International Journal of Medical Science and Clinical Research
www.journalofmedical.com
Online-ISSN: 2664-7761, Print ISSN: 2664-7753
Received: 10-08-2021, Accepted: 24-09-2021, Published: 10-09-2021
Volume 3, Issue 3, 2021, Page No. 18-20

Neonatal outcome in infant of diabetic mothers

Nagappa[1], Vijay Kumar B[2], Praveen Kumar Sindhur[3]
[1] Post Graduate, Department of Paediatrics, KVG Medical College and Hospital, Sullia, Karnataka, India
[2] Professor and HOD, Department of Paediatrics, KVG Medical College and Hospital, Sullia, Karnataka, India
[3] Professor, Department of Paediatrics, KVG Medical College and Hospital, Sullia, Karnataka, India

Abstract
Objective: To study the occurrence of metabolic and hematologic abnormalities in infant of diabetic mothers and to know the occurrence of congenital anomalies in infant of diabetic mothers.
Design: Hospital based prospective study
Setting: tertiary care hospital
Participants: Neonates of mothers diagnosed to have gestational diabetes mellitus or overt diabetes mellitus admitted in K.V.G. Medical College, Sullia. During the period 1st December 2019 to 30th November 2020.
Results: The present study is a hospital based prospective study to know the occurrence of metabolic, hematological abnormalities, congenital anomalies in infant of diabetic Mother. Among the 86 neonates born to diabetic mothers (GDM + overt DM), 44 (51.8%) were found to have hypoglycemia whereas 36 (42%) had hypocalcemia. 38 of the 86 (44%) were found to have polycythemia whereas 36 (42%) were found to have hyperbilirubinemia. 9 (11%) had cardiovascular anomalies, each one case of (1.8%) CNS and renal anomalies
Conclusions: The following conclusions can be drawn from this study. Among the pregnancies complicated by diabetes, GDM continues to have a major contribution. Hypoglycemia remains the most common biochemical abnormality followed by, polycythemia and hyperbilirubinemia, statistically significant in infants of GDM mothers. Congenital heart diseases were the most common among congenital anomalies, VSD being the commonest.

Keywords: hypoglycemia, newborn, term

Introduction

Diabetes mellitus is a disease whose prevalence has increased Dramatically over the past decades and is predicted to increase furthermore in the for seeable future, with the increasing obesity and more sedentary lifestyles [1].

Diabetes mellitus is a chronic metabolic disorder having hyperglycemia as the cardinal feature [2]. It is a heterogenous group of disorders characterized by glucose intolerance. Uncontrolled diabetes follows a vicious cycle. Early imprinting, even the in-utero environment is responsible for causing diabetes in later life [3].

The metabolic complications in infant of diabetic mother mainly includes hypoglycemia, hypocalcemia & hematological complications include polycythemia and hyperbilirubinemia.

Hypoglycemia: It is defined as blood glucose level less than 40mg/dl in an infant of any gestational age with or without symptoms [4]. It is seen within 1to 2 hours after birth and mostly in macrosomic babies. Pederson hypothesis of maternal hyperglycemia leading to hyperinsulinemia in the fetus explains the pathophysiology of hypoglycemia in infants of diabetic mother. It can present as asymptomatic hypoglycemia or may show symptoms like lethargy, apnea, respiratory distress, shock, cyanosis or seizures.

Hypocalcemia is defined as total serum calcium less than 7mg/dl or ionized calcium concentration less than 4mg/dl [5]. It is seen in 25% to50% of infants of diabetes mother if maternal glucose is not under control.

Glycosylated hemoglobin has a high affinity for oxygen, hence there is reduced oxygen delivery to the tissue. In women with elevated Hba1c levels, there is reduced oxygen supply in both maternal and fetal circulation. This leads to fetal hypoxia. In small for gestational age babies, there is fetal hypoxia due to placental insufficiency. This hypoxia as well as insulin like growth factors lead to increase in fetal erythropoietin production in the fetus and red cell production. All these are causes of polycythemia in the infants of diabetic mother. Hematocrits up to 60-70 volume% have been seen in 40% of infants of diabetic mother [6].

Hyperbilirubinemia is said when bilirubin level is more than 15mg/dl. As there is polycythemia, there is an increase in bilirubin load in the infants of diabetic mothers resulting in hyperbilirubinemia. Due to glycosylation of red blood cells, the cell membrane of erythrocytes become less deformable &hence their life span decrease. This also contributes to increased hemolysis resulting in increased bilirubin production. Other causes of hyperbilirubinemia can be prematurity, impaired hepatic conjugation of bilirubin and also enterohepatic circulation which increases due to feeding problems in infants of diabetic mother

Materials and Methods

Source of the data: Neonates of mothers diagnosed to have gestational diabetes mellitus or overt diabetes mellitus admitted at KVG medical college and Hospital.

Inclusion criteria

Singleton neonates of diabetic mothers.

Exclusion criteria

- Neonates of diabetic mothers with medical complications such as heart disease and renal disease.
- Neonates of diabetic mothers with pregnancy induced hypertension and eclampsia.
- Twin neonates of diabetic mothers with other co–morbidities like heart disease, tuberculosis, epilepsy, liver disease, chronic lung disease and renal disease.

Results

The present study is a hospital based prospective study to know the occurrence of metabolic, hematological abnormalities, congenital anomalies in infant of diabetic Mother. Among the 86 neonates born to diabetic mothers (GDM+overt DM), 44 (51.8%) were found to have hypoglycemia whereas 36 (42%) had hypocalcemia. 38 of the 86 (44%) were found to have polycythemia whereas 36 (42%) were found to have hyperbilirubinemia. 9 (11%) had cardiovascular anomalies, each one case of (1.8%) CNS and renal anomalies.

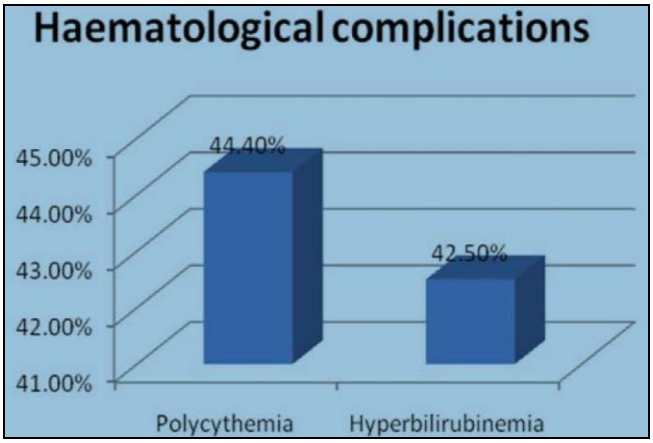

Fig 1

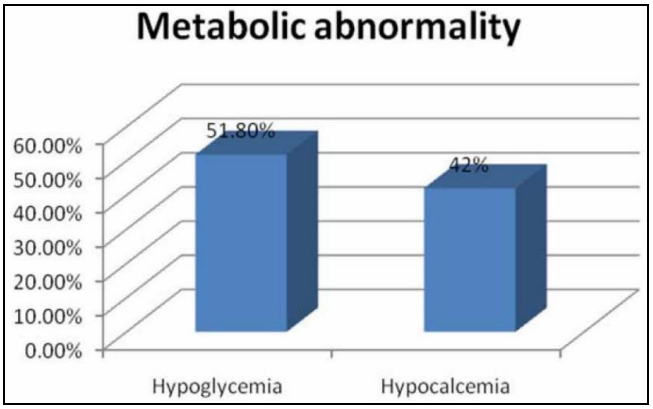

Fig 2

Distribution of metabolic abnormalities in infants of diabetic mothers.

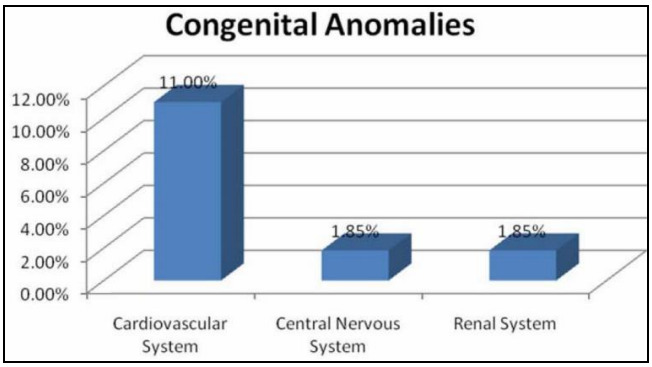

Fig 3

Discussion

India is a developing nation with the largest number of diabetic patients in the world. The WHO has projected that prevalence is increasing in epidemic especially in developing nations.

Cloherty *et al* in Newborn care manual has given that GDM complicates 6-8% of all pregnancies [8].

Hypoglycemia as a complication in the immediate newborn period was observed in 51% of babies, among which 68% were asymptomatic and 32% were symptomatic. The incidence of hypoglycemia was less when compared to other studies. This may be due to most of our patients were educated antenatal mothers with better control of their diabetic status during their 3rd trimester.

Statistically 42% of babies developed hyperbilirubinemia as a complication during the first week of life. This was comparable to the results of Yashowanth Rao *et al* study at their 45% hyperbilirubinemia and Uchendu O. Uchendu *et al* study of 40.7% hyperbilirubinemia [9].

Congenital heart disease was the most common congenital anomaly noted in the study, among which VSD and ASD were the most common. The incidence of heart disease was less when compared with other studies, maybe due to only symptomatic babies, infants who presented with the murmur and abnormal four limb saturation by pulse oximetry were subjected to echocardiogram in our study [10].

Conclusions

The following conclusions can be drawn from this study.Among the pregnancies complicated by diabetes, GDM continues to have a major contribution. Hypoglycemia remains the most common biochemical abnormality followed by, polycythemia and hyperbilirubinemia, statistically significant in infants of GDM mothers. Congenital heart diseases were the most common among congenital anomalies, VSD being the commonest.

References

1. Global report on diabetes, World Health Organisation, Geneva, 2016.
2. International Diabetes Federation Diabetes Atlas Seventh Edition, 2015. http://www.who.int/entyity/dg/speeches/2016/obesity-diabetes-disaster/en/-48k

3. Manual of Neonatal Care 7th Edition. A Lippincott Manual. Wolters Kluwer, Lippincott Williams & Wilkins, 2012.
4. Harper's Illustrated Biochemistry, 26th Edition. Lange Medical Books /McGraw-Hill, 2003.
5. Salvesen DR, Brudenell MJ, Nicolaides KH. Fetal polycythemia and thrombocytopenia in pregnancies complicated by maternal diabetes mellitus. American journal of obstetrics and gynecologym,1992:166 (4):1287-93.
6. Pedersen J: The Pregnant Diabetic and Her Newborn, 2nd ed. Baltimore, Williams & Wilkins
7. Echenwald ER. Cloherty & Starks Manual of Neonatal Care 8th Edition, 2020.
8. Uchendu UO, Leblanc P, Thomas JM, Maher OM, Morales Y, Fineza B. Clinical Profile and Outcome among Infants of Diabetic Mothers Delivered At the Brooklyn Hospital Center. Inter J Child Health Nutr,2014:10;3 (1):27-40.
9. Suraiya B, Kumar DS. J Neoantal-Perinatal Medicine, 2017, 403
10. Infant of diabetic mother. Textbook of Neonatology. Edited by NRC Roberton. 2nd Ed, 2000, 333-337.