



A Randomized Controlled Trial of a Barrier Dressing to Reduce Nasal Injury in Preterm Infants Receiving Binasal Noninvasive Respiratory Support

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Objective To determine whether the use of a hydrocolloid nasal barrier dressing during binasal continuous positive airway pressure (CPAP) therapy, compared with no barrier dressing, reduces the rate of nasal injury in very preterm and/or very low birth weight infants.

Study design A single-center randomized controlled trial conducted in the neonatal intensive care unit at The Royal Women's Hospital, Melbourne. Eligible infants were born <30 weeks of gestation and/or with birth weight <1250 g, and had received ≥4 hours, but <48 hours, of CPAP. Infants were randomly allocated to receive either a hydrocolloid nasal barrier dressing during CPAP (barrier group), or no barrier dressing (no barrier group). The primary outcome was the incidence of any nasal injury during CPAP support, until the infant was both >30 weeks of postmenstrual age and >1250 g, unless CPAP therapy was stopped earlier. Nasal injury was regularly assessed by bedside nurses using a standardized form.

Results A total of 108 preterm infants were enrolled: 53 infants in the barrier group and 55 infants in the no barrier group. Infants in the barrier group had a significantly lower rate of nasal injury compared with the no barrier group: 18 of 53 (34%) vs 31 of 55 (56%), respectively ($P = .02$), number needed to treat; 5 infants. No significant differences were detected in any secondary respiratory outcomes, or in the rate of common neonatal morbidities.

Conclusions Prophylactic use of a nasal barrier dressing within 48 hours of commencing treatment with binasal CPAP in very preterm or very low birth weight infants reduces nasal injury. (*J Pediatr* 2018;201:34-9).

Trial registration Australian and New Zealand Clinical Trials Register ACTRN12616000438459.

Nasal continuous positive airway pressure (CPAP) is the most widely used and studied form of noninvasive respiratory support to treat preterm infants with respiratory distress syndrome, apnea of prematurity, and evolving bronchopulmonary dysplasia.^{1,2} CPAP is most commonly administered by means of tightly fitted, short, binasal prongs. A prong size is chosen to fill the nares, with the aim of reducing leak.³ An adverse effect of correctly fitting this interface in preterm infants is CPAP-related nasal injury.^{3,4}

In preterm infants, nasal injury may be painful, may necessitate a change in mode or type of respiratory support, or in severe cases require surgical intervention to correct nasal deformities.^{5,6} Reported rates of nasal injury relating to CPAP use in preterm infants range from 20% to 100%.^{4,7-9} Reported injuries include hyperemia, nasal snubbing and flaring (upturned nose and enlarged nares), scab formation, and areas of necrosis.^{10,11} Preserving the skin and mucosal membranes in preterm infants is important to protect against infection; coagulase-negative staphylococcal sepsis has been described in preterm infants with nasal injury.¹²

Nasal barrier dressings in the shape of a “moustache,” protecting the columella, septum, and philtrum of the nose, have been used in preterm infants during CPAP to protect against nasal injury.^{9,13,14} To date, there have been 2 randomized studies investigating nasal barrier dressings.^{15,16} Both studies examined infants born >28 weeks of gestational age. Only 1 of these studies evaluated the efficacy of a hydrocolloid nasal barrier dressing and found less nasal injury when a barrier was used.¹⁵ However, no trials have specifically targeted the smallest, most immature infants who are most at risk of nasal injury.^{4,7,16}

We hypothesized that the use of a hydrocolloid nasal barrier dressing during binasal CPAP would reduce the rate of nasal injury in very preterm infants born <30 weeks of gestational age and/or very low birth weight infants born <1250 g,

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CPAP Continuous positive airway pressure
PMA Postmenstrual age
RWH The Royal Women's Hospital

compared with no barrier dressing. Secondly, we hypothesized that the use of a nasal barrier dressing would improve the effectiveness of CPAP because of reduced leak at the nares, and lead to improved clinical outcomes.

Methods

Study Design

A single-center randomized controlled trial conducted in the neonatal intensive care unit at The Royal Women's Hospital (RWH), Melbourne, Australia. Ethical approval for the trial was obtained from the RWH Human Research and Ethics Committee. The RWH Neonatal Services department funded the equipment used in the trial. The trial was prospectively registered with the Australian and New Zealand Clinical Trial Registry (ACTRN12616000438459).

Patients

Infants were eligible for the study if they were born <30 weeks of gestation or with birth weight <1250 g, and were expected to require treatment with binasal prongs (either CPAP or nasal intermittent positive pressure ventilation) for more than 4 hours. Infants were excluded if they had commenced CPAP ≥30 weeks of postmenstrual age (PMA) or at a weight ≥1250 g, or if they had received 48 hours or more of CPAP prior to randomization, had nasal injury documented prior to enrollment, or had facial features that might preclude treatment with binasal CPAP (eg, cleft lip or palate, Pierre Robin sequence, choanal atresia).

Infants were prospectively enrolled following informed, written parental consent. Parents of eligible infants were approached either prior to extubation to CPAP, or within 48 hours of CPAP commencement (either from birth, or following extubation).

Randomization

Infants were randomly allocated to the barrier or no barrier groups using computer-generated block randomization with variable block sizes. Prerandomization stratification was by gestation at birth (<28 weeks; ≥28 weeks). Eligible infants who were one of multiple births were randomized individually. A sequentially numbered, sealed, opaque envelope containing the

group allocation was opened once eligibility was confirmed and consent was obtained.

Study Intervention

Infants assigned to the barrier group were fitted with the Neo-Guard (Readmed Inc, Jiangsu Province, China; Australian Register of Therapeutic Goods Identifier 160458 Class 1) nasal barrier dressing (**Figure 1**). The Neo-Guard dressing adheres to the infant's skin and consists of a T-piece and a "snout" piece cut from a sheet of hydrocolloid dressing with an optional Velcro strap to secure the CPAP interface to the dressing. The Neo-Guard is fitted across the infant's philtrum, above the upper lip, over the columella, and onto the front of the nose. The Neo-Guard dressing is available in 3 sizes; the size used was chosen for the size and shape of the infant's nose and per manufacturer's guidelines (weight <700g: size 0, 700-1250 g: size 1, 1250-2000 g: size 2).

Study Outcomes

The primary outcome was the rate of any nasal injury, assessed and recorded by bedside nurses during each shift (2-3 shifts per 24 hours), using the RWH Nasal Integrity and Pressure Chart (**Figure 2**; available at www.jpeds.com). As described on the chart, nasal injury is defined as stage 0-skin intact; stage 1-nonblanchable erythema of intact skin; stage 2-partial thickness skin loss involving epidermis, dermis, or both; stage 3-full thickness skin loss involving damage to or necrosis of subcutaneous tissue; stage 4-full thickness skin loss with extensive destruction, tissue necrosis, or damage to supporting structures.

Secondary outcomes included the stage of nasal injury assessed by bedside nurses, the presence and stage of nasal injury on standardized, deidentified nasal photographs (taken using a smartphone camera) and assessed by a blinded investigator, respiratory outcomes, common neonatal morbidities, and cost of the dressings. For infants randomized to the barrier group, the bedside nurses also recorded the date and time of nasal barrier dressing changes, the reason for the change, and the condition of the skin underneath the dressing.

Statistical Analyses

Based on local rates of nasal injury in infants born <30 weeks of gestational age or <1250 g reported in a previous clinical

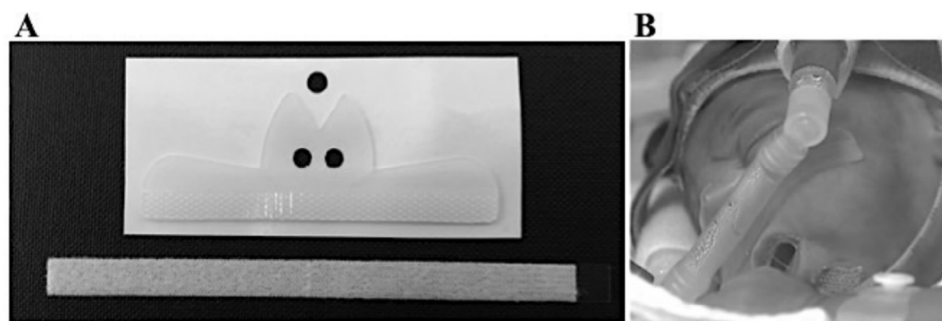


Figure 1. A, Neo-Guard hydrocolloid nasal dressing and Velcro strip; B, Dressing on preterm baby.

trial,¹⁷ we estimated the rate of the primary outcome in the control group to be 50%. Studies reporting a decrease in nasal injury using a barrier dressing in more mature infants reported a 63%-73% relative reduction in nasal injury rates.^{15,16}

We chose to power the study for a more conservative 40% relative reduction. We calculated that a sample size of 206 infants would provide 80% power (α 0.05) to detect a reduction in nasal injury with the use of a nasal barrier dressing from 50% to 30%.

All analyses were performed on an intention-to-treat basis. The primary outcome and secondary dichotomous outcomes were compared using χ^2 tests, the risk difference (and 2-sided 95% CI) between the groups was calculated. Gestational age subgroup analysis was performed for the primary outcome.

Categorical data were summarized as counts and percentages. Student *t* tests were used to compare continuous outcomes. A nonparametric test for trend was performed for the severity of nasal injury. A *P* value of <.05 was considered significant. All analyses were performed using Stata software, v 14.1 (StataCorp, College Station, Texas).

Results

From April 7, 2016 to August 15, 2017, a total of 258 infants were assessed for eligibility, of whom 167 were eligible and 108 enrolled: 53 infants were allocated to the barrier group and 55 to the no barrier group (Figure 3). Recruitment was ceased prior to the planned sample size being achieved because of slower than predicted recruitment. All infants were analyzed for the primary outcome and followed until 36 weeks of PMA. Demographic and clinical characteristics of the mothers and infants were similar in the 2 groups (Table 1).

Primary Outcome

There was a significantly lower rate of any nasal injury in the barrier group compared with the no barrier group: 18 of 53 (34.0%) vs 31 of 55 (56.4%), *P* = .02. Five infants would need to be treated with a nasal barrier dressing to prevent 1 case of nasal injury. Analysis by gestational age subgroup showed that infants born ≥ 28 weeks of gestation experienced significantly less nasal injury with the dressing (18.2% barrier vs 48.0% no barrier, *P* = .03), the reduction in the rate of nasal

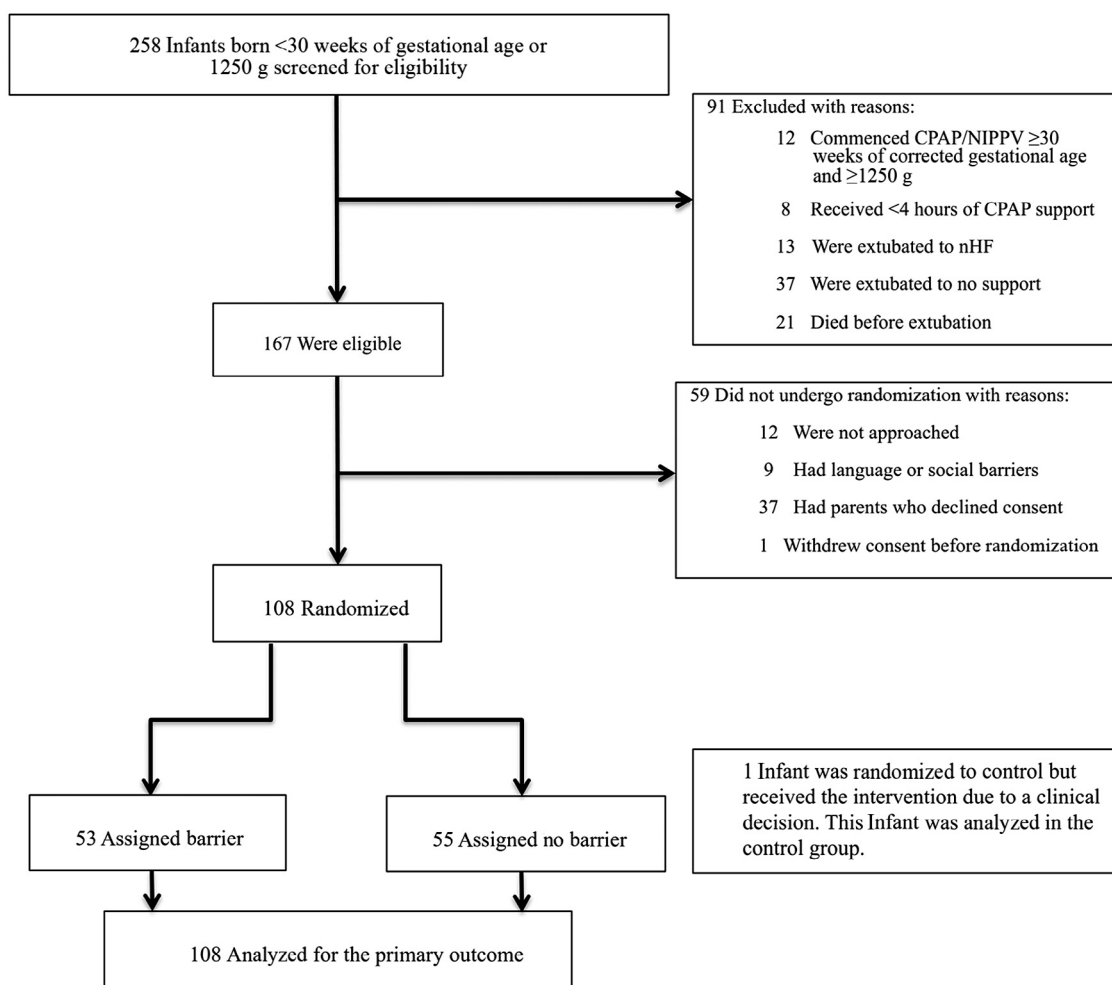


Figure 3. Participant flow diagram. *NIPPV*, nasal intermittent positive pressure ventilation. *nHF*, nasal high flow.

Table I. Baseline characteristics of mothers and infants

| Characteristics | Barrier (n = 53) | No barrier (n = 55) | P value |
|--|------------------|---------------------|---------|
| Mothers | | | |
| Caucasian ethnicity, no. (%) | 41 (77.4) | 40 (72.7) | .58 |
| Exposure to any antenatal corticosteroids, no. (%) | 47 (88.7) | 51 (92.7) | .47 |
| Labor prior to delivery, no. (%) | 30 (56.6) | 31 (56.4) | .98 |
| Cesarean delivery, no. (%) | 39 (73.6) | 42 (76.4) | .74 |
| Prolonged rupture of membranes >24 h, no. (%) | 15 (28.3) | 25 (45.4) | .07 |
| Infants | | | |
| Gestational age, wk, mean (SD) | 27.4 (1.7) | 27.5 (1.9) | .72 |
| Gestational age <28 wk, no. (%) | 31 (58.5) | 30 (54.6) | .68 |
| Birth weight, g, mean (SD) | 968 (253) | 963 (241) | .92 |
| Male sex, no. (%) | 27 (50.9) | 25 (45.5) | .57 |
| Multiple birth, no. (%) | 13 (24.5) | 16 (29.1) | .59 |
| Apgar score at 1 min, median (IQR) | 5 (3, 6) | 5 (3, 7) | .68 |
| Apgar score at 5 min, median (IQR) | 8 (6, 9) | 8 (6, 9) | .52 |
| Exogenous surfactant treatment prior to randomization, no. (%)* | 30 (56.6) | 31 (56.4) | .34 |
| Caffeine treatment prior to randomization, no. (%) | 52 (98) | 53 (96) | .58 |
| Duration of endotracheal ventilation prior to randomization, d, median (IQR) | 3 (1, 8.5) | 4 (1, 11) | .89 |
| Duration of CPAP prior to randomization, h, median (IQR) | 21 (8, 36) | 23 (12, 36) | .93 |

*Two infants in barrier group enrolled in a surfactant trial: surfactant administration for these infants is unknown.

injury in infants born <28 weeks of gestation was in the same direction, but did not reach statistical significance (45.2% barrier vs 63.3% no barrier, $P = .15$). The test for subgroup differences ($P = .43$, $I^2 = 0\%$) indicates that there was no important difference in the treatment effect between the gestational age strata.

Secondary Outcomes

Nasal Photographs. Of the 108 infants enrolled, 98 had at least 1 nasal photograph taken during their primary outcome period; a total of 230 good quality photographs were available to be scored by a blinded investigator. Although there was less nasal injury detected in the barrier group, this difference was not statistically significant: barrier group 10 of 50 (20.0%) vs no barrier 16 of 48 (33.3%), $P = .14$.

Severity of Nasal Injury. Overall, the severity of nasal injury detected in the trial was mild-moderate (Figure 4; available at www.jpeds.com). No infants experienced stage 3 or 4 nasal injuries on bedside charts, or on photographic evaluation. However, there was a statistically significant decrease in the severity of nasal injury in infants who had nasal injury in the barrier group compared with the no barrier group: $P = .02$, non-parametric test for trend.

Nursing Documentation. For infants in the barrier group, a “Barrier replacement form” was completed each time the dressing was changed. The dressing was routinely changed at least every 72 hours to assess the nares and to take a nasal photograph. However, on average the dressing was actually changed daily. At least 1 recording of a replacement of a dressing was completed for all 53 infants in the barrier group; 511 dressing change events were completed in total. The most frequently documented reason (78% of recordings) for dressing replacement was due to “peeling or falling off the nares.” The condition of the skin under the dressing was most commonly reported as “skin intact” (91% of recordings). No adverse

events were reported in relation to skin damage during barrier dressing removal, nor was there any urgent need for dressing removal for resuscitation efforts when the dressing was in situ.

Clinical Outcomes. There were no differences in respiratory outcomes between groups, or in common neonatal morbidities or mortality at 36 weeks of PMA (Table II). There was no difference in the need to change respiratory support because of nasal injury: 2 of 53 (3.8%) barrier group vs 4 of 55 (7.3%) no barrier group, $P = .625$.

Cost. The cost of barrier dressings was AU\$6.24 per dressing. An average of 11 nasal barrier dressings per infant was used in the barrier group, during an average duration of 15 days of CPAP support. Therefore, the average total cost of barrier dressings was AU\$68.65 per infant. Given a number needed to treat to prevent 1 case of nasal injury of 5 infants, the cost of preventing 1 case of nasal injury in this trial was estimated at AU\$343.25.

Discussion

This randomized controlled trial has shown that, when applied soon after commencing CPAP therapy, hydrocolloid nasal barrier dressings reduce the rate of nasal injury in infants <30 weeks of gestational age or <1250 g receiving CPAP. This is the only trial to include extremely preterm infants born <28 weeks of gestation; the average gestational age of enrolled infants was 27.4 weeks. Our results are consistent with those of Xie et al, who reported a lower incidence of nasal injury with the use of a hydrocolloid barrier dressing in 65 preterm infants with average gestational age of 32.6 weeks (6% vs 22%, $P = .01$).^{1,15} Lower rates of nasal injury were also reported in the only other randomized study¹⁶ of a nasal barrier system; a silicone gel barrier sheeting in 179 preterm infants (mean 32.4 weeks of gestation).

Table II. Outcomes

| | Barrier (n = 53) | No barrier (n = 55) | Risk difference (95% CI) | P value |
|--|---------------------|------------------------|--------------------------------------|---------|
| Incidence of any nasal injury on bedside charts, no. (%) | 18 (34.0) | 31 (56.4) | -0.22 (-0.41, -0.04) | .02 |
| Any nasal injury by gestational age at birth: | | | | |
| <28 wk, n/N (%) | 14/31 (45.2) | 19/30 (63.3) | -0.18 (-0.43, 0.06) | .15 |
| ≥28 wk, n/N (%) | 4/22 (18.2) | 12/25 (48.0) | -0.30 (-0.55, -0.04) | .03 |
| Severity of nasal injury on bedside charts, no. (%) | | | | |
| No injury | 35 (66.0) | 24 (43.6) | } | .02* |
| Stage 1 | 13 (24.5) | 25 (45.4) | | |
| Stage 2 | 5 (9.4) | 6 (10.9) | | |
| Stage 3 or 4 | 0 (0) | 0 (0) | | |
| Incidence of any nasal injury on nasal photographs, n/N (%) [†] | 10/50 (20.0) | 16/48 (33.3) | -0.13 (-0.31, 0.04) | .14 |
| Secondary outcomes during the primary outcome period | | | | |
| Duration of nasal barrier dressing application, d, median (IQR) | 14 (5, 23) | N/A | — | — |
| Maximum set CPAP pressure, cm H ₂ O, median (IQR) | 8 (8-9) | 8 (7-9) | — | .39 |
| Maximum sustained supplementary oxygen requirement, %, median (IQR) | 40 (27, 50) | 32 (21, 52) | — | .38 |
| Reintubation during primary outcome period, no. (%) | 12 (22.6) | 7 (12.7) | 0.10 (-0.05, 0.25) | .18 |
| Adverse events: no. (%) | | | | |
| Death before 36 wk PMA | 0 | 0 | — | — |
| Day of life infant first reached full enteral feed, mean (SD) | 12.9 (7.5) | 12.9 (6.3) | Mean difference: 0.01 (-2.63, 2.66) | .99 |
| Oxygen supplementation at 36 wk PMA | 19 (35.8) | 24 (43.6) | -0.08 (-0.26, 0.11) | .40 |
| Duration of CPAP/NIPPV treatment until 36 PMA, d, mean (SD) | 23.9 (17.2) | 20.1 (19.3) | Mean difference: 3.85 (-3.03, 10.73) | .27 |
| Corticosteroid treatment for lung disease after trial entry | 13 (24.5) | 11 (20.0) | 0.05 (-0.11, 0.20) | .57 |
| Pneumothorax after trial entry | 0 | 0 | — | — |
| Confirmed sepsis after trial entry [‡] | 8 (15.1) | 7 (12.7) | 0.02 (-0.11, 0.15) | .72 |
| Patent ductus arteriosus treated with medication or surgery | 26 (49.1) | 19 (34.5) | 0.15 (-0.04, 0.33) | .13 |
| Necrotizing enterocolitis, Bell stage 2 or 3 | 1 (1.9) | 2 (3.6) | -0.02 (-0.08, 0.04) | .58 |
| Laser surgery for retinopathy of prematurity >stage 2 | 12 (22.6) | 15 (27.3) | -0.05 (-0.21, 0.12) | .58 |
| Intraventricular hemorrhage, grade 3 or 4 or cystic periventricular leukomalacia | 3 (5.7) | 1 (1.8) | 0.04 (-0.03, 0.11) | .29 |
| Bronchopulmonary dysplasia at 36 wk PMA [§] | 28 (52.8) | 33 (60.0) | -0.07 (-0.26, 0.11) | .45 |

NIPPV, nasal intermittent positive pressure ventilation.

*Linear trend for severity of nasal injury (stages 0-4).

[†]No photographs were taken for 10 infants: Barrier n = 50 (3 missed); no barrier n = 48 (7 missed).

[‡]The criteria for confirmation of sepsis were a positive blood culture and treatment with intravenous antibiotics for at least 5 calendar days.

[§]Bronchopulmonary dysplasia was defined as supplementary oxygen and/or respiratory support at 36 weeks of PMA.

Previous studies reporting the incidence of nasal injury have found that smaller, more immature infants are more likely to develop CPAP pressure-related injuries. In our trial, we found no differential effect between the 2 gestational age subgroups (<28 weeks of gestational age and ≥28 weeks of gestational age), although our trial was stopped early, and was therefore underpowered to show such a difference. Possible explanations for increased rates of nasal injury in more mature infants include increased infant head movements and secretions that may have caused the binasal prongs to irritate the nasal septum. As reported in the nursing documentation, increased nasal secretions may have affected the adhesiveness of the hydrocolloid dressing and, thus, led to more frequent changes. This may render the physical barrier ineffective at times.

The nature of hydrocolloids is that they absorb water and therefore the dressings may peel off the skin if they become excessively wet. Hydrocolloid dressings that are combined with waterproof materials may be a better option. However, these may be too abrasive to be routinely used on a preterm infant's skin. An interesting conundrum in our trial was that although the condition of the nares was most commonly documented as "skin intact" when assessed, the most frequent comment from bedside nurses was that it was difficult to visualize and assess the nasal skin when the dressing was in situ. A perceived advantage of frequently replacing the dressing was that the nares could be regularly assessed. Although

these outcomes were not systematically assessed, it is reassuring that the use of hydrocolloid dressings did not cause any adverse event suggesting they are unlikely to interfere with regular CPAP management.

Our study found that the use of a hydrocolloid dressing was effective in reducing the incidence of mild (stage I; persistent erythema) nasal injury in very preterm infants. Although other hydrocolloid dressings are used to treat pressure-related injuries, we did not find a difference in the development of stage 2 (bleeding, abrasion, or scab formation) nasal injuries. A reduction in more severe forms of nasal injury, including full thickness loss would require a much larger sample size. Severe intranasal injuries associated with CPAP treatment, including columella necrosis, have been reported to occur after longer duration of CPAP therapy.¹⁶ However, in our study close surveillance and immediate action taken by bedside nurses and medical teams meant that severe nasal injury was rare.

To further evaluate whether the use of hydrocolloid dressings could have other benefits in this population, data on common neonatal morbidities were collected up to 36 weeks of PMA. We found no differences in respiratory outcomes to suggest that a hydrocolloid dressing improves CPAP effectiveness, such as maximum CPAP pressure, oxygen requirement or need for intubation/reintubation. However, the trial was underpowered to detect such differences. Nor were there

differences in important neonatal morbidities between groups, including rates of bronchopulmonary dysplasia or pneumothorax. No previous studies of barrier dressings have reported outcomes to 36 weeks of PMA. Previous literature suggests that nasal injury may predispose infants to bacterial infections such as coagulase-negative staphylococcal sepsis¹⁸; in our study rates of late onset sepsis were low, and similar in both groups.

The main limitation of our study is that due to lower than expected numbers of eligible infants, the planned sample size was not achieved. The reduction in the number of eligible infants was due to the adoption of nasal high-flow therapy, which was introduced to treat preterm infants born ≥ 28 weeks of gestational age following extubation. In addition, many eligible infants received < 4 hours of CPAP or were changed to nasal high-flow, at the discretion of the treating physician. Another reason for fewer eligible infants than predicted was that some potentially eligible preterm infants required a prolonged period of endotracheal ventilation, meaning they were > 30 weeks of PMA and > 1250 g prior to their first extubation to CPAP support, and, thus, ineligible. Second, blinding of the intervention was not possible, risking bias in the assessment of the primary outcome. In an effort to overcome this, blinded assessment of nasal photographs was included as a secondary outcome measure. However, we were not able to obtain multiple photographs for all infants in the study, potentially reducing the validity of the outcome. As infants enrolled in this trial are high-risk patients, CPAP binasal prongs were very briefly removed during standard, routine nursing cares. Consequently, there was limited opportunity to move or position the infants appropriately for a nasal photograph. In addition, low ambient light levels are maintained in the neonatal intensive care unit as per neonatal developmental guidelines. For these reasons, visual inspection and standard nasal injury scoring, instead of nasal photographs, was defined prospectively in the protocol as the primary measure of any nasal injury.

We conclude that, when used early in the course of CPAP treatment, a nasal barrier dressing reduces the rate of nasal injury in preterm infants born < 30 weeks of gestational age or < 1250 g receiving CPAP, without any adverse effect, and for a modest cost. Clinicians should consider their local population, and rate of CPAP-related nasal injury alongside the cost of barrier dressings when deciding whether to apply this intervention in preterm infants. ■

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|--|---|--|---|--|
|  the women's the royal women's hospital | | UR number _____ Surname _____ Given name/s _____ Date of birth / / Gender _____ (AFFIX PATIENT LABEL) | | |
| Nasal Integrity and Pressure Injury Chart | | | | |
| Date | | | | |
| Time | | | | |
| Respiratory therapy | | | | |
| Prong size | | | | |
| Hat size | | | | |
| PRESSURE INJURY STAGE (see legend below) | | | | |
| NASAL | | | | |
| External nare – L | | | | |
| External nare – R | | | | |
| Philtrum | | | | |
| Septum | | | | |
| HEAD / FACE | | | | |
| Head moulding ✓ Yes x No | | | | |
| Pressure injury to head / facial area ✓ Yes x No | | | | |
| Action ✓ Yes x No | | | | |
| Nurse initials | | | | |
| Respiratory therapy | C: Nasal CPAP L: Low Flow Nasal Cannulae | H: High Flow Nasal Cannulae E: Nasal ETT | | |
| Prong size | For Hudson prong CPAP enter appropriate size (0-2) For HFNC prongs: PR: Premature N: Neonatal I: Infant II: Intermediate Infant PE: Paediatric | | | |
| Stage 0 | Skin is intact. No sign of redness (<i>No action required</i>) | | | |
| Stage 1 | Non blanchable erythema of intact skin (intact unbroken skin) <i>Action: Notify medical staff, document in patient's health record (Tick action box when complete)</i> | | | |
| Stage 2 | Partial thickness skin loss involving epidermis, dermis or both (abrasion, tear, blister) <i>Action: Document, discuss and consider alternate mode of respiratory support. Record in Progress Notes and complete VHIMS</i> | | | |
| Stage 3 | Full thickness skin loss involving damage to or necrosis of subcutaneous tissue <i>Action: Document, discuss and consider alternate mode of respiratory support. Record in Progress Notes and complete VHIMS</i> | | | |
| Stage 4 | Full thickness skin loss with extensive destruction, tissue necrosis or damage to supporting structures <i>Action: Document, discuss and consider alternate mode of respiratory support. Record in Progress Notes and complete VHIMS</i> | | | |
| Pressure or moulding | Any sign of head moulding and / or pressure injury to head / facial area <i>Action: Document, discuss, consider alternate mode of respiratory support. Record in Progress Notes</i> | | | |
| STAFF SIGNATURE LOG | | | | |
| Print name, Signature, Designation | | Initial | Print name, Signature, Designation | |
| | | | | |
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41497
Allanby
December 2015

NASAL INTEGRITY AND PRESSURE INJURY CHART

MR/1808

Figure 2. RWH nasal integrity and pressure chart. (Continues)


| | | | | | | | | | | | | | |
|--|---|-------------------------|--|----------------|---|---|--------------|--|----------------|--|--|--|--|
|  the women's the royal women's hospital Nasal Integrity and Pressure Injury Chart | | UR number _____ | | | | | | | | | | | |
| | | Surname _____ | | | | | | | | | | | |
| | | Given name/s _____ | | | | | | | | | | | |
| | | Date of birth / / | | | | | Gender _____ | | | | | | |
| | | (AFFIX PATIENT LABEL) | | | | | | | | | | | |
| Date | | | | | | | | | | | | | |
| Time | | | | | | | | | | | | | |
| Respiratory therapy | | | | | | | | | | | | | |
| Prong size | | | | | | | | | | | | | |
| Hat size | | | | | | | | | | | | | |
| PRESSURE INJURY STAGE (see legend below) | | | | | | | | | | | | | |
| NASAL | | | | | | | | | | | | | |
| External nare - L | | | | | | | | | | | | | |
| External nare - R | | | | | | | | | | | | | |
| Philtrum | | | | | | | | | | | | | |
| Septum | | | | | | | | | | | | | |
| HEAD / FACE | | | | | | | | | | | | | |
| Head moulding ✓ Yes x No | | | | | | | | | | | | | |
| Pressure injury to head / facial area ✓ Yes x No | | | | | | | | | | | | | |
| Action ✓ Yes x No | | | | | | | | | | | | | |
| Nurse initials | | | | | | | | | | | | | |
| Respiratory therapy | C: Nasal CPAP L: Low Flow Nasal Cannulae | | | | | H: High Flow Nasal Cannulae E: Nasal ETT | | | | | | | |
| Prong size | For Hudson prong CPAP enter appropriate size (0-2) For HFNC prongs: PR: Premature N: Neonatal I: Infant II: Intermediate Infant PE: Paediatric | | | | | | | | | | | | |
| Stage 0 | Skin is intact. No sign of redness (<i>No action required</i>) | | | | | | | | | | | | |
| Stage 1 | Non blanchable erythema of intact skin (intact unbroken skin) <i>Action: Notify medical staff, document in patient's health record (Tick action box when complete)</i> | | | | | | | | | | | | |
| Stage 2 | Partial thickness skin loss involving epidermis, dermis or both (abrasion, tear, blister) <i>Action: Document, discuss and consider alternate mode of respiratory support. Record in Progress Notes and complete VHIMS</i> | | | | | | | | | | | | |
| Stage 3 | Full thickness skin loss involving damage to or necrosis of subcutaneous tissue <i>Action: Document, discuss and consider alternate mode of respiratory support. Record in Progress Notes and complete VHIMS</i> | | | | | | | | | | | | |
| Stage 4 | Full thickness skin loss with extensive destruction, tissue necrosis or damage to supporting structures <i>Action: Document, discuss and consider alternate mode of respiratory support. Record in Progress Notes and complete VHIMS</i> | | | | | | | | | | | | |
| Pressure or moulding | Any sign of head moulding and / or pressure injury to head / facial area <i>Action: Document, discuss, consider alternate mode of respiratory support. Record in Progress Notes</i> | | | | | | | | | | | | |
| STAFF SIGNATURE LOG | | | | | | | | | | | | | |
| Print name, Signature, Designation | | | | Initial | Print name, Signature, Designation | | | | Initial | | | | |
| | | | | | | | | | | | | | |
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Figure 2. Continued.

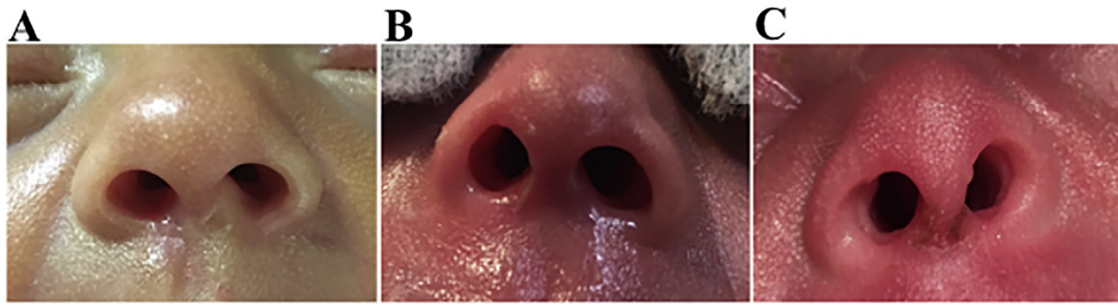


Figure 4. Nasal photographs taken of infants in the trial with **A**, stage 0 (no nasal injury); **B**, stage I, and **C**, stage II nasal injury.