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Co-relation of maternal risk factors and perinatal events with immediate neonatal outcome in late preterm compared to term small for gestational age babies

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Abstract

Objective: To establish co-relation of maternal risk factors and perinatal events with the immediate neonatal outcome in late preterm compared to term small for gestational age (SGA) babies.

Method: This observational study was conducted in the postnatal ward and neonatal intensive care unit (NICU) of an urban tertiary care unit. The out born babies are excluded.

Results: The percentage of jaundice was higher in late preterm (PT) babies (54.8%) compared to term SFD babies (45.16%). Jaundice was the most common cause for referral to the NICU in both the groups [54.84% in late pre-terms and 45.16% in term SGAs], but other indications seen in the late pre-terms included sepsis, feeding dificulty and hypoglycemia.

Conclusion: There was significantly increased risk of perinatal asphyxia, feeding dificulty, sepsis and hypoglycaemia in the late preterm infants as compared to the term SGA infants.

Keywords: Late preterm; SGA babies; immediate neonatal outcome

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Introduction

Recently described studies dealing with epidemiology, medical problems, morbidity/mortality in late preterm small for gestational age (PT SGA) babies have stimulated interest in exploring and comparing problems and basic mechanisms of disease in these infants [1-3]. There is growing evidence that late pre-terms constituting a majority of preterm births, have increased morbidity/mortality compared to term babies, and take up a significant amount of healthcare resources.

Since late PT SGA (239-259 days of gestational age) births are on the increase, it is mandatory to identify

these high risk neonates to prevent and diagnose complications at the earliest.

Method

The study was conducted between August 2011 to July 2012 including both late PT and term SGA babies. It was approved by the Institutional Ethics Committee and written informed consent was obtained from the parents of all the newborns.

Exclusion critiria: Out born babies and babies with major malformations were excluded. Relevant maternal clinical data, labor details, neonatal history and morbidity details were recorded in a predesigned case form. Ggestational age (GA) assessment was done by mother's LMP, antenatal USG during 1st trimester and New Ballard's score.

All neonates admitted to NICU were monitored for various health issues including respiratory distress syndrome (RDS), transient tachypnea of newborn (TTN), apnea, hyperbilirubinemia, hypoglycemia, feeding difficulties, hypothermia, sepsis, perinatal asphyxia and pulmonary hypertension.

Results

Out of 269 NICU admissions during the study period, n = 68 babies were inborn term and late preterm SGA babies and were included in the study. The percentage of late PT babies (52.94%) (n = 36) was more than that of term babies (47.06%) n = 32. The female to male ratio was 1.6: 1 in both term and late PT group.

Most of the mothers were in the age group of 21-30 years (67.67%) n= 46, with a height of more than 145 cm (97.1%) n=66.51.47% of the mothers were primigravidas (n=35). Significant association was found between the parity of the mother and SGA babies ($p < 0.05$, $p = 0.015$). 68% of term SGA babies and 63% of the late PT SGA babies were born to primigravida and multigravida mothers respectively.

Various maternal risk factors affecting the outcome of SGA babies were screened. The commonest causes which were observed were - pregnancy induced hypertension (PIH)/ preeclampsia, antepartum haemorrhage (APH)/ placenta praevia, twin deliveries, severe oligohydramnios, premature rupture of membranes (PROM), gestational diabetes, maternal infection etc. Of all these, PIH was found to be an important risk factor for SGA ($p< 0.05$, $p= 0.02$). Other prenatal risk factors did not have any statistical significance.

Another interesting observation was that most of the term SGA babies were born through normal vaginal delivery whereas late PT SGA babies were born through cesarean section for different indications. Although statistically it was not significant, it had a significant contribution towards the increased morbidity in late PT infants.

Neonatal morbidity rises as the gestational age falls, since immaturity of various organ systems is central in the pathogenesis of various neonatal disorders in late PT neonates. We found significantly increased risk of the following complications in the late PT SGA group (using the chi-square test and Fisher's exact test) as compared to the term SGA infants (findings are summarized in Table 1): (1) Perinatal asphyxia at birth ($p = 0.003$, OR = 0.1179), (2) Feed difficulties ($p = 0.041$, OR = 0.313), (3) Sepsis ($p = 0.045$, OR = 0.288) and (4) Hypoglycemia ($p <= 0.001$, OR = 0.074).

The term SGA babies had significantly higher incidence of meconium aspiration syndrome (MAS).

The percentage of jaundice was also higher in late PT babies (54.8%) compared to term babies (45.16%). Our study revealed that jaundice was the most common cause out of all for referral to the NICU in both the groups (54.84% in late pre-terms and 45.16% in term SGAs), but other causes seen in the late pre-terms included sepsis, feeding difficulty and hypoglycemia.

It was found that the rate of aggregated morbidity increased weekly as the GA decreased: 1% at >= 37 weeks; 12% at 36 weeks; 33% at 35 weeks, and 54% at 34 weeks. Fortunately, no mortality was observed in our study.

Discussion

This study is among the few Indian studies to evaluate the risk factors and outcomes in late PT SGA infants. They are the fastest growing subgroup of neonates and the incidence of medical problems,

Table 1: Distribution of babies with respect to perinatal morbidity and outcome.

Perinatal morbidity	*Outcome*		*Total*	*p value*
	Term (n=32)	*Late preterm (n=36)*		
Asphyxia	2	13	15	0.003*
Feeding difficulties	9	20	29	0.041*
Sepsis	6	16	22	0.045*
Jaundice	14	17	31	0.965
Meconium aspiration syndrome	10	2	12	0.009*
Hypoglycemia	2	17	19	<0.001*
Polycythemia	0	1	1	0.999
Pulmonary hypertension	1	0	1	0.47
Respiratory distress syndrome	9	15	24	0.312
Others	0	4	4	0.116

**p value < 0.05 indicates significant association.*

either short term or long term is higher among late PT than term infants [1, 4, 5].

In the present study significant association was found between parity of the mother and SGA babies. 68% of the term babies and 63% of the late PT SGA babies were born to primigravida and multigravida mothers, respectively. It was shown in a study [6], that the risk of an SGA baby increased significantly in mothers who smoked (adjusted OR 2.41;95% CI 1.78-3.28), primi-parous mothers (adjusted OR 1.34; 95% CI 1.03 - 1.73), mothers of Indian ethnicity (adjusted OR 3.22; 95% CI 1.95 - 5.30), women with pre eclamptic toxaemia (adjusted OR 2.42; 95% CI 1.08-5.40) and those with pre-existing hypertension toxaemia (adjusted OR 5.49; 95% CI 1.81-16.71). Mothers of SGA infants were shorter ($p<0.001$) and reported lower pre-pregnancy body weights ($p < 0.001$) than mothers of AGA infants.

In one of the few such studies [7] to evaluate the magnitude of perinatal risk factors in the causation and neonatal outcome of SGA babies in Indian setup, the major maternal risk factor for SGA babies was found to be toxemia of pregnancy (30.09%); others being hypertensive disorders of pregnancy excluding toxemia (5.8%), diabetes mellitus (1.94%), medical disorders including renal and cardiac (3.88%) and anemia (Hb. 8g%). Similar data were reported in studies by Western authors [6, 8]. In the present study also, PIH was found to be an important risk factor for SGA babies ($p < 0.05$).

An interesting observation in our study was that majority of late PT SGA were born through lower segment cesarean section (LSCS), most common being elective LSCS. Although statistically it was not significant it had significant contribution towards the increased morbidity in this subgroup of infants. No consensus has yet been reached on the contributing factors of the increase in late PT births. Available data suggest that medically indicated deliveries and patient driven factors may be responsible [9].

Since the actual indication for delivery is recognized as a determinant in neonatal outcome [10], more attention should be devoted to examining the etiology of late PT births; this study [10] also concluded that a significant number of late preterm births were potentially avoidable.

Late PT SGA neonates are at higher risk of morbidity than their term counterparts. Another study [5] found that the risk for neonatal morbidity was seven times higher in late PT infants than in term controls. The incidence of apparent life threatening

events in late PT infants is at least 8 times higher than in full term infants [11]. Available data suggests that respiratory distress syndrome (RDS), hyper bilirubinemia, intra ventricular haemorrhage (IVH), culture proven sepsis, temperature instability, hypoglycemia, dehydration and feeding difficulties are frequent problems in late PT neonates [12].

Another Indian study[13] also studied various risk factors for jaundice in late PT babies and found that there is a high incidence of significant jaundice in late PT infants. We also found that the aggregated morbidity increased weekly as the gestational age decreases from 37 weeks to 34 weeks.

Rate of NICU admission, length of stay and neonatal morbidity are significantly higher in late PT as compared to term births [14]. Neonatal complications were minimal at 38 weeks or longer. In another study [15], late PT infants were found to be at significantly higher risk for overall morbidity due to any cause [$p < 0.001$; adjusted OR : 5.5; 95% CI 4.2- 7.1].

As a result of the higher morbidity seen in late PT babies, it is not surprising that their survival rate is significantly reduced [16]. No mortality was observed in our study. Our analysis has focused only on morbidities occurring immediately after birth. We have not measured the long term associated morbidities which is an exciting field for further study.

Conclusion

We found significantly increased risk of perinatal asphyxia at birth, feeding difficulty, sepsis and hypoglycemia in the late PT neonates. Hyper bilirubinemia was the most common cause on the whole for referral to NICU in both the groups (54.84% in late PT and 45.16% in term SGA babies). The late PT SGA neonates constitute a vulnerable group.

Conflicts of interest

Authors declare no conflicts of interest.

References

[1] Wang ML, Dorer DJ, Fleming MP, Catlin EA. Clinical outcomes of near term infants. Pediatrics. 2004; 114(2):372-376.

[2] Shapiro-Mendoza CK, Tomashek KM, Kotelchuck M, Barfield W, Weiss J, et al. Risk factors for neonatal morbidity and mortality among "healthy" late preterm newborns. Semin Perinatol. 2006; 30(2):54-60.

[3] Kramer MS, Demissie K, Yang H, Platt RW, Sauve R, et al. The contribution of mild and moderate preterm birth to infant mortality. Fetal and Infant Health Study Group of the Canadian Perinatal Surveillance System. JAMA. 2000; 284(7):843-849.

[4] Ramachandrappa A, Jain L. Health issues of the late preterm infant. Pediatr Clin North Am. 2009; 56(3):565-577.

[5] Shapiro-Mendoza CK, Tomashek KM, Kotelchuck M, Barfield W, Nannini A, et al. Effect of late-preterm birth and maternal medical conditions on newborn morbidity risk. Pediatrics. 2008; 121(2):e223-232.

[6] Thompson JM, Clark PM, Robinson E, Bercroft DM, PattisonNS, et al. Risk factors for small for gestational age babies: The Auckland Birthweight Collaborative Study. J Paediatr Child Health. 2001; 37(4):369-375.

[7] Narang A, Chaudhuri MK, Kumar P. Small for gestational age babies: Indian scene.Indian J Pediatr .1997; 64(2):221-224.

[8] Peleg D, Kennedy CM, Hunter SK. Intrauterine growth restriction: Identification and management. Am Fam Physician.1998; 58(2):453-460,466-467.

[9] Davidoff MJ, Dias T, Damus K, Russell R, Bettegowda VR, et al. Changes in the gestational age distribution among US singleton births: impact on rates of late preterm birth, 1992-2002. Semin Perinatol. 2006; 30(1):8-15.

[10] Laughon SK, Reddy UM, Sun L, Zhang J. Precursors for late preterm birth in singleton gestations. Obstet Gynecol. 2010; 116(5):1047-1055.

[11] Hunt CE. Ontogeny of autonomic regulation in late preterm infants born at 34-37 weeks postmenstrual age. Semin Perinatol. 2006; 30(2):73-76.

[12] Shaw RR. Late preterm birth: A new nursing issue. MCN Am J Matern Child Nurs. 2008; 33(5):287-293.

[13] Lavanya KR, Jaiswal A, Reddy P, Murki S. Predictors of significant jaundice in late preterm infants. Indian Pediatr. 2012; 49(9):717-720.

[14] Lubow JM, How HY, Habli M, Maxwell R, Sibal BM. Indications for delivery and short-term neonatal outcomes in late preterm as compared with term births. Am J Obstet Gynecol. 2009; 200(5):e30-33.

[15] Jaiswal A, Murki S, Gaddam P, Reddy A. Early Neonatal Morbidities in Late Preterm Infants. Indian Pediatr. 2011; 48(8):607-611.

[16] Tomashek KM, Shapiro-Mendoza CK, Davidoff MJ, Petrini JR. Differences in mortality between late-preterm and term singleton infants in the United States, 1995-2002. J Pediatr. 2007; 151(5):450-456.