

To Determine Association of Macrosomia in Pregnant Women Who Have Altered Glycemic Control

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ABSTRACT

Objective: To determine association of macrosomia in pregnant women who have altered glycemic control.

Study Design: Prospective cohort study

Place and Duration of Study: This study was conducted at the Department of Obstetrics and Gynaecologic Unit 2, Civil Hospital, Dow University of Health Sciences, Karachi from 04-09-2013 to 04-02-2014.

Materials and Methods: Two thirty eight pregnant women were included in this study. 119 women who had abnormal HbA1c were in exposed group and 119 Women who had a normal HbA1C were taken as Non-Exposed Groups. Information from all patients were gathered through a pre- designed Proforma which include socio-demographics such as age, height weight as well as other study variables including booking status, gestational age, parity, history of macrosomic infants, history of diabetes in family, weight of baby.

Results: Macrosomia was 2 time (Approximate of 1.59) more common in exposed than non-exposed group (RR: 1.59 95%CI: 1.29 to 2.02).

Conclusion: We conclude that in this study woman with GDM mean HbA1c are significant predictors of newborn macrosomia. Early diagnosis and appropriate treatment of GDM aimed at tight control over maternal glucose levels positively influence the perinatal outcome and it prevents macrosomia.

Key Words: Gestational diabetes mellitus, Macrosomia, Altered glycemic control, HbA1c.

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INTRODUCTION

Gestational diabetes mellitus is associated with increased risk of macrosomia, development of impaired glucose level and diabetes after delivery. Previous pregnancy that resulted in large for gestational age infant is often considered to be a risk factor for gestational diabetes mellitus in subsequent pregnancy¹. Macrosomia is associated with a higher incidence of cesarean delivery (double that of control subjects) and with birth canal lacerations associated with vaginal delivery². Macrosomic neonates are at risk for shoulder dystocia and birth trauma. This risk is directly related to neonatal birth weight and begins to increase substantially when birth 5 weight exceeds 4500g. Brachial plexus injury is rare, with an incidence of fewer than 2 cases per 1000 vaginal deliveries. This risk is approximately 20 times higher when the birth weight is more than 4500g³. Gestational diabetes mellitus affects approximately 4% of all pregnant women in the US, complicates 4-14% of pregnancies⁶.

Glucose crosses the placental barrier, and the resulting higher levels of foetal glucose in gestational diabetic pregnancy induce hyperinsulinaemia, which is associated with an increased risk of large-for-gestational age (LGA) infants, shoulder dystocia and neonatal hypoglycemia^{7,8}. Glycylated hemoglobin, as measured by hemoglobin A1 C (HbA1C), can potentially identify pregnant women at high risk for adverse outcomes associated with. GDM including macrosomia and post-partum glucose intolerance⁹. Early diagnosis and appropriate treatment of GDM aimed at tight control over maternal glucose levels positively influence the perinatal outcome¹⁰ and it prevents macrosomia. Macrosomia is a complication of poor glycemic control in pregnancy. The purpose of my study is to estimate burden of impaired glucose tolerance and gestational diabetes who might benefit from life style modification and 6 pharmacological intervention, thus we can decrease the morbidity and prevent macrosomia in our population.

MATERIALS AND METHODS

After Approval from Hospital's Ethics Review Committee and competitive authority (College of Physicians and Surgeons of Pakistan), written as well verbal informed consent from patient, before commencing the study. All patients who fulfilled the eligibility criteria were included in this study. Information from all patients were gathered through a

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pre- designed Proforma which include demographics such as age, height weight as well as other study variables including booking status, gestational age, parity, history of macrosomic infants, history of diabetes in family, weight of baby. Patient was seen in labour room venous blood was drawn for HbA1C. Patient were divided into two groups one in whom HbA 1 C is abnormal are exposed and others in which HbA 1C is normal are non-exposed was followed delivered to see the outcomes of those patients.

RESULTS

Two thirty eight pregnant women were included in this study. 119 women who had abnormal HbA1c were in exposed group and 119 Women who had a normal HbA1C were taken as Non-Exposed Groups. The average age, gestational age, parity and BMI of the women were not significant between exposed and non-exposed group.⁷ Regarding parity status of the women, 30(12.6%) had nulli parity, 96(40.3%) had Primiparous and 112(47.1%) had multi parity (parity>2). Diabetic was observed in 19(8%) cases as shown. Out of 238 women, 77(32.4%) were delivered cesarean and 161(67.6%) were spontaneously. Mode of delivery with respect to exposed and non-exposed groups . History of macrosomic was noted in 18(7.6%) cases and high in exposed group. In this study, rate of macrosomia was observed in 26.9% (64/238) cases. Macrosomia was 2

time (Approximate of 1.59) more common in exposed than non-exposed group (RR: 1.59 95%CI: 1.29 to 2.02) . Stratification analysis showed that macrosomia was 2time more likely in exposed than non-exposed group for the age below 25 and 26 to 30 years of age women while it was not significant for 31 to 35 years of age women. Macrosomia was significantly high and also two times more likely in exposed group than non-exposed group in those women who had nullipara and multipara. Similarly with respect to mode of delivery, rate of Macrosomia was high in exposed groups in those women who delivered spontaneously and cesarean. Association of Macrosomia and HbA1c was also observed with respect to history of Macrosomia and diabetic women history of macrocosmic according to groups 8 n= 238T.

Table No.1: Association of macrosomia and glyemic control

Macro-somia	Exposed Group n=119	Non-Exposed Group n=119	Total	P-Value	RR (95% CI)
Yes	44 (37%)	20 (16.8%)	64 (26.9%)	0.0005	1.59 (1.29 to 2.02)
No	75 (63%)	99 (83.2%)	174 (73.1%)		

Chi-Square= 5.25 OR: Relative Risk; CI: Confidence Interval RR= (44/64)/ (75/174) = 1.59

Table No. 2: Association of macrosomia and glyemic control by mode of delivery.

Mode of Delivery	n	Macrosomia	Exposed Group	Non-Exposed Group	P-Value	RR (95% CI)
Spontaneous	161	Yes	26(31.3%)	13(16.7%)	0.03	1.42 (1.06 to 1.91)
		No	57(68.7%)	65(83.3%)		
		Total	83	78		
Caesarean Section	77	Yes	18(50%)	7(17.1%)	0.003	2.08 (1.33 to 3.25)
		No	18(50%)	34(82.9%)		
		Total	36	41		

Chi-square test and Fisher exact test were applied according to condition

Table No. 3: Association of macrosomia and glyemic control by history of macrosomia.

History of Macrosomia	n	Macrosomia	Exposed Group	Non-Exposed Group	P-Value	RR (95% CI)
Yes	18	Yes	6(40%)	0(0%)	0.18	1.61 (1.23 to 2.09)
		No	9(60%)	3(100%)		
		Total	15	3		
No	220	Yes	38(36.5%)	7(17.1%)	0.001	1.59 (1.25 to 2.02)
		No	66(63.5%)	34(82.9%)		
		Total	104	41		

Chi-square test and Fisher exact test were applied according to condition

Table No. 4: Association of macrosomia and glyemic control by diabetic mellitus.

Diabetic Militus	n	Macrosomia	Exposed Group	Non-Exposed Group	P-Value	RR (95% CI)
Yes	19	Yes	4(36.4%)	0(0%)	0.05	2.14 (1.24 to 3.68)
		No	7(63.6%)	8(100%)		
		Total	11	8		
No	219	Yes	40(37%)	20(18%)	0.002	2.67 (1.44 to 4.98)
		No	68(63%)	91(82%)		
		Total	108	111		

Chi-square test and Fisher exact test were applied according to condition

DISCUSSION

Maternal gestational diabetes (GDM) and hyperglycemia in pregnancy have long been related to excessive fetal growth^{11,12}. Maternal obesity before pregnancy and excessive weight gain during pregnancy are additional, potentially modifiable, independent risk factors of excessive fetal growth¹³ and often occur in conjunction with GDM or hyperglycemia in pregnancy. There is a worldwide consensus that delivery of a macrosomic or large-for-gestational-age (LGA) infant is associated with increased frequencies of prolonged labor, operative delivery, shoulder dystocia and brachial plexus trauma¹⁴. In the particular case of the macrosomia that is due to gestational diabetes mellitus (GDM), maternal hyperglycemia – and its consequence, fetal hyperinsulinemia – are positively correlated to neonatal excess body mass¹⁵. However, tight glucose control seems not to be enough to prevent macrosomia in GDM, as other variables have emerged as independent factors of excessive fetal growth, particularly maternal overweight and obesity (body mass index [BMI] of 25 or greater)¹⁶. HbA1c is widely used as a measure of metabolic control during pregnancy, and it has been documented that it is associated with diabetes-related pregnancy complications in type 1 diabetes¹⁷. In this study abnormal HbA1c (>6%) were in exposed group and women who had a normal HbA1c (6.0%⁴). Gonzalez Quintero VH et al found Macrosomia incidence with 15.7% compared to non-controlled which was 9.3 % in diabetic patients in his study⁵.

CONCLUSION

We conclude that in this study woman with GDM mean HbA1c are significant predictors of newborn macrosomia. Thus, without ceasing in our efforts to improve glycemic control during GDM pregnancies, patients with overweight/obesity need to be treated prior to becoming 15 pregnant. Early diagnosis and appropriate treatment of GDM aimed at tight control over maternal glucose levels positively influence the perinatal outcome and it prevents macrosomia.

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Author's Contribution:

Concept & Design of Study: Anila Rehman
 Drafting: Jahan Ara
 Data Analysis: Fozia Unar,
 Revisiting Critically: Asifa Khuwaja
 Final Approval of version: Anila Rehman

Conflict of Interest: The study has no conflict of interest to declare by any author.

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