



ORIGINAL ARTICLE

Influence of body position on the displacement of nasal prongs in preterm newborns receiving continuous positive airway pressure



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KEYWORDS

Premature infant;
Continuous positive
airway pressure;
Supine position;
Prone position

Abstract

Objective: To evaluate the influence of body position on the displacement of nasal prongs in preterm infants.

Methods: This prospective, randomized, crossover study enrolled infants born at a mean gestational age of 29.7 ± 2 weeks, birth weight of 1353 ± 280 g and 2.9 ± 2.2 days of life, submitted to continuous positive airway pressure by nasal prongs. The main outcome was the number of times that the nasal prongs were displaced following infant positioning in the following body positions: prone, right lateral, left lateral, and supine, according to a pre-established random order. Moreover, cardiorespiratory variables (respiratory rate, heart rate, and oxygen saturation) were evaluated for each body position. Data for each position were collected every 10 min, over a period of 60 min. An occurrence was defined when the nasal prongs were displaced from the nostrils after 3 min in the desired position, requiring intervention of the examiner.

Results: Among the 16 studied infants, the occurrence of nasal prong displacement was only observed in the prone position (9 infants – 56.2%) and in the left lateral position (2 infants – 12.5%). The number of times that the prongs were displaced was 11 in the prone position (7 within the first 10min) and 2 in the left lateral position (1 within the first 10min). No clinically significant changes were observed in the cardiorespiratory variables.

Conclusions: Maintenance of the nasal prongs to provide adequate noninvasive respiratory support was harder in the prone position.

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PALAVRAS-CHAVE

Recém-nascido prematuro;
Pressão positiva contínua nas vias aéreas;
Decúbito dorsal;
Decúbito ventral

Influência da posição corporal no deslocamento da pronga nasal em recém-nascido pré-termo em pressão positiva contínua em vias aéreas

Resumo

Objetivo: Analisar a influência da posição corporal no deslocamento da pronga nasal em recém-nascidos pré-termos.

Métodos: Estudo prospectivo, randomizado e tipo crossover. Foram estudados recém-nascidos com média de idade gestacional de $29,7 \pm 2$ semanas, peso de nascimento de 1.353 ± 280 g, $2,9 \pm 2,2$ dias de vida e em uso da pressão positiva contínua de vias aéreas. Avaliou-se o número de vezes em que o dispositivo nasal sofreu deslocamento, além de variáveis cardiorrespiratórias, como frequência respiratória, cardíaca e saturação de oxigênio, conforme a criança foi colocada nas posições corporais prona, lateral direita, lateral esquerda e supina, segundo ordem aleatória previamente estabelecida. As informações em cada posição foram coletadas a cada 10 minutos, por 60 minutos. Foi considerada ocorrência quando o dispositivo nasal se deslocou do orifício das narinas, após o período de três minutos na posição desejada, e houve necessidade de intervenção do examinador.

Resultados: Nas 16 crianças estudadas, o deslocamento do dispositivo nasal ocorreu somente nas posições prona (nove crianças – 56,2%) e lateral esquerda (duas crianças – 12,5%). A pronga se deslocou 11 vezes na posição prona, sete delas nos primeiros dez minutos, e duas vezes na posição lateral esquerda, uma nos primeiros dez minutos. Não se detectaram alterações clinicamente significativas nas variáveis cardiorrespiratórias.

Conclusões: A posição prona mostrou maior dificuldade para se manter o dispositivo nasal de suporte pressórico não invasivo na forma adequada.

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Introduction

Nasal prongs are a type of device used in infants receiving noninvasive pressure support through continuous positive airway pressure (CPAP). Nasal CPAP is frequently used in preterm infants at birth or after mechanical ventilation discontinuation.

Some advantages of using nasal CPAP as first choice of ventilatory support have been demonstrated, such as a decrease in the need for invasive ventilatory support, better pulmonary mechanics results and reduced respiratory work.¹ This support, when used after tracheal extubation, is indicated by the Brazilian Consensus on Mechanical Ventilation as level "A" of evidence.² Therefore, the neonatal care team should be encouraged to use the system.

The professional team involved in neonatal care is critical to the success of the nasal CPAP technique. Adequate knowledge of the technique by the team and care directed to the nasal device handling allow the decrease in complications, such as nasal septal lesions, nasal bleedings and inadequate prong positioning.³

Proper positioning of the nasal prongs is the one that does not deform the face, does not compress the nasal septum and does not allow the displacement of the interface inside the nostrils.⁴ Inadequate positioning of the nasal device generates increasing pressure in the columella, causing reduced blood flow and a consequent risk for ischemia and tissue damage.⁵ Thus, it is important to pay attention to the positioning of the nasal prongs in a preventive manner, in order to reduce the incidence of nasal lesions induced by the device.⁶

In order to attain better device fixation and stability on the face and in an attempt to keep the nasal CPAP interface properly and comfortably positioned, several fixation models have been developed. However, scientific studies have not described whether a certain body position could facilitate or hinder the permanence of nasal prongs in the correct place. The body positioning could influence the correct permanence of the prongs, as the adequate body position has shown to be important in certain clinical situations, such as increased gastric volume,⁷ in cases of apnea⁸ or for the sleep rhythm⁹ of the infant.

Therefore, this study aimed to analyze the influence of body positioning on the nasal prong displacement in preterm infants during nasal CPAP use.

Method

The study design was analytical, prospective, crossover and observational, carried out between January and December 2009. The assessed preterm infants were followed at the Pediatric Intensive Care sector of a tertiary public hospital. The study was approved by the Institutional Review Board, protocol #024/2008. The informed consent forms were shown to and signed by the infants' parents or guardians.

For inclusion in this study, preterm infants <34 weeks gestational age, weight <2000 g and using nasal CPAP in the first week of life were selected. Infants with congenital anomalies, post-surgical cases, those with hydrocephaly, neonatal infection, diagnosed with bronchopulmonary dysplasia and

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