

Research Article

Clinical profile and early hospital outcome of late preterms admitted in a tertiary care neonatal unit from South India

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ABSTRACT

Background: Late preterm infants refer to those born between 34 completed weeks (34^{0/7}) and less than 37 completed weeks (36^{6/7}). The incidence of medical problems, either short-term or long-term, is higher among late preterm infants than term infants.

Methods: This is prospective observational study conducted in Indira Gandhi Institute of Child Health, which is a tertiary care pediatric hospital, which caters to only outborn. All late preterm babies admitted, who met the inclusion criteria were studied for a period of one year from September 2012 to August 2013. After taking consent from parents, detailed antenatal history were taken in a structured proforma. Short term outcome was assessed in the form of neonatal morbidities, mortality. These late preterm infants were followed up and readmission to hospital and reasons for readmission were evaluated.

Results: A total of one hundred and forty four late preterm neonates comprised the study group. Male preponderance was noticed with a ratio of 1.5:1. Majority of the neonates had birth weight more than 2 kg. Premature rupture of membrane and previous history of caesarian section formed the major maternal risk factor for preterm. Neonatal hyperbilirubinemia was the major morbidity followed by respiratory distress, sepsis and feed intolerance. Majority of late preterm neonates required more than 7 days of hospital stay. Rate of rehospitalisation were also high among late preterm.

Conclusions: Late preterm infant group is less studied group. Morbidity and mortality in them is higher than expected, hence they need special attention while in hospital and a better follow up protocol after discharge. Late preterm infants comprise the majority of preterm newborns, caring for such a large population who are prone to have unfavourable outcomes can exert a profound impact on the society.

Keywords: Late preterm, Hyperbilirubinemia, Sepsis

INTRODUCTION

Preterm infants refer to those born before 37 weeks of gestation from the first day of last menstrual period. Late preterm infants refer to those born between 34 completed weeks (34^{0/7}) and less than 37 completed weeks (36^{6/7}).¹ Late preterm infants are the fastest growing subgroup of neonates and constitute approximately 75% of all preterm births in 2009. The birth rate of late preterm newborns

has increased by 25% from 1990 to 2005 in the United States.²

Late preterm infants are less studied group, only few studies are available.³⁻⁷ Many clinicians prefer elective delivery at near term, believing that these neonates may be mature enough. Late preterm infants may be treated by parents, caregivers, and health care professionals as though they are physiologically and metabolically mature

as term newborns. These infants are at increased risk of medical complications and mortality, especially during the first week after birth. The rate of preterm birth is increasing worldwide primarily at the expense of late preterm newborns. Few reasons for the increasing preterm birth are increasing proportion of pregnant women older than 35 years of age, medically indicated deliveries secondary to better surveillance of the mother and the fetus, attempts to reduce stillbirths, and stress from a variety of sources.⁸

The incidence of medical problems, either short-term or long-term, is higher among late preterm infants than term infants.

METHODS

Sources of data

All late preterm babies (34^{0/7} weeks-36^{6/7} weeks) admitted to Indira Gandhi Institute of child health who met the inclusion criteria for a period of one year from September 2012 to August 2013.

Method of collection of data

Gestational age was assessed by modified Ballard score by a single observer to avoid inter observer variation. All late preterms were selected after taking consent from parents. Neonates admitted after 2 days of life, gestational age was assessed from LMP date, antenatal ultrasonography evidence. Consent was taken from parents.

Exclusion criteria

1. Late preterm babies of parents who have not given consent.
2. Late preterm babies who had lethal malformation, surgical conditions, and genetic problems.

The following definition criteria were used for neonatal problems:

Transient tachypnea of newborn: Clinical and radiographic features identified during the first hours of life, followed by characteristic resolution during the subsequent 24-48 hours.

Birth asphyxia: Gasping and inadequate/no breathing or with APGAR of <4 at 1 minute.

Neonatal sepsis: Probable sepsis: Positive septic screen (two of the five parameters namely, TLC <5000/mm³ or >15000/mm³, band to total polymorph ratio of >0.2, absolute neutrophil count less than 1800/mm³ or >7200/mm³, C reactive protein >0.5 mg/dL, platelets <1 lakh/mm³); or Proven sepsis: Isolation of pathogens from blood or CSF and pus.

Intraventricular hemorrhage: Hemorrhage identified by serial cranial ultrasonography.

Hypoglycemia: Blood glucose level below 40 mg/dl.

Hypothermia: Rectal temperature <35.5°C.

Neonatal hyperbilirubinemia: Clinically visible jaundice requiring phototherapy/exchange transfusion as per hour specific total serum bilirubin normogram (Bhutani chart).

Neonatal thrombocytopenia: Platelet count less than 150,000/L.

Apnea of prematurity: Respiratory pause more than 20 second or if accompanied by cyanosis, pallor or bradycardia.

Respiratory insufficiency: Presence of tachypnea, flaring of the nasal alae, grunting or retractions of the chest wall, oxygen requirement for more than two hours after birth and required mechanical ventilation.

Feed intolerance: Delay in initiating and maintaining adequate oral milk intake was recorded as feeding difficulties in the absence of respiratory distress and septicemia.

Hospital outcome was assessed in the form of morbidity, mortality, other complications, rehospitalization following discharge.

RESULTS

Out of 174 admitted late preterm neonates, 144 met the inclusion criteria, among them 87 (60.47%) were male and 57 (39.6%) were female. Ratio of male to female is 1.5:1. 79 (54.9%) cases were admitted within first three days of life. 38 (26.4%) children were admitted between day 3 and day 5 of life which constitutes about 26.4%. 21 children were admitted between 6 to 10 days of life which constitute about 14.6%. 5 children were admitted between 11 to 15 days of life which constitute about 3.5%, and one child was admitted at 16 days of life. Regarding gestational age, 75 neonates were admitted between the gestational age of 34^{0/7} to 35^{6/7} who constitute about 52.1% and 69 neonates were admitted between the gestational age of 36^{0/7} to 36^{6/7} who constitute about 47.9% of the study group. 79 neonates (54.86%) had weight which was appropriate for gestation Age. 65 neonates (45.14%) were small for gestational age. Regarding Birth weight, 49 neonates were born with birth weight between 2 and 2.5 kg which constitute about 33.3%. 48 neonates were born with birth weight above 2.5 kg which constitute about 33.3%. 42 neonates were born with birth weight between 1.5 and 2 kg which constitute about 29.1%. 5 neonates were born with birth weight of <1.5 kg which constitute 3.5%.

Maternal risk factors were present in 87 mothers which constitute about 60.41%. Among which PROM and previous history of LSCS has high incidence (25.29%), followed by anemia and PIH which constitute about 20.69% and 17.24% each respectively. Multiple pregnancy and antepartum hemorrhage were found in 5 which constitute about 5.74 %. Gestational diabetes in 3 (3.45%) cases. Previous history of preterm delivery was found in 10 neonates which accounts for about 11.49%. Previous history of still birth/ abortion, diabetes, younger age and elderly primi were found in 3.45% each. Maternal risk factor could not be identifiable in 57 cases (39.58%). 93 neonates were delivered through vaginal route, which accounts for 64.6%. 51 neonates were born through LSCS which accounts for 35.4%.

Table 1: Morbidities of late preterm.

Morbidities	No. of patients	%
NNHB	75	52.1
Respiratory distress	51	35.4
Sepsis	33	22.9
Feed intolerance	33	22.9
Hypothermia	32	22.2
Birth asphyxia	18	12.5
Hypoglycemia	15	10.4
Cardiovascular problems	8	5.6
IVH	4	2.8
Anemia of prematurity	2	1.4

NNHB and respiratory distress constitute the major neonatal morbidity which accounts for 52.1%, 35.4% respectively. In respiratory system 26 neonates presented with respiratory distress secondary to pneumonia which accounts for 18.1%. 22 neonates presented with respiratory distress secondary to RDS which accounts for about 15.3%. 3 of the neonates presented as Transient tachypnea of newborn which accounts for about 2.1%. In cardiovascular system 4 neonates had acyanotic defects and 4 had cyanotic defect which accounts for about 2.8%. 26 neonates had probable sepsis which accounts for about 18.1%. 7 of the neonates had culture proven sepsis which accounts for about 4.9%.

Table 2: Interventions done in late preterms.

Interventions done	No. of patients	%
Nil	28	19.4
Oxygen	79	54.9
Phototherapy	75	52.1
Ventilation	33	22.9
Surfactant	22	15.3
Inotropes	15	10.4
NIPPV	42	2.8
Exchange transfusion	1	0.7

Among 144 neonates, 79 of the neonates required oxygen which accounts for about 54.9%. 75 of the neonates required phototherapy which accounts for about 52.1%, 33 neonates required invasive mechanical ventilation which accounts for about 22.9%. 4 neonates required NIPPV which accounts for about 2.8%. 9 neonates were mechanically ventilated for severe sepsis and 2 neonates for refractory convulsion. 22 of the neonates required surfactant administration which accounts for about 15.3%. 15 of the neonates required inotrope support which accounts for about 10.4%. 1 neonate required exchange transfusion for hyperbilirubinemia which accounts for about 0.7%.

Duration of hospital stay and outcome

Regarding duration of hospital stay, 15 neonates required less than 3 days hospital stay which accounts for about 10.4%, 36 neonates required duration of 4 to 7 days which accounts for about 25%. 66 neonates required 7 to 14 days of hospital stay which accounts for about 45.8%. 27 neonates required more than 14 days of hospital stay which accounts for about 18.8%. Among 144 neonates, 139 neonates were discharged after treatment which accounts for about 96.5% and 5 neonates died during hospital stay which accounts for about 3.5%. Among admitted neonates 111 of them required some medical Interventions which accounts for about 77.08%. 28 neonates did not require any active medical intervention which accounts for about 19.44%. Among discharged neonates 11 of them had rehospitalisation which accounts for about 7.63%.

DISCUSSION

The frequency of preterm births is increasing in many countries and this increase is mainly due to rise in late preterm birth. Risk in late preterm population is under appreciated.

In this study male predominance was observed (60.4%) and female constituted about 39.6% which is comparable with other studies (54.5%),⁷ (55.4%).⁹ Majority of the neonates (54.9%) were admitted within 3 days of life. Birth weight of more than 2 kg was found in 67.4%, among which 33.3% of the neonates were born with birth weight more than 2.5 kg. Weight was appropriate for gestational age in 97 neonates which constitute about 67.36%. Small for gestation is seen in 32.64% of the study group.

The above results were comparable with another study, where the mean birth weight was about 2.35 kg, weight for gestation was appropriate in 83.7% and SGA in 37%, which is comparable with the present study. Infants born late preterm may be similar to term infants in appearance, weight, and size.

Maternal risk factors

Maternal risk for preterm was elicited in 87 (60.41%). There were no recorded indication in 57 (39.58%) of the mothers. Among risk factors studied PROM and previous LSCS constitute the major one of 25.29% followed by Anaemia and PIH respectively. In a study 23% of late preterm births had no recorded indication for delivery and patient factors may be the cause. In the present study also PROM constituted the major maternal risk factor (25.29%) and spontaneous preterm labor seen in 24.3%. In a study PROM was the major precursor of Late Preterm (32.3%) followed by “indicated” and spontaneous labor which constitute 31.8% and 29.8% respectively. In 6.1% precursor were unknown.¹¹ Regarding mode of delivery, 93 neonates had vaginal deliveries which constitute about 64.6%. LSCS was done in 51 neonates which constitute 35.4%, which is similar to study by Jean-Bernard Gouyon et al.

Comparison of various studies related to morbidities in late preterm is shown in Table 3. In the present study morbidity related to hypothermia, oxygen dependency, mechanical ventilation (22.9%) is high compared to A Leone et al.¹² This can be explained by the fact of being a tertiary centre with most of critically sick cases referred from distant hospital without proper neonatal transport facility. In the present study morbidities related to sepsis, hypoglycemia, feeding intolerance, intraventricular haemorrhage are comparable with study by Leone et al.¹² In the present study incidence of neonatal hyperbilirubinemia is high, which is similar to study conducted in Pakistan where in hyperbilirubinemia was observed in 37.9%, respiratory distress was found in 16.5% and sepsis in 4.5%.¹³

Table 3: Comparison of various studies related to morbidities in late preterm.

Morbidities	A. Leone et al. ¹²	Ashish Jaiswal et al. ⁷	Margreet J. Teune et al. ⁶	Present study
Any morbidities	70%	70.8%	-	77.08
NNHB	47.7%	55.1	23.5	52.1
Respiratory distress	34.7	10.5	11	35.4
Sepsis	-	5.2	20.06	22.9
Feed intolerance	8.3	-	34	22.9
Hypothermia	2.5	-	1.5	22.2
Hypoglycemia	14.3	8.8	7.1	10.4
Mechanical ventilation	7.9	3	8	-
IVH	-	-	0.41	2.8
Anemia of prematurity	7.2	-	0.87	1.4

In another study respiratory distress was found in 13.8%, NNHB requiring was seen in 10.7%, sepsis was seen in 30.8%. Hypoglycemia was seen in 14.2%.¹⁴ Feeding problem was observed in 51%, 34%, 22% with gestational age of 34 weeks, 35 weeks, 36 weeks respectively.⁶ In another study 19.1%, 11.1%, 1.9%¹² of neonates with gestational age of 34, 35, 36 weeks respectively had feeding difficulty.¹²

Late preterm mortality

Studies have reported risks of death ranging from 1.5 to 6.3 which was comparable with the present study.¹⁵ There were 5 deaths in our study which accounts for 3.5%. Two neonates died because of severe sepsis and two neonates with RDS died because of pulmonary hemorrhage and one neonate died because of IVH. Early, late and post neonatal mortality were respectively six, three and two times greater among LPTI.^{16,17} During infancy, late preterm infants were 3 times more likely to die than term infants. Common causes of readmission are respiratory problem, jaundice, infection, feeding problems and excessive weight loss. In the present study 11 neonates were rehospitalized which accounts for 7.63%. Which is similar to another study (9.9%).⁷ Out of 11 neonates, 4 neonates had respiratory problem, 4 had sepsis, 2 had neonatal hyperbilirubinemia, 1 had excessive weight loss due to faulty feeding.

CONCLUSION

Late preterm infants are understudied group. These groups have unique needs. Though treated like full term newborn, they are at the risk of all morbidities like those of preterm babies. Present study shows that late preterm neonates suffer a large number of intercurrent problems during the neonatal period. Late preterm infants are therefore a high risk group of children and need special attention while in hospital, including delayed discharge and follow-up very soon after discharge. The rate of rehospitalization is also high in late preterm. Extending pregnancy to the maximum safest gestation will result in decrease in such morbidities. Treating late preterm infant as almost term and almost normal infants should be avoided. Discharging these infants before 48 hours precludes the opportunity of identifying morbidities early enough to allow timely intervention. It is important to explain to parents the vulnerabilities to which their children are subject and to educate them the importance of monitoring feeding, weight gain and jaundice.

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