offspring of seronegative mothers may not be appropriate. There is, however, no evidence that babies of more than 32 weeks' gestation benefit from the use of blood negative for CMV. Using gestational age rather than birth weight as the criterion for the use of blood screened for CMV seems reasonable, as morbidity from neonatal CMV infection is thought to be related to immaturity of the immune system.

Although the blood transfusion services are responsible for continuously monitoring the reliability of their test procedures, clinicians must take some responsibility. Firstly, laboratory evaluation of tests does not replace clinical observation. Any clinician who believes that a child has acquired CMV infection from blood products should discuss this with the blood transfusion service so that further investigation may be undertaken. Secondly, by limiting the use of specialised services such as the provision of blood screened for CMV to those cases for whom it is essential, the load on the service can be decreased and its efficiency increased.

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Reduction of head flattening in preterm infants

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SUMMARY During the first few weeks of life many preterm infants develop flattened heads. We have shown that this deformity can be reduced by nursing preterm infants on soft, air filled mattresses of the type used for detecting apnoea.

The shape of a newborn infant's head is independent of gestation because the support given by amniotic fluid is uniform and allows unrestrained growth.¹ After birth, however, more localised pressures are encountered and side to side flattening of the head may occur because infants are usually nursed with their heads turned laterally.^{1,2} In infants born at term the effect is mild, but in preterm infants the deformity is often pronounced and may persist into adulthood.¹ This is probably because preterm infants have thin, soft skull bones that are more malleable. In addition, they spend many weeks lying only on the sides of the head until they become developmentally mature enough to adjust their position voluntarily.

Head flattening has two clinical consequences.

Firstly, it may result in misleadingly high measurements of occipitofrontal circumference because for a given area the perimeter of an ellipse is greater than that of a circle.¹ Secondly, from a cosmetic point of view parents prefer their child to have a normally shaped head.³ In this study we have investigated whether the deformation can be reduced by nursing preterm infants on soft, air filled mattresses.

Subjects and methods

Infants of less than 32 weeks' gestation born at this hospital were included in the study. Within 24 hours of birth they were alternately assigned to be nursed either on a standard, firm, foam filled mattress 12 mm thick supplied with Vickers 79 incubators, or on a soft, air filled mattress. The air mattress was of the type used to detect apnoea (Apnoea alarm Mark 3, Vickers Medical, Hampshire), and was inflated to a pressure of about 2 cm H₂O. Apnoea in infants nursed on the standard mattress was detected by a respiratory sensor taped to the abdomen.

Measurements to determine head shape were made by a single observer (PHTC). The occipito-

frontal diameter and biparietal diameter were measured using an anthropometer (Holton Ltd, Dyfed) on days 3, 7, 14, and 21 of life. By not assessing infants during the first three days of life bias due to moulding was minimised. A ratio of the paired measurements of occipitofrontal and biparietal diameter was then calculated as an index of skull flattening and used to assess the progression of the deformity (the higher the ratio, the flatter the shape of the head). Statistical analysis was by unpaired Student's *t* test.

Forty three infants were enrolled into the study. Nine were subsequently excluded, one because of progressive hydrocephalus, and eight because they died before 3 weeks of age. The results of 34 infants were therefore available for analysis. Their gestational ages ranged from 26 to 31 weeks (mean 29.3), and birth weights from 990 to 1850 g (mean 1363). They were equally divided into infants nursed on air mattresses, and standard mattresses, and there were

no significant differences in gestational age (means 29.1 and 29.5 weeks) or birth weights (means 1314 and 1412 g). There were also no differences in the mode of delivery, or time spent postnatally in supine and prone positions.

Results

At 3 days of age infants nursed on air mattresses had slightly lower occipitofrontal:biparietal diameter ratios than those cared for on standard mattresses, though the difference was not significant (fig 1). During subsequent weeks the occipitofrontal:biparietal diameter ratio increased in both groups, but the change was most pronounced in those infants nursed on standard mattresses in whom the ratio increased from a mean of 1.37 at three days of age, to 1.48 at 21 days. By contrast, significantly smaller increases

Fig 1 The change in occipitofrontal:biparietal diameter ratio in preterm infants nursed for the first three weeks of life on either an air mattress or a standard foam mattress (mean and 95% confidence intervals).

Fig 2 Effects of postnatal cranial moulding on the appearance of a preterm infant 3 weeks old. Head is flattened (occipitofrontal:biparietal diameter ratio 1.50), forehead high and narrow, and eyes appear laterally placed on long narrow face.

occurred in infants cared for on air mattresses, from a mean occipitofrontal:biparietal diameter ratio of 1.34 at three days of age to 1.40 at 21 days. The ratio at three weeks of age was thus significantly lower in infants nursed on air mattresses ($p<0.001$).

Discussion

The pronounced degree of head flattening that we found in infants nursed on foam mattresses was similar to that reported previously.^{1 2} It was usually accompanied by the other features of postnatal cranial moulding including a high narrow forehead, and eyes which seem to be laterally placed on a long, narrow face (fig 2). This appearance is in stark contrast to the rounded face and head of most babies and is usually thought of as less attractive.³ We have shown that this deformity can be reduced by nursing preterm infants on soft, air mattresses which should lessen the concern that many parents feel about their infant's dolichocephaly.⁴ In addition, the rounder head allows for more accurate interpretation of measurements of head circumference, because they correlate more closely with head growth.¹

Postnatal cranial moulding can also be reduced by nursing preterm infants on rocking waterbeds.⁵ This elaborate equipment is, however, expensive and not generally available. A simpler method was suggested by Marsden, who successfully lessened de-

formity by using a water pillow in one of a pair of twins.⁶ The air mattress, which is commonly used to detect apnoea, is a preferable method of reducing head flattening in preterm infants, as it is simple, cheap, effective, and versatile.

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