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IS NIPPV SUPERIOR TO CPAP IN MAINTAINING TARGETED OXYGEN SATURATION RANGES IN PRETERM INFANTS ON MODERATE NON-INVASIVE RESPIRATORY SUPPORT?

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Background:

Non-invasive positive pressure ventilation (NIPPV) and continuous positive airway pressure (CPAP) are non-invasive respiratory supports commonly used in preterm infants. There is conflicting data on the superiority between these two modes of non-invasive respiratory support. The objective of this study was to determine if oxygen saturation is more within the target range on NIPPV compared to CPAP using the data from histograms.

Methods:

Retrospective analysis of premature neonates (< 1500 grams, gestational age < 30 weeks) admitted to the NICU for which oxygen saturation histogram data was available one day before and after the transition between NIPPV and CPAP. FiO₂ at the time of data collection was greater than 21 percent. This histogram data, the percentage of time spent in certain SpO₂ ranges, was compared before and after the de-escalation from NIPPV to CPAP or escalation from CPAP to NIPPV. FiO₂ was additionally compared between the two modes of respiratory support.

Tables:

Table1: Respiratory support and oxygen saturation.	CPAP	NIPPV	P
FiO ₂	28 (25-37.1)	27 (23.9-35)	0.08
O ₂ Saturation %			
<70	0 (0-0)	0(0-0)	0.8
70/85	2.3 (1.1-5.1)	3.5 (1.4-6.8)	0.1
86-88	3.2 (1.3-6.9)	5 (2.6-9.1)	0.04
89-94	39.9 (21.8-46.4)	43.9 (31.5-55.7)	0.09
>94	52.6 (40.3-77.6)	42.2 (29.2-58.6)	0.02

Table 2: Respiratory support and oxygen saturation switching from CPAP to NIPPV (n=15)	CPAP	NIPPV	P
FiO ₂	34 (27-41.5)	30 (26-37)	0.1
O ₂ Saturation (%)			
<70	0 (0-0)	0 (0-0)	0.8
70-85	4.2 (1.4-7)	3.5 (1.4-6.8)	0.1
86-88	5.8 (2.4-10.7)	5 (2.6-9.1)	0.04
89-94	42.1 (29-46)	43.9 (31.5-55.7)	0.09
>94	50.1 (21-55.2)	42.2 (29.2-58.6)	0.02

Table 3: Respiratory support and oxygen saturation switching from NIPPV to CPAP (n=19)	CPAP	NIPPV	p
FiO ₂	26 (25-35)	25 (23.5-32)	0.2
O ₂ Saturation (%)			
<70	0 (0-0)	0 (0-0)	0.2
70-85	1.7 (1.1-4.6)	2.8 (1.1-6.7)	0.09
86-88	1.4 (0-4.9)	5 (2.1-6.5)	0.02
89-94	30.5 (19.7-47.6)	43.7 (27-53.2)	0.08
>94	56 (42.9-78.5)	49 (31.4-64.3)	0.001

Results:

A total of 26 infants were included. The median gestational age was 25.5 weeks and the median weight of the infants was 792 grams. Among the 26 infants, there were 34 episodes of transition between NIPPV and CPAP, 19 switches from NIPPV to CPAP, and 15 from CPAP to NIPPV. The percentage of time that oxygen saturation was within the target range (89-94 %) was not statistically significant between the two modes of respiratory support (CPAP 39.9% vs. NIPPV 43.9%, p=0.09) (Table 1). The percentage of time that oxygen saturation was between 86-88% was higher on NIPPV and the percentage of time that oxygen saturation was >94% was higher on CPAP. There was a trend towards lower FiO₂ on NIPPV compared to CPAP. When switched from NIPPV to CPAP, there was a higher percentage of time spent above the target range (>94%) while on CPAP (56% vs 49%, p=0.001), and below the target range (86-88%) while on NIPPV (5.0% vs 1.4%, p=0.02) (Table 3). When switched from CPAP to NIPPV, there was no difference in oxygen saturation ranges (Table 2).

Conclusion:

Target oxygen saturation ranges on histogram data were similar in premature infants when supported on CPAP and NIPPV. However, oxygen saturation below the target range was more frequent on NIPPV compared to CPAP. NIPPV is not superior to CPAP in maintaining oxygen saturation within the target range in premature infants on moderate non-invasive respiratory support. The potential risk of low oxygen saturation range while supported on NIPPV in preterm infants requires further research.