Original Research Article

A study to assess relation of cord blood prolactin levels and development of respiratory syndrome – an observational study

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A B S T R A C T

Introduction: Neonatal respiratory distress syndrome (RDS) occurs in infants whose lungs have not yet fully developed. It can also be due to genetic problems with lung development. Most cases of RDS occur in babies born before 37 to 39 weeks. This study was conducted to find out incidence of Respiratory Distress syndrome among preterm and term born neonates.

Materials and Methods: 60 neonates were divided into two groups Group A consisted of Neonates born to mothers with gestational age between 28-37 weeks and Group B -Neonates born to mothers with gestational age of more than 37 weeks.

Results: It was observed that out of 60 neonates, 31 (52%) developed RDS. A out of 30 babies born about 25(83.33%) babies developed RDS as all the babies were premature. In Group B out of 30 babies born 6(20%) babies developed RDS.

Conclusion: Prolactin levels play a very important role in lung maturation of newborns. Identification of high risk cases of premature delivery and giving them prompt treatment at right time is very important. Proper care during antenatal period can reduce preterm deliveries and ultimately decrease in incidence of RDS and decrease in neonatal mortality rate.

1. Introduction

Respiratory distress syndrome (RDS), also known as hyaline membrane disease leads to severe morbidity and mortality in premature babies.[1] It is one of the leading cause for hospitalization in neonatal intensive care units. In India, it has been observed that 0.7% to 8.3% of all perinatal deaths occur due to respiratory distress syndrome. It is well-known that inadequate pulmonary surfactant is responsible for the development of RDS. Several hormones (estradiol, cortisol, testosterone, thyroid hormones, glucagon's, insulin) are involved in the production of lung surfactant.[2] But due to the under developed lungs in these preterm babies, or due to other genetic reasons of lung development, the surfactant production is inadequate leading to neonatal distress among

the babies born before 37 to 39 weeks. The more premature the baby is, the higher the chance of RDS after birth. The problem is uncommon in babies born full-term (after 39 weeks).[3]

Respiratory distress syndrome (RDS) is diagnosed by the presence of at least two of the following clinical signs: tachypnea (>60/min), dyspnea with inspiratory subcostal or intercostal retractions, nasal flaring, expiratory grunting and cyanosis in room air.[4] Prolactin in increasing concentration through a complex mechanism seems to participate in pulmonary maturation.[5] Several studies on prolactin in complicated pregnancies have shown correlation between prolactin levels and fetal outcome mainly in terms of development of respiratory distress syndrome. Thus, prolactin seems to have a role in lung maturation along with many other factors through a complex mechanism.[6] Considering all the factors related to Respiratory Distress

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syndrome and cord blood prolactin levels, the present study was conducted to find out incidence of Respiratory Distress Syndrome(RDS) among preterm and term born neonates. We also tried to assess the cord blood prolactin levels of neonates of term gestations mothers without any medical or obstetric diseases as well as the relationship between the incidence of Respiratory distress syndrome and serum cord blood prolactin levels in term and preterm neonates.

2. Materials and Methods

This observational type of study was carried out over a period of 21/2 years from by the department of OBGY at Krishna institute of medical sciences, Karad. 60 mothers who received intra-partum care during this period were included into the study and their neonates were studied for the development of Respiratory distress syndrome. Based on the gestational age of the babies, they were divided into 2 groups. 'Group A' consisted of Neonates born to mothers with gestational age between 28-37 weeks i.e. preterm gestational neonates, and 'Group B' which consisted of neonates born to mother with gestational age more than 37 completed weeks or. term gestational neonates. All the mothers had singleton pregnancies with vertex presentation, with no other obstetric or medical risk factors. Mothers of Group A neonates had come in advanced stage of labor where the benefits of prophylactic antenatal corticosteroids could not be of use. Mothers with less than 28 weeks of gestation, those having any associated medical or obstetric disorder, those receiving prophylactic corticosteroid therapy or those delivered by instrumentation or caesarean section were excluded from the study.

This study was cleared by the Institutional Ethical Committee permission and informed consent was taken from all the mothers after the clearance. A detailed history and examination was carried out. The delivery of the mother carried out with all aseptic precautions. Approximately 3 cc of mixed arterial and venous blood was collected, without squeezing the cord in a plain sterile vial just after delivery. The sample was kept at room temperature for separation of serum. Thereafter it was sent for estimation of cord blood serum prolactin levels. The reports of the prolactin levels in the blood were kept unknown from the neonatologist.

Quantitative estimation of serum prolactin was done with the IMMULITE and IMMULITE 1000 Analyzers. Every delivery was attended by a neonatologist. Immediately after delivery the routine measures for neonatal care such as drying the baby, suction of nasal and oral secretions, etc. was carried out. APGAR score was calculated.

To classify the newborns according to gestational age and birth weight as small, appropriate and large for gestational age, the Battaglia & Lubchenko intra-uterine growth curves were utilized. Newborns were considered to have appropriate weight for the gestational age when the weight was located between the 10th and 90th percentiles

of this curve. They were considered to be large for the gestational age when the birth weight was above the 90th percentile, and small for the gestational age when the weight was below the 10th percentile.

Routine follow-up of the neonates admitted to intensive care unit, on suspicion of respiratory distress syndrome was done. Respiratory distress syndrome was confirmed on the basis of clinical findings. The clinical presentation of expiratory grunting, tachypnea (respiratory rate more than 60/minute), subcostal and intercostal retractions, nasal flaring, and cyanosis was usually manifested in the first few hours and almost always before 8 hours of age. If symptoms did not develop until after 8 hours of normal breathing, RDS was excluded.

All the neonates with RDS were treated in N.I.C.U. by a special team of paeditricians. The neonates with severe RDS were given the respiratory ventilator support. In such cases, proper weaning was given so that ventilatory support can be removed early. Thorough antibiotic coverage was given to the neonates. During treatment, depending on the requirement, artificial surfactant was given through entotracheal route. Daily neonatal and maternal condition was observed and noted on a pre-designed and pre-structured questionnaire.

Data was entered in microsoft excel version and analyzed using proportions.

3. Results

It was observed in present study, that the mean age of mothers in Group A was 26years and in Group B, it was 24 years. In Group A 53% were primigravida and 47% were multigravida were as in Group B 67% were primigravida & 33% were multigravida (Figure 1).
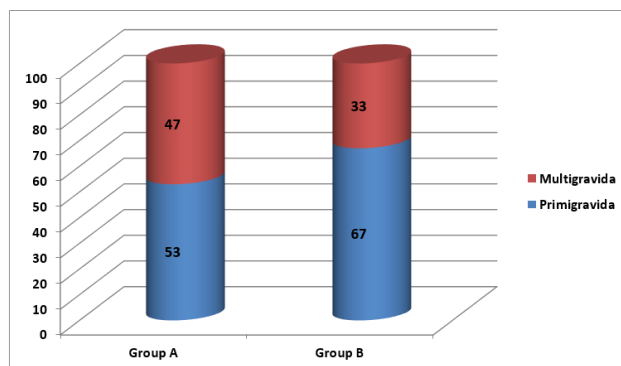

Fig. 1: Gravida status of the mother

The present study shows that over all 31 babies developed RDS. In Group A out of 30 babies born about 25(83.33%) babies developed RDS as all the babies were premature. In Group B out of 30 babies born 6(20%) babies developed RDS (Table 1).

Table 1: Distribution of babies with Respiratory Distress Syndrome (RDS)

Groups	RDS		Total
	Present	**Absent**	
Group A	25(83.33)	5(16.6)	30
Group B	6(20)	24(80)	30
Total	31	29	60

Table 2: Distribution of study participants with gestational age, prolactin levels and RDS

Groups (Gestation in weeks)	Frequency	Mean Prolactin level(ng/ml)	RDS	
			Present	**Absent**
Group A				
28 – 32	16	152.2	16(100)	0
32.1 –35	11	221.85	8(73)	3(27.27)
35.1 – 37	3	227.0	1(33.33)	2(67)
Group B				
>37	30	363.6	6(20)	24(80)

Table 3: Distribution of babies in relation to Mortality

Groups	RDS		Outcome	
	Present	**Absent**	**Alive**	**Expired**
Group A	25(83.33)	5(16.66)	9(36)	16(64)
Group B	6(20)	24(80)	5 (83.33)	1(16.66)

Majority of the study participants (53.32%) in Group A were in 28-32 weeks of gestation followed by 37% in 32.1-35 weeks of gestation. Respiratory Distress Syndrome(RDS) was seen all the cases in 28-32 weeks of gestation(100%) followed by 73% in 32.1-35 weeks of gestation showing that premature babies are more prone to RDS than the term ones. In Group B RDS was seen in 20% of the newborns born to mother with gestation of >37 weeks. An inverse relationship was observed between the incidences of RDS and gestational age. RDS is more common among the preterm infants due to immaturity of type II pneumocytes (Table 2).

Table 3 shows that in Group A near 83.33% of babies developed RDS and among them about 64% of the babies expired which shows that as they were born before 37 weeks of gestations and due to prematurity many of them couldn't survive. In Group B nearly 6 babies (20%) developed RDS and among them 1(16.66%) baby expired. The mortality was high among babies who were born premature.

4. Discussion

The mean age of study participants in Group A was 26 years and 24 years in Group B respectively. In a similar study, the mean age was 29.4± 6.36 Years. [7]

The present study findings showed that out of 60 newborn babies 31(51.66) babies developed RDS. In Group A out of 30 babies born about 25(83.33) babies developed RDS as all the babies were born before 37 weeks of gestation and were premature. In Group B out of 30 babies born 6(20%) babies developed RDS as were born after 37 weeks of gestation. In another study the prevalence of RDS was similar to present study, which was found to be 54.7% respectively and it was more among newborn who were born premature before 37 weeks of gestation. [7] In another study 7% of the newborn born before 37 weeks of gestation developed RDS. [1] In one study 30.55% babies who were born before 37weeks of gestation developed RDS. [6]

The present study findings shows that in Group A majority of the study participants (53.32%) were in 28-32 weeks of gestation followed by 37% in 32.1-35 weeks of gestation. Respiratory Distress Syndrome (RDS) was seen in more in 28-32 weeks of gestation(100%) followed by 73% in 32.1-35 weeks of gestation. In Group B RDS was seen in 20% of the newborns born to mother with gestation of >37 weeks. The present study findings were similar with other study such as in a study done by Namrata et al. it was observed that only 1(14.3%) baby developed RDS in 32 weeks of gestation while women in 32.1-35 weeks of gestation about 6(85.7%) newborn born with RDS. Among women delivered after 35 weeks of gestation RDS was not found among those newborns which suggests that RDS is more commonly seen among premature infants. [1]

It's a proven fact that less prolactin levels have increased risk of development of RDS which is more commonly observed in pre-term born neonates compared to term neonates. In present study in Group A all neonates born to women in 28-32 weeks of gestation, and 16 neonates born in 28-32 weeks developed RDS which suggests that premature infants are more prone to RDS. Nearly 11 neonates were born in 32.1-35 weeks of gestation and out of them 8(73%) developed RDS. About 3 neonates were born between 35.1-

37weeks of gestation and only 1(33.33%) developed RDS. In Group B out of 30 about 6(20%) neonates developed RDS. Present Study findings were consistent with one study were low serum prolactin levels lead to development of RDS.[6] In another study it was observed that cord blood prolactin levels were less than 200 ng/mL and there was high incidence of respiratory distress syndrome observed among newborns.[8] In another study it was found that cord blood prolactin levels were <140ng/ml and neonates developed RDS and they were born preterm.[1]

The present study findings showed that in Group A near about 83.33% of babies developed RDS and among them about 64% of the babies expired which shows that as they were born before 37 weeks of gestations, and they were premature so many of them couldn't survive. In Group B near about 6 babies (20%) developed RDS and among the 1(16.66%) baby expired. The mortality was high among babies who were born premature. In one study done by Adebami OJ 36% of infants died due to RDS.[9] In a study done by Swarnkar's et al.22.8% of infants died due to RDS.[10]

5. Conclusion

Prolactin levels play a very important role in lung maturation of newborns. The levels of prolactin increases with increase in gestational age. It was observed in present study as well as in other studies lower the gestational age, lower are the prolactin levels. Lowers prolactin levels leads to development of Respiratory distress syndrome due to immature lungs. There can be many reasons for premature delivery and such newborns are prone to development of RDS. So during antenatal period stress should be given for regular antenatal care and check up. Identification of high risk cases of premature delivery and giving them prompt treatment at right time is very important. Proper care during antenatal period can reduce preterm deliveries and ultimately decrease in incidence of RDS and decrease in neonatal mortality rate.

6. Source of Funding

7. Conflict of Interest

None.

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