



KPJ IPOH

SPECIALIST HOSPITAL

CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) IN PRETEM & TERM NEONATES

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1 . INTRODUCTION

CPAP has been shown to rapidly improve vital signs, gas exchange, work of breathing, decrease dyspnea and decrease the need for endotracheal intubation in neonates as well as the risk of mortality and bronchopulmonary dysplasia(BPD). *A study from Malawi showed that the early implementation of CPAP therapy led by Nurses could decrease Neonatal Mortality [1].The use of continuous positive airway pressure (CPAP) applied early after birth improves several outcomes when compared with intubation and invasive mechanical ventilation [2].*

3 . METHODOLOGY

Retrospective cohort studies was conducted at NICU KPJ Ipoh for all admission requiring CPAP support, for a duration of 4 years (from January 2019 to December 2022). **Exclusion criteria for this study** are elective intubation for operation, transportation and cardiac abnormalities e.g. Critical Congenital Heart Disease. Data were obtained for all in house new born neonates and referral cases from other health care center in Perak to NICU KPJ Ipoh, which required CPAP therapy for clinically diagnosed Respiratory distress syndrome (with or without surfactant administration via MIST), Transient tachypnea of newborn, Meconium aspiration syndrome, Primary pulmonary hypertension, Patent ductus arteriosus (PDA) and Apnea of prematurity.

4 . RESULTS

2019 – Identified 3 cases needed endotracheal intubation.

Jan, Apr & Dec April, there are 3 cases needing intubation due to late referral from other private hospital which was after 5 hours post birth. However high level of oxygenation has been commenced prior to transfer.

2020 – Identified only 1 case needed endotracheal intubation.

May, Referral from private health care center, Case of RDS,MAS 12 hours of life tacyhypneic, chest recession since born and SPO2 93-100% and on oxygen before came to KPJ Ipoh. In NICU started with DPAP but saturation not picking up, ECHO done showing PFO:Bidirectional shunt, PDA 2mm. Predominantly Left to right, PPHN, proceed with intubation for HFOV.

2022- Identified 2 cases needed endotracheal intubation-exclusive criteria (CARDIAC ABNORMALITIES & ELECTIVE INTUBATION FOR OPERATION

January, Case of ELSCS, Apgar score 9'10⁵, 10 mins post delivery saturation drop to 77% which presented with mild grunting, after IPPV saturation pick up to 85% & neonate send to NICU for DPAP. After 15 min saturation only 93% and neonate proceed with intubation for surfactant. ECHO, showing Obstructed Infracardiac TAPVD. Neonates refer to Nasional Heart Association for emergency surgical intervation.

May, Referral from private health care center, Case of TTN new born had grunting & subcostal recession. Started on DPAP after 1 day abdomen distended, neonate to keep fasting, Ryles tube free flow. Abdomen X-ray show Spontaneous Intestinal Perforation. Neonates refer to General Hospital for surgical intervention. Elective intubation performed as requested by the referral hospital.

2 . OBJECTIVE

To ensure that early CPAP Intervention **led by nurses is able to prevent endotracheal intubation** particularly for preterm neonates with Respiratory Distress Syndrome (RDS), Transient Tachypnea of the Newborn (TTN) & Meconium Aspiration Syndrome (MAS).

2019 - Among 27 neonates requiring CPAP, 24 improved with success rate of **89%**. (10 neonates (37%) required minimal O2 support, 14 neonates (52%) wean to room air whereas 3 neonates (11%) failed & required higher mode of ventilation).

2020 – Among 31 neonates requiring CPAP, 30 improved with success rate of **97%**. (6 neonates (19%) required minimal O2 support, 24 neonates (78%) wean to room air whereas 1 neonates (3%) required higher mode of ventilation.

2021 - **All 39 neonates (100%)** successfully wean off from CPAP. (4 neonates (10%) required minimal O2 support, whereas 35 neonates (90%) wean to room air).

2022 - **All 26 neonates (100%)** successfully wean off from CPAP. (2 neonates (8%) required minimal O2 support, 22 neonates (84%) wean to room air, whereas 2 neonates (8%) requiring higher mode of ventilation due to cardiac abnormalities and elective ventilation prior to operation).

Table 1: Nasal CPAP treatment effectiveness (success/failure) among neonates in RDS,TTN, MAS

Year	Total	Success (%)	Failure(%)
2019	27	89%	11%
2020	31	97%	3%
2021	39	100%	0%
2022	24	100%	0%

Table 2 : Distribution of neonates based on gestational age and results (121 Neonates on CPAP with RDS,TTN,MAS for 2019-2022)

Gestational age in weeks	Total	Success (%)	Failure (%)
7-30	1	1 (100%)	0%
31-34	23	23(100%)	0%
35-38	73	69 (95%)	4 (5%)
39-40	24	24(100%)	0%
Total (2019-2022)	121	117 (97%)	4 (3%)

5 .DATA ANALYSIS

Data Analysis: **CPAP is successful when:** The saturation is > 85%, Pao2 of 60-80 mmHg, paCO2 of 25 to 45 mmHg and pH of 7.3 to 7.4 with FiO2 <0.6. Neonate has no respiratory distress. CPAP failure is defined as PO2 < 50 mmHg or PCO2 > 60mmHg with FiO2 > 0.6 and pH < 7.25.



* 2022 , this 2 cases are under exclusive criteria

6 . CONCLUSIONS

Based on CPAP retrospective data for the 4 years trending, it was proven that the implementation of **early CPAP led by nurses was an effective intervention** in preventing endotracheal intubation particularly for preterm neonates with Respiratory Distress Syndrome(RDS) .

3 neonates identified in 2019 & 1 neonate identified in 2020 was due to late referral. Due to this, KPJ IPOH Neonatologist & Pediatrician Dr. Cheong Hon Kin advised to refer neonates early following the “GOLDEN HOUR CONCEPT- in order to support the Respiratory system”.

The care that a neonate receives in the first hour of life has a significant impact on their long term outcome. The aim is to stabilize the baby and perform all required procedures[3].

CPAP has now become a standard of care for all Preterm Neonates with Respiratory Distress. Evidence from high quality studies suggests significant survival advantage in Preterm Neonates with Severe Respiratory Distress and managed with CPAP as compared with those managed with only oxygen therapy [4].

Nasal CPAP is found to be effective in neonates with low birth weight in preterm with Respiratory Distress. It is safe, inexpensive and effective means of respiratory support [5].

ASPECT

IMPROVEMENT

Cost saving for parents
Promote bonding
(kangaroo care)

IMPACT

REDUCTION

Reduce length of stay
Reduce Mortality,
morbidity

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