Original Research Article

Neonatal outcomes in early term neonates versus term neonates in a tertiary care hospital - A cross sectional comparative study

M.A. Ramprakash[1*], Charanraj H[2], S. Manikumar[3], K. Srinivasan[4], L. Umadevi[5], Giridhar S[6], Rathinasamy[7]

[1]M.D. (Pediatrics) Final Year PG, Department of Pediatrics, Chettinad Hospitals and Research Institute, Kelambakkam, India

[2]DM Neonatology Final Year PG, Department of Neonatology, Chettinad Hospitals and Research Institute, Kelambakkam, India

[3]Assistant Professor, Department of Neonatology, Chettinad Hospitals and Research Institute, Kelambakkam, India

[4]Professor and Head, Department of Neonatology, Chettinad Hospitals and Research Institute, Kelambakkam, India

[5]Professor and Head, Department Pediatrics, Chettinad Hospitals and Research Institute, Kelambakkam, India

[6]Associate Professor, Department of Neonatology, Chettinad Hospitals and Research Institute, Kelambakkam, India

[7]Professor, Department of Neonatology, Chettinad Hospitals and Research Institute, Kelambakkam, India

[*]Corresponding author email: **ramprakashsenathypathy@gmail.com**

Abstract

Background: Preterm birth is one of the chief causes of neonatal mortality and morbidity. The larger studies presented higher rate of adverse outcomes in association to term infants in contrast of neonatal mortality and morbidity. The majority of studies confirmed significantly higher rate of adverse outcomes in preterm in the contrast of neonatal mortality and morbidity. In this contest, we studied

the association between different antenatal parameters between early term neonates and full term neonates and to compare neonatal complications.

Materials and methods: A total 180 neonates born in the study setting, for a period of 6 months were included and study was conducted in Department of Neonatology and Obstetrics and Gynecology in a tertiary care teaching hospital in south India. A structured and validated case report form was designed for the purpose of data collection. The tool was validated by including the inputs from five experts in the subject area. Descriptive analysis of demographic parameters, antenatal and intra natal parameters were done. Chi square test was used to assess the statistical significance of the association. P value < 0.05 was considered as statistically significant. IBM SPSS version 21 was used for statistical analysis.

Results: A total of 180 infants were included in the study, out of which 92 infants (51.1%) were early term and the remaining 88 (48.9%) were full term infants. The odds of early term pregnancy were 2.44 (95 % CI 1.04 to 5.7, p value 0.028) times higher in diabetic mothers, compared to mothers without diabetes. The odds of early term pregnancy was 4.08(95% CI 1.66 to 10.06, p value 0.001) for maternal hypertension and 11.81(95% CI 1.50 to 93.77, p value 0.004) for maternal anemia. The proportion of LSCS was quite high in early term pregnancy, compared to term pregnancy (52.2% Vs 18.2%, p value <0.001). The proportion of small for gestational age (SGA) babies was 29.7% in early term pregnancies (P value 0.011). The odds of hypoglycemia were 3.42 times more in ET pregnancies, compared to full term pregnancies (OR 3.423, 95 % CI 1.37 to 8.52, p value 0.006).

Conclusion: The early-term delivery is associated with greater morbidity. There was reasonable relationship was evident involving maternal diabetes mellitus, hypertension, anemia, IUGR and early term pregnancy. The proportion of LSCS was reasonably high in early term pregnancy with slightly higher proportion small for gestational age babies. Neonatal intensive care admissions were found higher in early term than full term pregnancies. Further, there is continual relationship between gestational age and neonatal morbidity from early pregnancy.

Key words

Introduction

Preterm birth is one of the major causes of neonatal mortality and morbidity. The complications of preterm birth arise from immature organ systems, which are not prepared to support life in the extra uterine setting [1]. The risk of neonatal illness decreases with gestational age, reflecting the fragility and immaturity of the brain, immune system, lungs, kidneys, eyes, skin, and gastrointestinal system [2]. Infants born preterm are more likely to die during the peri neonatal period and infancy [3]. The majority of studies confirmed significantly higher rate of adverse outcomes in preterm in the contrast of neonatal mortality and morbidity [4, 5]. To this rationale, we have studied the association between different antenatal parameters between early term neonate and full term neonates and to compare neonatal complications.

Material and methods

Study site: This study was conducted in Department of Neonatology and Obstetrics and Gynecology in Chettinad Hospitals and Research Institute, Kelambakkam, India.

Study population: Pregnant women and their neonates delivered in the study setting during the study period were included in the study

Study duration: The data collection for the study was done from January 2015 to June 2015, i.e. for a period of 6 months.

Sample size and sampling method: A total 180 neonates born in the study setting, during the study period were included in the study. All the participants were included in to the study sequentially, hence no sampling was done.

Study tools: A structured and validated case report form (CRF), designed for the purpose of data collection. The tool was validated by including the inputs from five experts in the subject area.

Ethical considerations: Informed written consent was obtained from all the women, after explaining the risks and benefits involved in the study and voluntary nature of their participation. Confidentiality of the study participants was maintained throughout the study. The neonates were evaluated for the complications, as per the routine hospital management protocol; hence no additional test was done for the purpose of the study.

Statistical methods

Descriptive analysis of demographic parameters, antenatal and intra natal parameters were done. Occurrence of various neonatal complications like hypoglycemia, NICU admission and NNH were considered as primary outcome variables. The mode of delivery and birth weight of the baby were considered as secondary outcome variables. The gestational age at the time of delivery, classified as early term or full term was considered as primary explanatory parameter. Categorical variables were presented as frequencies and percentages. Quantitative variables were presented as mean and standard deviation. The association between the explanatory and outcome variables was done by cross tabulation and calculating the corresponding odds ratio and 95% CI. Chi square test was used to assess the statistical significance of the association. P value < 0.05 was considered as statistically significant. IBM SPSS version 21 was used for statistical analysis.

Results

A total of 180 infants were included in the study, out of which 92 infants (51.1%) were early term and the remaining 88 (48.9%) were full term infants. The proportion of male and female babies was 55.6% and 44.4% respectively. (**Table - 1**)

There was a strong positive association between maternal diabetes mellitus, hypertension, IUGR, anemia and the early term pregnancy in study population. The odds of early term pregnancy were 2.44 (95 % CI 1.04 to 5.7, p value 0.028) times higher in diabetic mothers, compared to mothers without diabetes. The odds of early term pregnancy was 4.08 (95% CI 1.66 to 10.06, p value 0.001) for maternal hypertension and 11.81 (95% CI 1.50 to 93.77, p value 0.004) for maternal anemia. The odds of early term pregnancy were 3.06 (95% CI 1.45 to 6.48) times higher, when there was intra uterine growth retardation (IUGR). (**Table - 2**)

Table - 1: Summary of the study groups (N=180).

Parameter	Frequency	Percentage
I. Gestational age		
Early term	92	51.1
Full term	88	48.9
II. Gender of the baby		
Male	100	55.6
Female	80	44.4

The proportion of LSCS was quite high in early term pregnancy, compared to term pregnancy (52.2% Vs 18.2%, p value <0.001). The proportion of small for gestational age (SGA) babies was 29.7% in early term pregnancies, compared to 14% full term pregnancies (P value 0.011) as per **Table – 3**.

The odds of hypoglycemia were 3.42 times more in ET pregnancies, compared to full term pregnancies (OR 3.423, 95 % CI 1.37 to 8.52, p value 0.006).The odds of NNH were 3.59 times in early term pregnancies, compared to full term pregnancies (OR 3.59, 95 % CI 1.62 to 7.92, p value 0.001). The odds of NICU admission were 2.61 times in early term pregnancies, compared to full term pregnancies (OR 2.61, 95 % CI 1.37 to 4.99, p value 0.003). The odds of EBF were lesser in early term babies, compared with full term babies (OR 0.38, 95 % CI 0.17 to 0.81, p value 0.003) as per **Table – 4**.

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Table - 2: Factors leading to early term delivery in study population (N=180).

Parameter	ET	FT	Odds ratio	P-value	95% CI	
					Lower	Upper
I. Diabetes mellitus						
Yes	20 (69%)	9 (31.0%)	2.44	0.028	1.04	5.70
No	72 (47.7%)	79 (52.3%)				
II. Hypertension						
Yes	24 (77.4%)	7 (22.6%)	4.08	0.001	1.66	10.06
No	68 (45.6%)	81 (54.4%)				
III. IUGR						
Yes	30 (71.4%)	12 (28.6%)	3.06	0.003	1.45	6.48
No	62 (44.9%)	76 (55.1%)				
IV. Anemia						
Yes	11 (91.7%)	1 (8.3%)	11.81	0.004	1.50	93.57
No	81 (48.2%)	87 (51.8%)				

Table - 3: Impact of early term pregnancy on mode of delivery and birth weight of the baby in study group (N=180).

Parameter	ET	FT	Chi square value	P-vale
I. Mode of delivery				
NVD	40 (43.5%)	63 (71.6%)	22.981	<0.001
LSCS	48 (52.2%)	16 (18.2%)		
Vaccume	4 (4.3%)	9 (10.2%)		
II. Categories of birth weight				
AGA	56 (61.5%)	66 (76.7%)	6.453	0.040
SGA	27 (29.7%)	12 (14.0%)		
LGA	8 (8.8%)	8 (9.3%)		

Table - 4: Comparison of neonatal complications in early term and preterm infants in study group (N=180).

Parameter	ET	FT	Odds ratio	P-value	95% CI	
					Lower	Upper
I. Hypoglycemia						
Yes	21 (22.8%)	7 (8.0%)	3.423	0.006	1.374	8.527
No	71 (77.2%)	81 (92.0 %)				
II. NNH						
Yes	29 (31.5%)	10 (11.4%)	3.590	0.001	1.627	7.925
No	63 (68.5%)	78 (88.6%)				
III.NICU ADMISSION						
Yes	40 (43.5%)	20 (22.7%)	2.615	0.003	1.370	4.994
No	52 (56.5%)	68 (77.3%)				
IV. Feeding						
DBF	65 (70.7%)	76 (86.4%)	0.380	0.011	0.178	0.810
MIXED	27 (29.3%)	12 (13.6%)				

Discussion

Considerably a group of other studies [6-9] found early-term infants whom were delivered by cesarean section contributing to longer duration of hospital stay and resulting more respiratory morbidity and mortality. Our study results were also analogous to those found by McIntire, et al. [10] and Luis C. Machado Jr, et al. [11]. Early-term delivery is also associated with greater morbidity and with increased admission to intensive neonatology service [12]. The economic cost of early term birth is high in terms of neonatal intensive care and ongoing health care and educational needs [13].

Our study results were also supported by Shaon Sengupta, et al. [14]; early-term births were associated with high neonatal morbidity and with NICU or neonatology service admission. This study reconfirmed that gestational age remains fair interpreter of neonatal morbidity even after adjustment for mode of delivery.

Conclusion

Early-term delivery is associated with greater morbidity and prolongs the hospital stay. There was sensible relationship was evident between maternal diabetes mellitus, hypertension, anemia and early term pregnancy. The proportion of LSCS was reasonably high in early term pregnancy with slightly higher proportion small for gestational age babies. Neonatal intensive care admissions were found higher in early term than full term pregnancies. Further, there is incessant relationship between gestational age and neonatal morbidity from early pregnancy. Additional research on maternal factors leading to early-term delivery and its financial effect is essential to advance outcomes in the early-term neonatal population.

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