PostScript

LETTERS

Acute renal insufficiency in the neonatal intensive care unit

We read with interest the report by Cataldi *et al* of the case-control study on acute renal failure in preterm infants in seven Italian neonatal intensive care units.[1] We have recently completed a one year study of acute renal failure (ARF) in 467 consecutive admissions to a tertiary neonatal referral unit. There were 5661 live births in the adjoining maternity unit over the year, and 47 admissions were from outborn patients (one surgical, 46 medical). We defined ARF as plasma creatinine >100 µmol/l at 48 hours of age based on published data of declining creatinine concentrations in infants of various gestational ages.[2] Forty one infants (8.8% of NICU admissions) fulfilled this criterion, with renal impairment occurring in 23 of 63 (37%) admissions <28 weeks gestation, 10 of 123 (8%) at 28–32 weeks gestation, four of 93 (4%) at 33–36 weeks gestation, and four of 188 (2%) term infants. Cataldi *et al* noted that 79% of cases of ARF occurred in very low birthweight infants <1500 g, who were all <37 weeks gestation, compared with 63% in our series, which included infants of any gestation.

We also found the causes of ARF to be multifactorial, with sepsis the predominant insult in 16/41 (39%), perinatal asphyxia in 7/41 (17%), and hypotension not associated with sepsis in 4/41 (10%). A pH<7.3 was found in 59% of infants at the time of onset of the ARF, and 39% received inotropic support. In 13/41 (32%) infants, we found no specific cause other than prematurity. We agree that drug administration may be an important factor, with indomethacin being used prophylactically on our unit in all ventilated patients with a birth weight less than 1000 g or <28 weeks gestation.

The clinical management for ARF was conservative in all cases, with no infant requiring dialysis.[3] Death was the outcome in 10/41 patients (24%), and in only one was renal failure felt to be a contributing cause. Cataldi *et al* reported an 11% mortality in their 71 patients, but these data were gathered over three years in seven different units, and our series represents a one year survey in one tertiary unit. Mortality depends on the proportion of external admissions to the unit and the treatment of extreme preterm infants. The patients who died in our series (table 1) were more premature with a lower birth weight and had a more profound acidosis. All but two of the survivors in our study had a plasma creatinine <100 µmol/l before discharge. One term infant with perinatal asphyxia had persistent renal impairment, and one child had surgical treatment for posterior urethral valves with associated renal dysplasia.

We would concur with Cataldi *et al* that renal impairment is common in low birthweight infants, and careful attention to fluid and electrolyte management, along with drug dosing, is essential. However, there is still a paucity of information on the long term outcomes of neonates with ARF. Assessment of renal function should be part of the long term follow up of preterm cohorts, as acute renal impairment combined with potential oligonephronia could lead to hypertension and renal impairment in later life.[2 4]

A J F Lunn, I Shaheen, A R Watson
Nottingham City Hospital, Nottingham, UK
Dr Lunn, Nottingham City Hospital, Hucknall Road, Nottingham NG5 1PB, UK; alunn@ncht.trent.nhs.uk

doi: 10.1136/adc.2005.092023

Competing interests: none declared

References

1 **Cataldi L**, Leone R, Moretti U, *et al*. Potential risk factors for the development of acute renal failure in preterm newborn infants: a case-control study. *Arch Dis Child Fetal Neonatal Ed* 2005;**90**:F514–19.
2 **Drukker A**, Guignard J-P. Renal aspects of the term and preterm infant: a selective update. *Curr Opin Pediatr* 2002;**14**:175–82.
3 **Strazdins V**, Watson AR, Harvey B. Renal replacement therapy for acute renal failure in children: European guidelines. *Pediatr Nephrol* 2004;**19**:199–207.
4 **Rostand SG**. Oligonephronia, primary hypertension and renal disease: ''is the child father to the man?''. *Nephrol Dial Transplant* 2003;**18**:1434–8.

Should ultrasound be routinely used to confirm correct positioning of nasogastric tubes in neonates?

The National Patient Safety Agency (NPSA) has recently recommended the use of pH specific paper to test gastric aspirates instead of the traditional litmus paper in order to reduce harm caused by misplaced nasogastric feeding tubes.[1]

Eleven deaths and one case of serious harm over a two year period have been recorded. The evidence base is predominantly from adult studies, which show that the conventional methods including litmus paper and auscultation to check the placement of oro/nasogastric tubes can be inaccurate.

Nasogastric tube usage is very common in neonatal units. Over the years, units have relied on the experience of trained nursing staff in passing, testing, and using nasogastric tubes. Anecdotally, despite the large number of infants with nasogastric feeds, few have experienced serious problems. However, there has been no national system in place for reporting adverse incidents associated with use of nasogastric tubes in neonates, and so under-reporting may well have occurred. Aspiration and physiological disturbance have also been reported.[2]

The NPSA has excluded neonates from their guideline. Draft guidelines of the British Association of Perinatal Medicine[3] for confirming correct positioning of nasogastric tubes in neonates recommend the use of pH specific paper to test gastric aspirate and also suggest the use of ultrasound. Ultrasound has been shown to be successful in correct placement of nasoenteric feeding tubes in critically ill adult patients.[4]

We have therefore audited the successful recognition of placement of a nasogastric tube by ultrasound against our unit protocol of using pH specific paper with pH<5.5.

Ten preterm babies (gestational age 30–33 weeks, birth weight range 1800–2200 g, 3–5 days postnatal age, and on bolus two to three hourly feeds) were selected at random.

The nasogastric tube position had been confirmed in all 10 by pH specific paper with pH<5.5. A consultant paediatric radiologist (AE) scanned their abdomens. In only one case of 10 could intragastric positioning of the nasogastric tube tip be confirmed. χ^2 analysis showed this difference to be highly significant ($p<0.001$).

The single positive scan was in an infant who had just been fed (10 minutes before), and thus the nasogastric tube was seen against a background of milky stomach contents in contrast with a background of stomach gas.

Our pilot audit suggests that pH specific paper is safe and reliable, but abdominal ultrasound is not, for confirming nasogastric tube position in neonates.

S Tamhne, D Tuthill
Department of Paediatrics, Children's Hospital for Wales, Cardiff, Wales, UK

A Evans
Department pf Radiology, University Hospital of Wales, Cardiff

Correspondence to: Dr Tamhne, Dr Tuthill, Department of Paediatrics, Children's Hospital for Wales, Penlan Road, Penarth, Cardiff CF64 2XX, Wales, UK; davidtuthill@cardiffandvale.wales.nhs.uk; Sarang.tamhne@gmail.com

doi: 10.1136/adc.2005.088476

Competing interests: none declared

References

1 **National Patient Safety Agency (NPSA)**. Interim advice for all healthcare staff. 22 February 2005. www.npsa.nhs.uk (accessed 27 Apr 2006).
2 **Del Toro J**, Louis PT, Goddard-Finegold J. Cerebrovascular regulation and neonatal brain injury. *Paediatr Neurol* 2004;**7**:3–12.
3 **British Association of Perinatal Medicine (BAPM)**. BAPM information update no 28. www.bapm.org (accessed 27 Apr 2006).
4 **Hernandez-Socorro CR**, Marin J, Ruiz-Santana S, *et al*. Bedside sonographic guided versus blind nasoenteric feeding tube placement in critically ill patients. *Crit Care Med* 1996;**24**:1690–4.

Table 1 Gestation (mean), weight (mean), peak creatinine (median), and pH (mean) in infants who died compared with all preterm infants and all patients in our study

	Died (n = 10)	All preterm (n = 37)	All patients (n = 41)
Gestation (weeks)	26	27	28
Weight (kg)	0.805	1.13	1.335
Creatinine (µmol/l)	143	138	149
pH	7.131	7.249	7.248