

Prevalence of glucose intolerance during pregnancy

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ABSTRACT

We screened 302 subjects for glucose intolerance during pregnancy, using criteria put forth by O'Sullivan and Mahan (2). Plasma glucose estimation was carried out using the O'Toludine method. We find that random blood glucose estimation may miss glucose intolerance in patients with a familial history of diabetes and BOH. Therefore, we suggest that such subjects have an OGTT. Also, we find that an elevated glycosylated haemoglobin by itself is not helpful to establish the diagnosis of glucose intolerance. In our study, the maximum incidence of glucose intolerance occurred in the first trimester.

INTRODUCTION

Levin et al in 1986 (1) reported that two percent of all pregnant women have glucose intolerance. In India, using the criteria of O'Sullivan and Mahan (2), Aggarwal and Gupta (3) have observed about two percent of glucose intolerance during gestation.

MATERIAL AND METHODS

We have studied 302 subjects belonging to the upper-middle and affluent class (having an income of Rs. 5,000/- or more per month) and attending

Group	Number
Lessthan 20	21
20-25	124
26-30	109
31-35	37
36-40	9
41-45	2

Gravida	I	II	III	IV
Number	158	96	33	15
Trimester	I	II	III	IV
Number	170	83	45	
Detection of Glucose intolerance	14	8	1	

Plasma Glucose	GDM	IGTT	Normal
120-130 mg% or more	4	14	2
Normal PG but Abnormality elevated HbA1c, BOH and FH of diabetes	-	5	-

private medical institutes namely Shankarambal Nursing Home and Specialists' Clinic in Bangalore.

A protocol was designed to get all the details necessary, particularly with regard to the family history of diabetes, bad obstetrical history (BOH) in the past in the index subjects or in the family members. Careful physical examination was performed. Height, weight BP were recorded. Any abnormal findings were noted.

Patients with known diabetes, hypertension, renal disease, anemia and toxemia were excluded from this study.

Regardless of presence or absence of BOH, these subjects were screened for glucose intolerance (Table 1, 2). Glucose estimation was done in plasma by O'-Toludine method.

From: Shankarambal Nursing Home and Specilists' clinic, Bangalore.

Table 4 Number Of Subjects Screened: 302		
Abnormal glucose Tolerance	Number	Percentage
* I G G T	19	6.30
** G D M	4	1.32
Normal	279	92.38
O'Sullivan and Mahan Criteria, 1964		
* Two hour value between 100 and 145 mg%		
** Two abnormal values		

During the ante-natal check up a fasting or a random post meal or post-glucose (50gm dose) plasma glucose (PG) was estimated. Those with fasting PG of 100mg% or random PG of 120mg% or a post-glucose PG value of 130mg% or more one hour following glucose ingestion were suspected to have glucose intolerance. A glycosylated haemoglobin was also estimated on these subjects by the Ion Exchange method.

Those who had abnormally elevated PG values were subjected to 3 hr OGTT using a 100gm glucose load. Criteria put forth by O'Sullivan and Mahan (2) were applied to interpret the results (i.e. fasting blood sugar levels, in mg/dl, should be less than 105, 190, 165 and 145 at fasting, 1 hour post-prandial, 2 hour post-prandial and 3 hour post-prandial respectively).

RESULTS

Eighteen of the 20 patients had abnormal GTT. Of these 18, four satisfied the criteria of GDM and the rest IGTT. Additional five subjects with normal random PG values with BOH had IGTT curve (Table 3). Mean PG values in all these 23 subjects are shown (Table 5). From this it is concluded that the prevalence of IGTT is 6.3%, GDM 1.32%, both combined 7.62% (Table 4).

Twelve of the 23 have already delivered. Of these 12 subjects three GDM and two with IGTT had insulin therapy and the remaining seven subjects belonging to IGTT were managed on diet only. One GDM had still birth. The birth weight of nine IGTT and three GDM subjects are shown in Table 6.

Table 5 Results of OGTT				
	Plasma glucose mg/dl; mean \pm SD			
	Fasting	1	2	3
*IGGT 19 Subjects	79.94 \pm 10.17	130.31 \pm 18.00	117.33 \pm 12.59	97.89 \pm 16.54
G D M 4 Subjects	119.75 \pm 45.38	248.05 \pm 40.00	205.75 \pm 24.55	181.25 \pm 25.28
Normal 42 Subjects	73.35 \pm 7.71	106.14 \pm 11.41	94.45 \pm 9.24	82.21 \pm 7.15
* Fourteen had random mean Plasma glucose value of 146 mg%. Five had random mean plasma glucose value of 78.4 mg%				

Table 6 Birth Weight (kg) Of The New Born			
Groups	N	Mean	SD
IGGT + GDM*	12**	3.618	0.333
Nondiabetic control	50	2.992	0.5
* one still-birth ** three GDM and two IGGT had insulin therapy.			

Table 7 Glycosylated Haemoglobin* in 283 Subjects				
	N	Mean	SD	t
IGGT + GDM	21	8.747	1.4814	P < 0.001
Normal	262	7.702	1.334	Significant
* Good Control: 4.5-7.0%				
Fair Control: 7.0-8.5%				
Poor Control: 8.5% and above.				

Glycosylated haemoglobin was found to be significantly elevated in IGTT and GDM. It was marginally elevated in normal subjects. Of forty-two subjects with marginally elevated HBA_{1c}, forty-one had PG value of less than 120mg%. One had two random plasma glucose values of 165 and 185 mg%. However, the GTT values in all forty-two subjects were normal. Considering these contradictory data it was difficult to interpret the marginally elevated glycosylated haemoglobin in those who had normal glucose tolerance values in this study (Table 7). Interestingly, one subject with documented gestational diabetes mellitus in previous pregnancy had normal glucose tolerance in the present pregnancy.

DISCUSSION

Mere screening by random blood glucose estimation might miss glucose intolerance in patients with history of diabetes in the family and BOH. Such subjects should have an OGTT.

An elevated glycosylated haemoglobin by itself is not helpful to establish glucose intolerance.

In our study, the maximum number of glucose intolerance was picked up in the first trimester. It is

possible that these subjects had mild glucose intolerance even before pregnancy. But the important aspect is to look for glucose intolerance from the beginning of pregnancy itself. However, a conclusion can only be made after performing an OGTT on these subjects post partum.

Despite good control of diabetes the birth weight of new born is significantly high (3.618 kg) in IGTG and GDM compared to non-diabetic controls (2.992 kg). However, true macrosomia, defined as more than 3.75 kg weight, was not encountered.

REFERENCES

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