Weighing alone will not prevent hypernatraemic dehydration

Having recently reviewed the case notes of babies readmitted to hospital in the first 10 days of life (over a one year period), we firmly agree with the views expressed by Laing and Wong.¹ The incidence of documented hypernatraemic dehydration secondary to the failure of lactation in Bristol is 1.7 per 1000 live births much higher than that described by Oddie et al. in the Northern Region (2.5 per 10 000 live births).² In addition only 50% of infants readmitted with weight loss of <10% had a plasma sodium concentration measured. The true incidence of hypernatraemic dehydration secondary to lactation problems in Bristol could thus be as high as 3.4 per 1000 live births. Our estimate could be an underestimate. Firstly, our study looked only at infants readmitted within 10 days (Oddie et al. looked at infants readmitted up to 1 month of age) and secondly, due to failure to recognise of this condition.

Laing and Wong proposed weighing all infants when the Guthrie blood samples are taken, to identify those infants at risk of dehydration. We believe that this is too late as in many areas this occurs on days seven or on day 10 with handover of care to the health visitor. We have already described a series of babies with hypernatraemic dehydration where all presented to hospital before day seven.³ The case has been made correctly that newborn hypernatraemia is due to unsuccessful feeding.⁴ While we agree that careful examination and observation of the infant while feeding and so forth may identify these babies, we would dispute that this is currently universally possible. Due to midwifery shortages, postnatal wards are staffed and community midwives are fully stretched, so many women are discharged within a few hours of delivering. If a midwifery home visit does not coincide with a feed, the mother's assessment of feeding is assumed to be correct (as indeed it usually is). Weighing the baby will reassure most mothers that their baby is following the normal pattern of loss followed by gain. Identification of excessive weight loss should prompt the health professional to examine the baby for evidence of illness and carefully observe breast feeding technique. These mother-baby dyads could then be given additional support and advice in the community and thus successfully establish feeding. In our experience once the baby has become ill and required readmission to hospital the mother is reluctant to continue to attempt breastfeed. There continues to be confusion regarding the best way to manage this problem.⁵ It should be remembered that these babies have normal guts and are suffering from starvation. If the infant is not shocked, rehydration can occur safely using enteral fluids: expressed breast milk or a breast milk substitute. Serum sodium should be measured six hourly initially and the volume of milk altered to ensure a slow return to normality. We believe that we need to foster a greater awareness of this problem and weigh the babies at risk around day five if we are to prevent tragedies resulting from a common condition affecting otherwise well babies.

D Harding, J Maxham, P Cairns
Neonatal Medicine, Department of Child Health, University of Bristol, Bristol, UK; david.harding@bristol.ac.uk

References

3. Harding D, Cairns P, Gupta S, et al. Hypernatraemia: why wasn't it weighed? A case described in Oddie et al of a "bottle fed" baby admitted at 6 days of age with hypernatraemic dehydration whose dehydration had nothing to do with the bottle milk being "fed" to her but was caused by that she had oesophageal atresia.⁶ Hypernatraemic dehydration is frequently seen in the elderly and the mentally handicapped when their need for basic care, and presumably a regular intake of water, is neglected.⁹

Hypernatraemic dehydration is a sign of illness not a diagnosis. It is commonly caused by excess water loss or by insufficient water intake, either alone or in combination. Laing and Wong have almost never the result of excess sodium intake, which would result in retention of water and an increase in body weight, though this would obviously require intact thirst mechanisms and access to sufficient water.

S Richmond
Sunderland Royal Hospital, Sunderland, UK; sam.richmond@ncl.ac.uk

References


LETTERS

If you have a burning desire to respond to a paper published in ADC or F&N, why not make use of our "rapid response" option?

Log on to our website (www.archdischild.com), find the paper that interests you, click on "full text" and send your response by email by clicking on "submit a response".

Providing it isn’t libellous or obscene, it will be posted within seven days. You can retrieve it by clicking on "read eLetters" if you want to retrieve it by clicking on "read eLetters".

We believe that we need to foster a greater awareness of this problem and weigh the babies at risk around day five if we are to prevent tragedies resulting from a common condition affecting otherwise well babies.

D Harding, J Maxham, P Cairns
Neonatal Medicine, Department of Child Health, University of Bristol, Bristol, UK; david.harding@bristol.ac.uk

References

3. Harding D, Cairns P, Gupta S, et al. Hypernatraemia: why wasn't it weighed? A case described in Oddie et al of a "bottle fed" baby admitted at 6 days of age with hypernatraemic dehydration whose dehydration had nothing to do with the bottle milk being "fed" to her but was caused by that she had oesophageal atresia.⁶ Hypernatraemic dehydration is frequently seen in the elderly and the mentally handicapped when their need for basic care, and presumably a regular intake of water, is neglected.⁹

Hypernatraemic dehydration is a sign of illness not a diagnosis. It is commonly caused by excess water loss or by insufficient water intake, either alone or in combination. Laing and Wong have almost never the result of excess sodium intake, which would result in retention of water and an increase in body weight, though this would obviously require intact thirst mechanisms and access to sufficient water.

S Richmond
Sunderland Royal Hospital, Sunderland, UK; sam.richmond@ncl.ac.uk

References

Hypernatraemia in the first few days: a tragic case

Laing and Wong highlight the fact that hypernatraemic dehydration can be difficult to recognise and may have serious consequences. We describe an extreme case.

An 8 day old infant was admitted to hospital with a small haematocrit. She had lost 19% of her birth weight and her plasma sodium was 173 mmol/L. She had renal and hepatic impairment and was found to have a thrombosis of the descending aorta. In spite of rehydration, thrombolyis and full intensive care support, she died the following day from progressive subduralphagmatic ischaemia and multiorgan failure. A postmortem revealed no underlying abnormalities. Parental thrombopilia screens were normal.

The maternity notes revealed that she was born at term weighing 3.18 kg after an uncomplicated pregnancy. She had hypothyroidism, a hypernatraemic dehydration and a thrombosis of the descending aorta, and was diagnosed with a thrombosis of the descending aorta. In spite of rehydration, thrombolyis and full intensive care support, she died the following day from progressive subduralphagmatic ischaemia and multiorgan failure. A postmortem revealed no underlying abnormalities. Parental thrombopilia screens were normal.

The literature on the incidence of hypernatraemia in the first few days is sparse. The incidence is rising. Arch Dis Child Neonatal Ed 2002; 87:F18–62.

P D Macdonald
Southern General Hospital, Glasgow G51 4TF, UK
peter.macdonald@nhs.scot.nhs.uk

Louise Grant, S R M Ross
Southern General Hospital, Glasgow G51 4TF, UK

Systemic and cerebral blood flow

We read with interest the findings of Evans et al concerning the changes in middle cerebral artery (MCA) haemodynamics over the first two days after birth in preterm infants. Evans et al demonstrated a significant change in several Doppler velocity measures in the MCA, including systolic, diastolic, and mean velocity, pulsatility index and velocity time integral, during days 1 and 2 after birth in a cohort of preterm infants. Blood flow (F), blood pressure (P), and vascular resistance (R) are closely related (F = P/R), and resistance changes are a function of changing vessel calibre. The authors attempted to measure MCA diameter, but because measurements were inaccurate the authors did not attempt to calculate values for MCA blood flow.

Our own studies of cerebral haemodynamics, using near infrared spectroscopy, supports the view of Evans et al that there are significant changes in cerebral blood flow over the first 36 hours after birth. The demographic details of our cohort were similar to the one studied by Evans et al; however, we placed the infants on mechanical ventilation, and in our study the arterial oxygen saturation was 95%±3% during the first 4 days. We found a significant increase in cerebral blood flow between days 1 and 2 was accompanied by a significant decrease in cerebral fractional oxygen extraction (FOE). High cerebral FOE may protect the brain from hypoxia-ischemic injury, a potential consequence of reduced cerebral blood flow.

The results presented by Evans et al give an insight into the complex relationships that exist within a dynamic fluid system. Systemic blood pressure was closely related to MCA mean velocity, but not estimated MCA diameter, thus implying that cerebral blood flow would vary independently of systemic blood pressure because of changes in cerebrovascular resistance. Our own observations have produced similar results. Cerebral FOE, which is expected to increase as cerebral blood flow decreases, is not related to mean arterial blood pressure. There is, however, a significant relationship between cerebral FOE and left ventricular output. This major determinant of central blood flow. This latter finding is in agreement with the observation of Evans et al that superior vena cava blood flow, also related to central blood flow, was significantly associated with estimated MCA diameter.

Evans et al remind us that velocity is not the same as flow. Their observations, and our own, stress the importance of vascular resistance in mediating the relationship between blood pressure and blood flow. In the sick preterm infant, the presence of an adequate mean arterial blood pressure is often achieved using pharmacological methods. Although this is reassuring, it does not guarantee the presence of good central blood flow, nor the adequate perfusion of the end organs, including the brain.

C M Kissack, S P Wardle, A M Weindling
Neonatal Unit, Liverpool Women’s Hospital, Liverpool, UK
ukmearnhared@yahoo.co.uk

References

Transcutaneous bilirubin measurement in newborn infants: evaluation of a new spectrophotometric method

Transcutaneous bilirubinometry in jaundiced newborns has been extensively evaluated in the literature. Information about the new BiliCheck (TcBC) device has appeared in recent years. Because of the high correlation coefficient, most studies conclude that transcutaneous bilirubinometry could possibly replace the laboratory measurement of serum bilirubin (TSB). However, the number of infants with serum bilirubin > 257 µmol/l (15 mg/dl) is too small to assess the accuracy of TcBC for such infants.

We tested the clinical usefulness of this new device and compared it with the established Jaundice Meter (TcBM) by evaluating the levels of agreement, with TSB as the clinically used standard. Bilirubin levels were measured by TcBM, TcBM, and TSB in 122 healthy newborns gestational age 34–42 weeks; mean age 34–42 weeks; mean (SD) birth weight 3187 (582) g during the first days of life. For TSB the Vitros 250 Bulb slide was used. For statistical analysis, the correlation coefficients were calculated and the difference plots determined by the Bland-Altman method.

TSB levels ranged between 13.7 and 339 µmol/l (0.8 and 19.8 mg/dl) (mean 186.6 µmol/l (10.89 mg/dl), median 193.6 µmol/l (11.3 mg/dl)). The correlation coefficient, r, was 0.92 between TcBC and TSB, and 0.85 between TcBM and TSB. The plot of differences of TcBC against TSB yielded a maximum range of −109.9 to +56.5 µmol/l (−6.3 to +3.3 mg/dl). The bilirubin level at which TSB > TcBM was +107.9 µmol/l (−7.23 to +6.3 mg/dl). The 95% limits of agreement were between −61.5 and +55.3 µmol/l (−3.59 and +3.23 mg/dl) for TcBC, and −93.4 and +80.2 µmol/l (−5.45 and +4.68 mg/dl) for TcBM.

Although the correlation coefficients give the impression that TcBM and TcBM provide an accurate estimate of TSB, the differences between transcutaneous measurements were mean 39 and were not different. Both TSB values were often quite large. In particular, if TSB levels were higher than 188 µmol/l (11 mg/dl), the measurements of both instruments progressively deviated to lower bilirubin levels than TSB. This leads to a dangerous understimation of TSB, especially if a decision on treatment has to be made.

We conclude that transcutaneous bilirubinometry with the BiliCheck can be used as a screening tool in the evaluation of hyperbilirubinaemia, but it cannot replace laboratory measurements of serum bilirubin. Given the wide limits of agreement, we recommend that a venous blood sample is taken, if the difference between a potential phototherapy limit and the TcBM level falls below 60 µmol/l (3.5 mg/dl).

References

M Beck, N Kau
Department of Neonatology, Children’s Hospital Medical Center of the University of Bonn, Bonn, Germany

H Schlebusch
Center for Obstetrics and Gynecology of the University of Bonn, Germany

Correspondence to: Dr Beck, Zentrum für Kinderheilkunde der Universität Bonn, Adenauerallee 119, D-53113 Bonn, Germany
martin.beck@uni-bonn.de

www.archdischild.com
We observed hyponatraemia in several preterm infants with a ventricular access device punctures in preterm infants as a consequence of serial liquor punctures in the liquor. The mean sodium loss in the liquor was 3–34 ml (mean 15.6 ml). The resulting daily sodium loss was sometimes as high as the normal sodium requirement per day (3–5 mmol/kg/day).

Hyponatraemia in the first week of life in preterm infants

K Tenbrock, A Kriss, B Roth
Department of Neonatology and Pediatric Intensive Care, University Children's Hospital of Cologne, Cologne, Germany

B Speder
Neurosurgical Department, University Hospital of Cologne

Correspondence to: Dr Tenbrock, Walter Reed Army Institute of Research, MCR, Washington DC 20307-7100, USA; klaus.tenbrock@na.amedd.army.mil

References

Use of animal surfactant: should we seek consent?

Animal derived surfactants such as Curosurf (porcine) and Survanta (bovine) are the commonly used surfactants in the United Kingdom. Involvement in a trial of a new artificial surfactant, and the specific information on the origins of the surfactant in the patient information leaflet led us to review our practice. Two families declined to participate in the trial. A Hindu family wished to avoid use of Survanta, as cows are considered sacred in Hindu religion. A Moslem family preferred to avoid porcine products. Having reviewed our own practice, we were unsure as to the practice of other units.

We telephoned the second on call doctors in 42 teams providing newborn resuscitation and initial surfactant therapy to preterm infants in England and Wales. Respondents were asked about which surfactant was available in their unit (120 mg/kg/day; 30 mg/kg/dose). We sought consent? and asked about which surfactant was available in their unit and whether the treatment was usual. Respondents were asked about which surfactant was available in their unit (120 mg/kg/day; 30 mg/kg/dose). We asked about which surfactant was available in their unit and whether the treatment was usual. With many units choosing to stock only one surfactant, we think that it is important to keep all parents fully informed of the possibility of using the other surfactant.

We suspect that, while fully informed, most parents would agree to a life saving medicine. However, we are not sure if this consent should be presumed where there are grounds to wonder if this may be a problem. Individual doctors still need to make these decisions to avoid the perception that the medical profession has a paternalising attitude.

We hope to generate a discussion to see if a consensus can be evolved.

R Adappa, R Benson
Department of Paediatrics, Ysbyty Gwynedd, Bangor, N Wales, UK
S Oddie, J Wylie
Neonatal Intensive Care Unit, James Cook University Hospital, Middlesbrough, UK

Correspondence to: Dr Adappa, Roshanadappa@mac.com

Intravenous propacetamol overdose in a term newborn

Following a prescribing error, a term female infant was given two intravenous doses of 900 mg propacetamol (307 mg/kg/dose) at 6 hour intervals, which is 10 times the routine dose used in our unit (120 mg/kg/day; 30 mg/kg/dose). When the error was noted, immediately after the second dose, the plasma paracetamol level was 163.8 mg/l. N-Acetylcysteine was given as follows: 150 mg/kg (450 mg) after 15 minutes, 50 mg/kg (145 mg) after four hours, and 100 mg/kg (290 mg) after 16 hours. Plasma paracetamol levels were checked: 119 mg/l five hours later, 61.4 mg/l 11 hours later, 28.8 mg/l 16 hours later, and finally 1 mg/l 24 hours after the second dose (fig 1). Liver function and clotting factors were normal. The infant was discharged on day 7.

Paracetamol poisoning in newborn babies is usually due to either maternal absorption of high doses of the drug just before birth or oral absorption of an inappropriate dose. Reports of propacetamol overdose are unusual, and so far the overdose has only been by intramuscular injection. As far as we know, this is the first report of intravenous propacetamol poisoning in a newborn. This reason may be the rare use of this drug during the neonatal period, the pharmacokinetics having been

Figure 1 Serum paracetamol levels after administration of N-acetylcysteine.
published in only one study for this stage of life. However, as with other routes of administration described in the literature, no adverse effects were seen in this case. The administration of N-acetylcysteine following guidelines given for older patients proved efficient. The elimination of the drug seems to be linear. Although drug overdose should be carefully avoided, intravenous propacetamol is probably safe in term newborn babies.

A de la Pintière, A Beuchée, P E Bétrémieux
Unité de réanimation néonatale et pédiatrique, Pavillon Lechartier CHU Pontchaillou, Rennes 35033, France; pierre.betremieux@chu-rennes.fr

References

Endotracheal tube fixation in neonates
A stitch in time saves nine. But not all neonatal units believe in this saying and use different methods to secure oral endotracheal tubes in neonates who require ventilatory support. Success in stabilising a premature infant is best achieved by least intervention and good ventilatory support. A stable oral endotracheal tube will help. A naso-oral endotracheal tube is extremely easy to stabilise; however, stabilisation is not routinely performed in the United Kingdom.

Three commonly used methods are: (a) stitching the tube to a plastic flange; (b) fixing a premeasured and cut tube in a flange with adhesive tape; (c) fixing a premeasured and cut tube into a tight fitting flange. In all three methods, the tube is secured by tying it to the baby’s hat.

Normally, weight or foot length is used to determine endotracheal tube size, and this is quite reliable. However, head movement, suctioning, and patient care can all cause instability and displacement of the tube. If the tube is too short, there will be ineffective ventilation. If the tube is too long, it may collapse resulting in selective ventilation. A precut tube is difficult to manipulate if the positioning is not satisfactory. This is not a major problem in a stitched tube. There are pros and cons to each method.

There are no comparative studies from the United Kingdom to evaluate the benefits and disadvantages of each method. A search through the databases found no randomised trials comparing various techniques, except one study which compared an umbilical clamp with the routine fixing method.

Accidental extubation or unsatisfactory positioning of the tube may influence the reintubation rate. Securing and properly stabilising an endotracheal tube can solve this problem to a large extent.

A prospective randomised trial evaluating each method against reintubation criteria will help neonatal units to adopt the correct policy for their own situation.

V A Pai
Southmead Hospital, Bristol, UK

B V Pai
Royal united Hospital, Bath, UK; binapai@hotmail.com

References
Systemic and cerebral blood flow

C M Kissack, S P Wardle and A M Weindling

Arch Dis Child Fetal Neonatal Ed 2003 88: F350
doi: 10.1136/fn.88.4.F350-a

Updated information and services can be found at:
http://fn.bmj.com/content/88/4/F350.2

These include:

References

This article cites 2 articles, 1 of which you can access for free at:
http://fn.bmj.com/content/88/4/F350.2#BIBL

Email alerting service

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/