COMPARISON OF SHORT TERM NEONATAL MORBIDITIES IN LATE PRETERM VS TERM INFANTS

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ABSTRACT

Objective: To compare frequency of short term (first 7 days of life) neonatal morbidities in late preterm vs term infants.

Study Design: Prospective cohort study.

Place and Duration of Study: Study was carried out over a period of six months from Jan 2016 to Jun 2016.

Methodology: A total of 130 patients (65 in each group) were included in this study. All infants enrolled in study were followed till first 7 days of life for any morbidity by clinical evaluation. Infants who were discharged before 7 days were called for mandatory follow up evaluation in the outpatient clinic on 7th day of life.

Results: Mean age of the babies was 3.28 ± 1.45 and 1.58 ± 0.65 in group-A and B, respectively. Mean gestational age in group-A was 35.18 ± 0.73 weeks and in group-B was 38.38 ± 11.07 weeks. Mean weight (kg) of neonates was 2.53 ± 0.33 in group-A and 3.24 ± 0.49 in group-B. Morbidities were found as follows: Probable sepsis was seen in 17 cases (26.2%) of group-A and 7 cases (10.8%) of group-B with *p*-value of 0.024. Respiratory morbidity observed in 15 cases (23%) of group-A and 3 cases (4.6%) of group-B with *p*-value of 0.002. Hyperbilirubinemia developed in 33 cases (50.8%) of group-A and in 15 cases of group-B with *p*-value of 0.001.

Conclusion: The frequency of sepsis, respiratory morbidity and hyperbilirubinemia was more in late preterm as compared to term infants.

Keywords: Late preterm, Neonatal sepsis, Neonatal jaundice, Short term neonatal morbidities, Term infants.

INTRODUCTION

All over the world, premature babies add significantly to neonatal mortality and morbidity. Late preterm births, at 34^{+0} and 36^{+6} weeks of gestation, the largest group of all preterm births (75% of all preterm births) constitute approximately two-thirds of the recent increase in preterm births[1]. The frequency of premature deliveries per year is on the rise all over the world. More than 50% of these births occur in Asia, particularly South Asia and Africa[2]. Recent study shows 74% of all preterm births are late preterm in USA[3]. Many late preterm infants (LPIs) are similar in size to term infants and therefore, maybe treated by caregivers and health care professionals as if they are develop mentally similar to term infants. However, late preterm infants are physiologically immature and seen to be at greater risk of complications and death than are term infants[4]. Many obstetric decisions during the last weeks of gestation involve weighing the risks and benefits of delivering the infant prematurely against the risk and benefits of extending pregnancy. For fully informed decision making a full understanding of risk factors associated with both is necessary[2].

Significant declines in the infants mortality rate over the last decade has been observed, but the infant mortality rate for late-preterm infants has remained three to five fold higher than that for term infants. The risk of infant death increases with each decreasing week of estimated gestation[5]. Late preterm infants also at increased risk of morbidity before hospital discharge and has higher rates of hospital readmission in the first months of life. They are 4 times more at risk than

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term infants of having 1 medical condition and 3.5 times more to have 2 conditions diagnosed[6]. Latepreterm infants are often considered as normal and are discharged much earlier (<2-night hospital stay), which may be a factor in the increased overall risk of re-hospitalization[3].

Most late preterm (80%) will have a neonatal course with no significant complications. However, compared with term neonates, late preterm newborns are at increased risk of complications like resuscitation at birth, feeding difficulty, jaundice, hypoglycemia, temperature instability, apnea, and respiratory distress[7]. These morbidities variably result in workup for sepsis evaluations and antibiotic therapy, intravenous fluid administration, ventilator support, and increased length of stay in hospital. In addition to above mentioned co morbidities, LP infants hospital stay may also be affected by birth weight, mul-tiple gestations, gender and mode of delivery[8].

Much has been published and done about early preterms, but there is very limited data available in developing countries like Pakistan regarding problems of late preterms. The available data is primarily from developed countries. The obstetric and newborn care is different in our country as compared to developed countries. Keeping this in mind study was planned, which aimed to study common short-term (first 7 days of life) neonatal morbidities in late preterm babies.

METHODOLOGY

This prospective cohort study was conducted in the Department of Pediatrics, Combined Military Hospital, Peshawar, from Jan to Jun 2016. Sample size was calculated by using WHO calculator with following parameters: Level of significance=5%, Power of test=80%, Anticipated population P1=27.2%[2], Anticipated population P2=10.1%[3], Sample size=65 in each group, total n=130. Sampling technique used were non-probability consecutive sampling. All consecutive born babies deliver in the hospital in the study period were subjected to gestational assessment. Gold standard for gestational assessment was considered early obstetric ultrasound (6-12 weeks). In the absence of ultrasound, and if the menstrual history is reliable, gestation was calculated from the date of last menstrual period. In the absence of both, the gestation was calculated from clinical assessment by new Ballard score, babies with gestation from 34-42 weeks included in study and divided in two groups.

a. Exposed (late preterm)

   Gestation 340/7 to 366/7 weeks

b. Non-exposed (term)

   Gestation 37-42 weeks

Babies born early preterm (<34 weeks gestation) or late (>42 weeks gestation), newborns with congenital anomalies and newborns with known chromosomal syndromes were excluded from the study. The following operational definitions were used:

Late Term

Gestational age 340/7 to 366/7 weeks

Term

Gestational age 37 to 42 weeks

Short Term Morbidities

Presence of any these morbidities during first 7 days of life.

Presumed Sepsis

Positive septic screen one of the four parameters

a. Positive CRP
b. TLC <5000/mm^3 or >15000/min^3
c. Absolute neutrophil count less than 1800/mm^3 or >7200/mm^3
d. Platelets < 100,000/mm^3

Hyperbilirubinemia

Clinically visible jaundice requiring phototherapy as per AAP chart. Criteria for 35 weeks were used for infants with 34 weeks gestation.

Respiratory morbidities

Presence of at least 2 of the following criteria:

1. Respiratory rate >60/min

2. Subcostal/intercostal recessions
3. Expiratory grunt/moaning
4. Requiring oxygen therapy

Ventilation

Requiring CPAP (continuous positive airway pressure) or intubation and ventilator.

Data Collection Procedure

Study was started after approval from ethical review committee of the institute. All data was entered in the proforma made for study. All live born late preterm infants (340/7 to 366/7 weeks) and term infants (37 to 42 weeks) born in study period were included in the study. Informed parental consent was obtained prior to enrolment in the study. Infants with major congenital anomalies and those with clinically identified chromosomal syndromes were excluded.

All infants enrolled in study were followed till first 7 days of life for any morbidity by clinical evaluation. Infants who were discharged before 7 days were called for mandatory follow-up evaluation in the outpatient clinic on 7th day of life. Infants who would be unable to come for follow-up, were called on telephone and status of the baby was enquired. All procedures were performed by pediatric residents.

Data Analysis Procedure

All data was analyzed using SPSS software. Descriptive statistics was used to calculate quantitative and qualitative variables. For quantitative variables like age mean ± SD was calculated. Qualitative variables gender, hyperbilirubinemia, respiratory morbidities, probable sepsis and need for ventilation was measured as frequencies and percentages. Chi square test was used for qualitative variables (like gender, hyperbilirubinemia, respiratory morbidities, probable sepsis and need for ventilation) between two groups. A *p*-value <0.05 was taken as significant.

RESULTS

A total of 130 cases (65 in each group) were included in the study. Group-A belonged to later preterm neonates and in group-B term neonates were included.

Age ranged between 1-6 days. Mean age of the babies was 3.28 ± 1.45 and 1.58 ± 0.65 in group-A and B, respectively. In group-A 20 (30.8%) mothers and in group-B 19 (29.2%) mothers were were primigravida while multigravida were 45 (69.2%) in group-A and 46 (70.8%) in group-B. Mother comorbidity was found in 6 cases of group-A and 2 cases of group-B. Morbidities were found as follows: visible jaundice in 28 (43.0%) cases of group-A and 9 cases (13.9%) of group-B with *p*-value of <0.001. Probable sepsis was seen in 17 cases (26.2%) of group-A and 7 cases (10.8%) of group-B with *p*-value of 0.024. Respiratory morbidity observed in 15 cases (23%) of group-A and 3 cases (4.6%) of group-B with *p*-value of 0.002. Need of ventilation (CPAP or invasive ventilation) in 10 cases (15.4%) of group-

Table-I: Distribution of cases by visible jaundice requiring phototherapy.

Visible jaundice	Group-A (Late preterm)	Group-B (Term)	Total	*p*-value
	n (%)	n (%)		
Yes	28 (43.0)	09 (13.9)	37	0.000
No	37 (57.0)	56 (86.1)	93	
Total	65 (100.0)	65 (100.0)	130	

Table-II: Distribution of cases by probable sepsis.

Probable sepsis	Group-A (Late preterm)	Group-B (Term)	Total	*p*-value
	n (%)	n (%)		
Yes	17 (26.2)	07 (10.8)	24	0.024
No	48 (73.8)	58 (89.2)	106	
Total	65 (100.0)	65 (100.0)	130	

A and 2 cases (3.0%) of group-B with *p*-value of 0.015. Hyperbilirubinemia developed in 33 cases (50.8%) of group-A and in 15 cases of group-B with *p*-value of 0.001. Mean mother age was 23.15 ± 2.94 and 23.48 ± 3.06 in group-A and B, respectively. Mean gestational in group-A was 35.18 ± 0.73 weeks and in group-B was 38.38 ± 11.07 weeks. Mean weight (kg) of neonates was 2.53 ± 0.33 in group-A and 3.24 ± 0.49 in group B.

Table-III: Distribution of cases by respiratory morbidity.

Respiratory Morbidity	Group-A (Late preterm)	Group-B (Term)	Total	*p*-value
	n (%)	n (%)		
Yes	15 (23.0)	03 (04.6)	18	0.002
No	50 (77.0)	62 (95.4)	112	
Total	65 (100.0)	65 (100.0)	130	

Table-IV: Ventilation (CPAP or invasive ventilation).

Ventilation	Group-A (Late preterm)	Group-B (Term)	Total	*p*-value
	n (%)	n(%)		
Yes	10 (15.4)	02 (03.0)	12	0.015
No	55 (84.6)	63 (97.0)	118	
Total	65 (100.0)	65 (100.0)	130	

Table-V: Distribution of cases by hyperbilirubinemia.

Hyperbili-Rubinemia	Group-A (Late preterm)	Group-B (Term)	Total	*p*-value
	n (%)	n (%)		
Yes	33 (50.8)	15 (23.0)	48	0.001
No	32 (49.2)	50 (77.0)	82	
Total	65 (100.0)	65 (100.0)	130	

DISCUSSION

It is necessary to know the exact mortality and morbidity of premature babies. This will help the lawmakers and health care providers in making policies regarding preterm births and their care. The mortality and morbidity of premature babies vary greatly in different regions of the world. Almost 50% of the late preterm babies in developing countries die due to limited resources and non-availability of advance care. Health care set ups are not accessible to everyone. Most of the mothers are not educated regarding breast feedings practices, how to keep the preterm babies warm and hygienic measures for preventing infections. Mortality from respiratory problems is very high due non availability of specific therapies like surfactant and mechanical ventilators. On the other hand, mortality of these babies is negligible in developed countries[9]. As most late preterm babies appear mature and have birth weight comparable to full term neonates, these late pre termer were initially treated like full term neonates. But this is not true as mortality and morbidity for late pre termer is much higher as compared to full term infants. To decrease the overall mortality and morbidity of neonates, it is now stressed, that this age group should be paid special attention[10].

Most of the studies carried out in Pakistan are about term neonates or their problems[11-13]. Few local studies have addressed problems related to preterm babies. Late pre termer are faced with a lot of problems. Included in the list are inability to maintain normal blood sugar, breathing difficulties, feed intolerance, hypothermia, increase prevalence of infections due to immature immune system, hyper-bilirubinemia, TTN and apneic spells[14]. The most observed problems in late preterm babies in our study were hyperbilirubinemia, sepsis and respiratory issues. Mortality for late pre termer is much higher as com-

pared to full term neonates, approaching almost three fold[15].

In this study comparison was done between late preterm and term neonates which revealed that visible jaundice (43% vs 13.9%), probable sepsis (26.2% vs 10.8%), respiratory morbidity (23% vs 4.6%) and ventilation (CPAP or invasive ventilation) (15.4% vs 3.0%) were more prevalent in late preterm as compared to term babies. Almost similar findings have been mentioned in the literature: hyperbilirubinemia requiring phototherapy (37.9% vs 11.0%)[16], presumed sepsis (27.2% vs 10.1%)[2], Respiratory morbidities (10.5% vs 1.5%)[18] and ventilation (15.0% vs 0.0%)[2] which are more significant in late preterm babies than term babies[6].

The pattern of diseases in late preterm babies differ from that of term of babies. This group of neonates may require respiratory support more than term babies. In this study too, respiratory distress was observed more in late pre termer. Only 5% of the full term neonates suffered from respiratory distress whereas in late pre term babies the figure approached to 23%. Respiratory support in the form of CPAP and mechanical ventilations was given to 15% of LPI as compared to term neonates (only 3% required respiratory support with *p*-value <0.05). Similar to our findings an Italian study also revealed that LPI are more prone to respiratory distress and compared to term infants (12% vs 1%, respectively). In their study only 0.56% term babies required respiratory support as compared to 10% of PTI[18]. The most common observed morbidity found in our PTI cohort was hyperbilirubinemia which was observed in almost 50% of the PTI as compared to TI i.e 23%. In a study by Nabi *et al*, the most commonly observed morbidity in PTI was found to be hyperbilirubinemia (41% PTI vs 15% TI). Likewise respiratory distress was more prevalent in PTI as compared to TI in their study too[19].

Wang *et al* studied the problems of late pre term infants and their clinical outcome. They concluded that the incidence of low blood sugar, hyperbilirubinemia, breathing difficulty and temperature instability were much higher in late pre termers. The need for admission to neonatal intensive care unit and advance care in the form mechanical ventilation, is also significantly higher for these neonates[9,20]. These results are comparable with our findings.

CONCLUSION

The prevalence of neonatal infections, jaundice and respiratory distress was significantly higher in late preterm babies as compared to full term infants in our study. The requirement for respiratory support and phototherapy was more in late preterm infants as compared to full term babies.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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