Original Article

A study of hypoglycemia in infant of diabetic mothers

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Abstract

The prevalence of diabetes during pregnancy is increasing and this is associated with an increased risk of complications in both mother and fetus. The aim of this research is to study the onset hypoglycemia in infant of diabetic mothers and association of hypoglycemia with birth weight and gestational age. This was a prospective study that was conducted in Rajah Muthiah Medical College and hospital, Chidambaram in Newborn unit from March 2014 to February 2015. All infants born to diabetic mothers (IDM) during the study period were admitted to the neonatal care unit for evaluation. Data on sex, gestational age, and birth weight, mode of delivery, complications, investigations, birth injury, and length of hospital stay were recorded. Maternal data were retrieved from records. A total of 54 IDM were included in the study. 32(59.3%) infants were male, 22(40.7%) were females. Out of 54 babies, 47 was delivered by caesarian section. Only 7 were born by vaginal delivery. Out of 54 babies, hypoglycemia was seen in 27(50%) babies. Onset of hypoglycemia was within first 6 hours of life in most of the babies. Most of the infants were term (68.5%) and appropriate for gestational age (61.1%).

Keywords: hypoglycemia, infant of diabetic mothers.

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INTRODUCTION

Diabetes mellitus (DM) is the most common metabolic disorder complicating pregnancy[1]. About 1- 14% of all pregnancies are complicated by DM, 90% of them are gestational diabetes mellitus (GDM)[2]. Diabetes has long been associated with maternal and perinatal morbidity and mortality[3]. The neonatal mortality rate is over five times that of infants of non-diabetic mothers and is higher at all gestational age and in every birth weight for gestational age category[4]. Potential morbidities in infants of diabetic mothers are congenital anomalies, macrosomia, birth injury, asphyxia, hypoglycemia, hypocalcaemia, hypomagnesaemia, hyperbilirubinemia, neurologic instability, polycythemia, respiratory distress syndrome, small left colon syndrome etc. Hypoglycemia is seen in 25 – 40 % of babies born to diabetic Mothers[5,6]. Neonatal hypoglycemia is the most frequently presenting complication among those seen in infants born to diabetic mothers. According to the recent guidelines, blood glucose value of < 40mg/dl is hypoglycemia. It is mainly due to excessive insulin production by pancreatic islet cells of the newborn, which are enlarged and hyperactive due to maternal hyperglycemia which causes fetal hyperglycemia and stimulates the islet cells. Meticulous regulation of blood sugars, especially during the second and third trimester of pregnancy may reduce these complications.

Mostly it is asymptomatic, but the various presenting features are

- Jitteriness
- Lethargy
- Refusal of feeds
- Seizure
- Respiratory distress

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- Cyanosis
- Shock

These babies should be admitted in neonatal intensive care unit.

Periodic blood glucose monitoring is a must. In asymptomatic cases, frequent breast feeding is advised. In symptomatic cases, IV 10% Dextrose 2ml/kg should be given as a bolus. This should be followed up with glucose infusion starting from a glucose infusion rate of 4 to 6 mg/kg/min. This is to prevent rebound hypoglycemia. Hypoglycemia which persists even with a glucose infusion rate of 12 mg/kg/min is called refractory hypoglycemia. In such cases drugs such as Glucagon, Hydrocortisone and Diazoxide are used.

MATERIALS AND METHODS

Study type: Descriptive study

Period: March 2014 to February 2015

- **Inclusion criteria**
  1. All babies born to diabetic mothers in RMMCH
  2. All babies born to diabetic mothers in any hospital but brought to RMMCH within one hour of life.
- **Exclusion criteria**
  1. Out born babies more than one hour of life
  2. Any other medical illness associated with mother during pregnancy.

METHODOLOGY

IDMs who fulfilled the inclusion criteria were enrolled in the study. Informed written consent was obtained from parents/guardians prior to enrollment of their babies in the study. A predesigned proforma was used to collect data such as maternal age, parity, gestational age, previous abortions, still births, family history of diabetes and mode of delivery. Diabetic status and treatment was abstracted from the antenatal records and diagnosis of GDM was based on World Health Organization (WHO) criteria.

Babies born to diabetic mothers evaluated immediately after birth. Those requiring resuscitation were resuscitated according to National Neonatology Forum Protocol. On all neonates included in the study, detailed examination was performed at the time of admission and then daily during hospital stay and finally at the time of discharge.

Weight of each baby was recorded and gestational age calculated from New Ballard's scoring chart, subsequently they were grouped as appropriate for gestational age(AGA), large for gestational age(LGA), small for gestational age(SGA) by plotting their weight and gestational age on Lubchenco chart.

All neonates underwent investigations like complete blood count, chest X-ray, metabolic profile including blood sugar, serum calcium. Wherever indicated serum bilirubin, hematocrit was done on need basis. Cord blood was taken for random blood sugar immediately after birth for babies born in our hospital. Capillary blood glucose was done at 1, 2, 3, 6, 12, 24, 36 and 48 hours of life by glucostick method in babies heel and any abnormal values if found were sent to laboratory for confirmation by glucose oxidase method. Glucometer works by the principle of bioamperometry – glucose dehydrogenase in the strip converts the glucose in the blood sample to gluconolactone. This reaction creates harmless electrical current that the glucometer interprets for that blood glucose[7]. All the study neonates suspected of having congenital heart disease on clinical grounds or chest X-ray underwent 2D echocardiography.

RESULTS

Table 1: Distribution of hypoglycemia in IDMS

Hypoglycaemia	Number	Percentage
1-3 HOURS	17	31.4
4-6 HOURS	7	13
>6 HOURS	3	5.6

In this study, 31.4% of babies had hypoglycemia in first 3 hours of life. 13% of babies between 4-6 hours of life. 5.6% babies had hypoglycemia more than 6hours of life. Almost 75% babies had hypoglycemia less than 6hours of life.

Table 2: Association between hypoglycemia and birth weight

Weight	Hypoglycaemia				Total
	Yes	%	No	%	
<2.5kg	6	42.9	8	57.1	14
2.6-3.4kg	12	40	18	60	30
3.5-4kg	7	87.5	1	12.5	8
>4kg	2	100	0	0	2
Total	**27**		**27**		**54**

Chi square – 7.96 p value – 0.046 odds ratio – 13

In this study, out of 54 newborns, 27 had hypoglycemia. 2(100%) babies weighing more than 4 kg had hypoglycemia. 12 babies (40%) weighing between 2.6 to 3.4 kg had hypoglycemia. As weight increases the risk of hypoglycemia increases. P value 0.046, odds ratio 13 which is statistically significant.

Table 3: Association of hypoglycemia with gestational age in IDM

	Gestational age	Type of DM		Total
		GDM	Overt	
Hypoglycemia	Pre term	8	2	10
	Term	12	5	17
	Total	20	7	27

In this study, 12 term babies born to GDM had hypoglycemia, while 5 term babies born to overt diabetic mothers had hypoglycemia. Hypoglycemia was more common in term babies than preterm babies in both GDM and overt diabetic mothers. Out of 54 IDMs, 2 were post-term they didn't have hypoglycemia.

DISCUSSION

Diabetes mellitus complicating pregnancy is a global problem and this disease progression is in an increasing trend. The complications that occur, both in diabetic mothers during pregnancy and neonates born to them are unique. Various studies are being conducted worldwide on the complications of diabetic pregnancies, and more changes are being made in the treatment modalities for a fine tuning. Both the treating obstetricians and pediatricians should be familiar with the newer guidelines in the management of diabetes complicating pregnancies. Here an attempt was made to describe the pattern of hypoglycemia in newborn born to diabetic mothers and careful follow up of newborn during the early neonatal period for early diagnosis of the complications. In the present study conducted RMMCH, 54 infants born to diabetic mothers formed the study group. In present study, there was male predominance, which was also same in various studies by Girish *et al*[8], Peace *et al*[9], Mohammed *et al*[10]. in present study, GDM contributed to 75.9%, which correlates with study by Girish *et al*[8] (71%). In present study, 47(87%) babies were delivered by LSCS, which correlates with study by Peace *et al*[9] (81%). In present study, 30 babies were term and appropriate for gestational age.

Table 4: Incidence of hypoglycemia in idm in various studies

Study done by	Hypoglycaemia	
	Number	%
Present study (n=54)	27	50
Wasim *et al*[11] (n=96)	34	35.4
Mubashra *et al*[12] (n=100)	33	33
Girish *et al*[8] (n=69)	51	73.91
Mohammed *et al*[10] (n=42)	10	23.8
Peace *et al*[9] (n=47)	26	55.3

In various studies, hypoglycemia ranges from 23.8% to maximum of 74%. In present study hypoglycemia is 50%, which correlates with study by Peace *et al* 55.3%.

CONCLUSION

- Complications in newborn born to diabetic mothers are an emerging but preventable problem that seeks more importance.
- Caesarian delivery were more in diabetic mothers
- Hypoglycemia was the most common metabolic complication in IDMs and not mandatory in all IDMs
- Onset of hypoglycemia was within 6 hours of life in most of the IDMs. As birth weight increases, the risk of hypoglycemia increases
- Early recognition, precise assessment and appropriate management of complications as per guidelines would reduce the mortality and morbidity among babies born to diabetic mother.

REFERENCES

1. Daftary NS, Chakravarti S. Diabetes in pregnancy. In: Daftary NS, Charkravarti S, eds. Manual of Obstetrics. 1st ed. New Delhi: Elsevier; 2004: 107
2. Dutta DC. Diabetes Mellitus in pregnancy. In: Dutta DC, eds. Textbook of Obstetrics. 6th ed. New Delhi: Jaypee Brothers Medical Publishers; 2004: 284
3. Butle NF. Carbohydrate and lipid metabolism in pregnancy – normal compared with gestational diabetes mellitus. Am J Clin Nutr. 2007; 71(5): 12565-615
4. Stoll BJ. Infant of Diabetic mothers. In: Stoll BJ, eds. Nelson textbook of Pediatrics. 18th ed. Philadelphia: Saunders; 2008: 783
5. John P Cloherty , Eric C, Eichenwald, Anne R, Hansen, Stark, Aviva Lee Parritz. Manual of Neonatal Care. Lippincott Wolters Kluwer (India) Pvt.Ltd. Chapter II; 2012: 11-23
6. Fernando Arias, Shirish N Daftary, Amarnath, Bhide G. Practical guide to high risk pregnancy and delivery. A South Asian Perspective. 3rd edition; Sec II: 441
7. Thomas A, Buchanan, Anny Xiang, Siri L, Kjos, Richard Watanabe. Diabetes care. Volume 30; 2007: 141-5
8. Girish Gopal. A study of clinical, metabolic and hematological profile in IDM. IJPBR; 2014, 2(2):34-40
9. Paece, Opara, Tamunopriye Jaya, Uche C Onubogu, morbidity and mortality amongst IDM, Italian Journal of Pediatrics, Nigeria, 2010, 1-6
10. Mohammed Hussain, Mohammed Irshad *et al*. Frequency of various neonatal complications in IDM. JPM; Vol 25, 2011, 227-232
11. Wasim Rafiq, Sheik Quyoom Hussain, *et al*. Clinical and metabolic profile of neonates of diabetic mothers. International Journal of Contemporary Pediatrics; Vol 2, issue 2; 2015: 114-8
12. Mubashra Naz. Management and outcome of diabetic pregnancy. JUMDC; Vol 1; June-Dec 2010:17-23

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