

Clinical Profile of Respiratory Distress in Newborn

Ravindra Sonawane¹, Akshay Patil^{2*} and Sagar Sonawane³

¹Professor and Head, Department of Paediatrics, Dr. Vasant Rao Pawar Medical College Hospital and Research Centre, Nashik - 422003, Maharashtra, India; ravindra_sonawane2000@yahoo.com

²PG Resident, Department of Paediatrics, Dr. Vasant Rao Pawar Medical College Hospital and Research Centre, Nashik - 422003, Maharashtra, India; akshaypatil165@gmail.com

³Associate Professor, Department of Paediatrics, Dr. Vasant Rao Pawar Medical College Hospital and Research Centre, Nashik - 422003, Maharashtra, India; drsagarsonawane22@gmail.com

Abstract

Introduction: Pulmonary disorders represent one of the most common diagnoses in infants admitted to neonatal units. The clinical presentation of respiratory distress in the new born includes apnea, cyanosis, grunting, inspiratory stridor, nasal flaring, poor feeding, and tachypnea. Most cases are caused by transient tachypnea of the newborn, respiratory distress syndrome, or meconium aspiration syndrome, but various other causes are possible. **Objectives:** Study was performed to analyze clinical profile, risk factors and outcome in terms of mortality. **Methods:** Data was collected for 78 newborns included in the study with respiratory distress. General information, socioeconomic status, history and clinical examination were documented. Newborn with respiratory distress were shifted to NICU for further management. Time of onset of distress was documented and the severity of the distress was documented and the severity was assessed by using Silverman and Anderson clinical scoring. Duration of O₂ therapy, intervention done in the form of surgical/ventilator/surfactant therapy/treatment and mortality was documented to assess the clinical outcome against the final diagnosis. **Results:** It was seen that in 97.4% of the cases of newborn respiratory distress the cause was respiratory in origin. Majority of the newborns had severe respiratory distress (47.43%) and moderate respiratory distress (46.15%) compared to mild distress (6.4%). 100% of newborns with RDS was diagnosed with severe respiratory distress (5 out of 5) and 73.9% was with diagnosis of MAS (17 out of 23) had developed severe respiratory distress as compared to 29.8% of the neonates with respiratory distress with diagnosis of TTNB (14 out of 47). 55.5% of the newborns (30 out of 54) male babies developed severe respiratory distress compared to 33.3% (8 out of 24) female babies. **Interpretation and Conclusions:** Transient tachypnea of the newborn is the most common cause of respiratory distress in newborn. Almost 50% of newborn with respiratory distress develop severe respiratory distress which require intensive monitoring. Risk factors like high maternal age, primigravida mothers, Small for gestation age, birth weight less than 2.5Kg associated with severe respiratory distress in newborns.

Keywords: Neonate, Respiratory Distress

1. Introduction

Pulmonary disorders represent one of the most common diagnoses in infants admitted to neonatal units. Respiratory distress may vary from 7-8% amongst live births¹. The incidence varies from 30% among pre-

term's, 20% among post-terms to 4% in term babies². As expected, the incidence of respiratory disorders increases with decreasing gestational age and birth weight³. The clinical presentation of respiratory distress in the new born includes apnea, cyanosis, grunting, inspiratory stridor, nasal flaring, poor feeding, and tachypnea (more than

*Author for correspondence

60 breaths per minute). There may also be retractions in the intercostals, subcostal, or supracostal spaces. Most cases are caused by transient tachypnea of the newborn, respiratory distress syndrome, or meconium aspiration syndrome, but various other causes are possible (Table 1).

Transient tachypnea of the new born is the most common cause of neonatal respiratory distress, constituting more than 40% of cases⁴, it occurs when residual pulmonary fluid remains in fetal lung tissue e after delivery. When fluid persists, transient tachypnea of the newborn can result. Risk factors include maternal asthma⁵ male sex, macrosomia, maternal diabetes⁶ and cesarean delivery⁷.

Respiratory distress syndrome of the newborn, also called hyaline membrane disease, is the most common cause of respiratory distress in premature infants, correlating with structural and functional lung immaturity. It is most common in infants born at fewer than 28 weeks' gestation and affects one third of infants born at 28 to 34 weeks' gestation, but occurs in less than 5% of those born after 34 weeks' gestation⁸. Hyaline membranes form through the combination of sloughed epithelium, protein, and edema. Persistent respiratory distress syndrome leads to bronchopulmonary dysplasia.

Table 1. Causes of respiratory distress

Pulmonary	Extra-Pulmonary
Transient tachypnea of newborn	Cardiac failure
Hyaline membrane disease	Anemia, Polycythemia
Meconium aspiration syndrome	Septicemia
Pneumonia	Metabolic disorders
Pneumothorax	Renal failure, renal tubular acidosis
Congenital lung cysts	Meningitis/intracranial bleed
Diaphragmatic hernia	Ascites
Choanal atresia	
Laryngeal web/ polyp	

Meconium stained amniotic fluid occurs in approximately 15 percent of deliveries, causing meconium aspiration syndrome in the infant in 10 to 15 percent of those cases⁹. Meconium passage may represent hypoxia or fetal distress in utero.

Bacterial infection is another possible cause of neonatal respiratory distress. Common pathogens include group B streptococci (GBS), *Staphylococcus aureus*, *Streptococcus pneumoniae*, and gram-negative enteric rods. Prevention of GBS infection through universal screening and antepartum treatment reduces rate of disease, including pneumonia and sepsis, by 80 percent¹⁰.

Certain congenital malformations can lead to respiratory distress; these include pulmonary hypoplasia, congenital emphysema, esophageal atresia, and diaphragmatic hernia. Congenital heart disease also may be implicated.

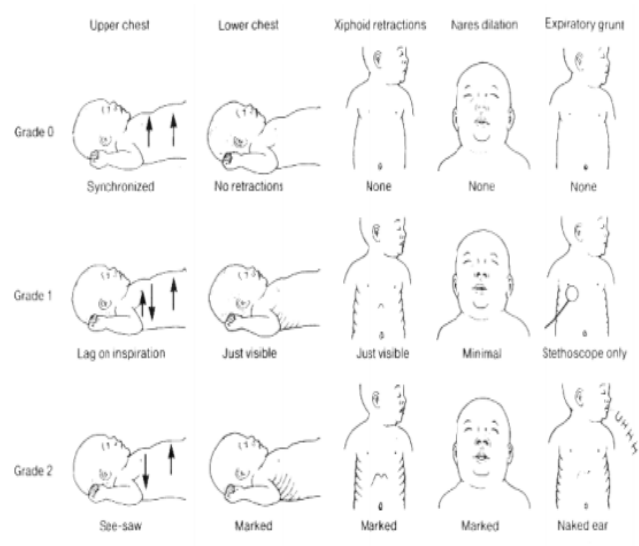


Figure 1. Method of assessing severity of Respiratory distress.

(Figure 1). Silverman and Anderson retraction score 100% of newborns with RDS was diagnosed with severe respiratory distress (5 out of 5) and 73.9% was with diagnosis of MAS (17 out of 23) had developed severe respiratory distress as compared to 29.8% of the neonates with respiratory distress with diagnosis of TTNB(14 out of 47) (Table 3). It was seen that in 97.4% of the cases of newborn respiratory distress the cause was respiratory in origin (Table 2). There was one case of diaphragmatic hernia & one case of Congenital heart disease (Acyanotic CHD, VSD, ASD, moderate PAH, heart failure). 69.56% of the newborns (15 out of 23) with duration of respiratory distress more than 24 hours developed severe respiratory distress (Table 4). 55.5% of the newborns (30 out of 54) male babies devel-

oped severe respiratory distress compared to 33.3% (8 out of 24) female babies. 8.69% patients (2 out of 23) of Meconium aspiration syndrome and 40% patients (2 out of 5) of Respiratory distress syndrome died (Table 5).

2. Methods

Data was collected for all newborns included in the study with respiratory distress. General information, socioeconomic status, history and clinical examination findings of mother and newborn was documented. Newborn with respiratory distress were shifted to NICU for further management. Time of onset of distress was documented and the severity of the distress was documented and the severity was assessed by using Silverman & Anderson clinical scoring. Depending on the clinical diagnosis of respiratory distress, relevant investigations were sent and newborns were managed as per protocol. Duration of O₂ therapy,

intervention done in the form of surgical/ventilator/surfactant therapy/treatment and mortality was documented to assess the clinical outcome against the final diagnosis.

Methods of assessing severity of Respiratory distress¹¹ (Figure 1).

Table 2. Etiology of respiratory distress

Etiology	Frequency n=78
Respiratory	76
Cardiac	1
Diaphragmatic hernia	1

3. Discussion

In the present study out of 78 cases identified with respiratory distress, 97.4% were respiratory in origin. 47.43% of the newborn had severe respiratory distress while 46% had moderate respiratory distress and 6.4% had mild

Table 3. Final diagnosis versus severity of respiratory distress

Final Diagnosis	Severity Respiratory Distress		Total
	Mild & Moderate	Severe	
Transient tachypnea of newborn (TTNB)	33 (70.21%)	14 (29.79%)	47 (60.25%)
Meconium Aspiration Syndrome (MAS)	6 (26.09%)	17 (73.91%)	23 (29.48%)
Respiratory Distress Syndrome (RDS)	0 (0%)	5 (100%)	5 (6.41%)
Acyanotic Congenital Heart disease (ACHD)	0 (0%)	1 (100%)	1 (1.3%)
Congenital diaphragmatic Hernia (CDH)	0 (0%)	1 (100%)	1 (1.3%)
Sepsis	1 (100%)	0 (0%)	1 (1.3%)
Total	40 (51.28%)	38 (48.72%)	78 (100%)

Table 4. Duration of respiratory distress versus severity of respiratory distress

Duration	Frequency n=78	Severe Distress N=38	Percentage
<24 hours	55	22	40
>24 hours	23	16	69.56

Table 5. Mortality

Final diagnosis	Frequency n=78	No of death
Transient Tachypnea of Newborn (TTNB)	47	0
Meconium Aspiration Syndrome (MAS)	23	2
Respiratory Distress Syndrome (RDS)	5	2
Acyanotic Congenital Heart disease (ACHD)	1	0
Congenital Diaphragmatic Hernia (CDH)	1	0
Sepsis	1	0

respiratory distress. The commonest cause for respiratory distress was Transient tachypnoea of Newborn (60.25%) followed by Meconium Aspiration Syndrome (29.48%) and RDS (6.4%). The only surgical cause for respiratory distress in the present study was CDH (1%). 71.4% of the newborns (5 out of 7) with the onset of respiratory distress after 6 hours of birth developed severe distress compared to 44.8 % (26 out of 58) & 53.8% (7 out of 13) newborn with onset of respiratory distress at birth and between 0-6 hours of birth respectively. Similar results were seen in a study done by Michal Rygl the onset of respiratory distress with the survival rate and found that neonates which were diagnosed with the onset of respiratory distress at birth survived in 89%, those with the onset between 2-6 hours survived in 75.4%, while neonates with the onset of respiratory distress after 6 hours survived 45.3 %.¹² In our study majority (61.5%) required O₂ less than 24 hours which implied O₂ requirement depends on the severity of respiratory distress. Gabriel. J studied the neonates born with respiratory distress requiring supplemental oxygen and it was seen that 8% required supplemental oxygen for at least an hour¹². Surgical intervention was done in one case of Congenital Diaphragmatic Hernia. The baby with CDH was operated within 48 hours and required ventilatory care post operative day. There were four mortalities seen in our 78 newborn with respiratory distress. In the present study it was seen that 91.66% of the newborns (11 out of 12) born to mothers with maternal age >30 developed severe respiratory distress compared to 57.89 % (11 out of 19) and 34.04% (16 out of 47) newborns born to mothers below 21 years and between 22-30 years respectively. In the present study 62.5% of the newborns (20 out of 32) born to Primigravida mothers developed severe respiratory distress when compared to 42.3% (11 out of 26) & 35% (7 out of 20) newborns born to 2nd and 3rd Gravida and multigravida 57.69% of the newborns (30 out of 52) born to mothers who had more than 4 Pervaginal examinations had severe respiratory distress compared to 30.76% (8 out of 26) born to mothers who had less than 4 per vaginal examinations. Dani *et al.*,¹³ has shown that the number of PV examination above 4 was significantly associated with respiratory distress. 70% of newborns (21 out of 30) born to mothers with meconium stained liquor developed severe respiratory distress compared to 35.41% of the newborns (17 out of 48) born to mother with clear liquor. 49.15% of newborns (29 out of 59) born by cesarean section developed severe respiratory distress compared to 47.36% of the newborns (9 out of 19) born

by normal vaginal route. In the present study it was seen that 84.21% of newborns (16 out of 19) with SGA developed severe respiratory distress compared to 62.5% (5 out of 8) and 33.3% (17 out of 51) newborns with LGA and AGA respectively. In the present study it was seen that 53.57% of newborns (30 out of 56) with 1 min apgar of less than 7 developed severe respiratory distress compared to 36.36% (8 out of 22) with 1 min apgar more than 7 In the present study it was seen that 57.15% of the newborns (12 out of 21) with birth weight of < 2.5 Kgs had developed severe respiratory distress compared to 49.01 % (25 out of 51) and 16.67% (1 out of 6) with birth weight of 2.5 -3.5 Kgs and >3.5kgs respectively. In the present study it was seen that 55.5% of the newborns (30 out of 54) male babies developed severe respiratory distress compared to 33.3% (8 out of 24) female babies. M. Lureti,¹⁴ shows the frequency of neonatal respiratory distress was higher in males than compared with females.

4. Conclusion

Transient tachypnea of the newborn is the most common cause of respiratory distress in newborn. Almost 50% of newborn with respiratory distress develop severe respiratory distress which require intensive monitoring. Risk factors like high maternal age, primigravida mothers, more than 4 per vaginal examinations, meconium stained liquor, cesarean delivered newborns, Small for gestation age, and 1 min Apgar score less than 7, birth weight less than 2.5Kg and male sex of newborn were associated with severe respiratory distress in newborns. Clinical assessment of severe respiratory distress against its onset and duration will help in early diagnosis. Immediate clinical outcome of newborn respiratory distress in term of mortality rate is variable and depends on the cause of newborn distress.

5. References

1. Edwards MO, Kotecha SJ, Kotecha S. Respiratory distress of the term newborn infant. *Paediatr Respir Rev.* 2013; 14(1):29–36 <https://doi.org/10.1016/j.prrv.2012.02.002> PMID:23347658
2. Bonafe L, Rubaltelli FF. The incidence of acute neonatal respiratory disorders in Padova county: An epidemiological survey. *Acta Paediatr.* 1996; 85:1236–40. <https://doi.org/10.1111/j.1651-2227.1996.tb18236.x> PMID:8922091
3. Chard T, Soe A, Costeloe K: The risk of neo- natal death and respiratory distress syn- drome in relation to birth weight

- of preterm infants. *Am J Perinatol*. 1997; 14:523–6. <https://doi.org/10.1055/s-2007-994327> PMID:9394160
4. Kumar A, Bhat BV. Epidemiology of respiratory distress of newborns. *Indian J Pediatr*. 1996; 63:93–8. <https://doi.org/10.1007/BF02823875> PMID:10829971
 5. Demissie K, Marcella SW, Breckenridge MB, Rhoads GG. Maternal asthma and transient tachypnea of the newborn. *Pediatrics*. 1998; 102(1 pt 1):84–90. <https://doi.org/10.1542/peds.102.1.84> PMID:9651418
 6. Persson B, Hanson U. Neonatal morbidities in gestational diabetes mellitus. *Diabetes Care*. 1998; 21(suppl2):B79–84. PMID:9704232
 7. Levine EM, Ghai V, Barton JJ, Strom CM. Mode of delivery and risk of respiratory diseases in newborns. *Obstet Gynecol*. 2001; 97:439–42. [https://doi.org/10.1016/S0029-7844\(00\)01150-9](https://doi.org/10.1016/S0029-7844(00)01150-9) PMID:11239653
 8. Respiratory distress syndrome of the newborn fact sheet. American Lung Association; 2006. Available at: <http://www.lungusa.org/site/pp.asp?c=dvLUK9O0E&b=35693>
 9. Cleary GM, Wiswell TE. Meconium-stained amniotic fluid and the meconium aspiration syndrome. An update. *Pediatr Clin North Am*. 1998; 45:511–29. [https://doi.org/10.1016/S0031-3955\(05\)70025-0](https://doi.org/10.1016/S0031-3955(05)70025-0)
 10. Schrag S, Gorwitz R, Fultz-Butts K, Schuchat A. Prevention of perinatal group B streptococcal disease. Revised guidelines from CDC. *MMWR Recomm Rep*. 2002; 51(RR-11):1–22. PMID:12211284
 11. Benhke ML. Patient assessment-textbook of neonatal and pediatric respiratory care; p. 26–33.
 12. Rygal M. Neonatal respiratory distress syndrome: an autopsy study of 190 cases. *Indian J Pediatr*. 1985; 52:43–6. <https://doi.org/10.1007/BF02754717>
 13. Dani C, Reali MF, Bertini G. Risk factors for the development of respiratory distress syndrome and transient tachypnea in newborn infants. Italian Group of Neonatal Pneumology. *Eur Respir J*. 1999; 14(1):155–159.
 14. Lureti M. Risk factors for respiratory distress syndrome in the newborn: A multicenter Italian survey. *Acta Obstetrica et Gynecologica Scandinavica*. 1993; 72(5):359–64. <https://doi.org/10.3109/00016349309021113>