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Clinical spectrum of respiratory distress in newborns admitted to NICU of tertiary care hospital - A Prospective Observational study

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Abstract

Introduction: The respiratory distress is one of the commonest problems encountered in neonates of all gestation periods and is the most important cause of morbidity and mortality. **Materials and methods:** A prospective observational study was conducted in the Department of Pediatrics after Ethical Committee approval. The inclusion criteria was neonates born after 26 weeks gestation and above and till 28 days of life (in-born and out- born).The exclusion criteria was parents of the newborn who refused to give consent and neonates with gross congenital malformations. **Results:** Out of the 190 neonates, 84(44.2%) were female and 106 (55.8%) were male. The minimum maternal age was 20 years and maximum was 40 years. Out of 190 neonates with respiratory distress, 98 mothers received antenatal corticosteroids which accounted to 51.6%. Among the preterm babies with respiratory distress, out of 118 neonates, 48 had mild (40.7%), 68 had moderate (57.6%) and 2 had severe (1.7%) respiratory distress according to Silverman scoring system. Among the term babies with respiratory distress, out of 72 neonates, 52 had mild (72.2%), 18 had moderate (25.0%) and 2 had severe (2.8%) respiratory distress according to Downe's scoring system. Out of 190 neonates with respiratory distress, surfactant was administered for 22 neonates which accounted to 11.6%. On comparing antenatal corticosteroids administration with respiratory distress syndrome, it was found to be statistically significant with a p-value of 0.003 that administration of antenatal corticosteroids significantly reduced occurrence of respiratory distress syndrome in neonates. **Conclusion:** The most common cause for Respiratory distress at Tertiary Unit Care was Respiratory distress syndrome. Statistically significance reduction in incidence of Respiratory distress syndrome with administration of antenatal steroids strengthens the existing knowledge of role of antenatal steroids in the outcome of preterm neonates.

Keywords: Respiratory distress, Neonates, Antenatal Steroids.

Introduction

The respiratory distress is one of the commonest problems encountered in neonates of all gestation periods and is the most important cause of morbidity and mortality. Whereas the most frequent cause of respiratory distress in a preterm neonate is hyaline membrane disease (HMD), the causes are more varied in term neonate. They include transient tachypnea of the newborn (TTN), meconium aspiration syndrome (MAS), sepsis/pneumonia, pulmonary hypoplasia and persistent pulmonary hypertension of the newborn (PPHN). [1]Knowing the fact that, neonates with respiratory distress are 2-4 times more likely to die than those without respiratory distress; [2] current study was planned to know the clinical spectrum of respiratory distress in newborns admitted to NICU

of tertiary care hospital.

Materials and methods

A prospective observational study was conducted in the Department of Pediatrics after Ethical Committee approval. A written informed consent was taken from the parents or the guardian of the neonates before enrolling for the study. The inclusion criteria was neonates born after 26 weeks gestation and above and till 28 days of life (in-born and out- born).The exclusion criteria was parents of the newborn who refused to give consent and neonates with gross congenital malformations. The neonates with presence of at least 2 of the following criteria, namely a) Respiratory rate of 60/min or more, b) Subcostal retraction, xiphoid retraction, suprasternal retraction, flaring of alae nasi, c) Expiratory grunt and cyanosis at room air, d) Requiring O2and respiratory support was considered criteria for respiratory distress. The respiratory distress was assessed using Silvermen Anderson scoring system for Preterm and Downe's scoring system for term. Rest of the data was collected using a data collection sheet.

Results

Out of the 190 neonates, 84(44.2%) were female and 106 (55.8%) were male. The minimum maternal age was 20 years and maximum was 40 years. The mean maternal age was 28.2 years. Out of 190 neonates with respiratory distress, 98 were born to multiparous mothers (51.6%) and 92 were born to primiparous mothers (48.4%). Out of 190 neonates with respiratory distress, 118 were Preterm (62.1%) and 72 were Term (37.9%). There were no post term babies during the study period. Out of 190 neonates with respiratory distress, 12 were born at < 28 weeks of gestation (6.3%), 42 were born at 28 – 32 weeks of gestation (22.1%), 34 were born at 32 – 34 weeks of gestation (17.9%), 48 were born at 34 - 37 weeks of gestation (25.3%) and27 were born at 37 to 42 weeks of gestation (28.4%).Out of 190 neonates with respiratory distress, 134 were delivered via Lower segment caesarian section (70.5%), 56 were delivered via vaginal delivery (29.5%).

Out of 190 neonates with respiratory distress, 98 mothers received antenatal corticosteroids which accounted to 51.6%. Among the preterm babies with respiratory distress, out of 118 neonates, 48 had mild (40.7%), 68 had moderate (57.6%) and 2 had severe (1.7%) respiratory distress according to Silverman scoring system. Among the term babies with respiratory distress, out of 72 neonates, 52 had mild (72.2%), 18 had moderate (25.0%) and 2 had severe (2.8%) respiratory distress according to Downe's scoring system. Out of 190 neonates with respiratory distress, surfactant was administered for 22 neonates which accounted to 11.6%.Out of 190 neonates with respiratory distress, 66 needed CPAP as initial mode of respiratory support (34.7%), 56 needed HFNC as initial mode of respiratory support (29.5%), 48 needed Supplemental O2 as initial mode of respiratory support (25.3%) and 20 needed Ventilator as initial mode of respiratory support (10.5%).Out of 190 neonates with respiratory distress, 14 babies died which accounted to 7.4%.

Table 1: Comparing respiratory distress syndrome with gestational age.

			RDS		Total
			Present	Absent	
Term/ Preterm/ Post Term	Preterm	Count	104	14	118
		%	75.4%	26.9%	62.1%
	Term	Count	34	38	72
		%	24.6%	73.1%	37.9%
Total		Count	138	52	190
		%	100.0%	100.0%	100.0%

Chi-Square Tests	Value	Df	p-value
Pearson Chi-Square	18.827[a]	1	.0005

On comparing Respiratory distress syndrome with gestational age, it was more common in preterm which was statistically highly significant with a p-value of 0.0005.

Table 2: Antenatal corticosteroids with Respiratory Distress Syndrome

ANS WITH RDS			RDS		Total
			Present	Absent	
ANS	YES	Count	54	38	92
		%	39.1%	73.1%	48.4%
	NO	Count	84	14	98
		%	60.9%	26.9%	51.6%
Total		Count	138	52	190
		%	100.0%	100.0%	100.0%

Chi-Square Tests	Value	Df	p-value
Pearson Chi-Square	8.713[a]	1	.003

On comparing antenatal corticosteroids administration with respiratory distress syndrome, it was found to be statistically significant with a p-value of 0.003 that administration of antenatal corticosteroids significantly reduced occurrence of respiratory distress syndrome in neonates.

Discussion

Out of 95 neonates our study had male preponderance which was similar to the study done by Choudhary PK et al[3], Palod PH et al[4], Kommawar A et al [5], Lamichhane et al[6] and Sahoo MR et al[7]. All the studies had male preponderance.

Table 3: Comparison of gender distribution

Gender	Present study	Lamichhane et al[6]	Shahad Qaril et al.[8]
Male	55.8%	60.36%	57.1%
Female	44.2%	38.74%	42.9%

In our study, 6.3% were born at < 28 weeks of gestation, 22.1% were born at 28 – 32 weeks of gestation, 17.9% were born at 32 – 34 weeks of gestation, 25.3% were born at 34 - 37 weeks of gestation and 28.4% were born at 37 to 42 weeks of gestation. Preterm babies outnumbered in our study which was similar to Palod PH et al[2]. In a study done by Sahoo MR et al[7], 52% of newborns of gestational age of 37 & >37 weeks developed respiratory distress when compared to 26%, 14%, 8% of newborns developed respiratory distress with age between 34-36, 31-33, 28-30 weeks respectively.[10]

In our study, 70.5% were delivered via Lower segment caesarian section, 29.5% were delivered via vaginal delivery. Since ours was a tertiary care hospital predominately Lower segment caesarian section was mode of delivery where cases were referred from remote areas with complications. Our results were similar to Sahoo

MR et al[10] and Lamichhane et al but in study done by Palod PH et al[9] normal delivery was predominate.

Table 4: Comparison of mothers who received antenatal corticosteroids

Antenatal Corticosteroids	Present study	Shahad Qaril et al[8]
No	48.4%	52.7%
Yes	51.6%	47.3%

In our study, 51.6% mothers received antenatal corticosteroids which was similar to Shahad Qaril et al[8] study. On analyzing the causes for respiratory distress, the most common cause was Respiratory distress syndrome which accounted to 51.6% followed by Transient Tachypnea of Newborn which accounted to 20.0%. In study by Palod PH et al. most common causes for respiratory distress were respiratory distress syndrome (31.3%), neonatal septicaemia including pneumonia (28.1%), TTBN (16.7%), birth asphyxia (14.9) and meconium aspiration syndrome (11%) which was similar to our study.[4] In study by Ravindra Sonawane et al the commonest cause for respiratory distress was Transient tachypnoea of Newborn (60.25%) followed by Meconium Aspiration Syndrome (29.48%) and RDS (6.4%)[11]. In study by Sahoo MR et al. the common cause of respiratory distress is transient tachypnoea of newborn 35.5% followed by hyaline membrane disease 32.2% and meconium aspiration syndrome 20% and congenital pneumonia 12.2 %.[7] The probable cause could be due to more number of preterm neonates in our study, RDS was the most common cause.In the present study the severity of respiratory distress was less compared to sahoo MR et al.[7] study which could be due to protective effect of antenatal corticosteroids.

In the present study the surfactant administration was only 11.6% which is very less in comparision with Shahad Qaril et al[8] study as usage of antenatal corticosteroids was higher in present study and this had a protective action on lung maturity.On comparing the mode of respiratory support only 10.5% of cases needed invasive ventilation which was low in comparison to other studies which could be due to effective usage of antenatal corticosteroids.

Table 5: Comparison of outcomes of neonates with respiratory distress

Outcome	Present study	Kommawar A et al.[5]	Sahoo MR et al.[8]
Alive	92.6%	78.5%	88.8%
Dead	7.4%	21.5%	11.1%

In the present study 7.4% neonates died compared to 21.5% in Kommawar A et al[5] and 11.1% in Sahoo MR et al.[7]. This difference in mortality could be due to administration of antenatal corticosteroids which is relatively high in our study which acts as a protective factor and probably due to quality antenatal care.

Conclusion

The present study concludes that the frequency of respiratory distress was higher as the gestational age decreased. The most common cause for Respiratory distress at Tertiary Unit Care was Respiratory distress syndrome. Statistically significance reduction in incidence of Respiratory distress syndrome with administration of antenatal steroids strengthens the existing knowledge of role of antenatal steroids in the outcome of preterm neonates.

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