P-0984 HbA1C, a Potential Predictor of Fetal Outcome in Pregnancy with Diabetes

Ruma Sen Gupta¹, Shahana Shermin²

1. Registrar, 2. Senior Medical Officer,

Dept. of Gynae & Obs., Ibrahim Medical College and BIRDEM General Hospital, Dhaka, Bangladesh.

Abstract

Background: Diabetes Mellitus poses substantial risk for the mother and fetus during pregnancy. Glycosylated HbA1C is increased in chronic hyperglycemia and co-relates closely with an increased risk of fetal and neonatal complications. **Objective:** The present study was undertaken to determine the association of maternal serum HbA1C level with fetal outcome. **Materials and Methods:** It was a prospective observational study carried out in the department of Obstetrics and Gynaecology in BIRDEM Hospital during the period of September 2006 to August 2007. During this study period, 100 pregnant patients with diabetes who attended or were admitted at BIRDEM Hospital were randomly selected. Estimation of serum HbA1C level was done in all patients in each trimester. From each patient 5 cc blood was taken and HbA1C level was measured by enzymatic method. HbA1C level < 6% was considered as normal. The complications in antenatal period, in postpartum period, during labour and fetal outcome were studied. **Results:** In this study serum HbA1C level was found raised in 83% of study subjects. Neonatal complications were higher in study subjects with uncontrolled HbA1C level. Among the complications in uncontrolled group the highest incidence was of neonatal hypoglycaemia (38.55%), followed by hyperbilirubinaemia (33.73%), macrosomia (18.07%) RDS (12.05%), birth asphyxia (12.05%), septicemia (6.02%) and IUGR (3.61%). Unexplained IUD occurred in 38.55% subjects in uncontrolled group. **Conclusion:** There is increasing evidence that raised level of maternal serum HbA1C in antenatal period is associated with neonatal complications and by measuring HbA1C level in each trimester, good glycaemic control in diabetic pregnancy can be achieved.

References:

1. Arias F. 1993. Risk of Pregnancy of mother & fetus. In: Practical guide to high risk pregnancy and delivery. 2nd ed. Singapore : Harcourt Brace & Co. Asia Pvt . Ltd, 280-98.
2. Gillmer MDG and Hurley PA. 1999. Diabetes & Endocrinedisorders in pregnancy. In : DK Edmonds editor, Dewhurst's textbook of obstetric and gynaecology for post graduates. 6th edition, London N. Churchill Livingstone. Elsever, UK; 197-209.
3. Allen DW, Schroeder WA, Balog J. Observation on the chromatographic heterogeneity of normal adult and fetal haemoglobin. J Am Chem. 1958; 8:1628-34.
4. Trivelli LA, Ranney HM, Lai HT : Haemoglobin components in patient with diabetes mellitus. N Engl J Med 1971; 284:353 – 57.
5. Bunn HF. Evaluation of glycosylated haemoglobin in diabetic patients. Diabetes 1981;30:613-17.
6. Koenig RJ, Peterson CH, Kilo C, et al : HbA1C as an indicator of the degree of glucose intolerance in diabetes. N Engl J Med 1977 ; 296 : 1060.
7. Steel JM, Johnson FD, Smith AF, Duncan LJF, 5 yr. Experience of a pre-pregnancy clinic for pregestational diabetes. Am J ObstetGynecol.1998 ; 144: 774-76.
8. Kovilam O, Khoury J, Miodovnik M, et al. Spontaneous preterm delivery in the type 1 diabetic pregnancy: The role of glycaemic control. J Mat-Fetal & Neonatal Med 2002;11:245-48.
9. Banerjee S; Ghosh US; Banerjee D. Effect of tight glycaemic control on fetal complications in diabetic pregnancies. J Assoc Physicians India. 2004; 52:109-13.
10. Bracero LA, Haberman S, Byrne DW. Maternal glycaemic control and umbilical artery Doppler velocimetry. J Matern Fetal Neonatal Med. 2002 Nov ; 12(5) : 342 – 48.
11. Raychaudhuri K, Maresh MJ. Glycaemic control throughout pregnancy and fetal growth in insulin-dependent diabetes. Obstet Gynecol. 2000;95(2):190–94.
12. Frier BM, Fisher M. 2006. Diabetes Mellitus. IN : Boon NA, Colledge NR, Walker BR, Hunter, JAA Editors. Davidson's Principle and Practice of medicine 20th ed. Edinburgh: Churchill Livingstone. 814-16.
13. Gabbay KH, Hasty K, Breslow JL, et al. Glycosylated haemoglobin and long term blood glucose control in diabetes mellitus. J. Clin Endocrinol Metab. 1976 ; 44 : 859 – 64.
14. Nielsen GL, Moller M, Sorensen HT. HbA1c in early diabetic pregnancy and pregnancy outcomes: a Danish population based cohort study of 573 pregnancies in women with type 1 diabetes. Diabetes Care. 2006; 29: 2612–16.
15. Deorary AK, Kabra SK, Paul VK, et al. Perinatal outcome of infants born to diabetic mother. Indian Paediatr 1991 ; 28 :1271-75.
16. Beard R, Marsch M. Diabetes In de Swiet M, Medical disorder in obstetrics and practice 2nd edition. Blackwell Scientific publications. London 1989 : 584-32.

Table I: Age distribution of the study subjects (n = 100)

Age (in years)	Frequency	Percentage
20-25	12	12
26-30	48	48
31-35	26	26
>35	14	14
Mean age ±SD	29.77±4.52	

Table II: Status of glycaemic control in late trimester of pregnancy in respect with HbA1C level (n = 100)

HbA1C level	Frequency	Percentage
Controlled	17	17
Uncontrolled	83	83

Table III: Distribution of fetal outcome in subjects with controlled and uncontrolled HbA1C

Fetal outcome	Controlled HbA1C	Uncontrolled HbA1C
	(n=17)	(n=83)
Hypoglycaemia	1 (5.88%)	32 (38.55%)
Hyperbilirubinaemia	2 (11.76%)	28 (33.73%)
IUGR	1 (5.88%)	3 (3.61%)
RDS	-	10 (12.05%)
Macrosomia	-	15 (18.07%)
Septicaemia	1 (5.88%)	5 (6.02%)
Birth asphyxia	1 (5.88%)	10 (12.05%)

Table IV: Distribution of perinatal mortality in subjects with controlled and uncontrolled HbA1C level

Perinatal outcome	Controlled HbA1C	Uncontrolled HbA1C
	(n=17)	(n=83)
Unexplained IUD	-	32 (38.55%)
Fresh Still Birth	1 (5.88%)	6 (7.22%)

Table V: Distribution of neonatal mortality in subjects with controlled and uncontrolled HbA1C level

Neonatal outcome	Controlled HbA1C	Uncontrolled HbA1C
	(n=17)	(n=83)
Survived	15 (88.23%)	74 (89.15%)
Expired	2 (11.77%)	9 (10.85%)