Original Article

A study of clinical profile of respiratory distress syndrome(RDS) in preterm babies

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Abstract

Objective: Study of clinical profile of Respiratory Distress Syndrome in preterm babies. **Design:** Prospective observational study. **Settings:** Neonatal Intensive Care unit at tertiary care hospital. **Outcome measures:** To study role of antenatal steroid, surfactant and assisted ventilation in RDS and outcome in terms of morbidity and mortality in preterms with RDS. **Results:** 150 neonates with gestational age <37wk with diagnosed as RDS as per clinical investigational guidelines were included.97.3% babies received antenatal steroid while 2.7% did not. Out of the babies who received antenatal steroid 80% survived and 20% died. All (100%) who did not receive antenatal steroid died. Out of them 57.3% received surfactant and 42.7% did not receive. Out of babies who received surfactant 88% survived 12% died. Out of babies who did not receive surfactant 64% survived 36% died. All babies (100%) receiving only CPAP (SA score <4) survived. Out of babies receiving both CPAP and surfactant (SA score 4–7) 98.6% survived and 1.4% died. All babies receiving only assisted ventilation for >10 days died. Morbidity in RDS was sepsis 14.66%, PDA 14%, NEC 8.66% and pulmonary hemorrhage 5.33%. At the end of study 118 (78.66%) babies survived while 32(21.33%) died. **Conclusion:** We conclude that administration of antenatal steroids in pregnant women during preterm delivery significantly improves lung maturity. CPAP was safe and effective treatment modality. Early institution of CPAP reduced need of ventilation. Early use of surfactant improved the survival and shortened duration of assisted ventilation.

Keywords: Respiratory distress syndrome, antenatal steroids, surfactant, clinical profile, patent ductus arteriosus, necrotizing enterocolitis,continous positive airway pressure,silverman Anderson score.

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INTRODUCTION

The primary cause of Respiratory Distress Syndrome (RDS) is inadequate pulmonary surfactant. The manifestations of the disease are caused by the consequent diffuse alveolar atelectasis, oedema and cell injury[1]. Hyaline membrane disease (HMD) is the commonest cause of respiratory distress among preterm newborn babies. The term HMD is often used synonymously with RDS. The current incidence of HMD in our country is 10 – 15/1000 live births and in preterm babies is 10 – 15%[2]. Significant advances made in the management of RDS include the development of prenatal diagnosis to identify infants at risk, improvements in prenatal care, advances in respiratory support, surfactant replacement therapy. With the better awareness of the condition, there is a determination to salvage the babies. HMD is primarily a disease of prematurity though it can be seen in presence of other factors like maternal diabetes, asphyxia, acidosis etc[3]. The incidence of HMD is highest below 28 weeks (68-80%), between 32-36 weeks it drops to 15-30% and in term neonates it is less than 1%[3,4]. Despite newer advances, HMD does provide a challenge in diagnosis. Several other conditions in preterm neonates cause respiratory distress soon after birth and differentiation from HMD may be difficult. Such conditions are retained pulmonary fluid, early onset neonatal sepsis, congenital pneumonias etc[5], The x-ray picture can also be non specific with diffuse haziness and low lung volumes. Thus it becomes necessary to promptly

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diagnose HMD. This will help in providing early treatment and prevent progress of HMD to more severe stages. Apart from the clinical suspicion and radiology, tests such as amniotic fluid L/S ratio and phosphatidyl glycerol assessment have 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]. Surfactant therapy is now available in India even though it is very expensive. Surfactant can be used judiciously if one can diagnose surfactant deficiency as the cause of HMD early enough. This will help in using this expensive treatment in a cost effective manner.

MATERIAL AND METHODOLOGY

This prospective descriptive study was conducted in Neonatal Intensive care unit from 1st January 2014 to 30th June 2015 of clinical profile of respiratory distress syndrome in preterm babies admitted in NICU at Government Medical College Miraj. All inborn and Outborn preterm babies whose gestational age <37wk and were diagnosed as RDS as per clinical and investigational guidelines were included in this study. Preterm babies with meconium aspiration, congenital pneumonia or with congenital anomalies like choanal atresia, tracheoesophageal fistula, diaphragmatic hernia were not included in this study. Informed consent was obtained from the parents/guardian regarding inclusion in the study. On clinical examination RR>60/min for >2 hours, grunting, flaring of nasal alae, subcostal, intercostals retractions, diffuse reticulogranular pattern and air bronchogram on X ray chest, arterial blood gas done whenever necessory.Treatment modality was decided according to severity of RDS (Oxygen inhalation, CPAP, Surfactant, Ventilator) .Patients were evaluated for Complications like Intraventricular hemorrhage, Patent ductus arteriosus, pneumothorax, Sepsis. Mortality in this babies were assessed. Statistical analysis was done by using chi-square test. The chi-square test for independence is used to determine the relationship between two variables of a sample. $X^{2=} \sum \frac{(Oi-Ei)2}{Ei}$

Data was analysed using the statistical software Microsoft Word and Excel,SPSS.21,Primer of biostatistics, Chi square test was used to test the level of significance.P value of less than 0.05 (within confidence limit of 95%) was used to assess the statistical significance.

RESULTS AND DISCUSSION

Out of the 150 babies observed, 59.3% were males and remaining were females . RDS was more common in male babies as compare to females, study done by Urs *et al*[8] 66 % were male and 34% females and study done by Balaji *et al*[9] 60 % male and 40 % females which was comparable. 11.33% of the babies were weighing less than 1kg and 7.34% were weighing more than 1.5kg whereas 81.3% were weighing between 1-1.5kg. In study done by Urs *et al*[8] <1 kg 8 %, 1-1.5 kg 66 % and >1.5 kg 26 % and study done by Shrestha *et al*[10] <1 kg 6.7 %, 1-1.5 kg 28 % and >1.5 kg 64.7 % which was comparable.

Maximum neonates 52.66% were 32-34 weeks in gestation whereas 18.66% were 30-32weeks and 17.33% were between 34-36 weeks.

Antenatal steroids were given in 146 babies out of 150. In our study 97.3% received antenatal steroid and 2.67% did not receive steroid. In study done by Urs *et al*[8] 56% received antenatal steroid, 44% did not receive and another study done by Balaji *et al*[9] 74.3% received antenatal steroid,25.7% not received.

In our study, 146 babies received antenatal corticosteroid therapy, only 4 babies did not receive antenatal corticosteroid therapy as they presented as head on perineum and delivered, those 4 babies who had not received antenatal steroid were 28-30wk gestation, presented with severe respiratory distress, CXR showed ground glass appearance were ventilated and not received surfactant due to financial constraint died.

Table 1: Effect of antenatal steroid and outcome

Antenatal steroid	Discharge	Death
Given	117	29
Not given	00	4

Chi Square=3.103; P=0.007; Significant

In this 2x2 table, more than 20 % cell count is less than 5. So chi-square could not be applied, chi-square was applied after yate's correction.

86 babies received surfactant out of the 150 babies observed. 42% did not receive surfactant. Out of 86 babies receiving surfactant only 10 deaths were seen whereas in 41 babies not receiving surfactant 23 succumbed.

Table 2: Effect of surfactant and outcome

Surfactant	Discharge	Death	Total
Given	76	10	86
Not given	41	23	64
Total	**117**	**33**	**150**

Chi Square=11.99, P=0.001; Significant.

Neonates were first classified according to Silverman Anderson score and accordingly given treatment as per score. neonates with score <4 received CPAP alone and neonates with score between 4-7 were given CPAP and surfactant, neonates with score >7 were ventilated and if affordable were given surfactant. Those who had recieved surfactant with ventilation average duration of ventilation was 3 to 4 days, and those who received only ventilation duration was about > 10 days. The outcome observed were as follows:

Table 3: Outcome

Treatment	CPAP	CPAP+SURF	SURF+VENTI	VENTI
Discharge	41	75	02	00
Death	00	01	08	23
Total	**41**	**76**	**10**	**23**

In our study out of 150 babies 41 (27%) babies received CPAP whose weight 1-1.5 kg and maturity was in between 32-34 wk gestation showed that it was effective treatment and all are discharged, according to Prashanth S Urs[8] *et al*, bubble CPAP-a primary respiratory support for RDS study showed that bubble CPAP effective in 40(80%) out of 50 babies, hence bubble CPAP is simple and effective means of primary respiratory support for management of mild and moderate grade RDS.

Jagdish koti[11] *et al* concluded that infant with no or partial exposure to antenatal steroid, white out CXR,PDA, sepsis and pneumonia and those with higher FiO2 requirement after initial stabilization on CPAP are at high risk of CPAP failure (needing mechanical ventilation), bubble CPAP was safe for preterm infant with RDS, R.V.Jeya Balaji[9] *et al*, concluded that early institution of CPAP in management of RDS with preterm, can reduce mechanical ventilation and surfactant with minimum complication.

Parameters	Discharge	Death
Antenatal steroid received	118	28
Surfactant given	77	9
Surfactant not given	41	19

In our study out of 146 babies who had received antenatal steroid 118 babies were discharged, out of which 77 babies received surfactant and 28 babies died of which 9 babies received surfactant and 19 not received surfactant, this showed that antenatal corticosteroid was helpful in reducing RDS, P value 0.007 was significant. According to Sumiartini Ni Made[12] *et al* study of efficacy of dexamethasone for lung maturity in preterm delivery in association with lamellar body count concluded that administration of dexamethasone in pregnant woman during preterm delivery significantly improved lung maturity measured by lamellar body count, in our study out of 146 babies who had received antenatal dexamethasone showed 118 babies survived which showed that it was helpful in reducing RDS. Type of respiratory support given after surfactant in our study 76(87%) received CPAP and 11(13%) received ventilation as compared to Monir Hossain[13] *et al* CPAP received 13(48%) and ventilation 14(51.77%), so he concluded that though surfactant is an expensive medicine, but its use shortened the duration of ventilation, reduced complications and decreased mortality. There were 32 deaths and 118 discharges. In our study out of 150 babies 32 were died that was 21.6% mortality, according to Pradeep. M,L.Rajam,P.Sudevan[14] *et al* study of perinatal mortality,A hospital based study, mortality due to RDS was 15% which was comparable, and also according to Report of National Neonatal Perinatal database[15] mortality due to RDS was 13.5% which was comparable with our study.

CONCLUSION

Administration of antenatal steroids in pregnant women during preterm delivery significantly improves lung maturity, and is associated with improved condition at birth and reduces respiratory morbidity and mortality. CPAP is safe and effective treatment modality.Early institution of CPAP in management of RDS can significantly reduced the need of mechanical ventilation and if used along with early surfactant, there was good recovery, with minimum complications. Early use of Surfactant improved survival, shortened the duration of ventilation, reduced complications and decrease mortality. Sepsis is an important complication and its presence; along with high RDS score at intubation is significant predictor of mortality.

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