

- ² Beevers DG, Bloxham CA, Blackhouse CI, Lim CC, Watson RDS. The Remler M2,000 semiautomatic blood pressure recorder. *Br Heart J* 1979;**42**:366.
- ³ Rose GA, Holland WW, Crowley EA. A sphygmomanometer for epidemiologists. *Lancet* 1964;ii:296-300.
- ⁴ Masterton G, Main CJ, Lever AF, Lever RS. Low blood pressure in psychiatric inpatients. *Br Heart J* 1981;**45**:442-6.
- ⁵ Hunyor SN, Flynn JM, Cochineas C. Comparison of performance of various sphygmomanometers with intra-arterial blood pressure readings. *Br Med J* 1978;iii:159-62.

(Accepted 14 September 1981)

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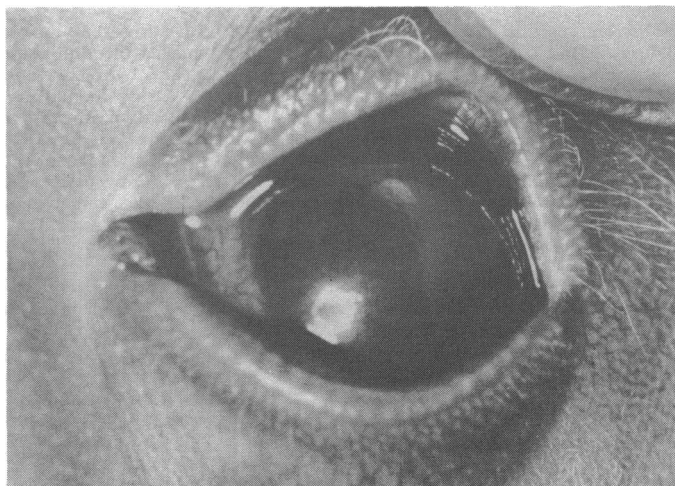
Mask for continuous positive airway pressure: does it cause corneal abrasions?

Severe pseudomonas panophthalmitis leading to the loss of an eye in an infant born at 32 weeks' gestation was recently reported from our neonatal unit.¹ As pseudomonas conjunctivitis leads to the destruction of deeper eye tissues only in the presence of corneal damage^{2,3} we speculated that the facemask with which the baby was given continuous positive airway pressure for five days for treatment of hyaline membrane disease had caused such damage. We carried out a prospective study to test the hypothesis that the facemask used to give continuous positive airway pressure (Puritan-Bennet International Co-operation, Chichester) causes corneal abrasions.

Patients, methods, and results

We studied 79 preterm infants. Group 1 consisted of 18 infants with hyaline membrane disease who received respiratory support (continuous positive airway pressure or ventilation) by facemask. In accordance with our unit's policy the size of mask was chosen by the nursing staff so that it fitted comfortably over the infant's nose and mouth, producing minimal air leakage. The mask was held firmly in place by Netelast (Roussel Laboratories, London) and in most cases rested over the baby's eyes. Group 2 comprised 61 control infants, of whom 23 had mild hyaline membrane disease requiring treatment with only increased ambient oxygen. The remaining 38 babies had no respiratory problem.

After eight hours or more of continuous airway pressure the eyes of the infants in group 1 were stained with 1% fluorescein drops and the cornea examined under blue light. The eyes of babies in the control group were examined in the same way. All examinations were carried out in the first two



Corneal abrasion in an infant born at 28 weeks' gestation shown by fluorescein staining.

days of life. When a corneal abrasion was suspected the eyes were re-examined by an ophthalmologist (PRC). Two corneal abrasions were found in the 18 infants treated with continuous positive airway pressure. The first was in the left cornea of a baby born at 28 weeks (birth weight 1230 g), who was examined after 10 hours of continuous positive airway pressure (figure). The second abrasion occurred in an infant born at 32 weeks (birth weight 1560 g), who was examined after 18 hours of continuous positive airway pressure. No corneal abrasions were found in the 61 control infants ($p=0.0497$, Fisher's exact test, significant at 5% level).

Comment

In our experience a small, well-fitting mask that does not encroach on the eyes commonly causes upper airways obstruction by pressing on the soft nose of infants. A larger mask that avoids this complication but rests on the eyes predisposes the baby to the risk of corneal abrasion. In our study the corneal abrasions caused by the facemask were transient, both healing completely within 24 hours of being detected. The potential danger of this iatrogenic hazard is that infection might establish itself and rapidly lead to panophthalmitis should the infant simultaneously develop conjunctivitis due to one of the proteus-producing organisms—for example, *Pseudomonas, proteus*. In a recent study⁴ 4-5% of all cases of ophthalmia neonatorum were caused by *Pseudomonas* in babies on postnatal wards, and it would not be unreasonable to assume that the incidence might be higher in neonatal intensive care units.

Applying respiratory support by means of a facemask is a common neonatal practice, and this study has emphasised its small but important hazards. As a result of our findings we suggest that if sticky eyes develop when a baby is receiving ventilatory support via a facemask Gram staining as well as culture of the discharge should be requested. If Gram-negative organisms are found fluorescein examination of the cornea should be undertaken by an ophthalmologist. In the event of a corneal abrasion being present, topical, parenteral, and possibly subtenon⁵ antibiotics should be administered and alternative methods of ventilatory support used.

We thank Dr D P Davies, Dr K Simpson, and Dr P Swift, consultant paediatricians, for allowing us to study their patients.

- ¹ Cole GF, Davies DP, Austin DJ. Pseudomonas ophthalmia neonatorum: a cause of blindness. *Br Med J* 1980;**281**:440-1.
- ² Ayliffe GAJ, Barry DR, Lowbury EJJ, Roper-Hall MJ, Walker WM. Post-operative infection with *Pseudomonas aeruginosa* in an eye hospital. *Lancet* 1966;ii:1113-7.
- ³ Drewett SE, Payne DJH, Tuke W, Verdon PE. Eradication of *Pseudomonas aeruginosa* infection from a special care nursery. *Lancet* 1971;ii:946-8.
- ⁴ Armstrong JH, Zacarias F, Rein HF. Ophthalmia neonatorum: a chart review. *Pediatrics* 1976;**57**:884-91.
- ⁵ Golden B, Coppel SP. Ocular tissue absorption of gentamicin. *Arch Ophthalmol* 1970;**84**:792-6.

(Accepted 7 September 1981)

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Perverse T waves and chronic beta-blocker treatment

T-wave inversion on the electrocardiogram is a non-specific abnormality that is also seen in some normal people, when its innocence may often be confirmed by its return to normal with beta-blockers.¹ General recognition is needed that treatment with beta-blockers may itself cause T-wave inversion.

Patients, methods, and results

Three men, aged 44-54, were investigated for chest pain, attributed ultimately to oesophageal spasm in two (cases 1 and 2) and a musculoskeletal cause in one (case 3). At presentation all patients were receiving chronic