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Original Research Article

To Determine the Outcome of Newborns of Indigenous Bubble CPAP with Respiratory Distress in Paediatrics Patients

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Abstract:

Background & Method: The aim of this study is to determine the outcome of newborns of indigenous bubble CPAP with respiratory distress at or after birth in Newborns. Newborns with respiratory distress with grunting and retractions within 6 hours of birth were enrolled in the study and evaluated and managed.

Result: The survival among RDS controls was 46.88%. The *p*-value is 0.962888. The result is *not* significant at $p < .05$. Only 48.78% of babies in the control group survived.

Conclusion: This study concludes usefulness & outcome of Bubble Continuous Positive Airway Pressure in neonates with respiratory distress. Indigenous BUBBLE CPAP can be used to manage respiratory distress due to RDS, congenital pneumonia & MAS.

Keywords: indigenous, CPAP, respiratory & newborns.

Study Designed: Observational Study, Newborns, Respiratory distress.

Introduction

Continuous Positive Airway Pressure (CPAP) is a means of providing respiratory support to neonates with either upper airway obstruction or respiratory failure. Respiratory failure constitutes either failure of ventilation or failure of lung function [1].

CPAP delivers oxygen concentrations and distending airway pressures via the ventilator without the hazards associated with full endotracheal intubation and mechanical ventilation. The delivery of constant positive pressure to the airway of a spontaneously breathing neonate maintains adequate functional residual capacity within the alveoli to prevent atelectasis and improves oxygen and carbon dioxide exchange within the pulmonary circulation.

These are useful and effective as neonates are obligate nasal breathers. The prongs can be sterilized and reused making them very cost-effective [2]. Mouth leak provides pressure pop off; there is no benefit of forcible mouth closure as the transient benefit is outweighed by occurrence of gastric distension and rupture. Prongs can cause trauma to nasal turbinates and septum. They are not universally beneficial in infants less than 1000 to 1250 grams. Single prong nasal CPAP has been used by cutting short an endotracheal tube. It can be used to deliver both nasal and nasopharyngeal CPAP.

However, double nasal prongs have been shown to be better than single nasal prongs for CPAP delivery [3]. A Cochrane Systematic Review suggests that short binasal prongs are more effective, in preterm infants, at preventing re-intubation compared to single nasal prongs. What should be the optimal length of nasal prongs has yet not been researched thoroughly [4,5].

Respiratory distress is the most frequent cause of admission of neonates to the neonatal intensive care units (NICU). Along with seizures it is the most common emergency during the neonatal period. It also constitutes the commonest cause of morbidity in the newborn babies and pulmonary pathology is the most frequent autopsy finding in the neonates. Neonates may present with respiratory distress due to pulmonary, cardiac, hematological, infections, anatomic and metabolic disorders that may directly or indirectly involve lungs and the clinical management may differ according to the underlying etiology [6]

Material & Method

This study was carried out on inborn neonates in the Index Medical College Hospital & Research Centre, Indore, M.P. from May 2018 to April 2019. It was a prospective observational study with matched controls taken from cases admitted to the same NICU in the previous four month period.

Exclusion Criteria:

1. Any congenital malformations.
2. Onset of respiratory distress after 6 hours of birth.
3. Birth weight less than 1000 grams.
4. Newborns without grunting respiration.

Methods

Newborns with respiratory distress with grunting and retractions within 6 hours of birth were enrolled in the study and evaluated and managed. Severity of respiratory distress was measured by Silverman Anderson Score and oxygen saturation. Newborns having respiratory distress with Silverman Anderson Score of 3 or more than 3 were started on oxygen inhalation.

Result

Table 1: Survival among various etiologies in controls

	RDS	Congenital Pneumonia	MAS	P Value
Total	64	08	10	0.962888
Survived	30	04	06	
Deaths	34	04	04	
Percentage	46.88%	50%	60%	

The survival among RDS controls was 46.88%. The chi-square statistic is 0.6016. The *p*-value is 0.962888. The result is *not* significant at $p < .05$.

Table 2: Distribution of cases according to sex

	Male	Female	Total
Number	60	52	112
Percentage	53.5%	46.5%	100%

Table 3: Outcome of controls

	Number	Percentage
Survived	40	48.78%
Deaths	42	51.22%
	82	100%

Only 48.78% of babies in the control group survived.

Discussion

Clinicians should be aware that CPAP has been associated with more serious complications including pneumothoraces and air embolism [7]. Therefore all infants needing respiratory support, be it invasive or non-invasive continue to require careful monitoring for clinical deterioration. No compromises for CPAP should be made in this regard, and CPAP usage requires constant observation of breathing patterns and standardized and rigorous training of physicians, respiratory practitioners and nursing staff.

No attempt should be made to keep the mouth closed while the baby is on CPAP. This has no added advantage and can result in local trauma and gastric distension. Intermittent opening of mouth prevents excessive buildup of pressure in the stomach. Some fluctuation in CPAP pressure is acceptable and reflects baby's efforts [8]. Periodic change in posture of the baby should be done. With prone posture, fixation of nasal prong can be a practical problem, so babies are usually nursed in supine or lateral positions.

CPAP is no contraindication to feeding. Once the baby is hemodynamically stable, minimal enteral nutrition should be started as 10 mL per kg of expressed breast milk by orogastric (OG) tube. It can be gradually increased depending on baby's clinical status and the unit policy. Abdominal girth and pre-feed aspirate should be monitored 2 hourly. Feed intolerance can occur due to gastric dilation secondary to CPAP [9].

Small, preterm babies with respiratory distress syndrome rarely require any sedation. However, trichlofos can be used occasionally to calm agitated term infant. Agitation can be further reduced by "nesting" the baby in linen made boundaries, decreasing environ-mental light and sound stimuli and minimal handling of baby. [10]

Conclusion

This study concludes usefulness & outcome of Bubble Continuous Positive Airway Pressure in neonates with respiratory distress. Indigenous BUBBLE CPAP can be used to manage respiratory distress due to RDS, congenital pneumonia & MAS.

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