

Etiology of Respiratory Distress in Newborn – Experience in BIRDEM

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Abstract:

Objectives: Respiratory distress is one of the most common causes of admission in Neonatal intensive care unit (NICU). There are many causes of respiratory distress, among them, transient tachypnoea of newborn, respiratory distress syndrome and perinatal asphyxia are commonest causes. The aim of this study was to identify the etiology of respiratory distress in special care baby unit (SCABU) in BIRDEM General Hospital and to observe the immediate hospital outcome of these babies. **Methods:** A retrospective study was conducted in SCABU, BIRDEM. Data were collected from all patients files admitted in to SCABU during the period from January to December 2011. **Results:** A total of 562 patients were admitted, among them 192 cases were admitted due to respiratory distress (34.1%). There was male predominance (64.6%). Two third (65.6%) babies were inborn and majority (84.4%) were born by caesarian section and preterm babies were more (65.6%). The commonest causes of respiratory distress in our study were transient tachypnoea

of newborn (43.2%), respiratory distress syndrome (30.2%), perinatal asphyxia (25%), septicemia (16.1%) congenital pneumonia (11.9%), congenital heart disease (10.4%). All babies required oxygen initially, subsequently mechanical ventilation and Bubble CPAP was required in 48 (25.0%) and 8(04.1%) cases respectively. Mortality was 16.7% and was highest in neonates with respiratory distress syndrome (RDS) (71.8%) followed by septicemia (40.6%) and perinatal asphyxia (37.3%). Among neonates requiring mechanical ventilation 56.2% died. **Conclusion:** Transient tachypnoea of newborn (TTN), respiratory distress syndrome (RDS), perinatal asphyxia and septicemia were the common etiology for respiratory distress. Mortality was very high in RDS and septicemia.

Key Words: Respiratory distress, Transient tachypnoea of newborn (TTN), respiratory distress syndrome (RDS), Prematurity

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Introduction:

Respiratory distress is one of the commonest problem encountered within the first 48-72 hours of life. It occurs in approximately 0.96%-6% of live births, and is responsible for about 20% of neonatal mortality¹. The causes of respiratory distress in neonates include transient tachypnea of newborn (TTN), respiratory distress syndrome (RDS), meconium aspiration syndrome, congenital pneumonia, congenital heart

disease (CHD), perinatal asphyxia (PA), and congenital anomalies as tracheo-oesophageal fistula, and congenital diaphragmatic hernia². The aim of the study was to identify the etiology of respiratory distress among the admitted newborns in special care baby unit (SCABU) in BIRDEM General Hospital and to observe the immediate hospital outcome of these babies.

Methods

This retrospective study was carried out at SCABU, BIRDEM General Hospital during January to December 2011. Patients who were admitted with respiratory distress during first 3 days of life were included in the study and babies with multiple congenital malformations were excluded. Respiratory distress in newborn was defined by the presence of one or more of the following: nasal flaring, chest retractions, tachypnoea (respiratory rate > 60/minutes) and grunting. Diagnosis was done within 24 hours of admission according to their clinical presentation and relevant investigations. Data were collected from patient's hospital records who were admitted in SCABU.

Mode of delivery, place of delivery, APGAR score, clinical examination data on admission including weight, sex,

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gestational age was assessed by modified Ballard score, vital signs, respiratory distress were recorded. Data regarding use of mechanical ventilation, Bubble CPAP or required only oxygen were recorded. Problem during hospital stay and immediate hospital outcome of all cases were also recorded. Statistical analysis was performed using the commercial statistical software Epi info version 3.5.

Results

Total 562 neonates were admitted during the studied period, 192 cases were admitted due to respiratory distress, representing 34.1% of all cases. Among them, two third (64.5%) were male with a male to female ratio 1.8:1. One third (34.3%) babies referred from other hospital or clinics of Dhaka city and from different corner of Bangladesh. One hundred and sixty two babies were delivered by caesarian section (c/s) and 30 cases by normal delivery. Majority (65.6%) were preterm. Mean gestational age was 34.6 ± 3.1 wks (range - 26 to 39 weeks). Mean weight was 2347 ± 886 gm (range - 690 to 4600 gm). Eighty five (44.2%) babies had normal birth weight, 7 (3.6%) were macrosomic (weight >4000gm), 60 (31.2%) were low birth weight, 24 (12.5%) were very low birth weight, 16 (8.3%) were extreme low birth weight babies. Majority of them (80.7%) were appropriate for gestational age (AGA).

In this study, transient tachypnoea of newborn (42.7%), respiratory distress syndrome (27.6%), perinatal

asphyxia (25%), septicaemia (16.1%), congenital pneumonia (11.9%) and congenital heart disease (CHD) (10.4%) were found common causes of respiratory distress. Surgical causes and meconium aspiration syndrome (MAS) were found as causes of respiratory distress in 2% and 1.5% respectively (Table -I).

Table I

Showing causes of respiratory distress of studied newborn

Disease	Number	Percentage
TTN	83	43.2%
RDS	58	30.2%
Perinatal asphyxia	48	25%
Septicaemia	31	16.1%
Congenital pneumonia	23	11.9%
CHD	20	10.4%
MAS	3	1.5%
Surgical causes	4	2.0%

TTN - Transient tachypnoea of newborn, RDS – Respiratory distress syndrome, CHD – Congenital heart disease, MAS – Meconium aspiration syndrome

The gestational age, sex, weight, place and mode of delivery of patients according to common causes of respiratory distress are shown in Table II.

Table II

Showing gestational age, sex, weight, place and mode of delivery of patients according to common causes of respiratory distress

Criteria	TTN	RDS	Perinatal asphyxia	Septicaemia	Cong.Pneumonia	CHD	
Male: female	2.2: 1	1.9: 1	1.8: 1	1.2: 1	1.3: 1	0.01: 1	
Term	n (%)	37 (45.1)	01 (1.7)	21 (43.7)	6 (19.3)	9 (39.1)	7 (35)
Preterm	n (%)	45 (54.8)	57 (98.2)	27 (56.2)	25 (80.6)	14 (60.8)	13 (65)
Mean gestational age (weeks) ± SD	36.3 ± 1.28	30.9 ± 2.7	34.4 ± 3.81	34.9 ± 2.98	35.8 ± 2.05	35.4 ± 2.03	
Mean weight (grams) ± SD	2883 ± 651	1403 ± 505	2145 ± 852	1890 ± 854	2534 ± 626	2434 ± 983	
C/S	n (%)	76 (92.6)	41 (70.6)	35 (72.9)	25 (80.6)	18 (90)	
NVD	n (%)	6 (7.3)	17 (29.3)	13 (27.0)	6 (19.3)	3 (13.0)	2 (10)
Inborn	n (%)	73 (89.0)	26 (44.8)	29 (60.4)	11 (35.4)	9 (39.1)	13 (65)
Outborn	n (%)	9 (10.9)	32 (55.1)	19 (39.5)	20 (64.5)	14 (60.8)	7 (35)

All cases required oxygen initially by head box, subsequently assisted ventilation was required in 56 (29.1%) cases, like mechanical ventilation 48 (25%) and bubble CPAP 8(4.1%).

Among the study subjects, 32 (16.7%) neonate died. Mortality was highest in neonate with RDS (71.8%) followed by septicaemia (40.6%) and perinatal asphyxia (37.3%). Mortality was high (56.2%) in those who required mechanical ventilation.

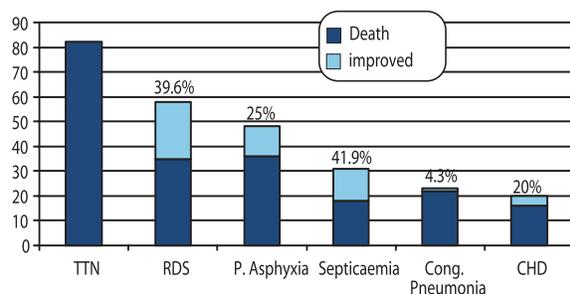


Fig.-1 : Showing outcome of common causes of respiratory distress

Discussion

Respiratory distress, the most common cause for which baby needed intensive care support and death rate was 2-4 times more in this group of patients than those required admission without respiratory distress³. In the present study, neonate admitted due to respiratory distress during the study period were 34.1% and most common causes of respiratory distress found were TTN, RDS, Perinatal asphyxia, Septicaemia, Congenital Pneumonia and Congenital Heart Disease. A study in a referral hospital of India also showed the incidence of respiratory distress 29.28% among all newborn admission, which is similar to our finding⁴.

TTN was the commonest (42.7%) cause of respiratory distress in our study. In many study, TTN was found to be the commonest cause which was consistent with our study^{5,6}. Among the neonates with TTN 55% were term and their mean Gestational age was 36.3 weeks, and their mean weight was 2893gm. Majority (92.6%) were delivered by C/S. Different studies showed cesarean section, term babies and male predominance to be associated with TTN^{7,8}. In this study similar result was found but more than half of the TTN cases were near term baby but their birth weight was normal. A large number of neonates admitted were Infant of diabetic mother (IDM) in this hospital. To avoid complications

like intra uterine death, C/S is done at near term of gestation. Therefore, in this study TTN was common in near term babies. Assisted ventilation in the form of bubble CPAP (bCPAP) was required in 3.5% cases without any mortality. Zaazou MH et al. found 37.9% neonates had respiratory distress due to TTN among them 11.5% cases required nasal CPAP with no mortality⁷. Many other studies also reported cases with TTN requiring assisted ventilation without any mortality^{6,9}.

RDS is an important cause of respiratory distress in our set up and also was the second common cause in our study. It constituted 30.2% of cases. Majority (98%) were preterm with mean gestational age 30.9 weeks and mean weight of 1403gram. One study showed that RDS was the second commonest cause of respiratory distress which constituted 31%, like our finding⁷. In many other studies showed low percentage (2-7%) of RDS^{6,10,11}. As this is a tertiary referral and diabetic hospital, number of RDS cases was high due to referral from other hospital and also many cases of IDM admitted in this unit. Assisted ventilation was required for the management of RDS, in the form of bCPAP and mechanical ventilation in 7.1% and 57.1% cases respectively. Mortality was 65.6% among the ventilated baby who required mechanical ventilation while no death observed who required bCPAP. One study showed that 83.2% cases of RDS required ventilator support and mortality rate was 76.0% who put on IMV mode⁷.

Perinatal asphyxia still remains one of the major cause of neonatal respiratory distress^{12,13}. Perinatal asphyxia was the third common (25%) cause of respiratory distress in this study. Their mean gestational age 34.4 weeks and mean weight 2145 grams. Nessa L et al found 52% newborn had respiratory distress who had perinatal asphyxia¹⁰ which is much higher than our study but on the contrary, many other study showed low incidence of perinatal asphyxia^{4,6,7}.

In this study, among all cases with respiratory distress, mechanical ventilation was required in 37.7% cases and bCPAP required in 5.3% cases. There was no death who required bCPAP but mortality rate was 40% among the babies who required mechanical ventilation. One study reported that mortality was high (80%) in perinatal asphyxia who required mechanical ventilation⁷. Lawn et al. reported that mortality rate in cases of perinatal asphyxia is as high as 25-50%¹⁴.

Neonatal sepsis is an important and common cause of neonatal morbidity and mortality^{15,16,17}. We found septicaemia as the fourth common (16.1%) cause of respiratory distress in this study. Majority (80.6%) of them were preterm, mean gestational age was 33.1 weeks and mean weight was 1890 grams. More than half of these babies (54.8%) required assisted ventilation in the form of mechanical ventilation (48.3%) and bCPAP (6.45%). Among these babies, majority (80%) died who required mechanical ventilation but no death was observed who required bCPAP. One study reported that case fatality rate is 33.3% in the cases with neonatal sepsis¹⁰. Congenital pneumonia was found in 11.9% cases. More than half (60.8%) were preterm mean gestational age was 35.8 weeks. Dutta A et al found pneumonia as the second common cause of respiratory distress in his study⁶, where in most cases it was part of septicaemia and 34.28% was primary pneumonia. In another study, pneumonia was found to be a cause of respiratory distress in 8% cases¹⁰, which is near to our finding. Mechanical ventilation and bCPAP were required in 26% and 8.6% cases respectively among these babies. Mortality was 12.5% among the cases who required mechanical ventilation but no death was observed in cases required bCPAP.

Conclusion

Respiratory distress is the commonest problem encountered in neonatal ICU. Most common causes of respiratory distress are TTN, RDS, perinatal asphyxia and septicaemia. Mortality was very high in neonates with RDS and septicaemia and in neonates who required mechanical ventilation. Prevention of preterm delivery and appropriate management of RDS may reduce neonatal mortality.

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