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Original Article

Paediatrics Section

A Study in Late Preterm Babies for Early Neonatal Outcome

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ABSTRACT

Introduction: Infants born between 34 and 36 weeks gestation have an increased risk of neonatal morbidity requiring admission to a neonatal unit compared with those born at/or beyond 37 weeks gestation.

Aim: To estimate the short term outcomes of late preterm babies in comparison with term babies and to study indication of caesarian section in late preterm deliveries.

Materials and Methods: This prospective observational study was carried out at level II and level III Neonatal Care Unit and Obstetrics and Gynecology Department of North Bengal Medical College and Hospital. Total 7138 live babies were delivered during study period, out of them, 4891 babies were included in study group.

Results: Total 919 late preterm were taken as cases and 3972 term neonates as control. Mean birth weight of term and late preterm neonates were 2.78 and 2.71kg respectively with standard deviation of 0.41 (p-value <0.01). Maternal age of term babies were 22.78 year with 3.81 standard deviation as against maternal age of late preterm were 23.03 with standard deviation 3.95 (p-value=0.0543). Among late preterm 120 (13.06%) developed respiratory distress as against 68 (1.71%) term neonates developed it during study period with a statistically significant p-value (p<0.01). 483 (52.56%) late preterm had jaundice while 1213 (30.54%) term babies developed it (p-value<0.001). Among all late preterm neonates 101 (10.99%) experienced one or more episodes of hypoglycemia while 57 (1.44%) term neonates experienced it (p-value<0.001). Hypothermia occurred in 73 (7.94%) late preterm neonates as against 69 (1.74%) term neonates (p-value<0.001). 39 (4.24%) late preterm experienced one or more episodes of apnoea as against 49 (1.23%) term babies (p-value<0.001). 166 (18.06%) late preterm babies had feeding problems but only 113 (2.84%) term babies had it (p-value<0.001). 90 (9.79%) term babies had confirmed sepsis while 70 (1.76%) term babies developed sepsis during study period (p-value<0.001). among all late preterm babies, 404 (43.96%) were delivered by caesarian section while rest 515 (56.04%) were delivered by spontaneous vaginal delivery. Among caesarian deliveries most common indication were foetal distress accounting for 12.8% of all deliveries followed by oligohydramnios (10.1%), meconium stained liquor (8.6%), IUGR (4%), Eclampsia (3.7%). Others less common are placental abruption, breech, CPD, uterine dehiscence. Mortality of late preterm was 7.29% (67) as against 47 (1.18%) terms.

Conclusion: In contrast to very preterm infants, serious neonatal morbidity in (Late/Moderately Preterm) LMPT infants is uncommon. However, even modest increases in morbidity in this sizeable group exert very significant demands on neonatal service.

Keywords: Hypoglycemia, Prematurity, Respiratory distress

INTRODUCTION

A preterm birth is defined, as per World Health Organization definition, as an infant who is born before the end of the 37 weeks (259th day) of pregnancy, from the first day of last menstrual period [1]. Late preterm birth is defined as birth between 34 weeks and 36 weeks of gestation from first day of last menstrual period [2]. The American Academy of Pediatrics and The American College of Obstetrics and Gynaecology also consider the same definition [3]. In 2005, NICHD, proposed the definition of late Preterm infants as those born between 340/7 to 366/7 weeks of gestation [3]. These babies were previously termed as "near term" as they are apparently mature and with comparable birth weight to that of term babies. This is however deceitful as they are triaged and managed as term babies though they are less mature both physiologically and metabolically, and have higher risk of complication than term infants.

In United States there was an increase in preterm birth rate from 9.1% (1981) to 12.3% (2003) an increase of 3.1%. Mostly it was due to an increase in the proportion of late preterm births. The primary reason is early deliveries of high risk pregnancy so as to prevent sudden and unexpected foetal complication [4]. Recently, many

studies have been conducted in western hemisphere, which prove the vulnerability of late preterm infants to short term morbidities as well as high rate of re-admission to hospital [5-7]. Recently, a study in India analysed, morbidity patterns in term and late preterm babies, but its relationship with maternal risk factors is not yet studied [4]. From India the data is scarce, and its relevance is due to racial and demographic variation, which has an impact on outcome [8]. Few studies have been published from South-East Asia [2,9]. In India, neonatal morbidity and mortality by providing meticulous care can be reduced in late preterm group.

MATERIALS AND METHODS

This was a prospective observational study carried out in level II and level III Neonatal Care Unit and Obstetrics and Gynecology Department of North Bengal Medical College and Hospital, Siliguri, India, for the duration of one year starting from June 2014 till May 2015. The study was approved by ethical committee of the Institute. Informed consent was obtained from the parents.

All live newborn babies (excluding those who fall under the exclusion criteria) delivered during study period in North Bengal Medical College and Hospital were considered for the study.

All the cases of pregnancy complicated due to multiple gestation, foetal malformation, maternal consumption of illicit drug, infant with incomplete documentation, perinatal asphyxia, Rh-incompatibility and infant of diabetic mother were excluded and rest of the other cases were included in the study. All the cases were divided into two groups.

1- Babies born between 34- 36 weeks of gestation were taken as cases (n=919).

2- Babies born at or after 37 weeks were taken as control (n=3972).

Following parameters were studied—

1- Gestational age- determined by first trimester ultrasound scan (if available), maternal history of Last Menstrual Period (LMP), and modified new Ballard scoring

2- Mode of delivery

3- Birth weight

4- Maternal age

5- Parity

6- Respiratory distress- As defined by presence of at least two criteria out of the following-

- Respiratory rate- >60/min
- Subcostal/intercostal retraction
- Expiratory grunt/groaning
- Requirement of oxygen therapy

7- Hyperbilirubinemia- As determined by sole staining, bilirubin measurement

8- Hypoglycemia- Determined by 12 hourly capillary blood glucose monitoring with level <40mg/dl

9- Hypothermia- with skin temperature <32°C

10- Apnoea/bradycardia

11- Feeding problem as defined by difficulty in initiating or maintaining breast feeding

12- Sepsis

13- Indication of Lower Segment Caesarean Section (LUCS) in late preterm

14- Indication of delivery in Late Preterm

STATISTICAL ANALYSIS

The data were entered into SPSS (Statistical Package for Social Sciences, 20.0) and were analysed using descriptive statistics (frequency, percentage), mean ages and birth weight were compared using independent Student's t-test. Chi-square test was used to analyse categorical variables.

RESULTS

Total 7138 live babies were delivered during study period, of them (4878) 68.3% were term and (1198) 16.8% were preterm and (1062) 14.9% were late preterm [Table/Fig-1]. Out of which 4891 babies were included in study group. Total 919 late preterm were taken as cases and 3972 term neonates as control. Mean birth weight of term, and late preterm neonates were 2.78 and 2.71 kg respectively with standard deviation of 0.41 each (p-value <0.01 statistically significant) [Table/Fig-2]. Maternal age of term babies were 22.78 year with 3.81 standard deviation as against maternal age of late preterm were 23.03 with standard deviation 3.95 (p-value=0.075 statistically not significant) [Table/Fig-2]. In our study, 13.06% late preterms had developed respiratory distress, 52.56% had jaundice, 10.99% experienced one or more episodes of hypoglycemia. 7.94% had hypothermia, 4.24% experienced one or more episodes of apnoea, 18.06% had feeding problems and 9.79% had confirmed sepsis in comparison to term babies

Gestational Age	Frequency	Percentage (%)
Term	4878	68.3
Preterm	1198	16.8
Late Preterm	1062	14.9

[Table/Fig-1]: Incidence of late preterm, term and early preterm in total number of babies delivered.

Gestational Age		Age (in weeks)	Birth weight (in kgs)
Term	Mean	22.78	2.78
	Std. Deviation	3.81	0.41
Late Preterm	Mean	23.03	2.71
	Std. Deviation	3.95	0.41
	p-value	0.075*	<0.001*
	Significance	Not Significant	Significant

[Table/Fig-2]: Mean age of mothers and mean birth weight of late preterm and term babies.
*Independent Student's t–test

Parameters		Gestational Age		Total (n%)	p-value	Significance
		Term	Late Preterm			
Respiratory distress	No	3904 (98.29)	799 (86.94)	4703 (96.16)	<0.001	Significant
	Yes	68 (1.71)	120 (13.06)	188 (3.84)		
Jaundice	No	2759 (69.46)	436 (47.44)	3195 (65.32)	<0.001*	Significant
	Yes	1213 (30.54)	483 (52.56)	1696 (34.68)		
Hypoglycemia	No	3915 (98.56)	818 (89.01)	4733 (96.77)	<0.001*	Significant
	Yes	57 (1.44)	101 (10.99)	158 (3.23)		
Hypothermia	No	3903 (98.26)	846 (92.06)	4749 (97.1)	<0.001*	Significant
	Yes	69 (1.74)	73 (7.94)	142 (2.9)		
Apnoea	No	3923 (98.77)	880 (95.76)	4803 (98.2)	<0.001*	Significant
	Yes	49 (1.23)	39 (4.24)	88 (1.8)		
Feeding Problem	No	3859 (97.16)	753 (81.94)	4612 (94.3)	<0.001*	Significant
	Yes	113 (2.84)	166 (18.06)	279 (5.7)		
Sepsis	No	3902 (98.24)	829 (90.21)	4731 (96.73)	<0.001*	Significant
	Yes	70 (1.76)	90 (9.79)	160 (3.27)		
Mode of Delivery	LUCS	1727 (43.48)	404 (43.96)	2131 (43.57)	0.791*	Not Significant
	SVD	2245 (56.52)	515 (56.04)	2760 (56.43)		
Total		3972 (100)	919 (100)	4891 (100)		

[Table/Fig-3]: Comparison of incidences of various parameters studied in term and late preterm.
*Chi-square test

during study period [Table/Fig-3]. Among all late preterm babies, 404 (43.96%) were delivered by caesarian section while rest 515 (56.04%) were delivered by spontaneous vaginal delivery and all term babies,1727 (43.4%) were delivered by caesarian section while rest 2245 (56.52%) were delivered by spontaneous vaginal delivery [Table/Fig-3]. Among caesarian deliveries most common indication were foetal distress accounting for 12.8% of all deliveries followed by oligohydramnios (10.1%), meconium stained liquor (8.6%), Intra Uterine Growth Restriction (IUGR) (4%), eclampsia (3.7%). Others less common are placental abruption, breech, Cephalopelvic Disproportion (CPD), uterine dehiscence [Table/Fig-4]. Mortality of late preterm were 7.29% (67) as against 47 (1.18%) terms [Table/Fig-5].

Indication of Delivery	Frequency	Percentage (%)
Placental Abruption	13	1.5
APH	1	0.1
Breech	4	0.4
CPD	3	0.3
Eclampsia	34	3.7
Error in GA	3	0.3
Foetal Distress	118	12.8
IUGR	37	4.0
MSL	79	8.6
Oligohydramnios	93	10.1
Polyhydramnios	8	0.9
Preeclampsia	3	0.3
PROM	11	1.2
Spontaneous	506	55.1
Uterine Dehiscence	5	0.5
Total	919	100.0

[Table/Fig-4]: Indication of delivery of late preterm babies.

DISCUSSION

Late preterms are at higher risks for neonatal morbidities and mortalities contrary to belief that they are nearly mature. In one study conducted by Binarbasi P et al., incidence of late preterm were 15.2% [10] which is comparable to present study. Many authors have opined that size and weight of late preterm infants are similar to term infants [7,11-13]. So, we determined the mean birth weight of late preterm infants are similar to term infants (2.71 vs 2.78) with standard deviation of 0.41.

We noted that in the present study 13.06% late preterm had signs of respiratory distress against 1.71% of term infants. Similar finding were observed in the study done

		Gestational Age		Total	p-value	Significance
		Term	Late Preterm			
Mortality	No	3925(98.82)	852(92.71)	4777(97.67)	<0.001	Significant
	Yes	47(1.18)	67(7.29)	114(2.33)		
Total		3972(100)	919(100)	4891(100)		

[Table/Fig-5]: Mortality of term and late preterm study subjects.
*Chi-square test

by Osama Abu Salah in which 13.8% of late preterm had respiratory distress [14].

In the present study, 52.56% late preterm and 30.54% term babies developed jaundice during study which is consistent to study conducted by Jaiswal et al., were they observed that 55.8% late preterm and 24.8% term neonates had jaundice [4].

In one study conducted by Osama Abu Salah, incidence of hypoglycemia were 1.1% in term neonates as against 10.3% in late preterm [14] whereas, in this study, 10.99% late preterm and 1.44% of term neonates had one or more episodes of hypoglycemia.

In a study conducted by Binarbasi P et al., hypothermia was noted in 14.5% of late preterm neonates [10]. In the present study 7.94% late preterm and 1.74% term neonates experienced hypothermia. This variation may be due to climatic condition of study places, difference in cut off temperature for consideration of hypothermia or differences in timing of study.

Ligginc GC et al., observed that incidence of apnoea in late preterm and term babies were 6% and 0.1% respectively [15]. In this study incidence of apnoea were 4.24 in late preterm as against 1.23% in term neonates.

Pinar Binarbasi et al., in their study observed that incidence of feeding difficulty were 19.1% in late preterm and 0.5% in term babies [10]. In the present study 18.06% late preterm and 2.84% term neonates had feeding difficulty. Osama Abu Salah noted feeding difficulty in 1.2% term neonates and 15.8% late preterm neonates [14].

In one study, incidence of sepsis in late preterm and term infants were 10.3% and1.37% [16]. We observed similar finding in present study with incidence of sepsis in late preterm and term neonates' were 9.79% and 1.76% respectively.

Martin JA et al., observed that rate of caesarian delivery rose from 23.5% to 34.3% between 1990-2006 [17]. In this study 43.57% of study subjects were delivered by caesarian delivery. In this study, among late preterm, 55.1% were delivered by spontaneous vaginal delivery and rest were by caesarian section most of which were medically indicated as per ACOG guidelines. Among caesarian deliveries most common indication were foetal distress accounting for 12.8% of all deliveries followed by oligohydramnios (10.1%), meconium stained liquor (8.6%), IUGR (4%), eclampsia (3.7%). Others less common are placental abruption, breech, CPD, uterine dehiscence. Perinatal mortality rate was 5.95% in late preterm,as evaluated by Karegoudar et al., [18]. this study had nearly similar finding of 7.29% mortality of late preterm and 1.18% of term infants.

LIMITATIONS

Main limitation of our study is our inability to enroll the whole late preterm births. Most of the times parents either could not be contacted or withdrew their consent. Since, mostly parents who withdrew consent belonged to lower socioeconomic strata, sampling bias could have been introduced and likely result in underestimation of adverse outcomes.

CONCLUSION

Late preterm infants are supposed to have high survival rates and good outcomes. In most neonatal centers across the country, late preterm infants receive neonatal care from birth. Normally formed late preterm infants are unlikely to require significantly different newborn care from term-born infants. They need not be separated from their mothers and may receive care on postnatal wards.

Supplementary postnatal support outside a newborn care unit may include phototherapy, nasogastric feeding, intravenous antibiotic administration, temperature management and other regular monitoring. Although stress have been given on more intensive early monitoring for all late preterm infants in various studies, it is not known whether such increased vigilance prevents or leads to earlier detection of neonatal problems or reduces length of stay. Potential risks must be balanced against benefits of keeping mother and baby together.

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