

# The effect of using BCPAP in the management of Respiratory Distress

Ali Jalil Malallah Al Rubaye [a]  
Nabeel Amer Mohammed Ali Al Quraishi [b]

Asaad Hasan Noaman[c]

\*Corresponding Authors

[a] Diploma in child health (DCH), Al- Furat Al-Awsat Teaching Hospital, [DrAliJalil24@gmail.com](mailto:DrAliJalil24@gmail.com)

[b] Diploma in child health (DCH), Al- Furat Al-Awsat Teaching Hospital, [nbylalqryshy38@gmail.com](mailto:nbylalqryshy38@gmail.com)

[c] PhD Physiology, specialist echocardiography, College of  
Medicine/ University of Kufa  
[asaadh.alaboodi@uokufa.edu.iq](mailto:asaadh.alaboodi@uokufa.edu.iq)

**Abstract:** In the developing world, one of the biggest cause why infant die is respiratory distress. A noninvasive respiratory support technique called bubble continuous positive airway pressure (BCPAP) is used to treat neonates who are experiencing respiratory distress. It was originally mentioned in 1971 as a way to help premature newborns' respiration. BCPAP is a less invasive method of providing respiratory assistance to newborns than mechanical ventilation. **Method:** 63 babies with respiratory distress were put on BCPAP as part of a clinical trial study that was undertaken at Al-Forat Al-Awsat Teaching Hospital in An'najaf city from February 1 to June 30, 2018. **Results:** It was shown that although 38 patients (60.31%) with respiratory distress were helped and effectively weaned off of BCPAP, CPAP failed to help 25 patients (39.68%) with respiratory distress, and they died as a result. **Conclusion:** BCPAP was beneficial in treating respiratory distress.

**Keywords:**

Continuous Positive Airway Pressure, Bubble Nasal Continuous Positive Airway Pressure, respiratory distress, Functional Residual Capacity

**Abbreviation:**

**CPAP:** Continuous Positive Airway Pressure, **BCPAP:** Bubble Nasal Continuous Positive Airway Pressure, **WOB:** Work of breathing, **HMD:** Hyaline Membrane Disease

**Introduction:**

A noninvasive method referred to as nasal continuous positive airway pressure (CPAP) is used to administer a consistent distending pressure level (above atmospheric) during inhalation and expiration to help newborn infants with lung illness in breathing on their own. An "open-lung technique" known as <sup>(1)</sup> Newborn newborns who are more likely to experience airway instability, edema, and atelectasis are treated with CPAP. Functional residual capacity (FRC), ventilation-perfusion matching, and alveolar collapse avoidance are all improved by CPAP. The therapeutic goals of CPAP are to prevent apnea, reduce effort of breathing, and prevent lung damage by maintaining the lungs' FRC and fostering gas exchange. <sup>(1)</sup>

A study of the pertinent literature is necessary since fresh material has just become available to explain the security and efficiency of noninvasive ventilation. To provide CPAP to the nasal airway's entry, bi-nasal short prongs or a nasal mask are frequently employed, and a variety of devices are used to apply pressure. CPAP is frequently accepted and successful in part because newborns prefer or must breathe via their noses and because of the physical seal that forms between the infant's tongue and soft palate. <sup>(1)</sup>

Preterm newborns with mild to severe Hyaline Membrane Disease (HMD) or mild prematurity apnea can be treated with CPAP. But CPAP has also been used to treat infants with a variety of respiratory issues, including transient neonatal tachypnea, pulmonary hemorrhage, patent ductus arteriosus, meconium aspiration syndrome, primary pulmonary hypertension and the ensuing pulmonary hypertension. CPAP enhances lung function following surgery to cure diaphragmatic hernias, paralyze a hemidiaphragm, or rectify congenital heart abnormalities. <sup>(2)</sup> It is a suitable substitute for young children as well. CPAP can

successfully treat two respiratory conditions in infants: congenital pneumonia and respiratory syncytial virus bronchiolitis.<sup>(3)</sup>

Patients who have persistent apneic episodes, severe cardiovascular instability, unrepaired diaphragmatic hernias, considerable ventilatory impairment (pH 7.25 and PaCO<sub>2</sub> 60 mm Hg), and upper airway abnormalities (such as cleft palate, choanal atresia, and tracheoesophageal fistula) shouldn't use CPAP.<sup>(4)</sup>

BCPAP stands for continuous-flow, variable-pressure CPAP. This kind of CPAP support is very well-liked all around the world, partly because it is easy to use, cheap, harmless, and effective for keeping CPAP in preterm infants.<sup>(1)</sup> On the other hand, a preterm lamb model comparing ventilator CPAP with BCPAP found that the bubble method was linked with a higher pH, better oxygenation and ventilation, less ventilation inhomogeneity, and lower alveolar released protein, as compared to the ventilator pressure group.<sup>(5)</sup>

The BCPAP system consists of a section of inspiratory circuit that connects a blended, humidified gas supply (4-6 L/min) to nasal prongs. Through a separate section of expiratory circuit tubing linked from the nasal interface into a water seal column of sterile H<sub>2</sub>O, exhaled gases and system bias flow are permitted to escape. The CPAP level is determined by how far the distal end of the expiratory tube is positioned below the water-seal surface (CPAP Generator).<sup>(2)</sup>

### Patients and methods

63 women who had just given birth at at Al-Forat Al-Awsat Teaching Hospital in An'najaf City were the focus of a clinical research examination from February 1 to June 30, 2018. In every instance,

1. Referred by a delivery or surgery room at at Al-Forat Al-Awsat Teaching Hospital.
2. As a result of their primary respiratory distress signs, tachypnea, dyspnea, cyanosis, and grunting, newborns require oxygen treatment. There were no babies born in the emergency room's cortage room. Senior house officers refer all of these cases of respiratory distress to the NICU, where staff members do CPR and take the patients in order to treat them with IV fluids, prophylactic aminophylline, some baby on Antibiotics and CPAP.

It was a BCPAP made by Fisher & Paykel (Figure 1). An infant bonnet and appropriately sized nasal prongs were used to secure the patient interface. The oxygen flow was set at 3 to 6 liters per minute, and PEEP was established by the CPAP generator at 3 to 10 cm H<sub>2</sub>O . The SpO<sub>2</sub>, RR, PR, and ECG were still being monitored by the bedside monitor.

We start weaning gradually when our general health improves and the signs of respiratory distress disappear. SpO<sub>2</sub> was over 92%, PEEP was initially decreased to 3 cm H<sub>2</sub>O, O<sub>2</sub> flow was subsequently decreased to 1-2 cm H<sub>2</sub>O, and finally, CPAP was gradually turned off while monitoring the infant.

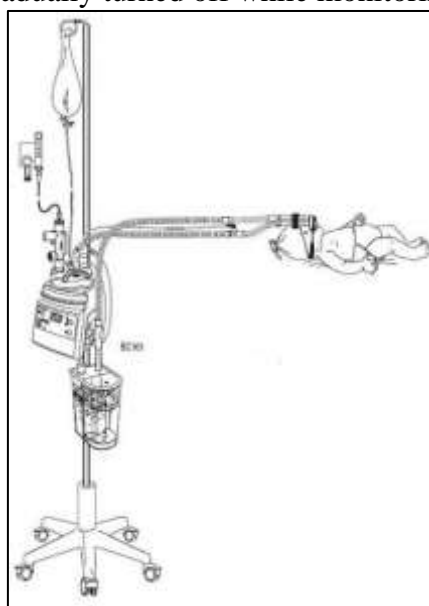


Figure 1: Schematic picture of BCPAP -BC 161 product of Fisher & Paykel Healthcare<sup>(6)</sup>

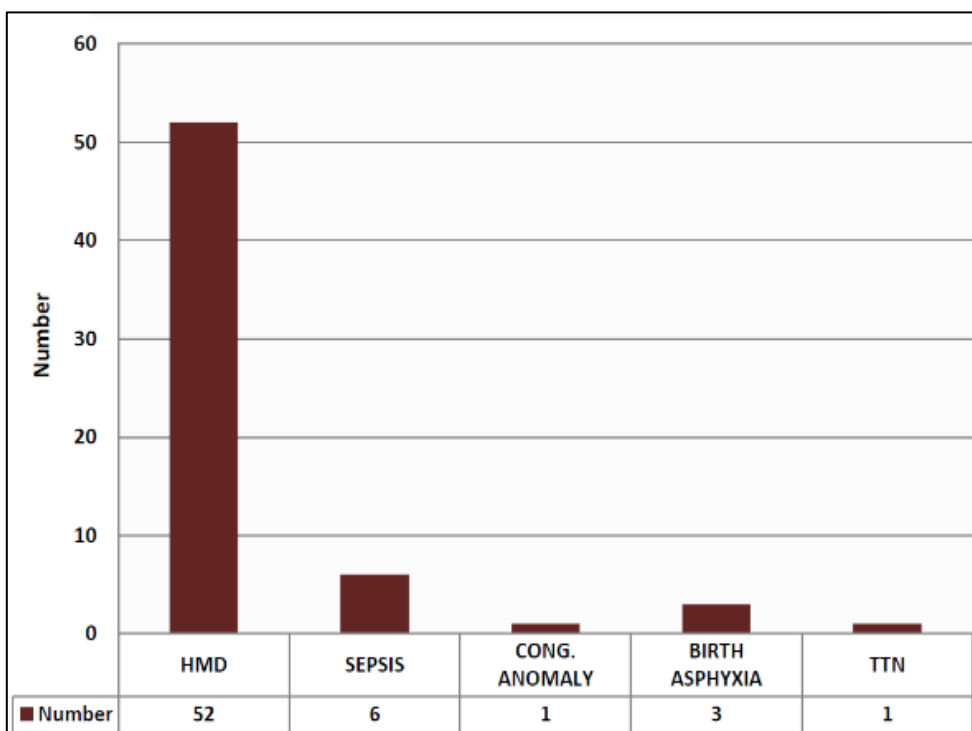
Each of the 63 patients had to complete a form with the following pertinent details about themselves and their mothers in order for data to be collected for each of them:

- Name, gender, and date of admission
- Apgar scores in the first and fifth minutes.
- Conceptional age
- Body weight
- The duration of BCPAP as well as its start and conclusion timings.
- Clinical judgment, a CXR, and additional research used to make the diagnosis.
- A consequence of BCPAP.
- The name of the mother, her age, her gestational status, how she gave birth, her history of steroid use, and any chronic illnesses.

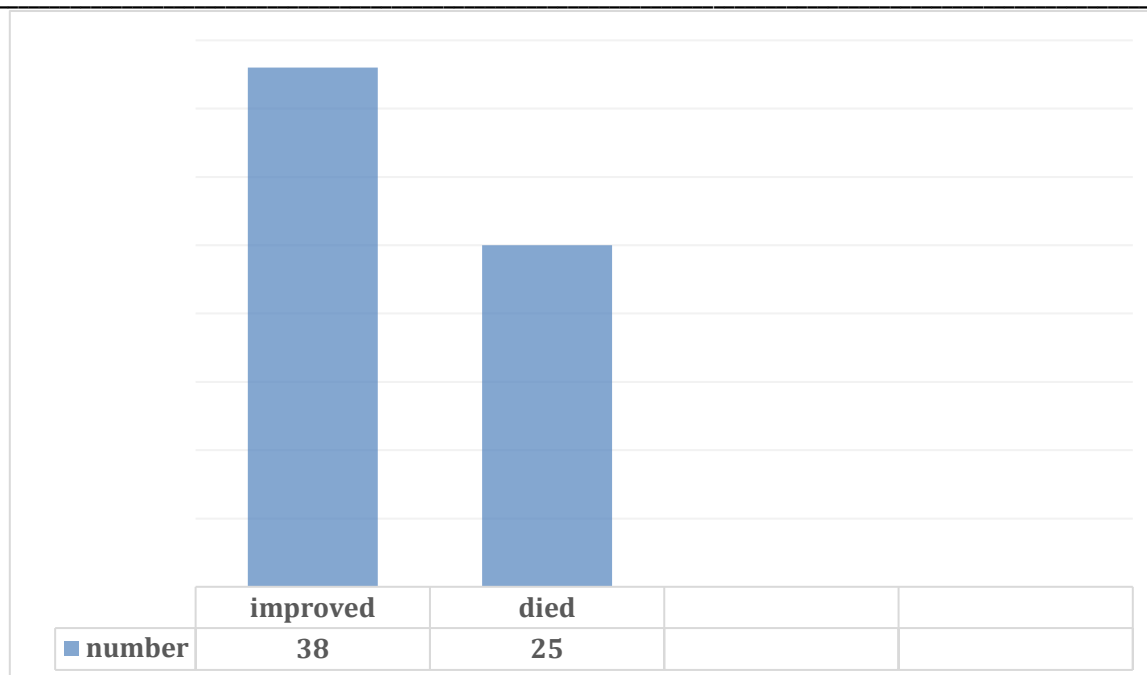
**Statistical analysis:**

- Using Statistica 5 to analyze data and do statistical analysis.
- Comparing the two means with a P value of 0.05.
- Comparing two proportions with the Z test, a P value of 0.05 or less.

**Results:**



**Figure 2: Distribution of Neonate put on BCPAP in this Study on the Diagnosis**



**Figure 3: effect of CPAP in neonate with respiratory distress admitted in NICU**

**Discussion:**

Twenty five instances (39.68%) died, compared to 38 patients (60.31%) who made improvement. This is in contrast to KOTI et al.'s failure rate of 25%.<sup>(7)</sup> The possible explanation for this is the absence of extra supportive treatments such Total Parenteral Nutrition (TPN), surfactant, and staff competence, which might lower the mortality rate by an average of 40%.

**Conclusion:**

It was successful to treat respiratory distress with BCPAP

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