NASAL INTERMITTENT POSITIVE PRESSURE VENTILATION VERSUS NASAL CONTINUOUS POSITIVE AIRWAY PRESSURE FOR PRETERM INFANTS WITH RESPIRATORY DISTRESS SYNDROME

By

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ABSTRACT

Introduction: *Respiratory distress syndrome (RDS) is the most common respiratory morbidity in preterm infants, despite surfactant therapy has become the standard of care in preterm infants with RDS, up to 40% of neonates with RDS may need intubation and mechanical ventilation.*

The aim of the work: *was to evaluate whether nasal intermittent positive pressure ventilation (NIPPV) is more successful than nasal continuous positive airway pressure (NCPAP) for management of preterm infants with respiratory distress syndrome (RDS) decreasing the requirement for endotracheal ventilation or not, and to compare the related complications and outcomes.*

Patients and methods: *The present comparative study included Seventy one preterm neonates with RDS delivered and admitted to neonatal intensive care units of Al Hussein University Hospital and Ahmed Maher Teaching Hospital from October 2014 till November 2015. They were selected by simple random method, sixty patients were enrolled in the study & classified into 2 groups, NCPAP group (n=31) and NIPPV group (n=29). Detailed history-taking, thorough examination and laboratory data were obtained.*

The results showed: *Those 24 (82.8 %) patients showed NIPPV success with 5 (17.2 %) patients needed endotracheal ventilation versus 22 (71 %) patients showed NCPAP success with 9 (29 %) patients needed endotracheal ventilation. Also, 25 (86.2 %) patients survived and 4 (13.7 %) patients expired among the NIPPV group versus 24 (77.4 %) patients survived, and 7 (22.6 %) patients expired among the NCPAP group. NIPPV group showed less duration of O2 need and hospital stay, and lower initial PEEP and FiO2, but no significant differences as regard complications between the 2 groups.*

In conclusion: *NIPPV is more effective and safer than NCPAP in the initial treatment of RDS.*

Key words: *Respiratory distress syndrome - Nasal intermittent positive pressure ventilation - Nasal continuous positive airway pressure.*

INTRODUCTION

Respiratory distress syndrome (RDS) is the most common respiratory morbidity in preterm infants. Despite surfactant therapy have become the standard of care in preterm infants with RDS, up to 40% of neonates with RDS may need intubation and mechanical ventilation **(Li et al., 2014)**.

Mechanical ventilation is associated with morbidity such as broncho-pulmonary dysplasia (BPD) and recently there is a trend to minimize the use of mechanical ventilation **(Zofia et al., 2013)**.

Noninvasive respiratory support is an important alternative to reduce mechanical ventilation (MV) duration and to progress from MV to spontaneous breathing. Current scientific and clinical interest in a noninvasive type of support, the nasal intermittent positive pressure ventilation (NIPPV) has increased. This type of ventilation is defined as the provision of positive pressure without using an intra-tracheal tube or tracheotomy. It ensures intermittent and noninvasive inspiratory support at a positive inspiratory pressure greater than expiratory pressure **(Sara et al., 2012)**.

Nasal ventilation may augment an immature infant's inadequate respiratory effort without the complication associated with endotracheal intubation (ETT). This approach may reduce the incidence of ventilator pneumonia and thus avoid the contribution of postnatal inflammatory response to the development of (BPD) **(Zofia et al., 2013)**.

Nasal continuous positive airway pressure (NCPAP) is positive pressure applied to the airways of a spontaneously breathing baby throughout the respiratory cycle. Distended pressure continues to be provided throughout the expiration, allowing lung stability. It is noninvasive ventilation that does not use an invasive artificial airway such as an endotracheal tube has been the initial respiratory support for preterm infants with RDS **(Shalabh and Sunil, 2013)**.

Nasal intermittent positive pressure ventilation (NIPPV) has been indicated to increase the beneficial effects of NCPAP by

combining it with ventilator inflations and therefore, has been shown to be more effective than NCPAP in preventing invasive mechanical ventilation and associated complications for preterm infants with RDS **(Meneses et al., 2012)**.

Aim of the Work

The aim of the work is to evaluate whether NIPPV would decrease the requirement for endotracheal ventilation compared with NCPAP for preterm infants with RDS and compare the related complications between these two noninvasive variations of respiratory support methods.

Research question: Is nasal intermittent positive pressure ventilation (NIPPV) is the best application for preterm infants with respiratory distress syndrome?

PATIENTS AND METHODS

Seventy one preterm neonates with RDS delivered and admitted to neonatal intensive care units of Al Hussein University Hospital and Ahmed Maher Teaching Hospital from October 2014 till November 2015, they were selected by simple random method, 11 patients excluded and 60 patients were enrolled in the study.

Inclusion criteria:

1. Preterm neonates (PT) with RDS.
2. Both sexes (Males and Females).
3. Vaginal delivery or cesarean section.

Exclusion criteria:

1. Critically ill babies (Hemodynamically unstable, shocked babies &/or suffering intrauterine hypoxia).
2. Preterm neonates with RDS who were already intubated and put on mechanical ventilator.
3. Presence of congenital heart diseases (except PDA).
4. Presence of other congenital anomalies that will require surgical interventions (GIT, CNS or renal anomalies).
5. Presence of symptoms and signs suggestive of metabolic diseases of newborn or intrauterine TORCH infections.

Group Classification:

Neonates included in the study were randomly assigned 2 groups as follow:

1. The 1st group composed of 31 PT neonates with RDS who were put on NCPAP.

2. The 2nd group composed of 29 PT neonates with RDS who were put on NIPPV.

Methods:

All patients in the study were subjected to the following:

1. Personal data: Name, gender, gestational age (GA) and birth weight.
2. Detailed history taking (antenatal, natal and postnatal).
3. Thorough general and systems examination.
4. Local examination of the chest.
5. Respiratory support methods and monitoring,
   (a) Time when the baby was put on NCPAP (group I) or NIPPV (group II).
   (b) Pulse oximetry (SpO2).
   (c) Blood gases initially, before and after disconnection
   (d) Chest X-ray findings.
   (e) Settings of the respiratory support methods, age of weaning from respiratory support, intubation was needed or not and if yes demonstrate its indication.
   (f) Failure and indications of invasive ventilation:
   • pH < 7.20; PaCO2 >65 mm Hg, &/or PaO2 < 50 mmHg despite the respiratory support.
   • Episode of apnea requiring bag and mask ventilation.
   • More than 3 apnea episodes requiring tactile stimulation per hour.
   • Frequent desaturation (SpO2 < 85 %) more than 3 episodes per hour.
6. Investigations:

• Laboratory:
   • CBC Total & differential leucocyte counts.
   • C-reactive protein (CRP).
   • Blood gases (umbilical, capillary, venous and/or arterial).
   • Other investigations according to the patient's condition for complete assessment and diagnosis (Blood culture, Cranial U/S and Echocardiography).

Statistical Methods:

Statistical analysis was done using IBM© SPSS© Statistics version 22 (IBM© Corp., Armonk, NY, USA). The power of the test used for primary outcome measure was estimated using the G*Power© software (Institutfür Experimentelle Psychologie, Heinrich Heine Universität,

Düsseldorf, Germany) version 3.1.9.2.

Numerical data were expressed as mean and standard deviation or median and range as appropriate. Qualitative data were expressed as frequency and percentage. Chi-square test (Fisher's exact test) was used to examine the relation between qualitative variables.

For quantitative data, comparison between two groups was done using independent sample t-test or Mann-Whitney test. Comparison of repeated measures was done using ANOVA for repeated measures test. All tests were two-tailed.

A p-value < 0.05 was considered significant.

RESULTS

Table (1): Demographic Data of the Studied Groups

Demographic Data	**NCPAP (n = 31)**	**NIPPV (n = 29)**	**Statistics Test**	***P-Value**
Gestational age (week) Range	28.0 - 36.0	29.0 - 36.0	t-test 0.183	**0.856**
Mean ±SD	32.8 ± 2.1	32.9 ± 1.8		
Median	33.0	33.0		
Weight (gram) Range	820-3000	910-2425	t-test 0.483	**0.627**
Mean ±SD	1672 ± 429	1726 ± 426		
Median	1650	1750		
Gender (n, %) Male	16 (51.6%)	15 (51.7)	Pearson chi-square 0.000	**1.000**
Female	15 (48.4%)	14 (48.3)		

*P-value < 0.05 was considered significant. There were no statistical significant differences between the two groups regarding the demographic data.

Table (2): Results of Initial Blood Gas Values of the Studied Groups

Initial Blood Gas Values	NCPAP (n = 31)	NIPPV (n = 29)	Statistics Test	*P-Value
pH				
Range	7.19 – 7.48	7.16 – 7.54	t-test -2.317	***0.024**
Mean ±SD	7.33 ± 0.07	7.29 ± 0.08		
Median	7.32	7.28		
PaO2 (mmHg)				
Range	41 – 80	42 – 84	t-test 1.649	**0.136**
Mean ±SD	47.93±14.59	50.75±15.41		
Median	58	67		
PaCO2 (mmHg) Range	16 – 56	17 – 67.9	t-test 3.477	***0.001**
Mean ±SD	34.5 ± 9.9	45.7 ± 14.4		
Median	35	50		
HCO3 (mmol/L)				
Range	9.9 – 26.4	9.3 – 27.0	t-test 1.131	**0.263**
Mean ±SD	17.9 ± 4.3	19.3 ± 5.1		
Median	18.5	20.1		

There were significant statistical differences between the 2 groups as regard pH and PaCO2, patients among NIPPV group had a lower pH and higher PaCO2.

Table (3): Comparison of Initial Settings between the Studied Groups

Initial Settings	NCPAP (n = 31)	NIPPV (n = 29)	Statistics Test	*P-Value
FiO2 (%) Range	40 – 60	30 – 60	t-test -3.777	*** 0.0001**
Mean ±SD	53.2 ± 8.7	45.2 ± 7.7		
Median	60	40		
PIP (cm H2O) Range	———	14 – 26	———	———
Mean ±SD		17.2 ± 1.3		
Median		18		
PEEP (cm H2O) Range	5 – 7	5 – 6	Mann-Whitney test 291.500	***0.001**
Mean ±SD	5.4 ± 0.6	5.1 ± 0.2		
Median	5	5		
Frequency (c/min) Range	———	20 – 40	———	———
Mean ±SD		33.2 ± 3.4		
Median		30		

Flow (L/min) Range	4 – 9	Adjusted by ventilator	———	———
Mean ±SD	5.8 ± 1.2			
Median	6			
Ti (sec) Range	———	0.5 – 0.8	———	———
Mean ±SD		0.57 ± 0.1		
Median		0.6		

There were highly significant statistical differences between the two groups as regard FiO2 & PEEP; patients among NIPPV group had lower FiO2 and PEEP.

Table (4): Abnormalities of Blood Gas Values within 30 minutes of ventilatory support among the Studied Groups

Frequency of Abnormal Blood Gas Values	NCPAP (n = 31)	NIPPV (n = 29)	Statistics Test	*P-Value
Hypoxia (n, %):	25 (80.6 %)	24 (82.8 %)	Pearson Chi-Square 0.045	**0.833**
Metabolic acidosis (n, %):	9 (29.0 %)	8 (27.6%)	Pearson Chi-Square 0.015	**0.901**
Respiratory acidosis (n, %):	5 (16.1 %)	5 (17.2 %)	Pearson Chi-Square 0.013	**0.908**
Mixed acidosis (n, %)**:**	3 (9.7 %)	2 (6.9 %)	Fisher's exact test	**1.000**

There were no statistical significant differences between the two groups as regard frequency of abnormal blood gas values within 30 minutes of mode of support.

Table (5): Results of Blood Gas Values of the Studied Groups after respiratory support Disconnection

Blood Gas Values after Disconnection	NCPAP (n = 31)	NIPPV (n = 29)	Statistics Test	*P-Value
pH Range	7.28 – 7.45	7.29 – 7.46	t-test 0.535	**0.595**
Mean ±SD	7.329 ± 0.08	7.339 ± 0.06		
Median	7.38	7.37		
PaO2 (mmHg) Range	45 - 95	44 – 96	t-test 0.468	**0.604**
Mean ±SD	66.83±18.59	62.39±18.26		

Median	79	80		
PaCO2 (mmHg) Range	30 – 50	29.8 – 49	t-test 1.039	**0.303**
Mean ±SD	38.6 ± 5.4	40.9 ± 4.7		
Median	39	40		
HCO3 (mmol/L) Range	18.6 – 25.3	19.1 – 27.6	t-test 1.649	**0.105**
Mean ±SD	20.2 ± 3.4	21.6 ± 3.1		
Median	20.9	20.6		

There were no statistical significant differences between the two groups as regard blood gas values after ventilatory support disconnection.

Table (6): Duration of O2-Needs (per hours) and Hospital-Stay among the Study

	NCPAP (n = 31)	**NIPPV (n = 29)**	**Statistics Test**	***P-Value**
Initial O2 duration (hour) Range	1 – 3	1 – 3	Mann-Whitney test 371.500	**0.165**
Mean ±SD	2 ± 0.6	1.8 ± 0.6		
Median	2	2		
O2-duration during mode connection (hour) Range	30 – 240	36 – 312	Mann-Whitney test 298.000	***0.024**
Mean ±SD	96.5 ± 48.5	76.3 ± 53.6		
Median	94	60		
O2-duration after mode disconnection (hour) Range	24 – 432	12 – 296	Mann-Whitney test 317.000	***0.048**
Mean ±SD	96.5 ± 85.1	73.7 ± 81.1		
Median	72	48		
Total O2-duration (hour) Range	72 – 744	31 – 360	Mann-Whitney test 203.500	***0.000**
Mean ±SD	221.8 ±139.6	126.9 ± 62.4		
Median	204	120		
Hospital Stay (days) Range	3 – 55	3 – 37	t-test -2.318	***0.024**
Mean ±SD	18.2 ± 12.9	11.7 ± 8.2		
Median	13	8		

The duration of oxygen-needs and hospital-stay were significantly shorter among the NIPPV group.

Table (7): Frequency of Complications among the NCPAP & NIPPV

Complications	**NCPAP** (n = 31)	**NIPPV** (n = 29)	**Statistics Test**	**P-value**
Pneumothorax (n,%)	1 (3.2 %)	1 (3.4 %)	Fisher's exact test	**1.000**
Pulmonary hemorrhage (n,%)	1 (3.2 %)	1 (3.4 %)	Fisher's exact test	**1.000**
Intraventricular hemorrhage. (n,%)	1 (3.2 %)	1 (3.4 %)	Fisher's exact test	**1.000**
Feeding intolerance (n, %)	8 (25.8%)	7 (24.1%)	Fisher's exact test	**1.000**
Abdominal distention (n, %)	8 (25.8%)	8 (27.6%)	Pearson chi-square 0.024	**1.000**
Nasal bleeding (n,%)	2 (6.5%)	1 (3.4%)	Fisher's exact test	**1.000**
Pressure necrosis (n,%)	2 (6.5%)	1 (3.4%)	Fisher's exact test	**1.000**
Sepsis (n,%)	2 (6.5%)	1 (3.4%)	Fisher's exact test	**1.000**
Bronchopulmonary dysplasia (n,%)	1 (3.2%)	0 (0.0%)	Pearson chi-square 1.337	1.000

There were no statistical significant differences between the 2 groups regarding the complications developed.

Table (8): Outcomes among the NCPAP & NIPPV

Outcomes	**NCPAP** (n = 31)	**NIPPV** (n = 29)	**Statistics Test**	*** P-Value**
Need for endotracheal ventilation Success (n, %)	22 (71.0 %)	24 (82.8 %)	Pearson Chi-Square 1.164	**0.281**
Failure (n, %)	9 (29.0%)	5 (17.2%)		
Mortality Survived (n, %)	24 (77.4%)	25 (86.2%)	Pearson chi-square 0.267	**0.750**
Expired (n, %)	7 (22.6%)	4 (13.7%)		

There were no statistical significant differences as regard the outcomes between the two groups.

DISCUSSION

MV is essential for survival of many extremely premature infants, but all form of positive pressure ventilation is to some degree injurious to the lungs. Variety of sophisticated devices are used to provide respiratory support, yet substantial uncertainty remains regarding the optimal ways in which these tools can be used to minimize ventilator-associated lung injury. MV is associated with morbidity such as BPD and recently there is a trend to minimize the use of MV **(Zofia et al., 2013)**. Noninvasive respiratory support is an important alternative to reduce MV duration and to progress from MV to spontaneous breathing.

Our results shows there were no statistical significant difference between the two groups regarding the demographic data (gestational age, weight, and gender), Apgar and Downe score which means that the 2 groups were cross-matched with equal chances for good comparison, p value > 0.05.

This was in accordance with Bahman results which showed that the effect of the NIPPV was not modified by gestational age, birth weight, gender, and surfactant usage as well **(Bahman et al., 2014)**.

Regarding the mode of delivery in our study among the NCPAP group 7 patients (22.6%) were delivered vaginally and 24 patients (77.4%) were delivered by caesarian section, while among the NIPPV group 4 patients (13.8%) were delivered vaginally and 25 patients (86.4%) were delivered by caesarian section, showing higher incidence of RDS among infants who were delivered by caesarian section.

This agrees with the retrospective cohort study of 652 infants born between 24 and 30 (6/7) week's gestation from March 31, 1996 to May 31, 2014. Neonates born by cesarean delivery were more likely to have RDS than those delivered vaginally **(Blue et al., 2015)**.

As regard the initial ventilator settings there were statistical significant difference, the mean FiO2 was 53.2 ± 8.7 % among the NCPAP group versus 45.2 ± 7.7 % among the NIPPV group, with P value < 0.0001, while the mean initial PEEP was 5.4 ± 0.6 cm H2o among the NCPAP group versus 5.1 ± 0.2 cm H2o among the NIPPV, with P value 0.001. This agrees with Bahman results which showed the same findings and emphasize the NIPPV efficacy **(Bahman et al., 2014)**.

There were no statistical significant difference between the two groups as regard chest x-ray findings, complete blood counts, and C - reactive protein pattern which means that the 2 groups were cross-matched with equal chances for good comparison, p value > 0.05.

Initial blood gas values showed statistical significant differences between the 2 groups, a lower pH and a higher PaCO2 among the NIPPV group than that among NCPAP group, with P value 0.024 and 0.001 respectively.

Among the NCPAP group there were 25 (80.6 %) patients with hypoxia, 9 (29.0%) patients with metabolic acidosis, 5 (16.1%) patients with respiratory acidosis, and 3 (9.7%) with mixed acidosis, while among the NIPPV group there were 24 (82.8 %) patients with hypoxia, 8 (27.6 %) patients with metabolic acidosis, 5 (17.2 %) patients with respiratory acidosis, and 2 (6.9%) with mixed acidosis. There were no statistical significant differences between the two groups as regard frequency of abnormal blood gas values within 30 minutes of mode connection (P value > 0.05)

This was in agreement with a randomized controlled study which was conducted on 100 neonates with RDS who were divided into NIPPV group (n=50) and NCPAP group (n=50) to compare the effectiveness of NIPPV versus NCPAP in the initial treatment of RDS from the following aspects: reducing CO2 retention, improving oxygenation, reducing second endotracheal intubation and second use of pulmonary surfactant, reducing the duration of invasive respiratory support, reducing the duration of oxygen use, and reducing the incidence of air leak, abdominal distension and ventilator-associated pneumonia. Results after 1 and 6 hours of noninvasive respiratory support, the NIPPV group was superior to the NCPAP group with respect to the reduction in CO2 retention and improvement in oxygenation, and significantly lower incidence of apnea and ventilator-associated pneumonia. In conclusions NIPPV was effective and safe in the initial treatment of RDS and holds promise for clinical application **(Fu and Xia 2014)**.

Among the NCPAP group the mean duration of O2-need during mode connection was 96.5 ± 48.5 hours, after mode disconnection was 96.5 ± 85.1 hours and the mean of the total duration was 221.8 ± 139.6 hours, while among the NIPPV group the mean duration of O2-needs during mode connection was 76.3 ± 51.6 hours,

after mode disconnection was 73.7 ± 81.1 hours and the mean of the total duration was 126.9 ± 62.4 hours. So the duration of O2-needs was significantly shorter among the NIPPV group, with P value < 0.0001.

In contrast to our results **Li et al., 2014** has reported that there was no difference in the duration of hospitalization in the NIPPV group compared with the NCPAP group. Besides, also no difference in the days on oxygen between the two groups.

This is conflicting with our study which showed that a highly statistical significant differences among the 2 groups, as regard the duration of oxygen-needs and hospital-stay.

As regard the duration of hospital-stay, the mean duration was 11.7 ± 8.2 days among the NIPPV group versus 18.2 ± 12.9 days among the NCPAP group. So the duration of hospital-stay was significantly shorter among the NIPPV group, with P value = 0.024.

This is conflicting with Kishore study who reported that the length of hospital stay, time to full feed and time to stop nasal support in the NIPPV and NCPAP groups were not significantly different **(Kishore et al., 2009)**.

While our results were in agreement with Bahman study as The mean ± SD duration of nasal support was 47.20 ± 20.71 hours for NIPPV versus 61.20 ± 29.45 hours for NCPAP, which was found to be statistically significant, giving a P=0.003. The mean ± SD duration of hospital-stay in NIPPV and NCPAP groups were 7.45 ± 2.02 and 9.65 ± 2.49 days respectively with P value = 0.001) which is highly significant **(Bahman et al., 2014)**.

Although initial limited data suggested that infants treated with NIPPV compared with either conventional ventilation or CPAP had a lower risk of the combined outcome of death and BPD, the evidence was not conclusive, and some of the preliminary studies focused only on short-term results during the post-extubation period. However, in a trial comparing NIPPV with nasal CPAP in 987 infants with birth weight less than 1000 grams and gestational age less than 30 weeks either prior to intubation during the first seven days or following extubation within 28 days after birth, the rate of survival without BPD at 36 weeks post menstrual age was not different between groups (38.4% versus 36.7%, OR 1.09, 95% CI 0.83-1.43). No differences were detected between groups in secondary outcomes, including the

proportion of infants who required intubation and mechanical ventilation after randomization **(James and Ann 2016)**.

In our study there were no statistical significant differences between the 2 groups as regard the complications developed and outcomes. The NIPPV group showed 5 (17.2%) patients required endotracheal ventilation versus 9 (29.0%) patients among the NCPAP group, P value = 0.556 which means that failure rate was more among the NCPAP group but not significant.

The reasons of failure was mainly due to recurrent apnea and frequent desaturation (SpO2 < 85%) not responding to settings adjustment.

This was in accordance with Bahman results which showed that the reasons of failure in the NIPPV group were recurrent apnea in 4 patients, increased FiO2 in 3 patients and frequent desaturation in one patient. While among the NCPAP group the reasons of failure were: 11 patients had recurrent apnea 7 patients had frequent desaturation and 7 patients had increased FiO2 **(Bahman et al., 2014)**.

As regard complications and outcomes of each group, there were no statistical significant differences between the two groups, among the NCPAP group 24 patients survived with successful rate (77.4 %) while among the NIPPV group 25 patients survived with higher successful rate (86.2 %), P value = 0.750.

This is similar to the results of the study conducted by **Kirpalani et al., 2013** on 1009 infants, from May 7, 2007, through June 29, 2011, which found no significant differences between nasal IPPV and nasal CPAP in the risk of death or survival with broncho-pulmonary dysplasia. Overall, also they found no significant differences in rates of other neonatal complications between the two treatment groups. These findings contrast with those of some other studies, which showed an increased risk of bowel perforation or necrotizing enter colitis or nasal trauma with nasal IPPV versus an increased risk of pneumothorax with CPAP.

Our results showed that the effect of NIPPV was not modified by gestational age, birth weight and gender. NIPPV on the other hand, provides an inspiratory positive pressure for ventilatory assistance, an expiratory positive pressure to help recruit lung volume, preventing atelectasis, with an adequate lung expansion as compared to NCPAP, the other

expected advantage for NIPPV over NCPAP is the elimination of PCO2 by providing rates.

Finally our study concluded that the use of early NIPPV was more successful for initial treatment of respiratory distress syndrome in premature infants by reducing the duration of O2-needs with less hospital stay, lower initial PEEP and FiO2 and to some extent the need for intubation as compared to early NCPAP in preterm neonates below 37 weeks gestation with respiratory distress syndrome.

This was in agreement with a study which was conducted on 120 preterm neonates at a level III neonatal care unit of Afzalipour hospital in Kerman University of Medical Sciences; Iran, which demonstrated that NIPPV was more successful than NCPAP as the initial treatment of respiratory distress syndrome, in premature infants by reducing the rate of endotracheal ventilation, and lessening the mean of initial PEEP, initial FiO2, time to start feeding, time to full feed, time to stop nasal support, hospital stay and the mean cost of hospitalization **(Bahman et al., 2014)**.

CONCLUSION

- Nasal intermittent positive pressure ventilation (NIPPV) is the natural extension of NCPAP treatment, which is safer, efficient and provides a greater level of respiratory support than did NCPAP.
- Early NIPPV associated with a shorter duration of oxygen-needs, a shorter duration of hospital-stay, and may prevent intubation and its associated risks in a larger fraction of neonates who would otherwise fail CPAP.
- Early NIPPV application may decrease broncho-pulmonary dysplasia and retinopathy of prematurity due to a lower FiO2 and a short duration of O2-needs.

RECOMMENDATION

- Administrations of early NIPPV in preterm neonates with RDS even those who do not receive surfactant.
- Try to avoid preterm labor as possible especially caesarian section due higher incidence of RDS with caesarian section.
- Good monitoring of babies on ventilatory support by blood gases and pulse oximetry aiming to minimize the duration of O2-needs and concentration avoiding its toxicity.
- Further studies including other respiratory disorders other than

RDS that may affect all neonates, and use of NIPPV in their management.

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التنفسٍ بالضغط الإيجابى المتقطع عن طريق الأنف مُقارنةً بالضغط الإيجابى المستمر عن طريق الأنف على الأطفال الخُدّج المصابين بمتلازمة الضيق التنفسى

د/ محمد جمال مصطفى مصطفى*, د/ مُسلم محمد السيد ناصر*, د/ أحمد يوسف السواح*، د/ أحمد السعيد السحراوى, د/ رغداء محمود على*****

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الدراسة الي تقييم مدى قدرة أجهزة توصيل ضغط الهواء الإيجابى المتقطع عن طريق الأنف على تقليل الاحتياج لاستخدام أجهزة التنفس الصناعى.

اجريت هذه الدراسه علي71 طفلا من المحجوزين في العنايه المركزه للأطفال حديثى الولادة بمستشفي الحسين الجامعي ومستشفي أحمد ماهر التعليمي في الفتره ما بين شهر اكتوبر 2014 الي نهايه شهر نوفمبر 2015.

وقد اشتملت الدراسه علي الاطفال حديثي الولادة الذين يقل عمرهم الرحمي عن 37 اسبوع وقد تم استبعاد 11 مريض من اجمالي 71 منهم 5 يعانون من عيوب خلقية بالقلب وحالتين مصابين بنقص اكسجين بالرحم و 4 حالات تم وضعهم علي جهاز التنفس الاصطناعي في الساعات الاولي بعد الولادة.

وقد تم اخضاع جميع الاطفال للاتي:

- اخذ التاريخ المرضي التفصيلي.

- الفحص الطبي الاكلينيكي الشامل للمريض.

- اجراء المعامل البحثية:

1- صوره دم كامله مع عد كلي وجزئي لكرات الدم البيضاء.

2- عمل غازات بالدم.

3- اشعة اكس علي الصدر.

وقد أظهرت النتائج الاتي:

فاعلية طريقة ضغط الهواء الايجابي المتقطع عن طريق الانف بنسبة 82.8 % (24 مريض) وعدم فاعليته بنسبة 17.2 % (5 مرضي) مقارنة بفاعلية طريقة ضغط الهواء الايجابي المستمر بنسبة نجاح 71 % (22 مريض) وعدم فاعليته بنسبة 29 % (9 مرضي).

ونخلص من الدراسة بأن طريقة ضغط الهواء الايجابي المتقطع حد من المضاعفات التي كانت تحدث نتيجة ضغط و نسبة الاكسجين المستخدم للطفل وكذلك خفض المدة الاجمالية للأكسجين التي يتم وضع الطفل عليها والتي قد تؤدي الي مضاعفات من خلل التنسج القصبي الرئوي او اعتلال الشبكية, وايضا قلل مدة حجز الاطفال بالمستشفي مما قد يودى الي تقليل المضاعفات.

ومن خلال دراستنا نوصى باستخدام طريقة ضغط الهواء الايجابي المتقطع عن طريق الانف وخاصة للاطفال الخدج الذين يعانون من متلازمة الضيق التنفسي حتي من لم يستقبلو عقار السيرفانتا.