Amiodarone and breast feeding

An infant was born at 33 + 2 weeks gestation by caesarean section after an in utero diagnosis of fetal asci and tachycardia. The mother had received treatment during pregnancy with flecainide, amiodarone, and propranolol. The amiodarone was prescribed initially at 200 mg three times a day and was reduced to twice a day after 11 days. Throughout this period the baby remained well and thyroid function was normal.

Although we would not recommend that breast feeding is necessarily safe for all babies exposed to amiodarone, this case illustrates that, in some circumstances, with close monitoring, breast feeding can be initiated.

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Reducing antibiotic use on the neonatal unit by improving communication of blood culture results: a completed audit cycle

It is common clinical practice to discontinue antibiotic treatment of asymptomatic babies if the blood cultures are negative at 48 hours. However, if blood culture results are only available during the normal working day, then antibiotic treatment of some babies may continue into the next working day. In our neonatal unit, blood culture results were routinely received from the microbiology laboratory via fax as a list every morning. Extra positive results would be telephoned through, if they became available, during the normal working day. Results could also be checked by the clinical staff telephoning the laboratory during “office hours”. This gave the potential for inadvertent prolongation of antibiotic courses for up to a day. In a previous study, McDonald et al found this to be a common occurrence. It is of concern because unnecessary antibiotic use may contribute to antibiotic pressure on the neonatal unit and may encourage the selection of drug resistant organisms.

We performed two audits into this problem within our neonatal unit. Our audit standard throughout the day. By 25 days, amiodarone was undetectable. Throughout this period the baby remained well and thyroid function was normal.

Table 1

<table>
<thead>
<tr>
<th>Results</th>
<th>Antibiotics stopped after</th>
<th>Antibiotics continued for</th>
<th>Antibiotics continued after</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;48 h</td>
<td>&gt;48 h deliberately</td>
<td>&gt;48 h unintentionally</td>
</tr>
<tr>
<td>First audit</td>
<td>132 (35.1%)</td>
<td>75 (19.9%)</td>
<td>144 (38.3%)</td>
</tr>
<tr>
<td>Second audit</td>
<td>117 (65.4%)</td>
<td>27 (15.1%)</td>
<td>20 (11.2%)</td>
</tr>
</tbody>
</table>

The results are summarised in table 1. The first audit was conducted on 451 babies with negative blood cultures between January 1997 and December 1998. We were able to collect complete data from case notes and drug charts for 376 (83.4%) of these blood cultures. We found that the audit standard was not met in 144/376 (38.3%). The median (range) duration of antibiotic treatment for each baby was 60 (16.9–332) hours.

The blood culture analyser in use in our laboratory (BacT/Alert Microbial Detection System; Organon Teknika Corporation, Durham, North Carolina, USA) tests for bacterial growth every 10 minutes and communicates the blood culture status (positive or negative) to a computer. After our initial audit, we established a computer link between the blood culture analyser and the neonatal unit. This allows the clinical staff to check the status of any blood culture in the analyser in real time, 24 hours a day.

The second audit was performed on babies with negative blood cultures between May 2000 and August 2000. Two hundred negative blood cultures were identified. Complete data were available for 179/200 (89.5%). The audit standard was not met in only 20/179 (11.2%); p < 0.001 compared with the first audit. The median (range) duration of treatment was reduced to 48 (1–182) hours (p < 0.0001). There was an overall reduction of two doses of antibiotic per baby (from a mean of 8.8 to 6.8 doses per baby).

Overall, we estimated that we saved 21 684 doses of antibiotics on the neonatal unit during January 1997 and December 1998. If the computer system had been in operation during this period, we estimate that we could have reduced this by 16.2% to 18.69. We think that this magnitude of reduction in antibiotic pressure on the neonatal unit is worth achieving.

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Swaddling and heat loss

The letter of Hawkes et al. raises the important issues of swaddling and temperature on admission to the neonatal unit. Bech et al. carried out a limited comparison of different swaddling materials and found a transparent plastic bag together with radiant heat to be effective in preventing heat loss in infants over 2 kg. Following a report in the literature, we have begun wrapping all preterm infants <1000 g in a thin plastic wrap. The wrap is preheated on a radiant warmer and the infant is immediately placed (un)dried on the plastic sheet, which is folded over to (but loosely) enclose the torso and extremities from the neck down. The infant is left in the wrap until transported to the neonatal unit and the temperature has stabilised in a humidified environment. The median temperature of the 19 <1000 g infants admitted since wrapping was commenced was 36.7°C on arrival to the nursery compared with 35.5°C for the previous 86 unwrapped infants (p=0.002; using Mann-Whitney U test). There were no significant differences in birth weight, gestational age or differences in birth weight, gestational age or sex.

Although our experience is in smaller preterm infants (who are more prone to hypothermia), our results are in keeping with those of Vohra et al., who studied infants <32 weeks. We now plan to wrap all preterm infants <1500 g.

The plastic wrap is to be more effective than towels because of reduction in evaporative heat loss and because it allows observation of the infant. However, the plastic wrap is unlikely to significantly reduce radiant heat loss, so an additional heat source is essential for preterm infants. Some form of head swaddling is also important and needs further study. Aluminum foil may reduce evaporative, convective, and radiant heat loss but does not allow observation or radiant warming.

It appears there are many aspects of swaddling that require further investigation.

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Preventing hypothermia at birth in preterm babies: a cost of overheating some?

In the Epicure study, the odds ratio of death before discharge for babies whose temperature on admission to the neonatal unit was >35°C was 0.58 (95% confidence interval (CI) 0.39 to 0.85) compared with those with lower temperatures. In 2001, we therefore introduced a policy of wrapping neonates <30 weeks gestation in polythene bags at birth without first drying them. Temperatures on admission to the neonatal unit after the introduction of this policy were compared with those of historical controls of <30 weeks gestation admitted unwrapped between 1996 and 2000. The admission temperatures were analysed by stepwise multiple regression against being "bagged" or not, time to admission to the unit, birth weight, gestation, mode of delivery, month of delivery, and maternal temperature. Significant coefficients of variation existed between admission temperature and:

- being bagged: +0.35°C (0.09 to 0.62) (co-efficient, 95% CI);
- time to admission: −0.02°C (−0.01 to 0.03) per minute;
- birth weight: +0.07°C (0.02 to 0.1) per 100 g;
- gestation: +0.0007°C (0.0002 to 0.001) °C per week.

Thus "bagging" increased admission temperatures by 0.35°C, which is rather less than the rise of 1.9°C in babies <28 weeks gestation reported in a previous study.

Table 1 shows that, in the comparable groups, this rise of 0.35°C resulted in a significant reduction in incidence of hypothermia (<35.5°C) in "bagged" babies. However, significantly more of them (12%) were significantly thermoregulated (CI >37°C), a phenomenon previously reported but not discussed.

The risks of hypothermia are less well defined than those of hyperthermia, but it may increase the risk of neuro-co-ordinate damage of partially after ischaemia. The technique of wrapping babies in polythene bags would seem to benefit very preterm babies, although we may yet have to learn to use it appropriately.

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References

Technique for insertion of percutaneous central venous catheters in the newborn period

The use of percutaneous central venous catheters is of proven value for the provision of parenteral nutrition and intravenous drug treatment in neonates. They have become an integral part of the management of very low birthweight infants in most intensive care units.

At the Royal Children's Hospital in Melbourne we used a plastic catheter, which has an external diameter of 0.6 mm and comes in a variety of different lengths (Epicutaneous catheter manufactured by Vygon; lengths 15, 30, and 50 cm; ref nos 2184.015, 2184.00, and 2184.005; cost AU$59.10). It is packaged with a metal 19 GA butterfly needle for use in insertion of the line.

This technique has some drawbacks.

1. The 19 GA needle is difficult to push into the neonatal veins because of its large size.
2. It can be difficult to appreciate "flash back" of blood into the metal needle.
3. It is not possible to "flush" the needle to ensure correct positioning of the line as well as patency of the vessel.
4. It is not feasible to place femoral venous lines using this method.

We therefore use a method whereby the vein, using the Seldinger technique, is ultimately cannulated with a 20 GA catheter through which the slotted line can be inserted.

1. The procedure should be carried out under optimal conditions using an aseptic technique. If the infant is already ventilated, we advocate the use of a muscle relaxant as well as adequate sedation. This is especially advisable for insertion of femoral venous lines.
2. The vein is initially cannulated with a 24 GA (external diameter 0.7 mm) cannula. The sites most often used are the great saphenous vein at the ankle or knee joint, the femoral vein, the basilic or cephalic veins in the antecubital fossa, or, occasionally, the superficial temporal vein. A transilluminator or "cold light" inserted into the finger of a sterile glove can be of use in locating deep veins as well as protecting the sterile field.
3. A guidewire is then inserted through the cannula into the vein. We use a "duoflex spring wire guide": diameter 0.45 mm, length 25 cm (duoflex spring wire guide manufactured by Arrow; product no AW-04018; cost £2184.00).

Table 1 Incidence of hypothermia and hyperthermia in control babies and babies wrapped in polythene bags (study group)

<table>
<thead>
<tr>
<th>Control group</th>
<th>Study group</th>
<th>Difference (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>230</td>
<td>28 (23-29)</td>
</tr>
<tr>
<td>Gestation (weeks)</td>
<td>27.5 (23-29)</td>
<td>28 (23-29)</td>
</tr>
<tr>
<td>Weight (g)</td>
<td>1020 (400-1900)</td>
<td>1027 (500-1700)</td>
</tr>
<tr>
<td>Number &lt;35.5°C</td>
<td>96 (42)</td>
<td>12 (25)</td>
</tr>
<tr>
<td>Number &gt;37°C</td>
<td>1 (0.4)</td>
<td>6 (12.5)</td>
</tr>
</tbody>
</table>

Values are either median (range) or number (%). CI, confidence interval.
AUS13.00. Insyte intravenous catheter manufactured by Becton Dickinson catheter; GA 24, 22, and 20; cost AU$2.00). This has the advantage of having a soft tip at both ends of the wire and being a snug fit to the smallest catheter. Care must be taken not to advance the wire if any resistance is met.

(4) A small nick is made in the skin at the site of wire to facilitate the insertion of the larger pericardial tamponade. This is done by dilating the vein before the larger cannula is inserted. This can be flushed with saline to ensure patency of the vein.

(5) The silastic catheter can then be fed up the vein through the cannula is inserted). This can be flushed with USP F257

Table 1 Comparison between the outcomes for grade 3–4 intraventricular haemorrhage (IVH) in the three studies

<table>
<thead>
<tr>
<th>Murphy et al</th>
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<th>MMC 1997–2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 3–4 IVH (% of all &lt;1500 g)</td>
<td>79 (7%)</td>
<td>94 (6%)</td>
</tr>
<tr>
<td>Death &lt; 14 days</td>
<td>18/79 (23%)</td>
<td>29/94 (30%)</td>
</tr>
<tr>
<td>PVD requiring treatment</td>
<td>34/61 (56%)</td>
<td>24/65 (37%)</td>
</tr>
<tr>
<td>VP shunt/late death (% of PVD treatment)</td>
<td>18/8 (26/34+76%)</td>
<td>12/3 (15/24+63%)</td>
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*Rate for all infants <35 weeks.
**Rate for all deaths <30 days.

We have found this method to be extremely reliable in the insertion of percutaneous venous catheters. The guide wire incurs additional costs (see above). In our experience these are partially offset by an improved success rate using the above method. We do not open the silastic catheter until the 20 GA is in place within the vein. This means that a line is not wasted if the vein cannot be cannulated.

Umbilical granulomas: a randomised controlled trial

The Archimedes section has previously contained a brief section on the treatment of umbilical granulomas. We have now conducted a randomised controlled trial of the management of umbilical granulomas. The trial compared silver nitrate cautery with the use of alcoholic wipes at each nappy change (conservative management). The imputation for this work was a series of three burns to the anterior abdominal wall after silver nitrate cautery, seen in a single London hospital over a two-year period.

The trial aimed to show equivalence between the two treatment modalities. On the basis of equal efficacy, we intended to change practice to conservative management. More than 40 infants were referred, but a large number of parents chose conservative management rather than randomisation. Difficulty in recruitment meant there were inadequate numbers to show statistical significance within the limited time span available.

The salient results were that two of three granulomas resolved over a week period without cauterisation. Those infants whose granulomas did not resolve went on to treatment with cautery following a protocol that involved drying the area both before and after silver nitrate application, surrounding the umbilicus with white soft paraffin, and leaving the area exposed for 10 minutes after application. This resulted in resolution in all remaining cases without harm due to delay in treatment.

On the basis of this work, we suggest a change in current practice to initial conservative management followed by cautery only when conservative treatment fails.

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References

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PostScript
Do we need to assess the thyroid function in the infants of mothers with Hashimoto’s thyroiditis?

We read with interest the recent comprehensive review of neonatal thyroid disorders, which gave evidence-based answers to many important questions. The author recommended that all babies born to mothers with Hashimoto’s thyroiditis should be reviewed at 10 days to 2 weeks and a thyroid function test taken because infants may develop transient hypothyroidism or, very rarely, hyperthyroidism.1

As paediatricians, in a hospital with a paediatric endocrine caseload similar to some tertiary centres and a subregional neonatal intensive care unit with local deliveries of 6000 per annum, we think that the potential benefits of this practice are difficult to justify. We do understand that such practice will help in identifying babies who may develop transient congenital hypothyroidism caused by maternal thyrotropin receptor blocking antibodies. However, the incidence of this form of hypothyroidism has been estimated to be 1 in 180 000 normal infants (~2 % of congenital hypothyroidism) and the majority of them will have raised thyroid stimulation hormone levels that can be detected by the current neonatal screening.2 Based on a simple calculation, in a unit of our size only one baby will be detected every 30 years. We feel that there would be major disadvantages if we are to adopt the author’s recommendation. Firstly, an extra hospital visit for babies and parents; secondly the need to bleed many healthy infants; and finally the potential for confusion and unnecessary anxiety. Until objective evidence emerges about the significance of subtle thyroid dysfunction in early life we feel that the current screening programme should not be extended.

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References

CORRECTIONS

In the CD Review (Arch Dis Child Fetal Neonatal Ed 2003;88:F164) reviewed by C Wren, please note that the affiliation of the authors is published incorrectly. This should have read Royal Prince Alfred Hospital, Sydney. Also, the web address in the final paragraph is incomplete. The correct address is: http://www.cs.nsw.gov.au/rapa/neonatal/default.htm. The errors are much regretted.

The authors would like to acknowledge and apologise for an error in our article Socioeconomic status and preterm birth: New Zealand trends, 1980 to 1999. ED Craig, JMD Thompson, EA Mitchell (Arch Dis Child Fetal Neonatal Ed 2002;86:F142–6).

Paragraph four in the Results section should read “Figure 2 summarises changes in preterm birth rates by deprivation index decile between 1980 and 1999. During this period rates rose from 5.2% to 5.9% among those living in the most deprived areas (a 13.5% increase), from 4.0 to 5.5% amongst those living in average areas (a 37.3% increase) and from 3.1% to 5.4% amongst those living in the least deprived areas (a 74.2% increase). Thus while in 1980 a marked social gradient in preterm birth existed, by 1999 this had diminished markedly.” Table 2 and table 3 are amended. These errors do not significantly change the reported trends in preterm birth or the interpretation of the findings previously published.

Table 2 Multivariate odds ratios for preterm birth by gestational age category and deprivation index decile; New Zealand singleton live births 1980, 1990, and 1999

<table>
<thead>
<tr>
<th>Year</th>
<th>NZDep Index</th>
<th>Gestational age category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Decile</td>
<td>All preterm (n=51711)</td>
</tr>
<tr>
<td>1980</td>
<td>1</td>
<td>1.00</td>
</tr>
<tr>
<td>1980</td>
<td>5</td>
<td>1.15</td>
</tr>
<tr>
<td>1980</td>
<td>10</td>
<td>1.36</td>
</tr>
<tr>
<td>1990</td>
<td>1</td>
<td>1.30</td>
</tr>
<tr>
<td>1990</td>
<td>5</td>
<td>1.44</td>
</tr>
<tr>
<td>1990</td>
<td>10</td>
<td>1.63</td>
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<td>1999</td>
<td>1</td>
<td>1.64</td>
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<td>1999</td>
<td>5</td>
<td>1.76</td>
</tr>
<tr>
<td>1999</td>
<td>10</td>
<td>1.93</td>
</tr>
</tbody>
</table>

Multivariate analysis adjusted for gender, maternal age, parity, birth year and birth year*decile, year*age, year*parity, decile*age, decile*parity.
*Odds ratios (OR) with reference category deprivation index decile 1, 1980.
**Odds ratios for the 20–27 week category did not reach statistical significance.

Table 3 The “social gradient in preterm birth”; risk of preterm birth amongst decile 10 women compared to decile 1 women (same year), New Zealand singleton live births 1980, 1990, and 1999

<table>
<thead>
<tr>
<th>Year</th>
<th>All preterm (n=51711)</th>
<th>20–27 weeks (n=2697)</th>
<th>28–33 weeks (n=12703)</th>
<th>34–36 weeks (n=3631)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>1.36</td>
<td>1.18</td>
<td>1.39</td>
<td>1.36</td>
</tr>
<tr>
<td>1990</td>
<td>1.26</td>
<td>1.27</td>
<td>1.25</td>
<td>1.26</td>
</tr>
<tr>
<td>1999</td>
<td>1.17</td>
<td>1.35</td>
<td>1.14</td>
<td>1.17</td>
</tr>
</tbody>
</table>

Multivariate analysis adjusted for gender, maternal age, parity, birth year and birth year*decile, year*age, year*parity, decile*age, decile*parity.
*Odds ratios (OR) for preterm birth amongst decile 10 women compared to those in decile 1 for each particular year reflects the social gradient for that year.
**Odds ratios for the 20–27 week category did not reach statistical significance.