

Original Research Article

A clinical study of respiratory distress in neonates

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ABSTRACT

Background: Respiratory distress is a medical emergency responsible for most of the admissions in NICUs during neonatal period. It is a major contributor to neonatal morbidity and mortality and results from a variety of respiratory and non-respiratory etiology. It occurs in 0.96 to 12% of live births and responsible for about 20% of neonatal mortality. Aim of study to find out the proportion of patients with different etiology of respiratory distress in neonates.

Methods: The present study is a prospective, descriptive study which was carried out at neonatal units attached to SMS Medical College, Jaipur. All the neonates with respiratory distress admitted in NICU admitted from April 2012 to March 2013 were selected for the present study. Detailed history including antenatal history, natal history, postnatal history with thorough clinical examinations and investigations done in each case and were recorded in the performa.

Results: A total of 500 neonates were admitted and among them 375 were inborn (delivered in our hospitals) and 125 out-born (referred to our hospitals from outside). In inborn group hyaline membrane disease (HMD) was the most common cause (32%) of respiratory distress and in out-born congenital pneumonia/septicaemia (34.4%). There was male preponderance in both inborn and out-born groups with male: female ratio 1.45:1 and 1.6:1 respectively.

Conclusions: Majority of cases in both inborn and out-born groups were preterm (56.8% and 54.4% respectively) which emphasises the need for care of mother during antenatal period for prevention of premature delivery.

Keywords: Congenital pneumonia, Hyaline membrane disease, Inborn, Neonates, Out-born, Preterm, Respiratory distress, Septicaemia

INTRODUCTION

Respiratory distress is a common medical emergency responsible for 30-40% of total admissions in the neonatal period.¹ Respiratory distress is one of the major causes of mortality and morbidity among the newborns. It occurs in 0.90 to 12% of live births and responsible for about 20% of neonatal mortality.¹

There are many causes of respiratory distress in neonates.²

These include:

- Transient tachypnea of newborns (TTNB)
- Septicemia
- Meconium aspiration syndrome (MAS)
- Hyaline membrane disease (HMD)

- Perinatal asphyxia
- Congenital or acquired pneumonia
- Persistent Pulmonary Hypertension of the Newborn (PPHN)
- Air leaks(Pneumothorax)
- Congenital anomalies of upper airway (choanal atresia), gut (tracheoesophageal fistula, congenital diaphragmatic hernia) or lungs (lobar emphysema, congenital cystic adenomatoid malformation, cysts)
- Cardiac shock or Congenital Heart Disease (CHD)
- Hematological causes (severe anemia, Polycythemia)
- Neurological causes leading to hyperventilation like seizures
- Metabolic causes- Inborn Errors of Metabolism

Aim of this study to find out the proportion of patients with different etiology of respiratory distress in neonates admitted in Neonatal units attached to SMS medical college, Jaipur, Rajasthan, India.

METHODS

This is a prospective descriptive study, carried out at neonatal units (SPMCHI, Zenana Hospital, Mahila Chikitsalaya, and Gangori Hospital) attached to SMS Medical College, Jaipur, Rajasthan, India. 500 neonates with respiratory distress admitted in NICU both male and female, inborn (375) and out-born (125) were included in the study. Study was conducted for the period of one Year April 2012 to March 2013.

Inclusion criteria

- Neonates inborn or out-born admitted to the neonatology units with symptoms and/or signs of respiratory distress.
- Age less than 28 days.

Exclusion criteria

- Respiratory distress settled in first 2 hours after birth, in inborn neonates by correction of hypothermia, hypoglycemia and not needed admission to NICU were excluded from the study.

Detailed history including antenatal history, natal history, postnatal history with thorough clinical examinations and investigations done in each case and were recorded in the performa. The diagnosis of respiratory problems was based on guidelines recommended by National Neonatology Forum (National Neonatal-Perinatal Database 2002-03).³

Respiratory Distress

Presence of at least 2 of the following criteria

- Respiratory rate >60/minute

- Subcostal/intercostal recessions
- Expiratory grunt/groaning.
- Flaring of alae nasi
- Central cyanosis in room air

Transient tachypnea of newborn (TTN) is diagnosed as respiratory distress in a term or borderline term or preterm neonate starting within 6 hours after birth, often requiring supplemental oxygen, but recovering spontaneously within 3-4 days and showing characteristic x-ray changes i.e. Linear streaking at hilar and inter-lobar fluid.

Hyaline Membrane Disease (HMD) is diagnosed when following three criteria are present: (a) preterm neonates ; (b) respiratory distress having onset within 6 hours of birth ; and (c) Amniotic fluid L/S ratio of <1.5, or negative gastric aspirate shake test, or skiagram of chest showing poor expansion with air bronchogram/reticulogranular pattern/ ground glass opacity.

Meconium Aspiration Syndrome (MAS) is diagnosed in the presence of at least two of the following: (1) meconium staining of the liquor or staining of nails or umbilical cord or skin; (2) respiratory distress soon after birth; and (3) Radiological evidence of aspiration pneumonitis (atelectasis or hyperinflation)

Congenital Pneumonia is diagnosed in the presence of respiratory distress with : (A) positive blood culture or (B) if any two of the following are present: (1) existing or predisposing factors characterised by one of the following (a) maternal fever (>38°C) (b) foul smelling liquor; (c) prolonged rupture of membrane(>18hrs) (2) clinical picture of sepsis characterised by any of the following; (a) poor feeding, (b) lethargy, (c) poor reflexes, (d) hypo or hyperthermia, (e) abdominal distension; and (3) X-ray picture suggestive of pneumonia characterised by any of the following; nodular or coarse patchy infiltrates, diffuse haziness or granularity, air bronchogram, and lobar or sub lobar consolidation. (4) Positive septic screen.

Birth asphyxia

Definition I

Moderate birth asphyxia: Slow gasping breathing at 1-minute of age.

Severe birth asphyxia: No breathing at 1-minute of age.

Definition II

Birth asphyxia: Apgar score of less than 7 at 1 minute of age

Moderate birth asphyxia: Apgar score between 4 and 6 at 1-minute of age

Severe birth asphyxia: Apgar score of 3 or less at 1-minute of age.

Septicemia (systemic bacterial infection)

Culture negative (clinical)

In an infant having clinical picture suggestive of septicemia, the presence of any one of the Following criteria is enough for assigning probable diagnosis of infection:

1. Existence of predisposing factors: maternal fever or foul smelling liquor or prolonged Rupture of membranes (>18 hrs) or gastric polymorphs (>5 per high power field).
2. Positive septic screen: two of the four parameters - TLC <5000/mm, band to total polymorph ratio of > 0.2, absolute neutrophil count less than 1800, and micro ESR>10 mm 1st hour.
3. Radiological evidences of pneumonia.

Culture positive sepsis

In an infant having clinical picture suggestive of septicemia, pneumonia or meningitis along with either of the following, -isolation of pathogens from blood or CSF or urine or abscess (es) -pathological evidence of sepsis on autopsy.

Investigations

- X-ray Chest AP View:
- Septic screening:
 - Total leucocytes count (TLC)
 - Absolute Neutrophil Count(ANC)
 - Immature to total neutrophil (I/T ratio)
 - C-reactive protein(CRP):
- Blood culture and sensitivity

Other investigations which were done as and when required are

- Culture from other whenever indicated.
- Urine examination (Complete, Culture and Sensitivity)
- Stool examination (for occult blood).
- Bleeding profile.
- Cranial , Chest and Abdominal ultrasonography.
- ABG (Arterial blood gas)
- SpO₂ monitoring
- Blood urea and serum creatinine
- Blood sugar monitoring
- Metabolic screening for inborn errors
- 2D ECHO

RESULTS

Out of 500 neonates admitted, 375 were inborn (delivered in our hospitals) and 125 out-born (referred to our hospitals from outside). Sex wise distribution of neonates admitted in NICU with respiratory distress is shown in Table 1. There was male preponderance in both the groups (neonates born in hospital and outside the hospital).

The distribution of cases of respiratory distress based on the diagnosis is shown in Table 2. The most common cause of respiratory distress in neonates born in hospital was hyaline membrane disease (32%) and in neonates born outside the hospital, was congenital pneumonia/septicaemia (34.4%).

Table 1: Sex-wise distribution of neonates and admitted in NICU with respiratory distress.

No. of cases of Respiratory Distress	Male	Female	Total	Ratio M:F
Inborn	222	153	375	1.45:1
Out - born	77	48	125	1.60:1

Table 2: Distribution of cases of respiratory distress according to diagnosis.

Disease	Inborn		Out - born	
	No. of Cases	Percentage (%)	No. of Cases	Percentage (%)
Hyaline membrane disease (HMD)	120	32	34	27.2
Congenital pneumonia/Septicaemia	108	28.8	43	34.4
Transient Tachypnea of Newborn(TTN)	51	13.6	12	9.6
Meconium aspiration syndrome (MAS)	39	10.4	17	13.6
Perinatal Asphyxia	39	10.4	13	10.4
Congenital heart disease (CHD)	9	2.5	2	1.6
Surgical causes (TOF, CDH Diaphragmatic eventration)	6	1.6	2	1.6
Inborn error of metabolism (IEM)	3	0.8	0	0
Aspiration pneumonia	0	0	2	1.6

DISCUSSION

The sex ratio in present study was 1.48:1 overall, with male predominance which is consistent with study conducted by Ali Z et al, (1.48:1).⁴ Male predominance was also shown by Hjalmarson O et al, (1.7:1), Mishra PK et al, (1.5:1) and Malhotra et al, (1.08:1).⁵⁻⁷

In our study male predominance was 59.8% and preterm babies with respiratory distress constituted 55.6%. Overall commonest cause of respiratory distress in our study was HMD (30.8%).

The study done by Haque A et al, showed that there was male predominance (64.6%) and most of babies admitted in NICU with respiratory distress were preterm babies (65.6%). The commonest causes of respiratory distress in this study was transient tachypnea of newborn (43.2%) followed by hyaline membrane disease (30.2%)⁸

Santosh S et al, observed that out of 76 babies with respiratory distress, 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, 1 (1.3%) neonates had laryngomalacia.⁹

Fedakar A et al, reported that 20.4% cases with respiratory distress were premature, 64.4% were males and TTN was the most common (76.7%) cause for admission in NICU followed by meconium aspiration syndrome (MAS) (8.3%), respiratory distress syndrome (HMD) (6.3%), birth asphyxia (3.8%), sepsis (2.1%), pneumonia (1.7%), multiple congenital anomalies (0.4%), inborn metabolic disease (0.4%), and aspiration pneumonia (0.4%)¹⁰.

QIAN Li-ling et al, study showed that most common of respiratory distress was hyaline membrane disease.¹¹

Saeed Zaman et al, showed that TTN was found to be the commonest (35.7%) cause of respiratory distress (RD) followed by hyaline membrane disease (25%).¹²

N.B. Mathur, et al, found that pneumonia to be the most common cause (68.6%) of respiratory distress in neonates.¹³

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