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Original Research Article

A study of clinical profile of neonates with respiratory distress and predictors of their survival admitted in neonatal intensive care unit of tertiary care hospital

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ABSTRACT

Background: Respiratory disorders are the most frequent cause of admission for neonatal intensive care in both term and preterm infants. The clinical diagnosis of respiratory distress in a newborn is suspected if the respiratory rate is greater than 60 per minute in a quite resting baby, presence of grunting and/or there are inspiratory subcostal/intracostal retractions Signs and symptoms of respiratory distress include cyanosis, grunting, nasal flaring, retractions, tachypnea, decreased breath sounds with or without rales and/or rhonchi, and pallor. Objectives of present study were to know the clinical profile and aetiology of neonates with respiratory distress and to study the morbidity and mortality of respiratory distress in neonatal intensive care unit (NICU). And to find out the predictors of survival in the neonates admitted with respiratory distress.
Methods: Study is done on 281 neonates admitted in Neonatal Intensive Care Unit (NICU) as a Prospective Cohort and Descriptive Study and Simple Random sampling is used to include neonates in the study. All the neonates included in study were subjected to the following detailed perinatal history and thorough clinical examination of newborns was done.
Results: Males outnumber the females in admission. Most of the affected neonates were weighing between 1500g to 2500g (185). Out of total patients of two hundred and eighty-one, there were 35 deaths (12.5%) and 246 patients survived (87.5%). In present study most common causes for respiratory distress were respiratory distress syndrome (31.3%), neonatal septicaemia including pneumonia (28.1%), TTBN (16.7%).
Conclusions: The overall survival rate was 87.5%. Male outnumber female on admissions but the survival in females was better than males. Common causes of respiratory distress in our study are RDS, Neonatal septicaemia and TTBN. As the gestation increased the survival also improved. Term neonates had better survival as compared to preterm neonates. Antenatal corticosteroid administration improved the survival.

Keywords: NICU, Respiratory distress, Tachypnea

INTRODUCTION

Respiratory disorders are the most frequent cause of admission for neonatal intensive care in both term and preterm infants.[1] Signs and symptoms of respiratory distress include cyanosis, grunting, nasal flaring, retractions, tachypnea, decreased breath sounds with or without rales and/or rhonchi, and pallor.[1] The clinical diagnosis of respiratory distress in a newborn is suspected if the respiratory rate is greater than 60 per minute in a quite resting baby, presence of grunting and/or there are inspiratory subcostal/intracostal retractions.[2]

The severity od respiratory distress can be assessed by Downe's scoring system which includes parameters such as respiratory rate, cyanosis, retractions, grunting and air entry in both the lungs.[2] Common causes of respiratory distress are respiratory distress syndrome, transient tachypnea, pneumonia, aspiration syndromes, pneumothorax and air leaks, pulmonary edema, pleural effusion and pulmonary hemorrhage.[1]

Other uncommon respiratory causes include tracheoesophageal fistula, cysts and tumors, congenital lobar emphysema, pulmonary hypoplasia, accessory or sequestered lobes, pulmonary lymphangiectasia, pulmonary arteriovenous fistula.[1] Non respiratory causes of respiratory distress are cardiac failure, central nervous system trauma or asphyxia, diaphragmatic paralysis, organic acidemias, hypoglycaemia and various metabolic disorders.[2]

Respiratory Distress Syndrome (Hyaline Membrane Disease): Respiratory distress syndrome occurs primarily in premature infants; its incidence is inversely related to gestational age and birthweight. It occurs in 60-80% of infants <28 wk of gestational age, in 15-30% of those between 32 and 36 wk of gestational age, and rarely in those >37 wk of gestational age.[1] Meconium aspiration syndrome: Meconium aspiration syndrome results from meconium stained amniotic fluid(MSAF).

The incidence of MSAF in preterm infants is very low.[3] Aproximately 5% of the neonates born through MSAF develop meconium aspiration syndrome and approximately 50% of these infants require mechanical ventilation.[3] Transient tachypnea of Newborn: Transient tachypnea is most common after term cesarean delivery. It is characterized by the early onset of tachypnea, sometimes with retractions, or expiratory grunting and, occasionally, cyanosis that is relieved by minimal oxygen supplementation (<40%).[1] In developing contries, pneumonias account for 50% cases of respiratory distress in the newborn.[2]

Initial evaluation in the assessment of respiratory distress include X ray chest, oxygen saturation(SpO2) and complete blood count. There has been tremendous advances in the manage¬ment of respiratory distress such as ventilator therapy with different modes such as CPAP, conventional mechanical ventilation, ultra high frequency jet ventilation, liquid ventilation, surfactant replacement therapy, sophisticated monitoring and extracorporeal membrane oxygenation all have improved the outcome among the babies with respiratory distress.

Objectives of present study to know the clinical profile and itiology of neonates with respiratory distress, to study the morbidity and mortality of respiratory distress in neonatal intensive care unit (NICU) and to find out the predictors of survival in the neonates admitted with respiratory distress.

METHODS

All newborn babies admitted to Tertiary Care Hospital NICU during a period of 12 months from April 2016 to March 2017 who developed respiratory distress were studied. These admissions comprised of neonates delivered in our hospital as well as those neonates who were referred to our NICU from other hospitals and delivery centres and neonates who were delivered at home. Study is done on 281 neonates admitted in Neonatal Intensive Care Unit as a Prospective Cohort and Descriptive Study and Simple Random sampling is used to include neonates in the study. Neonates whose parents did not give the consent, neonates who left the study against medical advice and neonates with birth weight <500g/ gestational age <26 weeks were excluded from the study. All the neonates included in study were subjected to the following detailed perinatal history with special emphasis on history of Maternal illness like fever/ rashes/ h/o BT / anaemia/ hypertension. Whether steroid was given in case of anticipated preterm delivery (Two dose course of betamethasone or four dose course of dexamethasone). Age of mother, Status of mother according to Gravidity, Parity, Abortion, Live Births. Noting of any obstetric complication like ante partum hemorrhage (APH), premature rupture of membranes (PROM), Pregnancy induced hypertension(PIH), pre-eclampsia, eclampsia. presence of fetal distress, presence of meconium (MSL), place of delivery, mode of delivery, whether pregnancy was singleton or twin or triple geststion, whether antenatal checkup done or not. (ANC: Adequate antenatal checkup considered when the pregnant woman was registered at any time, had atleast three antenatal checkup, had taken two doses of inj TT Vaccine, had taken atleast 100 iron folic acid tablets).

Thorough clinical examination of newborns including the following are noted: complaints of poor feeding, lethargy/irritability, yellowish discoloration of eyes and skin, excessive crying, fever, rash, vomiting, loose stools, fast / noisy breathing, abdominal distension, loss of weight, dryness of skin. Gestational age was assessed using New Ballard Scoring System.[5] Anthropometry of neonates were recorded. Apgar scoring was done at 1 min and 5 min whenever feasible. The vitals of the baby (Heart rate, Respiratory Rate, Peripheral Pulses, temperature and capillary refilling time) were noted. General examination of neonate was performed according to the proforma. The required investigations were done. Such as Complete blood count: hemoglobin, total count, differential count, Sepsis screening: C-reactive protein, blood culture if necessary, Random blood sugar: was measured by glucose oxidase method (calorimetric) in laboratory. Hypoglycemia was diagnosed if RBS is less than 40 mg/dl, X-Ray Chest/ abdomen, Serum bilirubin, USG Cranium: to rule out intracranial hemorrhage, hydrocephalus, asphyxia changes in case of suspected birth asphyxia.

All newborns admitted were treated according to standard treatment protocol. The outcome measure would be in-hospital death and survival would be defined as the discharge of a live infant from the hospital. A written, well informed consent was taken from the caretakers/parents as the case may be. For the purpose of analysis, babies discharged home were counted as 'survivors' and compared to those babies that 'expired' during their hospital admission. Cross-tabulations of categorical variables with survival and expired were produced and statistical association between these categorical variables and survival outcome were done using the chi-Square test of association. All statistical tests were conducted at 5% significance level.

RESULTS

In present study, total 281 neonates with respiratory distress were admitted in NICU over 18 months of duration.

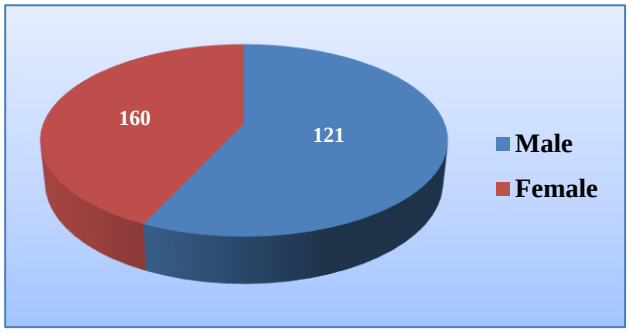

Figure 1: Distribution according to gender of neonates.

Males outnumber the females in admission. Most of the neonates admitted were born by vaginal delivery (161) and rest were born by LSCS (120).

Table 1: Distribution according to ANC, gestational age and mode of delivery.

Criteria	Distribution	
ANC	Yes=253	No=28
Gestational age	Preterm=189	Term=92
Mode of delivery	Vaginal=161	Lscs=120

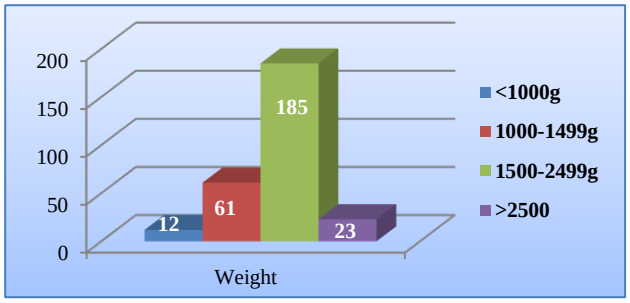

Figure 2: Distribution according to weight of the neonate.

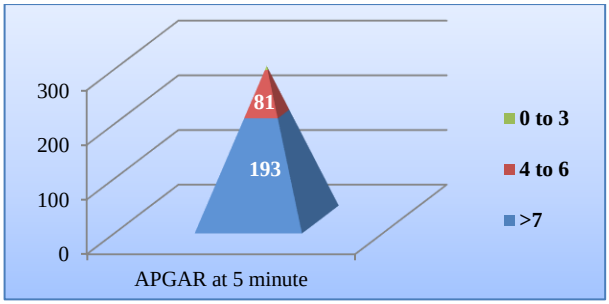

Figure 3: Distribution according to APGAR at 5 minutes.

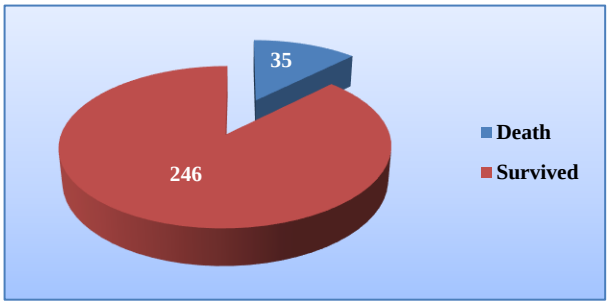

Figure 4: Distribution according to outcome of neonates.

Most of the affected neonates were weighing between 1500g to 2500g (185). Mothers of most of the neonates had received adequate antenatal care (253). Preterm neonates outnumber term neonates where as there is no significant difference in number of AGA and SGA neonate, 158 and 123 respectively.

Table 2: Distribution according to causes of respiratory distress.

Diagnosis	Total (%)	Survived (%)	Death (%)
RDS	88 (31.3)	76 (86.4)	12 (13.6)
TTNB	47 (16.7)	46 (97.8)	1 (2.2)
BA	42 (14.9)	33 (78.5)	9 (21.5)
MAS	31 (11)	27 (87.1)	4 (12.9)
NNS including pneumonia	79 (28.1)	65 (82.2)	14 (17.8)
RS congenital anomoly-diaphragmtic hernia, tracheoesophagial fistula, laryngomalacia	5 (1.7)	3 (60)	2 (40)
Pneumothorax	4 (1.4)	3 (75)	1 (25)
CVS causes (CHD, CCF)	12 (4.2)	9 (75)	3 (25)
others (Metabolic disorders, PPHN, HDN, Pulm Hemorrhage)	24 (8.5)	19 (79.2)	5 (20.8)

DISCUSSION

In present study, out of total patients of two hundred and eighty one, there were 35 deaths (12.5%) and 246 patients survived (87.5%). This finding is consistent with study conducted by Santosh S et al. In their study, 92.2% neonates with respiratory distress survived.[4] Whereas in study done by Keerti Swarnkar et al the mortality rate was 22.86%.[6]

In present study 140 of the neonates were eligible to receive antenatal corticosteroids. Out of those 140 neonates, 36 received antenatal corticosteroid but 104 did not. The percent survival among those are 94.4% and 79.8% respectively which is statistically significant.In consistent to our results, Morris et al. showed that antenatal corticosteroids prior to premature delivery have had a crucial impact on neonatal mortality.[7]

Table 3: Predictors of survival of neonates with respiratory distress admitted to NICU.

		Survived	%	Died	%	Total	CHI square value	P value
Gender	Male	136	85	24	15	160	2.20	0.13
	Female	110	90.9	11	9.1	121		
Weight	<1000	6	50	6	50	12	22.27	<0.001
	1000-1499	49	80.3	12	19.7	61		
	1500-2499	169	91.35	16	8.65	185		
	>2500	22	95.6	1	4.4	23		
GA	Preterm	160	84.6	29	15.4	189	4.41	0.035
	Term	86	93.4	6	6.6	92		
APGAR at 5 min	0-3	1	14.2	6	85.8	7	84.14	<0.001
	4_6	55	67.9	26	32.1	81		
	>7	190	98.4	3	1.6	193		
Antenatal corticosteroid	Yes	34	94.4	2	5.6	36	4.17	0.041
	No	83	79.8	21	20.2	104		
Mode of delivery	LSCS	112	93.3	8	6.7	120	6.43	0.011
	Vaginal	134	83.2	27	16.8	161		
ANC	Yes	224	88.5	29	11.5	253	2.29	0.12
	No	22	78.6	6	21.4	28		
Weight for age	AGA	144	91.1	14	8.9	158	4.27	0.038
	SGA	102	82.9	21	17.1	123		

In current study 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%). This finding is consistent with the findings of study done by Dr Antony K et al.[8]

According to Hermansen CL et al Transient Tachypnea of the newborn is the most common cause of neonatal respiratory distress, constituting more than 40% of cases.[9] But in our region where the vaginal deliveries are more common and fair number of cases admitted in NICU are preterm so the incidence is less.

In the study done by Sauparna C et al most common cause for respiratory distress was sepsis (pneumonia) 38.9% followed by respiratory distress syndrome (23%), meconium aspiration syndrome (20.5%), transient tachypnea of newborn (10%), congenital heart disease (6%), congenital diaphragmatic hernia (1%) and pulmonary hemorrhage (1%).[10]

In present study we found that the survival rate increases as the birth weight of the neonate increases. Also, survival in term neonates and preterm neonates are 93.4% and 84.6% respectively which is statistically significant. Bajad M et al and Adebami OJ et al also reported similar finding.[11,12]

CONCLUSION

The overall survival rate was 87.5%. Male outnumber female on admissions but the survival in females was better than males.

Common causes of respiratory distress in this study are RDS, Neonatal septicaemia and TTBN. As the gestation increased the survival also improved.

Term neonates had better survival as compared to preterm neonates. Antenatal corticosteroid administration improved the survival.

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