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Original Research Article

Importance of universal screening - DIPSI for ANC cases

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ABSTRACT

Background: Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance with varying degree, onset or first recognition during pregnancy. The study was done to assess the feasibility of DIPSI for screening and diagnosis of gestational diabetes mellitus.
Methods: Pregnant women at 24-28weeks gestation were given 75 grams of glucose in 300 ml of water, irrespective of last meal. If 2 hours plasma glucose levels are >200mg/dl were diagnosed as GDM, if it was >140 mg/dl and <200 mg/dl these patients were subjected to OGTT according to WHO criteria (1999) (FBS>126 mg/dl, 2-hour PG>140 mg/dl, one should be positive). After 8-12 hours fasting, FBS measured, 7 5gm of glucose in 300-400 ml water was given orally, later 2-hour plasma glucose measured. Those diagnosed as GDM followed up throughout pregnancy till delivery.
Results: Among 100 pregnant women, 5 were DIPSI+ and out of 5, 3 were OGTT+, making DIPSI 100% sensitive, 97.9% specific and NPV of 100% PPV of 60%. Mean age of GDM positive women was 28.8 years, mean BMI 24 kg/m^2. Out of 5 DIPSI+ 3(60%) of them had c-section, 2 (40%) had FTVD. 2 babies had birthweight between 2.5-3 kg, 2 of them 3-3.5 kg and 1 had 3.8 kg (no macrosomia). Out of 5 women with GDM, 1 managed with insulin and others MNT. There was statistically significant association between mean BMI, birth weight of neonate among GDM and non GDM group. No association between parity and mode of delivery.
Conclusions: The DIPSI test used in screening of GDM proved to be simple, less cumbersome, cost effective and easily acceptable to the patients. GDM can be present in patients without risk factors, hence the need for universal screening. Timely intervention with diet, insulin therapy, patient education is required to prevent maternal and neonatal complications.

Keywords: GDM, DIPSI, OGTT, Positive predictive value, Sensitivity, Specificity, Medical nutritional therapy

INTRODUCTION

Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance with varying degree, onset or first recognition during pregnancy was first recognized in 1823. The term "gestational diabetes mellitus" coined by Carrington in 1957.[1] The prevalence of GDM in India is between 4.6%-14% in urban area and 1.7%-13.2% in rural areas.[2]

As pregnancy advances insulin resistance and diabetogenic stress due to placental hormones (estrogen, progesterons, human placental lactogen, cortisol) these harmones increase in mid pregnancy period necessitate compensatory increase in insulin secretion when this compensation is inadequate GDM develops.[3]

Universal screening in early pregnancy is advised- to ensure prompt treatment and normalization of blood glucose levels; to avoid risk of diabetic complications like

diabetic retinopathy and nephropathy; to prevent the risk of congenital malformations in offsprings.[4]

The Diabetes in Pregnancy Study Group of India (DIPSI) is simple, economical, feasible test which serves both screening and diagnostic purpose.

METHODS

It was a prospective study. The study took place at Navodaya Medical College Hospital and Research Centre, Raichur. This study took place from August 2023 to July 2024.

Selection criteria

Out of all the pregnant women who attended the OPD between 24-28 weeks 100 women were selected for the study.

Inclusion criteria

100 pregnant women with gestational age between 24-28 weeks, irrespective of maternal age and gravidity, presence or absence of clinical or historic risk factors of GDM.

Exclusion criteria

Known diabetes mellitus. Patients on drugs steroids, calcium channel blockers, thiazides. Women not willing for the test.

Methodology

Informed consent was obtained from pregnant women attending the OPD. Patients underwent detailed clinical examination. Pregnant women At 24-28 weeks' gestation were given 75 grams of glucose dissolved in 300 ml of water and were asked to drink it over a 10-15-minute period, irrespective of time of the day and her last meal. After 2 hours of ingestion of glucose, venous blood was drawn

In the presence of atmospheric oxygen, glucose present in the specimen is oxidised by the enzyme glucose oxidase (GOD) to gluconic acid and hydrogen peroxide (H_2O_2). Thus, formed H_2O_2 oxidatively couples with 4 aminoantipyrine and phenol in the presence of peroxidase (POD) to form red coloured quinonimine dye. The intensity of the color is directly proportional to the concentration of glucose present the.

Patients with 2-hour plasma glucose value of 200 mg/dl or more are directly diagnosed as GDM. If plasma glucose value is ≥140 mg/dl, the screening is considered as positive. The DIPSI positive patients were subjected to OGTT by WHO Criteria (1999). Three days prior to OGTT test, patients are asked to take normal unrestricted diet. After overnight fasting of 8-14 hours, a fasting blood sample was drawn; following which 75 gm of glucose dissolved in 300-400 ml water is given orally.

There after venous glucose plasma levels are assessed after 2hours.patient was labelled GDM positive if (FBS >126 mg/dl, post 75 gm glucose load 2-hr PG>140 mg/dl. Any one value must be positive). Those diagnosed as GDM were admitted, evaluated, treated and followed till delivery and also after puerperium. Maternal and perinatal outcomes were studies.

Ethical approval and statistical analysis

Ethical clearance was obtained from the institute and statistical analysis was done using SPSS software.

RESULTS

Total of 100 subjects participated in the study ,100 pregnant women who came for regular antenatal checkup at our OPD were selected and followed up till delivery. Out of 100, 5 (5%) patients were DIPSI positive were diagnosed as GDM, out of 5 DIPSI positive patient 3 were OGTT positive (Table 1). Tables 2 and 3 shows DIPSI to be 100% sensitive, 97.94% specificity, 60% PPV and 100% negative predictive value.

Table 1: Incidence of GDM according to DIPSI and OGTT (WHO).

	DIPSI	OGTT (WHO)
GDM	5	3
Non GDM	95	97

Table 2: 2×2 table representing data of GDM positive cases by DIPSI versus OGTT (WHO).

DIPSI	WHO (OGTT)		
	Positive	**Negative**	**Total**
Positive	3	2	5
Negative	0	95	95
Total	3	97	100

Table 3: Showing sensitivity, specificity, PPV, NPV of DIPSI.

	Value	95% CI
Sensitivity	100.00%	29.24-100.00%
Specificity	97.94%	92.75-99.75%
Positive predictive value	60.00%	14.66-94.73%
Negative predictive value	100.00%	96.19-100.00%

Table 4 shows age wise distribution of subjects. Out of 5 DIPSI positive cases 80% belong to age more than 25 years, mean age of women among GDM positive patients was 28.8. There was positive correlation with increasing age and increase in incidence of GDM. Table 5 shows that

80% women with GDM had BMI>25. There was statistically significant correlation found among GDM and NON GDM group. Table 6 shows that out of 5 GDM 80% were multi and 20% were primi there was no statistically significant correlation found between GDM and non GDM group.

Table 4: Age wise distribution of subjects.

Age group (years)	Non GDM		GDM	
	N	%	N	%
<25 years	65	68.4	1	20
26-30 years	24	25.2	2	40
30-35 years	6	6.3	2	40
Total	95	100	5	100
Mean age	24.56		28.8	
SD	5.26		3.66	
P value	<0.001			

Table 5: Distribution of subjects according to body mass index.

BMI kg/m^2	Non GDM		GDM	
	N	%	N	%
18.5-24.9	58	61.05	1	20
25-29.9	35	36.8	2	40
>30	2	2.1	2	40
Mean	28.01		24.0	
SD	1.45		2.76	
P value	0.015			

Table 6: Distribution of subjects based on parity.

Parity	Non GDM		GDM		P value
	N	%	N	%	
Multi	56	58.9	4	80	0.348
Primi	39	41.4	1	10	

Table 7: Distribution of subjects according to mode of delivery.

Mode of delivery	Non GDM		GDM		P value
	N	%	N	%	
LSCS	42	44.3	3	60	0.489
FTVD	53	55.7	2	40	

Table 8: Mean birth weight and SD of neonates.

	GDM	Non GDM	P value
Mean birth weight	3.28	2.66	0.015
SD	0.656	0.283	

Different outcome of GDM positive women in terms of Mode of delivery and birthweight of neonates are presented in Tables 7 and 8. 60% of women with GDM delivered through c-section where as in NON GDM 44% underwent c-section. Even though the number of GDM patients undergoing c-section were more there was no statistically significant correlation between GDM and non GDM (Table 7). Table 8 shows that the mean birthweight of neonates of women with GDM was 3.88 when compared to 2.66 among women with non GDM. Table 9 shows that many 80% of GDM positive women were managed by medical nutrition therapy and only a few required insulins. Early diagnosis and timely intervention prevented the maternal and fetal adverse outcomes associated with GDM.

Table 9: Distribution of GDM subjects according to management.

	Frequency	Percentage
Diet	4	80
Diet + insulin	1	20
Total	5	100.0

DISCUSSION

Gestational diabetes mellitus is a carbohydrate intolerance of variable severity with the onset or first recognition during the present pregnancy. Due to high prevalence of GDM screening is essential to all pregnant women. Women diagnosed with GDM require intensive monitoring during pregnancy till delivery to prevent the potential complications, thus accuracy of diagnosis is of greater importance.

In our study the incidence of GDM was shown to be 5%. In a study conducted by Ferrara et al showed the incidence range from 4% 7.5%.[5] In study by Seshaih et al, Karla et al, Sawin et al incidence of GDM was 16.55%, 6.6%, 5% respectively.[6-8] In Present study DIPSI showed 100% sensitivity and 97.9% specificity. A study by Anjalakshi et al 75 gm OGCT done on 800 pregnant women showed 100%sensitivity and specificity.[9] The positive predictive value was 60% and negative predictive value of 100% indicating that screening with 75 gm glucose (DIPSI) is less sensitive and more specific test for diagnosis of GDM.

In our study there was gradual increase in prevalence of DIPSI positive cases with increase in age and with higher BMI. In a study by Anjalakshi et al and Dwarakanath et al showed positive correlation of age and BMI with incidence of GDM.[9,10] In present study there was positive correlation between increasing incidence of GDM and birthweight of neonate. In a study by Yang et al GDM was significantly associated with higher birth weight and an increased risk of large for gestational age and macrosomia blood glucose levels had significant effect on birthweight of neonates.[11] Macrosomia was not documented in this study due to immediate management with diet and diet + insulin.

In our study the 80% of GDM cases were multigravida similarly in a study by Sworoopa et al, GDM was found to occur more in multigravida (72%).[12] In our study the incidence of LSCS with GDM was 60%. According to study by Dudhwadkar et al and Kale et al, the incidence of

LSCS in patients with GDM was found to be more than 50%.[13,14]

One of the limitations of study is that the sample size was less. This is because the study was limited to one hospital. Nevertheless, the study has yielded important results. Larger yet similar studies are required for more precise findings.

CONCLUSION

DIPSI is a universal screening test used for early detection of GDM in early weeks of gestation. It is patient friendly as it can be done irrespective of the last meal, it is a simple, less cumbersome, cost effective and causes least disturbance in the pregnant women's routine activities. If DIPSI is borderline, patient is advised dietary modifications to control blood glucose level, if screening is positive then patient is subjected to OGTT. Early diagnosis has important role in preventing the maternal complications like spontaneous abortions, pre-term labour, still birth, pre-eclampsia progression to type 2DM, diabetic retinopathy and nephropathy. Fetal complications like congenital anomalies and macrosomia.

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