

Coronary Artery Disease (CAD) in Gestational Diabetes Mellitus (GDM) in Patients Visiting Shree Bhawani Hospital and Research Center

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Abstract: *Gestational Diabetes Mellitus (GDM) have an increased future risk of coronary artery disease (CAD). The purpose of the study was to find out if GDM is a risk factor for CAD or not. Case control was the method of study where source of case was hospitalised patients and the source of control was general population. Simple random technique was used as a method of sampling in which certain CAD patients 20 - 35 years age group were taken under the study. The sample size was 35 and Odd Ratio was used for the elimination of risk of disease associated with exposure. GDM showed a risk of having CAD 2.25 times higher than that of non GDM. Thus GDM can be considered as a major risk factor for CAD.*

Keywords: GDM, CAD, Risk Factor

1. Introduction

GDM is diabetes diagnosed for the first time during pregnancy (gestation). It causes high blood sugar that can affect pregnancy and baby's health. In women with gestational diabetes, blood sugar usually returns to normal soon after delivery but have a higher risk of getting type 2 diabetes and later on cardiovascular disease in future. For most women, gestational diabetes doesn't cause noticeable signs or symptoms. Increased thirst and more frequent urination are possible symptoms. The cause of GDM is still idiopathic however hormonal imbalance during pregnancy causes hyperglycemia during pregnancy. Apart from this excess weight before pregnancy often plays a major role in establishment of GDM. Risk factors for gestational diabetes include the following:

- Overweight and obesity
- A lack of physical activity
- Previous GDM or prediabetes
- Polycystic ovary syndrome
- Diabetes in an immediate family member
- Previously delivering a baby weighing more than 9 pounds
- Race: women who are black, Hispanic, American Indian and Asian American have a higher risk of developing gestational diabetes.

Effects of GDM:

(A) On baby:

- Excessive birth weight
- Preterm birth
- Serious breathing difficulties
- Low blood sugar (hypoglycaemia)
- Still birth

(B) On mother

- CAD
- Type 2 diabetes later in life
- High blood pressure and preeclampsia
- Having a surgical delivery

Diagnosis: for an average risk of gestational diabetes, screening test is done at 24 - 28 weeks of gestation whereas for high risk patients like previous GDM, screening test is done at first prenatal visit and is repeated at 24 - 28 weeks of gestation if result is negative in the first screening test. GDM is diagnosed if any one of the following two criteria is fulfilled:

- 1) Fasting blood glucose: greater and equal to 5.6 mol/L
- 2) 2 hour OGTT (Oral Glucose Tolerance Test): greater and equal to 7.8mmol/L

Treatment: life style changes, blood sugar monitoring, medication if necessary

In a study of over 1, 100 women, those with previous gestational diabetes had more than two - fold increased risk for coronary artery calcification later, regardless of glucose levels, reported Erica Gunderson, PhD, Ms, Mph of Kaiser Permanente in Oakland, California [1]. Among women with a family history of type 2 diabetes, those with prior GDM were even more likely to not only have CVD risk factors, including metabolic syndrome and type 2 diabetes, but also to have experienced CVD events, which occurred at a younger age. Thus, women with both a family history of type 2 diabetes and personal history of GDM may be especially suitable for early intervention aimed at preventing or reducing the risk of CVD and diabetes [2]. In a study of nearly 90, 000 U. S women for up to 26 years from 1989 - 2015, researchers found that women with a history of gestational diabetes had 43% greater risk of heart attack and stroke than women without this condition [3].

2. Methodology

Case control was the method of study where the source of case was hospitalized patients and the source of the control was general population. Simple random technique was the method of sampling. Odd ratio was used for the estimation of risk of disease associated with the exposure. After the data was collected from the survey, we found that 60 CAD

patients were having the history of GDM in average. The population mean is within 10 unit's interval that is 60 ± 10 .

Assuming that distribution of the sample was approximately normal, the following formula was used to calculate the size of the sample $N = ZS/d$ where N = size of the sample, Z = Z statistics for level of confidence = population standard deviation, d = half width of desired interval. For 95% confidence, $Z = 1.96$, let the interval be $\pm 50 - 70$ so $d = 10$. Assuming standard deviation to be 30. So using above formula we get sample size to be 35.

3. Result

a) Exposure rate among the cases and control:

	Cases (with CAD)	Control (without CAD)
GDM	a.15	b.20
Non GDM	c.2	d.6
Total	(a+c) 17	(b+d) 26

Exposure rate among cases = $a/a+c = 88.23\%$

Exposure rate among control = $b/(b+d) = 76.92\%$

So the frequency rate of CAD is definitely higher among GDM than among non GDM.

P value is less than 0.5 so the null hypothesis can be neglected and alternate hypothesis 'GDM is a risk factor for CAD can be accepted.

b) Estimation of disease risk associated exposure (odds ratio).

	CAD (yes)	CAD (no)
Exposed (GDM)	a.15	b.20
Non exposed (GDM)	c.2	d.6

Odds ratio = $ad/bc = 2.25$

The GDM showed a risk of having CAD 2.25 times than that of non GDM.

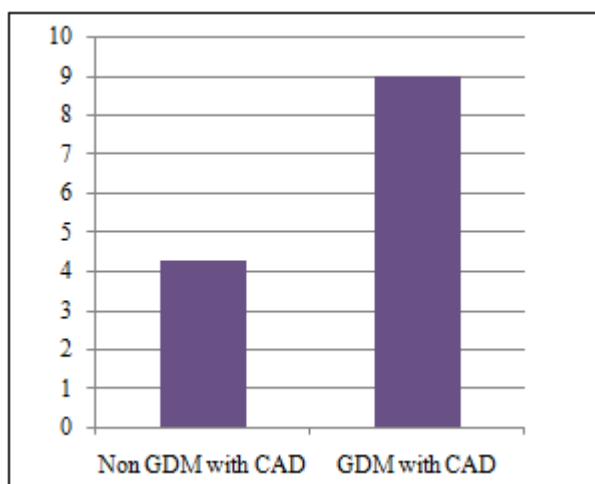


Figure: Shows GDM has higher risk of CAD than that of non GDM

4. Discussion

A series of studies in recent years has suggested that despite their relative youth (i. e., being of child bearing age), women with GDM have an increased incidence of major

cardiovascular events in the years to decades postpartum. Some studies have suggested that women with GDM only develop CVD if the progress to type 2 diabetes, others have argued that an increased cardiovascular risk can be manifest even in the absence of diabetes [4, 5]. women with mild glucose intolerance in pregnancy (not meeting the diagnostic criteria for GDM) have been shown to have an elevated risk of cardiovascular events over a median of 12, 3 years after delivery as compared with their normo glycaemia peers [6]. Women with GDM have a twofold higher risk of CVD events. The risk is not dependent upon the development of type 2 diabetes and is opponent with in the first decade postpartum [7]. According to a study published in lancet, women who experienced gestational diabetes have a seven fold increase in the risk of developing type 2 diabetes, and diabetes is itself a major risk factor for heart disease. But research suggests that even when women with gestational diabetes do not go on to develop type 2 diabetes, they are still at heightened risk for heart disease in the decades to come [8]. However according to this research there is close relation between GDM and CAD. Out of other factors responsible for development of CAD, GDM can be considered as one of the major factors. This study has not only showed GDM, a risk factor for CAD but also by how many times CAD is common in GDM than that of non GDM.

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