Original Paper

Morbidity and Mortality Outcome in Late Preterm Neonates at a Tertiary Care Hospital

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Abstract

Introduction: The morbidity and mortality in late preterm neonates is higher than term neonates. The main reason is the relative physical and neurologic immaturity, though there is no significant difference in the weight or the size of the two groups.

Objective: The study was conducted to compare the early neonatal morbidity and mortality (within first 7 days of life) in late preterm infants (34–36 6/7 weeks) with those in term neonates (37–41 6/7 weeks).

Materials and Methods: This was a prospective study conducted from 01 January 2015 to 30 June 2015 in the department of Neonatology at a tertiary hospital.

Results: Total 100 neonates were included in the study; fifty neonates in each group. Late preterm infants had significantly higher morbidity due to any cause, e.g. respiratory morbidity ($p<0.05$), jaundice ($p<0.05$), hypoglycemia ($p<0.05$), sepsis ($p<0.05$) and perinatal asphyxia ($p<0.05$). Early neonatal mortality in late preterm neonates was significantly higher than term neonates ($p<0.05$).

Conclusion: Late preterm neonates are at high risk for morbidity and mortality as compared to term neonates.

Key-words: preterm neonates, morbidity, mortality.

Introduction

Preterm birth rates are on the rise all over the world and continue to be the most important determinant of neonatal morbidity and mortality[1]. Preterm delivery can occur spontaneously or by obstetric intervention and may or may not be a result of pregnancy complications or preexisting maternal medical conditions[2]. In either case, infants who are born preterm are at an increased risk for newborn morbidity and mortality[3]. The morbidity and mortality pattern in late preterm infants is higher than term infants (gestational age ≥ 37weeks)[4]. The main reason behind that is the relative physiologic and metabolic immaturity, though there is no significant difference in the weight or the size of the two groups[5]. The late preterm infants are at twice to thrice increased risk of morbidities like hypoglycemia, poor feeding, jaundice, infection and re-admission rates after initial hospital discharge[6]. The infant mortality rate during first year of life for late preterm infants is on an average four-fold higher than that for term infants[7].

Late preterm infants– The American Academy of Pediatrics (AAP), American College of Obstetrics and Gynecology (ACOG) and National Center for Health Statistics (NCHS) define late preterm birth as the delivery of an infant from 34 weeks to 36 weeks and 6 days of gestation (i.e., 239 to 259 days after the first day of the LMP)[8]. They account for 9.1% of all births and three-quarter of all preterm births[9].

Apnea occurs more frequently among late preterm infants than term infants[10]. The incidence of apnea in late preterm infants is reported to be between 4% and 7% compared with 1% to 2% at term[11]. Immature liver glycogenolysis, hormonal dysregulation and inefficient hepatic glycogenesis and ketogenesis predispose preterm neonates for developing symptomatic hypoglycemia[12]. Also, late preterm infants have increased chances of developing hyperbilirubinemia because feeding difficulties predispose them to an increase in enterohepatic circulation, decreased stool frequency and dehydration[13]. Late preterm infants are also more vulnerable to develop various respiratory morbidities including transient tachypnea of the newborn, respiratory distress syndrome, pneumonia and pulmonary hypertension[14]. Most common factor responsible for late preterm birth is preterm labor (45%)[15]. Late preterm neonates have increased risk of

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mortality and morbidity. However, late preterm infants are more likely to develop problems such as respiratory distress, apnea, feeding intolerance, hyperbilirubinemia, hypoglycemia and hypothermia[16]. Moreover, the prevalence of these problems may be different in each country[17]. Therefore, determining the risk factors in these infants leads to more comprehensive preventive and treatment strategies[18]. Late preterm infants who have potentially higher risk for morbidity and hospitalization require closer monitoring and follow-up[19].

Materials and Methods

This prospective cohort study was conducted in the Neonatal ward at Sher-E-Bangla Medical College, Barisal in Bangladesh from 01 January 2015 to 30 June 2015. The objective of the study was to identify early neonatal morbidity and mortality (within first 7 days of life) in late preterm infants (34–36, 6/7 weeks) in comparison to those in term neonates. Inclusion criteria were both the late preterm neonates (34–36, 6/7 week gestation) and term neonates (37–41, 6/7 week gestation) and exclusion criteria were major congenital anomalies and clinically identifiable chromosomal syndromes. Gestational age was assessed by maternal last menstrual period (LMP) and New Ballard score. All infants enrolled in the study were followed up for first seven days of life for any morbidity and mortality. The common morbidity e.g. apnea, hypoglycemia, jaundice, sepsis, perinatal asphyxia, respiratory distress syndrome (RDS) were evaluated and mortality were compared between the two study groups. All data collected were analyzed using SPSS software version 12. Chi-square test or Fishers exact test and student t test were used for statistical analysis. The p-value <0.05 was considered significant.

Results

The study was conducted from 01 January 2015 to 30 June 2015. The study groups included a total of 100 live born neonates; fifty were late preterm neonates and another 50 were term neonates, who were compared for morbidity and mortality; gestational age, birth weight and male/female ratio in both groups were comparable i.e. (p value>0.05). Table-I shows the baseline variables of the study population.

Table-I: Baseline Variables of the study population

Variable		Late preterm (n = 50)	Term (n = 50)	P value
Gestation (wks) Mean (SD)		35.8±0.2	37.2 ±0.2	>0.05
Birth weight (gm) Mean (SD)		2220± 48	2610±24	>0.05
Sex	Male	52%	51%	>0.05
	Female	48%	49%	
Mode of delivery	Vaginal	24%	28%	>0.05
	Cesarean	76%	72%	

Both the study groups were compared for various morbidities e.g. apnea, respiratory distress, feed intolerance, hypoglycemia, hypothermia, hyperbilirubinemia, sepsis, Necrotising enterocolitis (NEC) and perinatal asphyxia. Late preterm neonates had statistically more significant complications than the term neonates, i.e. p value <0.05. The results are given below in Table-II.

Table-II: Morbidity outcome of late preterm neonates and the term neonates

Morbidity	Late preterm Neonates		Term Neonates		P value
	n(50)	%	n(50)	%	
Apnea	24	48	3	6	<0.05
Respiratory distress	12	24	2	4	<0.05
Feed intolerance	18	36	4	8	<0.05
Hypoglycemia	14	28	2	4	<0.05
Hypothermia	8	16	0	0	<0.05
Hyperbilirubinemia	22	44	5	10	<0.05
Sepsis	25	50	7	14	<0.05
NEC	3	6	0	0	<0.05
Perinatal asphyxia	16	32	5	10	<0.05

Over all morbidity between late preterm neonates and term neonates was statistically significant, 76% late preterm infants had morbidities compared with 28% term infants as shown in Table-III.

Table-III: Morbidity outcome of late preterm neonates and term neonates

Morbidity	Late preterm neonates		Term neonates		P value
	n (50)	%	n(50)	%	
Present	38	76	14	28	<0.05
Absent	12	24	36	72	

Mortality outcome was compared between the two study groups; mortality was statistically more significant in late preterm neonates (28%) than the term neonate (6%), i.e. p value <0.05.

Table-IV: Mortality outcome of late preterm neonates and the term neonates

Mortality	Late preterm neonates		Term neonates		P value
	n(50)	%	n(50)	%	
Alive	36	72	47	94	<0.05
Death	14	28	3	6	

Discussion

All infants enrolled in study were followed up for first seven days of life for any morbidity and mortality. The common morbidity e.g. apnea, hypoglycemia, jaundice, sepsis, perinatal asphyxia, respiratory distress

syndrome (RDS) were evaluated and mortality were compared between the two study groups. Overall morbidity was found significantly higher in late preterm neonates (76%) as compared to term neonates (28%) (p value <0.05). Similar result was found by Srinivasmurki et al[4] In this study, late preterm neonates had significantly higher mortality than term neonates (28% vs 6%, p value <0.05); similar results were found by Young et al[12] and Esobar et al[16] Late preterm neonates in this study had more complications compared to term neonates. Sepsis was the most frequent morbidity, 50% in late preterm neonates as compared with 14% in term neonates, which was statistically significant (p value <0.05); similar result was found in the previous study[20]. Besides neonatal sepsis, other neonatal complications were statistically more significant in late preterm neonates than term neonates; apnea (48% vs 6%, p<0.05), respiratory distress (24% vs 4%, p<0.05), feed intolerance (36% vs 8%, p<0.05), hypoglycemia (28% vs 4%, p<0.05), hypothermia (16% vs 0%, p<0.05), hyperbilirubinemia (44% vs 10%, p<0.05), NEC (6% vs 0%, p<0.05) and perinatal asphyxia (32% vs 10%, p<0.05). Wang et [21] did a study in which they found jaundice in 54.4% late preterm neonates and 37.9% term neonates (OR 1.95, 95% CI (1.04–3.67), p-value <0.027. Due to relative deficiency of uridinediphosphoglucuronate-glucuronosyltransferase (UDPGT), there is more chance of hyperbilirubinaemia among late-preterm infants than term infants[22]. Also, late-preterm infants have increased chances of developing hyperbilirubinaemia because feeding difficulties predispose them to an increase in enterohepatic circulation, decreased stool frequency and dehydration[23,24].

Araújo BF, Zatti H et al, found that late-preterms were statistically more likely to be subjected to hypoglycemia as compared to term neonates[3]. Similar result was found in this study where hypoglycemia in late preterm infants was significantly higher than term infants. Preterm infants are at increased risk of developing hypoglycemia after birth, because they have immature hepatic glycogenolysis and adipose tissue lipolysis, hormonal dysregulation and deficient hepatic gluconeogenesis and ketogenesis[25]. Statistically respiratory morbidities were found significantly higher in late preterm neonates as compared to term neonates (p-value <0.05). Hendricks-Muñoz KD et al found Respiratory Distress Syndrome (RDS) in 9%, 4%, 3%, in 34-week, 35-week, 36-week as compared to 0.7%, 0.2% and 0% in 37-week, 38 to 39 week, and 40-week gestational age neonates (p<0.001)[1]. In this study late preterm neonates had perinatal asphyxia and NEC significantly higher as compared to term neonates. Similar results were found in other studies[26,27].

In this study, death occurred in 28% of late preterm neonates as compared to 6% in term neonates. Statistically, mortality was found significantly higher in late preterm neonates as compared to term neonates (p<0.05). Celik IH et al[2] also found mortality in late preterm significantly higher as compared to term neonates (p<0.001).

Conclusion

This study revealed that late-preterm neonates have significantly higher risk of morbidity and mortality compared with term newborns. Further research is needed to find out the greater risk and early recognition, greater care and optimal management can reduce morbidity and mortality in late preterm neonates.

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