Research Article

Morbidities and follow-up of admitted late preterm infants

Bandi Ramya*, Basanth Kumar G.R., Guruprasad G.

Department of Pediatrics, JJM medical College, Davangere, Karnataka, India

Received: 21 November 2015

Accepted: 05 December 2015

***Correspondence:**

Dr. Bandi Ramya,

E-mail: dramyabandi@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: The objective of the study was to document the neonatal morbidities in late preterm infants admitted to tertiary care newborn centre.

Methods: Observational prospective case series study. All late preterm infants during the study period of one year were included. Descriptive statistics and analysis of the morbidities was done. A follow up of 6 months was done to assess growth and development.

Results: 100 infants were studied. The admission complaints were respiratory distress (32%), low birth weight care (31%), jaundice (15%), feeding difficulties & lethargy (5%). morbidities included jaundice (68%), hypoglycaemia (38%), septicemia (24%), respiratory distress syndrome (20%) & transient tachypnea of newborn (15%). 55% of infants with subnormal head growth were identified in follow-up.

Conclusions: The most common cause for admission was respiratory distress (32%) within 48 hours of life and jaundice later. Most common morbidity was jaundice (68%). Most of the morbidities could be effectively treated with timely care. Follow up of these infants for early identification and treatment of problems is imperative.

Keywords: Late preterm infants, Neonatal morbidities, Follow up

INTRODUCTION

An expert panel at a workshop convened by the National Institute of Child Health and Human Development (NICHD) of the National Institutes of Health (NIH) in July 2005 recommended that births between 34 completed weeks (340/7 weeks or day 239) and less than 37 completed weeks (366/7 weeks or day 259) of gestation be referred to as late preterm infants (LPTI).¹ Concern about higher morbidity in late preterm infants has led to numerous publications with largely the same conclusions: Late preterm infants are more prone to problems related to delayed transition and overall immaturity, and they should be treated differently from their more mature term counterparts. Over 60% of preterm births occur in Africa and south Asia. Countries with the highest numbers include Brazil, India, Nigeria and the United States of America.² Nearly three out of

four preterm births occur at late preterm gestational ages, and this number is increasing.³ This reflects the large burden of late preterm births globally and in India. This study reflects Indian scenario of LPTI admission to tertiary hospital and their outcome.

METHODS

This study was carried out in neonatal Intensive Care Unit (NICU) in Bapuji Child Health Institute and Research Centre attached to Pediatric department of JJM medical college, Davangere, Karnataka.

This study includes all LPTI admitted to NICU in the first week of life during a period of 1 year from January 2012 to December 2012. Gestational age (GA) was being assessed by early obstetric scan (6-12 weeks) or maternal last menstrual period or by modified Ballard score if

earlier two were unavailable. Only singletons without severe congenital malformations and metabolic disorders were included in the study.

Method of examination

For LPTI meeting the inclusion criteria, relevant maternal data and morbidities such as post resuscitation care, respiratory distress, hypoglycaemia, sepsis, feeding difficulties, jaundice were treated and documented meticulously with the help of prestructured proforma. While discharging parents were told about the follow up plan and next visit dates. They were also reminded on telephone before the scheduled date. Follow up of all infants was done up to six months of corrected age, twice a month for the initial three months and once a month for the later months. During the follow-up visits infant's physical growth (length, weight, and occipitofrontal circumference) and development by Denver Developmental Screening Test 2(DSST) were assessed. The abnormalities were noted in all 4 parameters gross motor, fine motor, and language and psychosocial.

Statistical analysis

Descriptive statistics of the study subjects and their outcomes was done. All statistical analyses were performed by SPSS 17.0 software.

RESULTS

Table 1: Gestational age & morbidities.

Variable	34 weeks (n=19) (%)	35 weeks (n=34) (%)	36 weeks (n=47) (%)
EPJ	15(78.9)	23(67.6)	30(63.8)
Hypoglycaemia	8(10.5)	8(5.8)	22(4.2)
Probable Sepsis	7(36.8)	8(23.5)	9(19.1)
Confirmed Sepsis	3(15.7)	2(5.8)	2(4.2)
RDS	4(21)	9(26.4)	7(14.8)
TTNB	2(10.5)	4(11.7)	9(19.1)
Ventilation(CPAP)	3(15.7)	2(5.8)	3(6.3)
Ventilation(IIPV)	3(15.7)	1(2.9)	4(8.5)
HIE	4(21)	4(11.7)	8(17)
Polycythaemia	1(5.2)	3(8.8)	3(6.3)
Feeding difficulties	1(5.2)	2(5.8)	3(6.3)
Pneumonia	2(10.5)	1(2.9)	1(2.1)
DIC	0	0	1(2.1)

EPJ: Exaggerated Physiological Jaundice, RDS; Respiratory Distress Syndrome; TTNB: Transient Tachypnea of Newborn, CPAP: Continuous Positive Airway Pressure; IPPV: Intermittent positive Pressure Ventilation; HIE: Hypoxic Ischemic Encephalopathy; DIC: Disseminated Intravascular Coagulation

There were 2,372 admissions to NICU during the study period of which 559 (23.5%) were preterm infants. Of them 131(23.4%) were LPTI. There were 10 pairs of late preterm twins admitted and 11 more infants did not meet the inclusion criteria. Hence the total number of infants included in the study was 100 (67% males). Isolated spontaneous deliveries accounted for 40% of all deliveries followed by 31% for maternal medical conditions, 28% for obstetric complications and 1% for no recorded indications.

Table 2: Outcomes after follow up of 6 months of corrected age.

Developmental Outcome	GA			Total
	34 Weeks	35 Weeks	36 Weeks	
Global developmental delay	0	1	2	3
Suspected developmental delay	0	6	3	9
Normal	15	26	36	77

Nineteen (19%), 34 (34%) and 47 (47%) infants were of 34, 35 and 36 weeks GA respectively. 31%, 44%, 55% of infants with GA 34, 35,36 weeks respectively were small for gestational age (SGA).None of them were large for gestational age (LGA). The mean birth weight of infants with 34, 35, 36 weeks GA was 1.79, 1.87 and 2.04 kg respectively. Fifty infants were delivered by normal delivery and 50 by cesarean section. Common complaints for admission to NICU were respiratory distress (32%), followed by LBW care (31%), Jaundice (15%), birth asphyxia requiring post resuscitation care (15%), feeding difficulties (5%), lethargy (3%) and apnea (2%). Morbidities in decreasing order included exaggerated physiological Jaundice (EPJ) (68%), hypoglycaemia (38%), septicaemia (24%), Respiratory distress syndrome (RDS) (20%), Transient tachypnea of newborn (TTNB) (15%) and birth asphyxia (9%) (Table 2).Out of the 100 cases 6 died during hospital stay out of which birth asphyxia was cause of death in 3 infants, RDS in 2 and septicaemia in one.

5 infants were lost to follow up among which one died at 1 month of age at home. 89 infants were followed up closely till 6 corrected months of age. Two infants were readmitted during the follow up for lactation management. During the follow up visits 3 infants were observed to have laryngomalacia and 2 infants had septic arthritis of hip which were treated on OPD basis.

At the end of 6 months (corrected age) of follow up the growth parameters were plotted on WHO growth charts. Many infants weighed above 50th centile [50th to 85th centile (n=29, 32.5%), 85th to 97th centile (n=27,

30.33%), >97th centile (n=13,14.6%)]]. Infants with birth weight above 1.5 kg have maintained centiles above 50 compared to infants with birth weight <1.5 kg.

Out of 89 infants 12 infants occipitofrontal circumference was less than 3rd centile. Most of the infants had head circumference at 3rd centile (n=26, 29.21%), followed by 20 infants (22.4%) between 3rd to 15th centile, followed by 19 infants (21.3%) between 15th to 50th centile.

Nine (10.11%) infants had suspected development delay. 3 infants (3.37%) had global developmental delay that could be attributed to their morbidities in NICU (Table 2).

DISCUSSION

Reddy et al categorized the etiology of late preterm deliveries into five groups: maternal medical conditions, obstetric complications, no recorded indications, isolated spontaneous deliveries and major congenital anomalies, which accounted for 14%, 16%, 23.2%, 49% and 1% of all deliveries respectively which have largely matched with our study.⁴ Since our unit accepts infants delivered elsewhere, a significant number of infants were admitted for LBW care before developing any morbidity.

Analysing the respiratory morbidities, respiratory distress (32%) was the leading complaint for admission. According to an article published by Ma et al, respiratory distress (42.1%) was the most common medical problem that required admission, similar to our study.⁵ Later, 50% of infants had respiratory distress of which RDS (40%) was the major cause followed by TTNB (30%), birth asphyxia (20%), pneumonia/sepsis (8%) and 1 infant had meconium aspiration syndrome. According to Escobar et al among infants of 35 to 36 weeks with respiratory distress, RDS, Meconium Aspiration Syndrome (MAS), Pneumonia/sepsis are diagnosed at frequencies of 62%, 1.3% and 8% respectively.⁶ These figures almost correlate with our study. Though it is thought that surfactant production is achieved adequately by 34 weeks of gestation, late preterm infants are still at a higher risk of having RDS when compared to term infants.⁷ TTNB was the second most common cause of respiratory distress and only six of these 15 infants were delivered via cesarean section. This would again support the fact that multiple factors play role in clearing lung fluid and not the vaginal squeeze alone.³ The high rates of sepsis (24%) in our study compared to Ma et al, Jaiswal et al could be because, we have studied only the admitted infants.^{5,8}

Many studies enumerated about the feeding difficulties in late preterm infants, which were successfully overcome in our unit by timely help to every mother with feeding and expression of breast milk.⁹ Rate of formula feeding was almost negligible.

Most common morbidity during the whole hospital stay was jaundice (68%) for which low birth weight, physiological immaturity, sepsis, dehydration due to feeding difficulties were contributing factors. A total of 75% LPTI had clinically significant jaundice. This study highlights that the morbidities in late preterm infants are more of respiratory related which have a definitive treatment and good results. LPTI would require timely identification and treatment of morbidities, (of which majority are not serious), to surpass the prematurity and establish harmony in growth and development.

Growth after discharge is a good measure of physical, neurologic, and environmental well-being. A clinic visit at about 4 to 6 months of corrected age is important for documenting problems of inadequate catch-up growth and severe neurologic abnormality that might require intervention and physical therapy.¹⁰ Accordingly, our follow-up schedule is empowered to document the inadequate catch up growth and major neurological abnormalities. There was a good catch up growth in terms of weight for age in our study. Length percentiles followed weight centiles.

Though the centiles of the weight for age were satisfactory but the head circumference centiles for age were worrying. At 6 months of corrected age 49 infants (55.5%) had head circumference centiles at (n=26, 29.2%) and below (n=23, 25.8%) 3rd centile which signifies subnormal head size. Since the catch up head circumference growth occurs till 6 months to 1 year after expected date of delivery these infants still have a fair chance to attain catch up growth of head size. Nevertheless, as many as 55% of infants with subnormal head growth were identified because of close follow up. 12 infants with developmental delay were also identified in this study of which 3 have global developmental delay.

This study is not empowered to comment about the association of prematurity with developmental delay since the follow up period was very less and the subjects were NICU graduates. But this study definitely highlights the importance of follow-up. In a study done by Woythel et al there was worse developmental outcome for late preterm infants compared to term infants and late preterm infants were also not referred for early intervention programs regularly.¹¹ A study by McGowan et al concluded that there was no difference in early childhood development between LPTI that were not admitted and admitted to NICU.¹² Hence, in conclusion if we follow-up these infants we can identify their problems earlier and give them a fair chance to grow and develop like their cohort population.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Raju TN, Higgins RD, Stark AR, Leveno KJ. Optimizing care and outcome for late-preterm (near-term) gestations and for late-preterm infants: a summary of the workshop sponsored by the National Institutes of Health and Human Development. *Pediatrics*. 2006;118:1207-14.
2. WHO. Preterm Birth. Switzerland: World health Organization; 2015 Aug. Available from: <http://www.who.int/mediacentre/factsheets/fs363/en>
3. Ramachandrapa A, Jain L. The Late preterm Infant. In: Martin RJ, Fanaroff AA, Walsh MC, eds. *Fanaroff and Martin's Neonatal-Perinatal Medicine*. 9th ed. Philadelphia, PA: Mosby Elsevier. 2011:629-642.
4. Reddy UM, Ko CW, Raju TN, Willinger M. Delivery indications at late-preterm gestations and infant mortality rates in the United States. *Pediatrics*. 2009;124:234-40.
5. Ma X, Huang C, Lou S, Lv Q, Su W, Tan J, et al. The clinical outcome of late preterm infants. *J Perinat. Med*. 2009;37(6):695-9.
6. Escobar GJ, Clark RH, Greene JD. Short-term outcomes of infants born at 35 and 36 weeks gestation: we need to ask more questions. *Semin Perinatol*. 2006;30:28-33.
7. Fuch K, Wapner R. Elective cesarean section and Induction and Their Impact on Late Preterm Births, *Clin Perinatol*. 2006;33:793-801.
8. Jaiswal A, Murki S, Gaddam P, Reddy A. Early Neonatal Morbidities in Late Preterm Infants. *Indian pediatri*. 2011;48:607-11.
9. Wang ML Dorer DJ, Fleming MP, Catlin EA. Clinical outcomes of near-term infants, *Pediatrics*. 2004;114:372-6.
10. Costello DW, Hack M. Follow-up for High Risk Neonates. In: Martin RJ, Fanaroff AA, Walsh MC, eds. *Fanaroff and Martin's Neonatal-Perinatal Medicine*. 9th ed. Philadelphia, PA: Mosby Elsevier. 2011:629-642.
11. Woythaler, McCormick MC, Smith VC. Late Preterm Infants Have Worse 24-Month Neuro developmental outcomes Than Term Infants. *Pediatrics*. 2011;127:e622.
12. McGowan JE, Alderdice FA, Doran J, Holmes VA, Jenkins J, Craig S, et al. Impact of Neonatal Intensive Care on Late Preterm Infants: Developmental Outcomes at 3 years, *Pediatrics*. 2012;130:e1105.

Cite this article as: Ramya B, Basanth Kumar GR, Guruprasad G. Morbidities and follow-up of admitted late preterm infants. *Int J Contemp Pediatr* 2016;3:31-4.