

## Use of mask continuous positive airway pressure in a preterm infant presenting with bilateral cleft lip and palate

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### Abstract

This report highlights innovative ways of overcoming difficulties in delivering effective continuous positive airway pressure in an extremely preterm baby with bilateral cleft lip and cleft palate.

**Key words:** Cleft Lip; Cleft Palate; CPAP Ventilation; Infant, Premature

### Case report

A 25 + 1/40 gestation female infant was born to Caucasian parents at the Manor Hospital, Walsall. The infant was delivered vaginally, with a cephalic presentation. Birth weight was 750 g. She was noted at that time to have a severe, bilateral cleft lip and cleft palate (Figure 1). No other dysmorphic features were observed. Following intubation and ventilation, the infant was transferred for continuation of intensive therapy within the neonatal unit of New Cross Hospital, Wolverhampton.

The antenatal period was uneventful, with normal fetal scans. A normal karyotype was subsequently confirmed.

On the neonatal unit, the infant required ventilation because of surfactant deficiency respiratory distress syndrome. Within the first two weeks there were radiological changes indicating pulmonary interstitial emphysema and lobar consolidation.



FIG. 1  
Bilateral cleft lip and palate.



FIG. 2  
Delivery of continuous positive airway pressure via a secured Laerdal™ silicone infant mask (size 00).

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Accepted for publication: 29 September 2005.



FIG. 3

Delivery of continuous positive airway pressure incorporating both a Laerdal™ silicone infant mask (size 00) and an Infant Flow System™.

On day 16, the decision was made to extubate on to continuous positive airway pressure (CPAP) using a long prong. Short-prong nasal CPAP had already been ruled out due to the infant's significant nasal deformity. Extubation failed, due partly to the fact that adequate pressures were not achievable via the long prong device. The infant was therefore reintubated.

A dilemma ensued as to the most appropriate method of CPAP delivery. Mask CPAP was employed, in the form of a Laerdal™ silicone infant mask (size 00; Laerdal, Kent, UK). This was secured using an adapted elastic band tied to the infant's ventilation bonnet (Figure 2).

On day 23, the infant was extubated to mask CPAP using the device previously described. Pressures were well maintained and observations remained stable.

On day 42 of life, the infant was transferred back to its referring hospital (Walsall) for continuation of care; she weighed 1130 g.

At Walsall, an alternative method of delivering CPAP was devised, using the nasal mask from the Infant Flow System™ (Viasys, Warwick, UK) secured to the infant's bonnet and connected to a Laerdal™ silicone infant mask (size 00). This rather ramshackled 'Heath Robinson' contraption was achieved by piggybacking one mask upon the other and securing with adhesive tape (Figure 3). Whilst unconventional, an adequate seal was achieved. Moreover, the arrangement enabled delivery of the much favoured Infant Flow System™ method of CPAP. This system generates flow to assist an inspiratory breath, then diverts the flow when expiration occurs, thus ensuring the infant does not need to breathe against the CPAP and become exhausted. This 'fluidic flip' phenomenon has been termed the 'coanda effect'.<sup>1</sup>

The infant was given continuous CPAP in this fashion for another 23 days, following which she was weaned off successfully. At the time of writing, she was 10 months old and doing very well developmentally.

#### Acknowledgement

This article is dedicated to Indranil (Nil) Bagchi, who died tragically before this article was published.

#### Reference

- 1 Hogkinson J, Ducker T. Step by step guide: infant flow advance. *Journal of Neonatal Nursing* 2002;6(3):May(supp)

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Mr R M McMahon takes responsibility for the integrity of the content of the paper.

Competing interests: None declared

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