Original Research Paper

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Paediatrics

SCREENING OF ETIOPATHOGENESIS OF RESPIRATORY DISTRESS IN NEWBORN IN A TERTIARY MEDICAL COLLEGE OF WESTERN U.P

Dr. Karam Chand	Post graduate student, Department of Paediatrics, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh, India
Dr. Yogesh Goel*	Professor, Department of Paediatrics, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh, India *Corresponding Author
Dr. Manish Agrawal	Professor, Department of Paediatrics ,Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh, India
Dr Viveksinha	Associate professor, Department of Biochemistry, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh, India

ABSTRACT

Background: Respiratory distress is one of the most common cause for newborn admission in ICU, seen in around 7.3%-12% of newborns. Certain risk factors like prematurity, cesarean section delivery, meconium-stained amniotic fluid (MSAF), maternal chorioamnionitis, gestational diabetes, and oligohydramnios or congenital lung anomalies increase the likelihood of neonatal respiratory distress.

Aims and Objective of the study: (I) To identify and diagnose the common etiological causes of respiratory distress in newborn. (II) To differentiate pulmonary causes, cardiovascular causes and other systemic causes of respiratory distress in newborn. (III) To identify the risks associated with respiratory distress in preterm and term newborns.

Material and Methods: All newborns (inborn /out born) admitted in NICU of the Department of Pediatrics, Saraswathi medical college, Hapur who developed respiratory distress with in 72hrs of birth were studied. Newborns with birth weight less than 1000gm, gestational age <28wks and those with congenital anomalies were excluded from the study. Sample size was decided on the basis of prevalence of neonatal respiratory distress in our area. It was conducted for a period of 1year from 1st August 2017 to 31st July 2018.

Results: The present study was prospective in nature where clinical spectrum of respiratory distress in neonates was studied. This study was conducted on 110 newborns who developed respiratory distress within 72hrs of birth, 10 of them were excluded from study due to extreme prematurity, congenital anomalies and ELBW, Out of 100 newborns 68 were males and 32 were females. Male to female ratio was 2.12:1. Out of 100 Neonates with respiratory distress, 55 had low birth weight and remaining 45 neonates had normal birth weight. In the overall study 94 were survived and 6 were expired. Four deaths were due to RDS, 1 due to HIE and 1 due to sepsis with pneumonia. Most of the deaths were due to RDS (66.6%).

Conclusion: Transient tachypnea of newborn was the main cause of respiratory distress followed by RDS. The commonest cause of death was RDS. Prematurity & Caesarean section were the most common predisposing factors associated with the development of respiratory distress in neonates. In most of the cases X-ray findings correlated with the clinical picture. ABG findings were normal in most of the cases. The main cause for ventilatory requirement was RDS. The outcome of neonatal respiratory distress was found as a survival rate of 94%, mortality rate of 6%.

KEYWORDS : Respiratory distress, Transient tachypnea of newborn, Respiratory distress syndrome, cesarean section.

BACKGROUND

Respiratory distress in neonates is one of the important clinical manifestations of a variety of conditions of the respiratory and non-respiratory disorders. The prevalence of respiratory distress varies with the gestational age, with 35-40% among preterm, 5-8% among term and 20% among post term (1, 2, 3). Various risk factors like prematurity, meconium-stained amniotic fluid, cesarean delivery, gestational diabetes, maternal chorioamnionitis, or oligohydramnios and structural anomalies. There has been a tremendous advances in the management of respiratory distress such as ventillatory therapy with different modes such as CPAP, conventional mechanical ventilation, ultra high frequency jet ventilation,, surfactant replacement therapy, sophisticated monitoring and extracorporeal membrane oxygenation all have improved the outcome among the babies with respiratory distress. Despite of these advances in clinching diagnosis and management the respiratory distress is responsible for 40-50% of all the perinatal deaths (1,4). The present study was done with an aim to know the etiopathogenesis and outcome of the neonates with respiratory distress in the Hapur region.

MATERIALS and METHODS

All newborn babies admitted to SIMS Hospital NICU during a period from August 2017 to July 2018 who developed respiratory distress were studied. These admissions comprised of neonates delivered in our hospital (inborn) as well as outborn neonates. The study protocol was approved by institutional ethical committee, well informed written consent was taken from mother's/guardian's of each infant.

Inclusion criteria :-

Both inborn and outborn neonate admitted to NICU with respiratory distress.

Exclusion criteria :-

- Babies more than 72hrs of life,
- Babies weight less than 1000 gms,
- Babies less than 28 wks of age gestation,
- Babies with congenital anomaly

Babies were admitted and nursed under servo control open care system. Respiratory distress was diagnosed clinically by the presence of atleast 2 of the following criteria, namely Respiratory rate 60/min or more, flaring of alae nasi, expiratory grunt, subcostal in drawing, xiphoid retraction, suprasternal in drawing, and cyanosis at room air. These infants were examined in detail and assessed by Downe's scoring system. They were given specific treatment and kept under constant supervision till discharge or death. The diagnosis of etiology of respiratory distress was based mainly on the history, clinical and radiological findings. Continuous monitoring of oxygen saturation was done. ABG analysis was done frequently in unstable babies and following changes in ventilator settings. Blood glucose was monitored regularly using the dextrostix, sepsis work up was done when clinically indicated, and endotracheal tube and blood culture sensitivity were done if septicemia or pneumonia was suspected. Ventilatory support was provided to those who required due to impending respiratory failure, with appro priate settings according to the underlying disease. With an aim to use the minimum possible fractional inspired oxygen concentrator (FiO2) to maintain normal blood gases. All babies were monitored for any complication like air leak, congestive cardiac failure, sepsis, PDA, etc. chest physiotherapy was given during and after ventilation. Babies were weaned off the ventilator when they showed clinical, radiological improvements and normal ABG findings. Dexamethasone (0.2 to 0.4 mg/kg) was given 24 hours prior to expected extubation. The endpoint of the study was hemodynamically stable baby accepting feeds well were fit to be shifted out of NICU or when baby succumbed to treatment.

RESULTS

This was a prospective study where clinical spectrum of respiratory distress in neonates was studied. During the study period 110 newborns with respiratory distress were admitted in NICU, 10 were excluded from study on the basis of exclusion criteria. Out of 100 RD newborns, 68 were males and 32 were females. Male to female ratio was 2.12:1 that is similar to other autors (7). In the overall study 94 were survived with 6 deaths. 4 Deaths were due to RDS, 1 due to HIE and 1 due to sepsis with pneumonia. Most of the deaths were due to RDS (66.6%).

Table-1 Etiology of respiratory distress in neonates.

Diagnosis	Total no. of cases, n=100
TTN	60
RDS	14
MAS	13
HIE	8
Sepsis with pneumonia	4
Congenital heart disease	1

Table-1 shows that transient tachypnea of newborn was found to be most common cause of RD in neonates (n=60) followed by respiratory distress syndrome (n=14) and meconium aspiration syndrome (n=13), after that hypoxic ischemic encephalopathy (n=8), pneumonia (n=4), CHD (n=1). Pneumonia was common in outborn neonates, mainly with home based delivery.

Out of 100 children 10 were less than 1500 gm, 45 neonates were between 1500-2499gm, 36 neonates had weight between 2500-3499 gm and 9 neonates had weight >3500gm. Many of the respiratory distress neonates were delivered by LSCS. 46 inborn and 14 outborn neonates had diagnosis of TTN who presented with respiratory distress in NICU, whereas 10 inborn and 4 outborn neonates had RDS.

Table-2 Birth weight wise distribution of causes of respiratory distress.

Birth weight	TTNB n=60	MAS n=13	RDS n=14	Sepsis with pneumonia n=4	HIE n=8	Congenital heart disease n=1	Total n=100
1000-1499gm	0	0	9	1	0	0	10
1500-2499gm	30	4	5	1	5	0	45
2500-3499gm	24	7	0	2	2	1	36
>3500gm	6	2	0	0	1	0	9

Table- 2 shows birth weight wise distribution of causes of respiratory distress, with maximum number of cases with TTNB and HIE seen in 1.5 -2.49kg, maximum neonates with RDS were <1.5kg.

Table-3 Gestational age wise distribution of causes of respiratory distress.

Gestational age	TTN	MAS	HIE	RDS	Sepsis with pneumonia	CHD	Total
<37wks	8	2	2	14	2	1	32
37-42wks	44	5	5	0	2	0	53
>42wks	8	6	1	0	0	0	15

Table-3 shows gestation wise relationship of RD, it was found that all cases of RDS seen in preterm neonates and most TTNB cases were term neonates, while sepsis with pneumonia were equally seen in preterm and term neonates.

Table-4 Assessment Downe's score in various causes of respiratory distress.

Downe's score	TTN n=60	MAS n=13	HIE n=8	RDS n=14	Sepsis with pneumonia (n=4)	CHD n=1	Total n=100
<3	38	2	1	2	0	0	43
4-6	22	8	3	5	2	1	41
>7	0	3	4	7	2	0	16

Table-4 shows that maximum downe's score (>7) were seen in RDS followed by HIE and MAS, they required mechanical ventilator support, mild (<3) RD was seen in transient Tachypnea of newborn.

Table-5 Treatment of respiratory distress babies.

Treatment given	Number of cases
C-PAP support	27
Ventilator support	16
Surfactant	14

Table-5 shows that neonates with respiratory distress 27 were required C-PAP support and most of them recovered on C-PAP but few of them landed on ventilator support, 16 neonates were required ventilator support out of them 6 were expired, maximum mortality seen in RDS (n=4) followed by HIE (n=1) and pneumonia (n=1).

Table-6 Chest x-ray findings among respiratory distress babies.

Chest x-ray findings	Number
Normal	16
Pulmonary infiltration	46
Hyperinflation	26
Consolidation	4
Pneumothorax	2
Ground glass opacities with air bronchogram	6

Table-6 shows that Chest x-ray of 46 neonates shows pulmonary infiltrates followed by hyper inflated chest in 26 neonates, normal x-ray findings were seen in 16 cases, ground glass opacities with air bronchogram were seen in 6 cases.

Table-7 Outcome of neonates with respiratory distress admitted in NICU

Outcome	Inborn	Outborn
Discharge	68	26
Death	2	4
Total	70	30

Table-7 shows that out of 100 cases of respiratory distress 94 were discharged out of them 68 were inborn and 26 were outborn.

Table-8 Causes of deaths in neonates with respiratory distress.

Causes of death	Total deaths (n=6)
Transient tachypnea of newborn	0
Meconium aspiration syndrome	0
Respiratory distress syndrome	4
HIE	1
Pneumonia	1
CHD	0

Table-8 shows that a total of 6 patients were expired with 2 were inborn and 4 were outborn all of them were preterm with weight <2.5kg. Mortality rate was higher in RDS neonates.

DISCUSSION

Respiratory distress is one of the commonest disorder encounters within the first 72hrs. it occurs in 7.8-12% of all newborns and is responsible for 30% neonatal mortality. The respiratory disorders in newborn includes TTNB, RDS, HIE, Sepsis with pneumonia, MAS, and congenital heart disease, with various other causes. A total of 100 neonates with respiratory distress included in this study of which 6 were expired in the study. The most common cause of respiratory distress was transient tachypnea of newborn (n=60), followed by respiratory distress syndrome (n=14), and meconium aspiration syndrome (n=13). Respiratory distress syndrome was proved to be number one cause of mortality in this study.

According to Tudehope et al (5) TTN is the commonest cause of RD accounting for 41%, he also showed TTNB was more common following caesarean section. In the study done by Kumar A (6)

transient tachypnea of newborn (TTN) was found to be the commonest (42.7%) cause of RD followed by infection (17.0%), meconium aspiration syndrome (10.7%), hyaline membrane disease (9.3%) and birth asphyxia (3.3%).

In the study by Rakholia et al, in both inborn and out born neonates the most common cause of respiratory distress was respiratory distress syndrome. The second common cause in inborn neonates was birth asphyxia (17%) and in outborn neonates had sepsis.4

It was noted that the birth asphyxia in present study as a cause of neonatal respiratory distress was less common. Santosh S et al mentioned that, 35 (46%) babies had TTNB, 24 (31.5%) babies had RDS, 19 (25%) had BA, 19 (25%) babies had pneumonia and sepsis, 6 (7.8%) babies had MAS, 2 (2.6%) babies had pneumothorax, 1 (1.3%) neonates had CHD as a cause for respiratory distress (4).

In our study, 32 neonates were preterm, 53 were term and 15 were post term. The study done by Thomas et al.[4] showed 58% of term babies and 42% were preterm developed RD. In Khatua SP et al., study [5] among 182 babies with RD 133 (73%) babies were term infants and 49 (29%) were preterm.

In our study among 16 neonates were put on ventilator and 6 of them expired, i.e., 62.5% were survived and among 14 neonates who were given surfactant all survived. In a study done by Kulkarni M L et al., [8] 51% survived among ventilated babies.

In the overall study 94% survived with 6 deaths. Most of the deaths were due to RDS (66.6%). According to Malhotra A K [9] 88% mortality was due to HMD and all cases of TTNB and MAS were survived. In our study all the deaths were in below 2.5kg babies with male predominance similar to study done by Malhotra AK.

Antenatal risk factors increase the incidence of RD. Transient tachypnea was the main cause of respiratory distress followed by RDS. In most of the cases x ray findings correlated with the clinical picture. ABG was found normal in most of the cases. RDS was the main cause for ventilation. The common cause of death was preterm and RDS.

CONCLUSION

Respiratory distress accounts for one of commonest problem for all NICU admissions. Premature babies were more prone to respiratory distress with male predominance. Mortality was very high in neonates with RDS and those required ventilator support. Most of them were delivered vaginally. Antenatal risk factors increase the incidence of RD. In this study Transient tachypnea was the found to be the commonest cause of respiratory distress followed by RDS. In most of the cases x ray findings correlated with the clinical picture. ABG was found normal in most of the cases. RDS was the main cause for mechanical ventilation support. Out of 100 cases of respiratory distress the survival rate was 94%. Proper antenatal care, prevention of preterm delivery, institutional based deliveries, prevention of infection appropriate management may reduce the neonatal respiratory distress incidence and mortality.

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