Incidence of early onset hypocalcaemia in newborns admitted in level III NICU

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Abstract

Background: Metabolic derangements like hypoglycaemia, hypocalcaemia, hyponatremia are common in newborns especially at risk babies like immature babies, infants of diabetic mother (IDM), babies with perinatal asphyxia[1-3]. Hypocalcaemia can manifest as seizures, apnoea, jitteriness and stridor.[(4)] But majority of hypocalcaemia in early neonatal period (<72 Hrs.) are asymptomatic, which cannot be picked up easily. No study has been conducted to know the incidence of early onset hypocalcemia in babies admitted in neonatal intensive care unit. Hence we did this study in Baby Memorial Hospital, a tertiary referral hospital, in Calicut; Incidence of early onset hypocalcaemia is more common in high risk neonates (immature babies, infants of diabetic mothers, babies with perinatal asphyxia).

Aims of the study: To know the incidence of early onset hypocalcaemia in neonates admitted in NICU.
To know the incidence of asymptomatic and symptomatic early onset hypocalcaemia.
To know the high risk period of early onset hypocalcaemia.

Materials and Methods: A hospital based prospective observational study with a sample size of 150 consecutive babies admitted in NICU. After taking informed consent each baby in NICU underwent serial serum calcium estimation at 24, 48 & 72 hours and serum magnesium & serum albumin estimation at 24 hours. It was decided that if the baby develops symptoms of hypocalcaemia any time before 72 hours; serum calcium, magnesium and albumin estimation would be done again.

Observation and results: The overall incidence of early onset hypocalcaemia in Baby Memorial Hospital was 26.7%. This study shows that 24-48 hours of life has highest risk of early onset hypocalcaemia and 80% of hypocalcaemia were asymptomatic. The incidence of early onset hypocalcaemia among infants of diabetic mothers was found to be 52%.The incidence of early onset hypocalcaemia among perinatal asphyxia babies was 35%.

Conclusions: Early onset hypocalcaemia is commonly seen in premature babies, infants of diabetic mothers and perinatal asphyxia. Majority of early onset hypocalcaemia are asymptomatic. Hence it is advisable to do routine serum calcium estimation in babies admitted in NICU within 72 hours of life, preferably at 24,48 and 72 hours of life.

Keywords: Hypocalcaemia, Perinatal asphyxia, Infants of diabetic mother.

Introduction

Metabolic derangements like hypoglycaemia, hypocalcaemia, hyponatremia are common in newborns especially at risk babies like immature babies, infants of diabetic mother (IDM), babies with perinatal asphyxia.[(1-3)] Hypocalcaemia is the second common metabolic derangement after hypoglycaemia. Hypocalcaemia can manifest as seizures, apnoea, jitteriness and stridor[4]. But majority of hypocalcaemia in early neonatal period (<72 Hrs) are asymptomatic, which cannot be picked up easily. No study has been conducted to know the incidence of early onset hypocalcemia in babies admitted in neonatal intensive care unit. Hence we did this study in Baby Memorial Hospital, a tertiary referral hospital, in Calicut, Kerala where on an average 2000-3000 deliveries take place annually with an average admission to neonatal intensive care unit of 250-300 annually. Incidence of early onset hypocalcaemia is more common in high risk neonates (immature babies, infants of diabetic mothers, babies with perinatal asphyxia). These high risk neonates are invariably admitted in neonatal intensive care unit. Hence the study groups taken were babies admitted in neonatal intensive care unit. This study will try to emphasize the incidence of early onset hypocalcaemia, compare incidence of asymptomatic with symptomatic hypocalcaemia and risk period of hypocalcaemia and high risk groups of early onset hypocalcaemia.

Aims of the study

To know the incidence of early onset hypocalcaemia in neonates admitted in NICU.
To know the incidence of asymptomatic and symptomatic early onset hypocalcaemia.
To know the high risk period of early onset hypocalcaemia.

Materials and Methods

Study Design: A hospital based prospective observational study

Study settings

This study was conducted from May 1st 2009 to April 30th 2010 (taking 150 consecutive babies admitted in NICU as sample size). After taking informed consent each baby in NICU underwent serial serum calcium estimation at 24, 48 & 72 hours and serum magne- sium & serum albumin estimation at 24 hours. It was decided that if the baby develops symptoms of hypocalcaemia

any time before 72 hours; serum calcium, magnesium and albumin estimation would be done again. Those babies with serum calcium level < 7mg/ dl were considered as hypocalcaemic (Serum calcium level = 7 mg/dl is not taken as hypocalcaemia).Serum magnesium <1.5mg/dl[5] was considered as hypomagnecaemia. Serum albumin <3.5g/dl is considered as hypoalbuminaemia. Calcium estimation was done by colorimetric end point test using Arsenazo III reagent, serum magnesium by Xylidyl blue colorimetric method and albumin by Bromocresol green colorimetric method.

Sample size: 150

Inclusion criteria

Newborns admitted in NICU (level III) Baby Memorial Hospital, Calicut, Kerala

Exclusion criteria

Major congenital anamolies, surgical newborns, babies who died before 72 hours of birth

Observation and Results

A total number of 150 samples were reviewed, out of which 78(52%) were males and 72(48%) were females. Hypocalcaemia was noted in 24.4% of the male and 29.2% of the female infants. Sex did not have any influence on incidence of early onset hypocalcaemia ('p' value=0.506).

Table 1: Incidence of hypocalcaemia

	Frequency	Percentage
Yes	40	26.7
No	110	73.3
Total	150	100

Table 2: Symptomatic vs asymptomatic hypocalcaemia

	No	Percentage
Symptomatic	8	20
Asymptomatic	32	80
Total	40	100

Table 3: Day wise distribution of hypocalcaemia

Time after birth	No of Hypocalcaemia
<24 HRS	8
24-48HRS	28
48-72HRS	4

Table 4: Hypocalcaemia among immature babies

Hypocalcaemia	No	Percentage
Present	20	34
Absent	39	66
Total	59	100

Chi-Square Test

	Value	DF	P-Value
PSN Chi-Square	1.520	1	0.220

The study does not show any significant correlation between imma- turityand early onset hypocalcaemia. This finding could be attributed to the small sample size of the study.

Table 5: Incidence of hypocalcaemia among IDM

Hypocalcaemia	No	Percentage
Present	13	62
Absent	8	38
Total	21	100

Chi-square Test

	Value	DF	P-Value
PSN Chi-Square	15.505	1	0.000

The study shows significant association between IDM and earlyonset hypocalcaemia.

Table 6: Incidence of early onset hypocalcaemia among perinatal asphyxia babies

Hypocalcemia	No	Percentage
Present	7	3 5
Absent	1 3	6 5
Total	20	100

Chi-Square Test

	Value	DF	P-Value
PSN Chi-Square	.819	1	.365

The study does not show any significant relationship between perinatal asphyxia and early onset hypocalcemia. This may be because of small sample size.

Discussion

Out of the total sample population of 150 at NICU, Baby Memorial Hospital; 40 babies were detected to have early onset hypocalcaemia, irrespective of symptoms. So overall incidence of early onset hypocalcaemia in Baby Memorial Hospital was 26.7%. Hillman R et al[6] and David L et al[7] suggest that the majority of hypocalcaemia occur in the 24-48 hours of life. In our study out of 40 early onset hypocalcaemia; 28 were between 24-48 hours of life, 8 were <24 hours of life and 4 were 48-72 hours of life. So majority occur in the 24-48 hours of life.[7] Thus the study shows that 24-48 hours of life has highest risk of early onset hypocalcaemia.

Teotia m et al shows that majority of hypocalcaemia in at risk babies are asymptomatic.[8] In our study majority of hypocalcaemia were asymptomatic i.e. 80% were asymptomatic and 20% were symptomatic.

In our study early onset hypocalcaemia has come under following categories: Prematurity = 20 IDM = 13 Delivery complications = 7

Available literature shows that the incidence of hypocalcaemia among premature babies is around 30%.[9] Our study shows the incidence of early onset hypocalcaemia of 34% in the same category.

The results of our study is concurrent with Moore RT et al who have shown that the incidence of early

onset hypocalcaemia among infants of diabetic mothers is around 50%.[10] Our study shows the incidence of early onset hypocalcaemia of 62%.

According to literature incidence of early onset hypocalcaemia among perinatal asphyxia babies is around 22%. Our study shows the incidence of early onset hypocalcaemia of 35%. High value may be due to small sample size.

Parity and sex did not influence the early onset hypocalcaemia in the present study.

Note: These hypocalcaemic babies were followed up till the NICU stay with estimation of serum calcium at 5th day and subsequently if needed. No babies had hypocalcaemia in the NICU stay after 72 hours of birth and discharged with oral calcium supplementation following IV calcium.

Conclusions

- The incidence of early onset hypocalcaemia in babies admitted in NICU at Baby Memorial Hospital is 26.7%.
- The incidence of early onset hypocalcaemia among premature babies is 34%.
- The incidence of early onset hypocalcaemia among infants of diabetic mothers' is 62%.
- The incidence of early onset hypocalcaemia among perinatal asphyxia babies is 35%.
- The majority of early onset hypocalcaemia remained asymptomatic.
- The majority of early onset hypocalcaemia were during 24-48 hrs. of life.

The study shows that in NICU (level-3) setting the incidence of early onset hypocalcaemia is 26.7%. They are commonly seen in premature babies, infants of diabetic mothers and perinatal asphyxia. Majority of early onset hypocalcaemia are asymptomatic. Hence it is advisable to do routine serum calcium estimation in babies admitted in NICU within 72 hours of life, preferably at 24,48 and 72 hours of life.

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