

## Intra-gastric Pressures in Neonates Receiving Bubble CPAP

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### Abstract

**Objective** To study intra-gastric pressures in neonates receiving bubble continuous positive airway pressure (BCPAP) by nasopharyngeal prong.

**Methods** Twenty seven neonates were recruited for the study. BCPAP pressure of 6 cm water was used in all the neonates. A pressure sensor attached to orogastric tube, measured the intra-gastric pressure prior to starting BCPAP and again between 30 and 90 min of BCPAP. The clinical variables like Downe's score, oxygen saturation, venous blood gas pH, pCO<sub>2</sub> and abdominal girth were recorded alongside with pressure readings.

**Results** BCPAP resulted in improvement ( $p < 0.05$ ) in parameters of respiratory distress such as Downe's score (DS), oxygen saturation (SpO<sub>2</sub>) and venous blood gas parameters (pH, pCO<sub>2</sub>). There was no statistical significant increase in intra-gastric pressures ( $p = 0.834$ ). There were no gastrointestinal complications; abdominal distention, necrotising enterocolitis or gastric perforation during the study.

**Conclusions** Nasopharyngeal BCPAP at 6 cm of water pressure is an effective modality of treating babies with respiratory distress and the present study shows that it is not associated with a significant rise in intra-gastric pressures.

**Keywords** Bubble CPAP (BCPAP) · Intra-gastric pressure · G.I complications

### Introduction

Early use of continuous positive airway pressure (CPAP) in newborns is associated with lower incidence of chronic lung disease [1]. This has led to increase in the use of CPAP as an alternative to intubation and ventilation, in some units [2, 3].

CPAP has also been established as an effective method for weaning from mechanical ventilation, in preventing extubation failure and is used in the management of apnea of prematurity [4, 5].

Although bubble CPAP (BCPAP) is seen to be superior to continuous steady pressure CPAP [6–11], its pressure delivery system can be highly variable and unpredictable as reported by Kahn et al. [12].

CPAP has been associated with gastrointestinal adverse effects – although rarely. In 1992 Jaile et al. published a case and coined the term CPAP belly syndrome [13]. They used this term to denote the gaseous bowel-distension in infants treated with nasal CPAP. These infants do not have abdominal distension at birth, but after treatment with nasal CPAP for a short period develop soft, strikingly distended abdomens and visibly dilated loops. The continuous flow of air in the nasopharynx causes an increase in swallowing of air. The distended abdomen causes increase in pressure on the diaphragm, which may result in a compromised respiratory state [14].

Rare case reports of gastric insufflations potentially leading to aspiration, abdominal distention and perforation in neonates on CPAP have been reported [15, 16]. Reporting of 2 deaths in the BCPAP study group of Gupta et al. [17] due to necrotizing enterocolitis (NEC) are disconcerting and raises question marks on serious gastrointestinal side effects of BCPAP and

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