

Early Neonatal Morbidities of Late Preterm Neonates Admitted to SNCU in the Government District Hospital

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Abstract

Introduction: The rate of preterm birth is increasing worldwide primarily at the expense of late preterm newborns. Late preterm infants are the fastest growing sub group of neonates and constitute approximately 75% of all preterm birth since 2009. The birth rate of late preterm newborns has increased by 25% from 1990 to 2005 in the United States. **Methodology:** Details regarding maternal risk factors were collected by detailed history taking and the medical records with them. The infants in the sample were followed throughout their stay in the SNCU and postnatal wards, up until hospital discharge. Data were collected from infants and mothers medical records and supplemented with additional information collected at discharge using a structured form covering the variables of interest. **Results:** Hyperbilirubinaemia, Sepsis, Birth asphyxia and respiratory distress constitute the major neonatal morbidities which accounts for 68%, 68%, 41% & 34% respectively. **Conclusion:** Rate of re hospitalization is high in late preterm neonates.

Keywords: Preterm; Hyperbilirubinaemia; Sepsis; Birth Asphyxia.

Introduction

Premature infants are defined as those born before 37 weeks of gestation (259 days from the first day of the mother's last menstrual period) [1]. It is well known that prematurity places infants at an increased risk for morbidities like HMD, IVH, PDA, feeding difficulties, NEC, hypothermia, hypoglycemia, hyperbilirubinaemia, sepsis and death as compared with term infants [2-5].

Babies born at 35 and 36 weeks comprise 7% of all live births and 58.3% of all premature infants in the United States [2]. Much less is known about this subset of more "mature" premature infants. Most of the data in the literature focus on premature babies that are less than 33 weeks of gestation. Late preterm infants refer to those born between 34 weeks (340/7) and less than 37 completed weeks (366/7). [1].

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Infants born late preterm may be similar to term infants (37 to 41 completed weeks gestation) in appearance, weight and size and compared with preterm infants born at earlier gestations, they are generally healthier. However, late preterm infants are developmentally and physically immature compared with term infants. Consequently, they are at increased risk for medical complications and mortality, especially during the first week after birth [2,3].

Infants born at 340/7 through 366/7 weeks' gestation or "late-preterm" infants, are often the same size and weight of some term infants (born at 370/7-416/7 weeks' gestation). Because of this fact, late preterm infants may be treated by parents, care givers and healthcare professionals as though they are developmentally mature and at low risk of morbidity. They are often managed in the new born level 1 (basic) nurseries or remain with their mother after birth [4].

The rate of preterm birth is increasing worldwide primarily at the expense of late preterm newborns. Late preterm infants are the fastest growing sub group of neonates and constitute approximately 75% of all preterm birth since 2009. The birth rate of late preterm newborns has increased by 25% from 1990 to 2005 in the United States [5]. The incidence of medical problems, either short-term or long-term, is higher among late preterm infants than term infants. Because late preterm infants comprise the majority of preterm

newborns, caring for such large populations who are prone to have unfavorable out come scan exert a profound impact on the society. This study focused on health facet so flat epreterm infants to understand the significant public health problem better and re-evaluate our Obstetric and neonatal practices [5].

Methodology

All late preterm babies (34^{0/7} weeks - 36^{6/7} weeks) admitted to SNCU in Government District Hospital who meet the inclusion criteria for a period of five months .

Gestational age was assessed by Modified Ballard score Among preterm, late preterm (34^{0/7} -36^{6/7} weeks) were selected after taking consent from parents. If neonate is admitted after 2 days of life, gestational age will be assessed from LMP date and ultrasonography evidence. For hypothermia, hypoglycemia, hyperbilirubinemia, respiratory insufficiency, birth asphyxia, sepsis, feed intolerance well established definitions were used. Regarding rehospitalisation, duration considered was within one month of age.

Details regarding maternal risk factors were collected by detailed history taking and the medical records with them. The infants in the sample were followed throughout their stay in the SNCU and postnatal wards, up until hospital discharge. Data were collected from infants and mothers medical records and supplemented with additional information collected at discharge using a structured form covering the variables of interest. Variables relating to the mothers and their infants were analyzed.

The maternal and gestational variables studied were: Age (years), number of pregnancies, prior history of miscarriages, still births and premature deliveries; type of delivery (normal or caesarean); previous caesarean section, intercurrent clinical conditions observed during gestation – diabetes, hypertension, anemia, urinary infections at any point during pregnancy, syphilis, human immunodeficiency virus (HIV), toxoplasmosis, heart disease, hepatitis B, premature rupture of membranes (PROM) for longer than 18 hours, placental abruption.

The neonatal variables studied were: Age at admission, days in hospital, sex, birth weight; gestational age (Calculated from modified Ballard's scoring); hypothermia/ hyperthermia (hypothermia: body temperature below 36°C, hyperthermia: temperature above 37.5 °C); hypoglycemia (glucose

below 40 mg/dL); hyperbilirubinemia requiring phototherapy/exchange transfusion; feed intolerance; respiratory pathologies – transient tachypnea of the newborn (TTN), hyaline membrane disease (HMD), pneumonia, sepsis, interventions done, deaths, rehospitalizations.

Inclusion Criteria

All late preterm babies (34^{0/7} weeks to 36^{6/7} weeks) admitted to SNCU and postnatal wards for a period of Five months.

Exclusion Criteria

1. Late preterm babies of parents who have not given consent.
2. Late preterm babies who had surgical conditions, congenital malformations, genetic disorders, metabolic disorders other than hypoglycaemia (suspected IEM), babies of multiple gestation.

Results

Among 100 neonates, 53 neonates had probable sepsis which accounts for about 53%. 15 of the neonates had culture proven sepsis which accounts for about 15%. Among 100 neonates, 13 neonates did not require any interventions which accounts for about 13%. 16 of the neonates required Oxygen which accounts for about 16%. 35 of the neonates required phototherapy which accounts for about 35%. 36 neonates required more than two interventions like Ventilation, inotropes, surfactant, cpap and one neonate required exchange transfusion.

Regarding duration of hospital stay, 22 neonates required <3days hospital stay which accounts for about 22%, 30 neonates required duration of 4 to 7 days which accounts for about 30%. 33 neonates required 7 to 14 days of hospital stay which accounts for about 33%. 15 neonates required >14 days of hospital stay which accounts for about 15%.

Among 100 neonates, 77 neonates were discharged after treatment which accounts for about 77% and 23 neonates died during hospital stay which accounts for about 23%. Among admitted neonates 87 of them required some medical Interventions which accounts for about 87% [13]. Neonates didn't require any active medical intervention which accounts for about 13%.

Table 5 shows, hyperbilirubinaemia, Sepsis, Birth asphyxia and respiratory distress constitute the major

Table 1: Sepsis of patients studied

Sepsis	No. of patients	%
Absent	32	32
Culture proven sepsis	15	15
Probable sepsis	53	53
Total	100	100

Table 2: Intervention done

Intervention done	No of patients(n=100)	%
Nil	13	13
Oxygen	16	16
Phototherapy	35	35
More than two interventions	36	36

Table 3: Duration of hospital stay in days

Duration of hospital stay	No. of Patients	%
<3	22	22
4-7	30	30
7-14	33	33
>14	15	15
Total	100	100

Table 4: Outcome of patients studied

Outcome	No. of Patients	%
Discharged	77	77
Death	23	23
TOTAL	100	100

Table 5: Overall Morbidities

Morbidities	No. of Patients	%
Hyperbilirubinaemia	68	68
Respiratory Distress	34	34
Sepsis	68	68
Feed intolerance	19	19
Hypothermia	16	16
Birth asphyxia	41	41
Hypoglycemia	26	26
AOP	24	24

Table 6: Comparison with a Leone et. al. study

Morbidity	A Leone et. al. ⁶	Present Study
Hyperbilirubinemia	47.7%	68%
Respiratory distress	34.7%	34%
Hypoglycemia	14.3%	26%
Hypothermia	2.5%	16%
Feed intolerance	8.3%	19%
Oxygen dependency	16.6%	16%

Table 7: Comparison with Margreet J. Teune et. al. study

Morbidity	Margreet J Teune et. al. ⁷	Present study
Pneumonia	2.2%	2%
Hyperbilirubinemia	23.5%	68%
Sepsis	20.06%	68%
RDS	5.3%	34%
TTN	3.5%	2%
Hypoglycemia	7.1%	16%
Hypothermia	1.5%	19%
Feed intolerance	34%	24%
Apnea	0.87%	24%

neonatal morbidities which accounts for 68%, 68%, 41% & 34% respectively.

Discussion

In both the study, hyperbilirubinemia followed by respiratory distress constitute the most common neonatal morbidity in late preterm babies. Morbidity of hypoglycaemia is comparable in both the studies. In the present study morbidity related to hypothermia, Oxygen dependency, mechanical ventilation is high compared to Leone et al. This can be explained by the fact of being a tertiary centre with most of critically sick cases referred from distant places and hospitals without proper neonatal transport facility.

Margreet J. Teune et al, in 2011 conducted a study- "A systemic review of severe morbidity in infants born late preterm". In that an electronic search was conducted for cohort studies published from January 2000 through July 2010. They identified 22 studies studying 29,375,675 infants. They concluded that compared with infants born at term, infants born late preterm were more likely to suffer poorer short-term outcomes such as respiratory distress syndrome, intraventricular hemorrhage, hyperbilirubinemia, sepsis, feeding difficulty and death. Beyond the neonatal period, late preterm infants were more likely to die in the first year and to suffer from cerebral palsy. They concluded that although the absolute incidence of neonatal mortality and morbidity in infants born late preterm is low, its incidence is significantly increased as compared with infants born at term.

In the present study morbidities related to sepsis, hypoglycemia, feed intolerance, are comparable with the above study. Higher morbidity related to hypothermia in the present study can be explained by the time lag while transportation of these neonates to our hospitals. Number of late preterm neonates requiring mechanical ventilation was also high in the present study due to more RDS, sepsis and birth asphyxia cases referred to our hospitals of which most of them required mechanical ventilation. In the present study neonatal hyperbilirubinemia was high. This can be explained by the fact being tertiary centre

most of the cases are referred exclusively for phototherapy and most of the cases are sick. There will also be delay in initiation of enteral feeds which will further exaggerate the hyperbilirubinaemia.

Ashish Jaiswal et al. did a study "Early Neonatal Morbidities in Late Preterm Infants" in 2010 From Fernandez Hospital, Hyderabad. It's a prospective cohort study in which they compared early neonatal morbidity in late preterm infants with term infants. 363 late preterm infants and 2707 term infants were included in the study. The study concluded compared with term infants, late preterm infants were at 5.5 times higher risk for overall morbidity due to any cause, 7.5 times higher risk for respiratory morbidity, 4.2 times higher risk for ventilation (noninvasive or invasive), 3.4 times higher risk for jaundice, and 4.5 times and 3.2 times higher risk for hypoglycemia and probable sepsis, respectively [8].

Ashish Jaiswal et al. found, neonatal jaundice requiring phototherapy (55.1%) followed by respiratory morbidity (10.5%) were the frequently identified morbidities in late preterm infants. In the present study also neonatal jaundice requiring phototherapy followed by Probable Sepsis forms the first two major morbidities identified. Rate of sepsis is high compared in the present study compared to the above study which can be explained by the fact as most of the sepsis cases were referred in view of tertiary care center. In most of the neonates ventilated in the present study was with respiratory distress, severe sepsis and severe birth asphyxia who forms the major number and being referral center most of the neonates admitted were very sick at the time of admission.

Osama Abu-Salah, in 2010 did a study in Neonatal Unit, Queen Alia Military Hospital, Amman, Jordan, to determine the impact of late preterm birth on neonatal morbidity and neonatal unit admissions compared to full term babies. They concluded late preterm infants are at higher risk of morbidity and hospitalization than term infants. Treating late preterm infant as almost term and almost normal infants should be avoided. In that study respiratory distress was found in 13.8%, hyperbilirubinaemia was seen in 10.7%, sepsis was seen in 30.8%. hypoglycemia was seen in 14.2% [10].

Table 8: Comparison with Ashish Jaiswal et. al. study

Morbidity	Ashish Jaiswal et. al. ⁹	Present study
Anymorbidity	70.8%	-
Hyperbilirubinemia	55.1%	68
Respiratory distress	10.5%	34
Probable sepsis	4.1%	53
Confirmed sepsis	1.1%	15
Hypoglycemia	8.8%	26

Nir Melamed et al, did a retrospective study of all spontaneous, low-risk latepreterm deliveries (34^{0/7} to 36^{6/7} weeks of gestation) during the years 1997 to 2006 (n_2,478). Multiple gestations and pregnancies complicated By pre term premature eruption of membranes (PROM) or maternal or fetal complications were excluded.

They concluded latepretermaturity is associated with significant neonatal morbidity in cases of spontaneous low risk singleton deliveries. This information is important for appropriate counseling and should stimulate efforts to decrease the rate of latepreterm deliveries [11].

In addition to feeding problems caused by neonatal pathologies, the immaturity of preterms' gastrointestinal tracts and the consequent lack of coordination of suction and deglutition mechanisms are often barriers to establishing successful breast feeding, which in turn leads to excessive weight loss and dehydration during the first days of life. In the present study feed intolerance is seen in 19%.

This is comparable with study conducted by Margreet J. Teune et al. In that study feeding problem is observed in 34% of the latepreterms and the feeding problems decreases with the increasing gestational age.

In the present study majority of late preterm neonates (33%) required prolonged hospital stay of more than 7 days.

During hospital stay most of the neonates required intravenous infusions, antibiotics and were subjected to blood investigations for sepsis. Risk of death was nine times greater for late preterms than for full term babies. Studies have reported risks of death ranging from 1.5 to 6.3 [12,13], which was comparable with the present study.

There were 23 deaths in our study which accounts for 23%. Tomashek et al. Conducted a study that showed that early neonatal mortality, late neonatal mortality and post neonatal mortality were respectively six, three and two times greater among latepreterms [64].

Ying Dong et al. in 2011 did a study "An overview of morbidity, mortality and long-term outcome of late preterm birth". They found the mortality in the early neonatal (age 0-6 days), late neonatal (age 7-27 days) and post neonatal (age 28-364 days) periods was 6, 3, and 2 times higher respectively in late preterm infants than term infants. During infancy, latepreterm infants were 3 times more likely to die than term infants.

Conclusion

In this study, analysis of the data shows that latepreterm neonates suffer a large number of inter current problems during the neonatal period, especially increased likelihood of resuscitation in the delivery room, hypothermia, hypoglycemia, jaundice requiring phototherapy, respiratory pathologies, sepsis, antibiotic use, feeding intolerance and mechanical ventilation contributing to a high neonatal mortality rate.

References

1. Stark AR. American Academy of Pediatrics, Committee on Fetus Newborn. Levels of neonatal care. *Pediatrics*. 2004;114:1341-1347.
2. Raju TNK, Higgins RD, Stark AR, et al. Optimizing care and outcome for late- preterm (near-term) infants: a summary of the workshop sponsored by the NICHD. *Pediatrics* 2006;118:1207-14.
3. Davidoff MJ, Dias T, Damus K, et al. Changes in the gestational age distribution among US singleton births: impact on rates of late preterm birth, 1992 to 2002. *Semin Perinatol*. 2006;30:8-15.
4. Mateus J, Fox K, Jain S, Jain S, Latta R, Cohen J. Preterm premature rupture of membranes: clinical outcomes of late-preterm infants. *ClinPediatr (Phila)*, 2010;49:60-65.
5. Buus-Frank ME. The great imposter. *Adv Neonatal Care* 2005;5(5);233:6.
6. Casey BM, McIntire DD, Leveno KJ. The continuing value of the Apgar score for the assessment of newborn infants. *New Engl J Med* 2001;344:467-71.
7. Teune MJ, Bakhuizen S, Gyamfi Bannerman C, et al. A systemic review of severe morbidity in infants born late preterm. *Am J Obstet Gynecol* 2011;205:374.e1-9.
8. Moster D, Lie RT, Irgens LM, Bjerkedal T, Markestad T. The association of Apgar score with subsequent death and cerebral palsy: A population based study in term infants. *J Pediatr* 2001;138:798-803.
9. Ashish Jaiswal, Srinivasmurki, pramodgaddam and anupamareddy, " Early Neonatal Morbidities in Late Preterm Infants" *Indian Pediatr* 2011;48;607:611
10. Osama Abu-Salah "Unfavourable outcomes associated with late preterm birth: observations from Jordan" *J PMA* 2011;61:769.
11. Raju TN, Higgins RD, Stark AR, Leveno KJ. Optimizing care and outcome for late-preterm (near-term) infants: a summary of the workshop sponsored by the National Institute of Child Health and Human Development. *Pediatrics* 2006;118:1207-1214.
12. Arpino C, Compagnone E, Montanaro ML, Cacciatore D, DeLuca A, Cerulli A, et al. Preterm birth and neuro

- developmental outcome: a review. Childs Nerv Syst 2010;26:1139-1149.
13. Adams-Chapman I. Neurodevelopmental outcome of the late preterm infant. Clin Perinatol 2006;33:947-964.
14. Inder TE, Warfield SK, Wang H, Hüppi PS, Volpe JJ. Abnormal cerebral structure is present at term in premature infants. Pediatrics 2005;115:286-294.

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