CASE REPORT

Columella erosion secondary to nasal prongs in the neonate

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Accepted 3 June 2016

SUMMARY

There is limited awareness of the risks of pressure necrosis to the columella when using nasal prongs in the neonate. Previous studies have found that signs of skin damage can occur rapidly—within days. This case report aims to illustrate a simple technique of prophylactically lowering the risk of septal injury (if prolonged use of nasal prongs is envisaged), as well as a way of conservatively treating already damaged skin areas. Routine daily skin inspections are also recommended.

BACKGROUND

The risks of pressure necrosis associated with prolonged non-invasive ventilation via nasal prongs in preterm neonates has previously been reported in the literature.^{1–4} However, there is limited general awareness of it among clinical staff caring for these patients. We report a case aiming to highlight the importance of ensuring medical and nursing staff are vigilant to this potentially preventable complication, and discuss techniques to avoid it.

CASE PRESENTATION

Our patient was born at 27+6 weeks gestation, weighing 1.1 kg. He was diagnosed with severe respiratory distress syndrome, patent ductus arteriosus and a grade 3 bilateral intraventricular haemorrhage. This required intensive treatment unit admission and intubation. After 13 days, he was transferred to a different hospital closer to home, yet after a number of failed stepdown attempts, he was retransferred to us 8 days later and started on continuous positive airway pressure (CPAP) ventilation (Carefusion, Infant Flow LP System, San Diego, California, USA: Becton, Dickinson and Company). The team alternated between using nasal prongs (size=small, double, code=777000S) and nasal mask (size=small, code=777002S). On day 10 of this treatment, evidence of nasal erosion was first noticed (day 31 after birth). The infant's ventilatory support was then switched to 'Vapotherm'—a form of high-flow therapy using nasal prongs—which delivers humidified and heated air at rates exceeding inspiratory demand (Vapotherm Inc, Exeter, New Hampshire: neonatal 1.5 mm diameter tip nasal prongs, providing 4–5 L/min air flow).

Over the coming days, the small area of erosion continued to grow in size—advice was then sought from the plastic surgery unit (figure 1). By this stage, there was complete erosion of the membranous nasal septum and columella, extending posteriorly to the caudal edge of the cartilaginous septum. This pressure sore was due to direct

contact between the skin and horizontal nasal prong bridge. This lesion would be classified as 'severe' by Buettiker's skin classification system.¹

TREATMENT

Any intervention should be ideally initiated at the earliest recognition of any skin changes. In most cases, this can be managed conservatively with a combination of pressure relief and wound toilet. In our patient, hypoallergenic tape was cut to size and fashioned in such a way as to lift away the horizontal bridge from the septal area, yet still maintain good insertion of the Vapotherm prongs into their respective nares. This technique can be seen in figure 2, conducted on a neonate model—a 'v-shaped' anchor point was placed on the dorsum of the nose, with a contiguous vertical strip leading off this wrapped around the nasal prong bridge in between the prongs. This then connected to a further anchor point on the neonate's upper lip. This resulted in the prongs being kept under tension in the desired position, relieving pressure on the columella. The challenge is to be able to continue to deliver ventilatory support (which must be the priority) while simultaneously managing the wound.

OUTCOME AND FOLLOW-UP

Figure 3 demonstrates the effectiveness of the technique, showing rapid septal healing over the next 40 days. It should be noted that there may still be a noticeable septal abnormality following primary healing. The infant's family was counselled about this, including the options for future secondary rhinoplasty procedures. Any intervention in this case, however, would be delayed until later teen years, when the child has reached full skeletal maturity.²

Figure 1 Facial photo taken on referral to plastic surgeons, 4 weeks postbirth, displaying severe columella erosion.

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To cite: Campbell E, Pacifico MD. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2015-212510

Figure 2 Image displaying fixation technique of hypoallergenic tape, using a neonatal model, to ensure adequate pressure relief from nasal prongs.

DISCUSSION

CPAP with nasal prongs is the most prevalent form of ventilatory support in the newborn.³ Previously, within a study group of 47 preterm neonates, Cabral De Sousa *et al*⁴ found there was a 68% incidence of nasal skin lesions associated with prong use. Lesions were also correlated with low birth weight and treatment duration. This percentage was found to be even higher in a study by Nascimento *et al*, where 100% of newborns in a convenience sample (147 neonates—with 83.7% under 37 weeks) were found to develop ‘nasal lesions’ after two days or more of continuous nasal prong use.¹ The authors further stratified this into mild, medium and severe lesions, based on criteria previously presented by Buettiker *et al*¹ in the *Neonatal Paediatric Intensive Care* journal (mild=skin redness, moderate=bleeding injury, severe=skin necrosis). When prong use was required for 4 days or more, all neonates developed features of ‘severe’ skin injury. It has also been emphasised by Diblasi that the fixation technique used for prongs was an important factor in both reducing the risk of nasal damage and ensuring adequate system pressure.⁵

The number of days on prong CPAP is a predictive factor for skin damage, hence if a short duration is predicted, nothing need be done.⁶ If prolonged nasal prong use is foreseen, given the successive healing of our patient’s nasal injury, it is suggested that the above described dressing be fashioned for the neonate

in order to help prevent any iatrogenic skin damage in the first instance. We further recommend regular checking of this area, in a way similar to how patients’ pressure areas are monitored when in hospital, as severe skin necrosis can develop within a number of days. This could include daily focused skin assessments for all patients on prolonged prong therapy.

Learning points

- ▶ The use of nasal prongs for continuous positive airway pressure (CPAP) delivery in neonates is common, especially in those who are preterm.
- ▶ Time on CPAP is a predictive factor for skin damage, therefore it should be for the least amount of time possible.
- ▶ Careful fixation of nasal prongs to try and avoid skin contact will help to reduce the risk of pressure damage, and can help facilitate healing of injuries already present.
- ▶ There should potentially be focused skin assessments for all neonates on prolonged prong therapy.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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Figure 3 Facial photo taken 9 weeks postbirth showing columella healing after conservative pressure management.

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