

Clinical Study of Neonatal Respiratory Distress Syndrome

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Abstract: Neonatal Respiratory Distress Syndrome (NRDS) is an important cause of mortality and morbidity in premature infants, primarily due to surfactant deficiency. A retrospective study was carried out in tertiary care neonatal intensive care unit (NICU) to analyze clinical profile, morbidity and mortality in our hospital. 150 neonates with gestational age <37wk with diagnosis of RDS as per clinical investigational guidelines were analyzed. 58% were males while 42% were females. 90% mothers received antenatal steroids out of which 15% babies died while 80% babies died whose mothers didn't receive it. Total 66% babies received surfactant and mortality among them was 14% while 36% in babies who didn't receive it.

Keywords: RDS, surfactant, antenatal steroid

1. Introduction

RDS formerly known as hyaline membrane disease mainly affects preterm infants due to insufficient surfactant in alveoli. The current incidence of RDS in our country in preterm babies is 10–15% [1]. Respiratory Distress Syndrome is defined as, respiratory distress of early onset i.e. within 6 hours of birth in a preterm baby with triad of tachypnea RR > 60/min, inspiratory retractions, expiratory grunting ± cyanosis due to surfactant deficiency [1].

Most important risk factor for RDS is prematurity [2], [3]. Preterm infants are particularly prone to RDS because alveolar type 2 cells do not develop until early in the third trimester [4]. Incidence of RDS is inversely proportional to gestational age. It occurs in 60-80% preterm newborns of gestational age below 28 weeks and in 10-15% in those of 32-36 weeks gestational age, while it is rare in >37 weeks gestational age [5]. Other risk factors include male sex, maternal diabetes and delivery of previous preterm baby, second born of twin baby.

RDS is diagnosed clinically and by chest X-ray. There are 4 grades of RDS according to x-ray pattern. Apart from the clinical suspicion and radiology, tests such as amniotic fluid L/S ratio and phosphatidyl glycerol assessment has been used for the diagnosis [6]. The Gastric Shake Test has been a useful bedside screening test to assess the risk of development of RDS. It is rapid, easy and less expensive [7].

There has been a remarkable advance in the management of RDS in the form of identifying risk factors, antenatal steroids, CPAP, surfactant therapy, mechanical ventilation, extracorporeal membrane oxygenation which have improved the outcome among these babies.

In spite of the availability of all these modalities of treatment, RDS is still challenge to neonatology and outcome has not changed much.

Aims and Objectives:

- To study clinical profile of infants with RDS.
- To study role of antenatal steroids, surfactant and assisted ventilation
- To study mortality in preterm with RDS.

2. Materials and Methods

Inclusion Criteria:

All inborn and out born preterm neonates (<37 weeks) and having RDS within 24 hours.

Exclusion Criteria:

- Babies with congenital anomalies like, cleft lip and palate, congenital diaphragmatic hernia, choanal atresia, major cardiac anomalies etc.
- Babies having respiratory distress due to cardiac causes.

This hospital based retrospective study was carried out in neonatal intensive care unit (NICU) at tertiary care hospital. Clinical data of all neonates from January 2014 to December 2016 were collected from case records. The institutional ethical committee approved the study protocol. Inborn neonates with gestational age <37 weeks satisfying inclusion and exclusion criteria were enrolled.

Data was collected for all neonates included in study with respiratory distress. General information, history and clinical examination findings of newborn was noted. Time of onset of distress and the severity of the distress was documented; the severity was assessed by using Silverman & Anderson (SA) scoring. They had received surfactant, CPAP, mechanical ventilation according to scoring. Neonates with SA score < 4 received CPAP alone and neonates between score 4-7 given both CPAP and surfactant, neonates with score >7 were ventilated and received surfactant in affordable patient. Mortality was noted to assess the clinical outcome against the final diagnosis.

This study did not interfere with the routine management, and no additional intervention was made part of the study. The data thus collected were fed on the computer and

Volume 9 Issue 3, March 2020

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subjected to statistical analysis.

3. Results

Total 150 neonates with RDS were analyzed, out of which, maximum neonates i.e. 47% were found in 30-32 weeks gestational age group followed by 23% between 28-30 weeks, 14% between 32-34 weeks and 13% in less than 28 weeks gestational age. And minimum i.e. only 3% found after 34 weeks of gestational age. Out of 150 cases, 58% (87) were males while 42% (63) were female. 90% (135) mothers received antenatal steroids while 10% (15) did not.

According to SA scoring systems, 18% cases had mild respiratory distress while 47% had moderate and 35% had severe respiratory distress.

Table 1: Distribution as per gestational age

Gestational Age	Number (n)	%
<28 weeks	20	13%
28-30 weeks	34	23%
30-32 weeks	70	47%
32-34 weeks	21	14%
>34 weeks	5	3%

Table 2: Antenatal steroids

	Discharged	Death	Total
Received	115 (85%)	20 (15%)	135 (90%)
Not Received	3 (20%)	12 (80%)	15 (10%)

$X^2 = 15.78$, p value < 0.05

Table 3: Surfactant

	Discharged	Death	Total
Received	86 (86%)	14 (14%)	100 (66%)
Not Received	32 (74%)	18 (36%)	50 (34%)

$X^2 = 5.91$, p value < 0.05

Table 4: Modalities of treatment

	Discharged	Death	Total
CPAP	27	0	27
CPAP + Surfactant	64	7	71
Surfactant + MV	22	7	29
MV	5	18	23

4. Discussion

In our study, majority (58%) of cases were males. Similar results were reported by study done by Balaji et al [8], Sanghavi et al [9], Farhan et al [10] and M. Saboute et al [11].

In the our study, 48% neonates were between 30-32 weeks which was the commonest, followed by 23% between 28-30 weeks and 14% between 32-34 weeks. Similar result was reported by study done by M. Saboute et al [11] in which maximum number of cases were between 30-32 weeks. Agrawal S et al [12] also found maximum numbers of cases were in between 28-32 weeks.

While CK Praneetha and Ahirrao VK [13] and Wagh et al [14] had found maximum number of cases between 32-34 weeks followed by 30-32 weeks in their study.

In our study, 90% cases received antenatal steroid and mortality rate among them was only 15% while it was 80% among babies whose mothers didn't receive it. Similar results were reported by Wagh et al [14] study in which 97.5 % cases received antenatal steroid with mortality rate of 20% and all babies died whose mother did not receive it.

In our study, 66% received surfactant with mortality rate of 14% while it was 36% who did not receive it. Similar result was reported by Wagh et al [14] study in which 12% neonates died who received surfactant while 36% died who did not receive it.

In our study, 18% neonates had mild distress and all of them received only CPAP and no mortality was noted among them. 47% neonates had moderate distress and they received both CPAP and surfactant. Out of them 10% neonates died. In 35% neonates with severe distress, 19% neonates received both mechanical ventilation and surfactant, out of which 24% neonates died. While remaining 16% neonates with severe distress received only mechanical ventilation and maximum mortality of 78% was reported among them.

In study done by CK Praneetha and Ahirrao VK [13], no mortality was noted in neonates with mild distress and maximum mortality was noted in neonates who had received only mechanical ventilation without surfactant.

5. Conclusion

According to our study, prematurity is the most common cause for RDS and admission in NICU. Administration of antenatal steroids in pregnant women during preterm delivery significantly improves lung maturity and reduces respiratory morbidity and mortality associated with RDS. Early use of Surfactant is associated with improved survival, shortened the duration of ventilation and reduced mortality. Also early initiation of CPAP is really safe and an effective treatment modality and if used with surfactant, it reduces need of mechanical ventilation and improves survival.

References

- [1] Singh M. Care of the Newborn 7th edition 2010; pp283
- [2] Matthias R. RDS in near term babies after caesarian section, Swiss Medical Weekly, 2003;133:283-288
- [3] Angus DC, Linde – Zwirbe WT, Clermont G. Epidemiology Neonatal Respiratory Failure. Am J Respi Crit Care Med 2001;164:1154-1160
- [4] Halliday HL. Surfactants: Past, present and future. J Perinatal 2008;28:S47-S56
- [5] Nelson's Textbook of Pediatrics 20th ed. 2016; pp 850
- [6] Clements JA, Plodzker A, Tiemey DF. Assessment of risk of RDS by rapid test for surfactant in amniotic fluid. N Engl J Med ;286:1077
- [7] Avery ME. Lung disorders in newborn in newborn infants. Saunders WB and Co., Philadelphia. 6th ed.:2005;pp557-552
- [8] Balaji RV, Rajiv PK, Patel VK and Kripal M. Outcome of early CPAP in the management of RDS in premature babies with <32 weeks of gestation. *Indian Journal of Neonatal Medicine and Research*. 2015; 3(2) 1-6.

- [9] Sanghvi A, Rasania M. "Study of RDS in newborn with special reference to the role of bubble CPAP in its management. *Int J Contemp Pediatr* 2017 Jul;4(4):1334-1339.
- [10] Farhan A.E. et al "Incidence and outcome of surfactant therapy in premature neonates in ICU of KAMC." *Int. J. Curr. Microbiol. App. Sci* (2018);7(4)
- [11] Saboute M et al "The incidence of Respiratory Distress Syndrome among Preterm Infants Admitted to Neonatal Intensive Care Unit:A retrospective study." *Open Journal of Pediatrics*;2015(5):285-289.
- [12] Agarwal S, Maria A "A randomize trial comparing efficacy of bubble and ventilator derived nasal CPAP in very low birth weight neonates with respiratory distress." *J Clin Diagn Res.* 2016.Sep;10(9);SC 09-SC12.
- [13] Praneetha CK, Ahirrao VS. Clinical profile and outcome of RDS in Rural Tertiary Care Hospital. *Int J of Basic and Applied Medical Sciences* ISSN:2018, vol 8(3)16-20
- [14] Wagh SS, Phirke SD. A study of clinical profile of RDS in preterm babies. *International Journal of Recent Trends in Science and Technology* 2016;21(1) 34-37

