

CLINICAL PROFILE AND OUTCOME OF RDS IN RURAL TERTIARY CARE HOSPITAL

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ABSTRACT

Respiratory distress syndrome (RDS) is an important cause of mortality and morbidity in premature infants, primarily due to surfactant deficiency. Early recognition of RD and initiation of treatment is important to ensure optimal outcomes. Studies documenting the outcome of RDS in rural tertiary setup are very few.

Aims and Objectives: This prospective study was performed to assess the clinical profile and immediate outcome of respiratory distress syndrome in preterm infants.

Materials and Methods: 92 preterm neonates <37 weeks diagnosed as RDS as per clinical investigational guidelines were studied. Study was conducted over 1 year between MAY 2015 to MAY 2016 in the department of paediatrics at MVJMC&RH.

Results: Among 145 preterm neonates admitted to NICU, 92 (63.5%) had RDS. Of them, incidence was 60% in males and 40% in females. 27 (30%) babies received surfactant, out of them, 89% survived and 11% died. All babies who received only CPAP survived. Out of the babies who received both CPAP and surfactant 98% survived and rest 2% died. All Babies who required only Mechanical Ventilation more than 10 days expired. Mortality was also high in newborns who did not receive surfactant and those who required assisted ventilation for more than 10 days.

Conclusion: Early use of surfactant improved survival, shortened the duration of ventilation, reduced complication and decreased mortality. Also early institution of CPAP can reduce the need for mechanical ventilation. These results may be particularly relevant for resource limited setting.

Keywords: *Respiratory Distress Syndrome, Surfactant, Continuous Positive Airway Pressure, Mechanical Ventilation*

INTRODUCTION

Respiratory distress syndrome (RDS) is an important cause of mortality and morbidity in premature infants, primarily due to surfactant deficiency (Sinha *et al.*, 2008). The manifestations of the disease are caused by the consequent diffuse alveolar atelectasis, oedema and cell injury (Wagh *et al.*, 2016). The clinical manifestation of RDS includes apnoea, cyanosis, grunting, inspiratory stridor, nasal flaring, poor feeding, tachypnoea, retractions in the intercostal, subcostal, or suprasternal spaces. These signs and symptoms are present at birth or shortly afterwards with getting worse over the first 48 - 72 hours of infant's life (Kushal, 2011). The neonatal mortality rate varies by state but, overall, it is reported to be 39 /1000 live births in India (Barkiya *et al.*, 2016). Lower the gestation higher is the incidence of RDS, accounting for nearly 80% incidence in preterm infants less than 28 weeks. The incidence of HMD is highest below 28 weeks (68-80%), between 32-36 weeks it drops to 15%, term neonates it is less than 1% (Miller *et al.*, 1968).

There has been a tremendous advance in the management 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 (Rao *et al.*, 2017).

In spite of the varying recent advance in clinching diagnosis and management there have been very less clinical studies on the neonatal respiratory distress in our country. Therefore, there is a need to know the clinical profile and outcome of the babies with respiratory distress (Rao *et al.*, 2017).

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Controversies still exist in the early respiratory management of RDS in premature infants. Considering the invasive nature, higher cost and high risk of chronic lung disease, IPPV with surfactant therapy may not be the ideal intervention in resource limited settings like India.

This study was undertaken to study the incidence and clinical profile of RDS in a rural tertiary centre and the effect of modern advancements like bubble CPAP and mechanical ventilation on the outcome of newborns with severe distress because the information available in our area till date is insufficient to prognosticate the outcome of severe respiratory distress.

With this background present study is conducted in a rural tertiary centre where the affordability and availability of surfactant is limited and the use of CPAP has helped greatly in reducing the need for surfactant.

MATERIALS AND METHODS

Inclusion Criteria

1. All inborn and out born preterm neonates (<37 weeks) and having RDS within 24 hrs. According to scoring guidelines.

Exclusion Criteria

1. Babies with congenital anomalies like, cleft lip & palate, congenital diaphragmatic hernia, choanal atresia, major cardiac anomalies etc.
2. Babies having respiratory distress due to cardiac causes other than PDA

It was a hospital based prospective observational study conducted at neonatal intensive care unit of MVJ MC & RH during May 2015 to May 2016. It was approved by the institutional Ethical Committee. After taking an informed consent from the parent / legal guardian. Inborn neonates with gestational age <37 weeks satisfying inclusion and exclusion criteria were enrolled.

Data was collected for all new-borns included in the study with respiratory distress. General information, socioeconomic status, history and clinical examination findings of newborn was documented. Time of onset of distress and the severity of the distress was documented, the severity was assessed by using Silverman & Anderson clinical scoring. They were assessed for the development of distress against time of onset, aetiology, requirement of surfactant, CPAP, mechanical ventilation and immediate outcome. Neonates with Silverman Anderson score less than 4 received CPAP alone and neonates between score 4-7 given both CPAP and surfactant, neonates with score >7 were ventilated and if affordable given surfactant. Depending on the severity of distress other relevant investigations were sent.

Primary outcome was to study the clinical profile of RDS in a rural tertiary centre. Secondary outcome was to assess immediate outcome in terms of need of surfactant, requirement of CPAP and MV for RDS in our NICU. Mortality was documented to assess the clinical outcome against the final diagnosis.

Statistical Analysis

The data collected was entered systematically in Microsoft Excel. Tables and charts generated using MS Excel and MS Word. Data was analysed using the statistical software Microsoft Word and Excel, SPSS.21, Primer of biostatistics, Chi square test was used to analyse the data. P value <0.05 was considered statistically significant

RESULTS

Out of 145 preterms admitted in the NICU during the study period, ninety two newborns had RDS and were included in the study. The incidence of RDS was found to be 63.5%.

Out of the 92 neonates with RDS, maximum neonates' i.e., 52% were between 32-34 weeks which was the commonest followed by 28% between 30-32 weeks and 20% between 34-37 weeks. Severe respiratory distress was more common in gestation age group of 30-32 weeks. Out of the 92 cases studied, 60%(55) were males and 40%(45) were females. 50% newborns had moderate respiratory distress, while 28% of newborns had severe distress and 22% had mild respiratory distress according to SA score. It was also found that vaginally delivered babies (57%) had more RDS when compared to LSCS (43%).

Table 1: Baseline characteristics

GESTATIONAL AGE	Number (n)	Percentage (%)	P value=0.01
30-32weeks	27	30%	
32-34weeks	48	53%	
34-36 weeks	17	18%	
GENDER			0.001
Male	55	60%	
Female	45	40%	
BIRTHWEIGHT			0.004
<2.5 Kgs	54	59%	
>2.5 Kgs	38	41%	
SEVERITY			0.05
Mild	20	22%	
Moderate	46	50%	
Severe	26	28%	
MODE OF DELIVERY			0.009
NVD	52	57%	
LSCS	40	43%	

Table 2: Surfactant

Surfactant	Discharged	Death	Total
Given	49(87.5%)	7(12.5%)	56
Not given	20(55.5%)	16(44.5%)	36
Total	69	23	92

P value=0.001, Significant.

56(61%) babies received surfactant out of 92 babies observed. Out of those who received surfactant, 87.5 % survived and 12.5% died. Out of the remaining 36 babies who did not receive surfactant 20(55.5%) survived and 16(44.5%) died. P value was significant which suggests that use of surfactant improved survival, shortened the need for mechanical ventilation and reduced complications and mortality.

Table 3: Outcome

Outcome	CPAP	CPAP + Surfactant	MV + Surfactant	MV
Discharged	20	45	4	0
Death	0	1	6	16
Total	20	46	10	16

(20) 21% of the children received CPAP. All babies who received only CPAP survived(P value<0.01).This shows that use of CPAP is effective means of respiratory support for mild and moderate respiratory distress. Out of the babies who received both CPAP and surfactant 98% survived and rest 2% died. All Babies who required only Mechanical Ventilation more than 10 days expired. Overall mortality in the present study was 25%.

DISCUSSION

Ninety two cases with RDS were included in the study.

Out of the 92 cases studied, 60% were males and 40% were females. Similarly studies done by (Urs *et al.*, 2009) showed males were 66% and 34 % females and (Balaji *et al.*, 2015) showed 60% males and 40% females Present study showed male predominance, which suggests male sex is a risk factor for Respiratory distress syndrome (RDS).

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In the present study, 48(52%) neonates were between 32-34 weeks which was the commonest, followed by 27 (28%) between 30-32 weeks and 17(20%) between 34-37 weeks. This was comparable to study done by (Wagh *et al.*, 2016) which was 52.6% between the gestation age of 32-34 weeks, 18.6% were in the age group of 30-32 weeks and 17.33% were between 34-36 weeks. There were only 4 babies who were 28-30wk gestation, presented with severe respiratory distress, were ventilated and not received surfactant due to financial constraint and died.

50% newborns had moderate respiratory distress, while 28% of newborns had severe distress and 22% had mild respiratory distress according to SA score. This was comparable to the study done by (Sahoo *et al.*, 2015) which had similar results of 23% of mild, 50% moderate and 27% severe respiratory distress.

It was also found that vaginally delivered babies (57%) had more RDS when compared to LSCS (43%). A study conducted by (Santhosh *et al.*, 2013) also showed that majority of preterm babies who were delivered vaginally developed severe RDS which was comparable to our study.

56(61%) babies received surfactant out of 92 babies observed. Out of those who received surfactant, 87.5% survived and 12.5% died. Out of those babies who did not receive surfactant 78% survived and 22% died. Other studies done by (Wagh *et al.*, 2016) also showed similar use of surfactant, i.e. 58%. P value was significant which suggested that use of surfactant reduced the duration of ventilation, complications and mortality.

Out of 92 babies, 66(72%) babies received CPAP. A study done by (Wagh *et al.*, 2016) showed that 87% neonates required CPAP which is little higher than the present study. 21% of the children received only CPAP without any surfactant. All babies who received only CPAP survived. Out of the 46 babies who received both CPAP and surfactant, 45(98%) survived and rest (2%) died. 10(11%) babies required both mechanical ventilation and surfactant. Out of the babies who required MV and surfactant, 4(40%) survived and 6(60%) expired. All babies who required only Mechanical Ventilation more than 10 days expired. Out of 92 babies, 23(25%) expired which was similar to study done by (Wagh *et al.*, 2016) which had 21.6% mortality.

CONCLUSION

According to our study, low birth weight and prematurity are the common causes for RDS and admission in the NICU. Newborns with lower gestational age are more prone to develop severe respiratory distress. Early use of Surfactant improved survival, shortened the duration of ventilation, reduced complications and decrease mortality. Also initiating early CPAP is an effective and safe method for the treatment of RDS in preterm newborns and reduces the need for some invasive procedures such as intubation and mechanical ventilation.

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