serotonin cannot be ruled out from the clinical assessment alone as there is considerable overlap between the two entities. The cause of the discontinuation syndrome in adults also remains incompletely understood.

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