PATTERNS OF BLOOD AND URINE SUGAR LEVELS IN DIABETIC AND NON DIABETIC PREGNANCIES

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SUMMARY

Through this prospective case controlled study, patterns of blood and urine sugar levels in diabetics and non diabetic pregnancies are being presented. It was found that PG_2BS is the most sensitive parameter in mid-trimester to diagnose a pregnant diabetic. No diabetic mother touched levels of 150 mg% or less at the end of two hours thus influencing the GTT. Mothers with "high risk" for diabetes did not show much difference in patterns of blood sugar than non diabetic controls. Urine sugar proved to be a poor investigative parameter for diabetes in pregnancy.

INTRODUCTION

Blood glucose levels serve as a cardinal factor in management of a diabetic pregnancy. Subtle differences in blood glucose levels of diabetic and non diabetic pregnant mothers are thus only to be expected. These differences may emerge as early as 10 weeks (Lind & Pinkin - 1973) who found at this duration of pregnancy, a subtle but small difference in blood glucose levels of pregnant diabetic and non diabetics.

In this study we have tried to document this difference of blood glucose levels between diabetics and non diabetics in pregnancy. Also,

we have tried to employ urinary glucose estimation also alongwith, so as to appreciate the effect of blood sugar variation on this parameter.

MATERIAL & METHODS

The present study, a case-controlled prospective one, was carried out in the Department of Obstetrics and Gynecology, Medical College and SSG Hospital, Baroda for a period of one year from 1st March 1991 to 29th February 1992.

All antenatal mothers who attended the antenatal clinic of unit III of the department were screened for their blood sugar levels. (Random Blood Sugar - RBS) by glucometer (Miles India Ltd.). On the basis of this RBS level these patients were grouped into three

groups :

Group A : Indexed cases with RBS more than 110 mg.%.

Group B : Cases with RBS less than 110 mg% but a positive history suggestive of possibility of diabetes in the mother (High Risk for diabetes) - details vide infra.

Group C : Controls - RBS less than 110 mg% and no contributory history.

This classification was done as per the recommendations of Norder - Bander (1978).

In Group B the mothers who were included were those with family history of diabetes in first degree relatives, bad obstetric history, past history of pre-eclampsia, hydramnios in present pregnancy, obesity, suspected big size baby in past or present pregnancy, past history of a child born with congenital malformations or past history of stillborn children.

At the time of enrollment in the study all the cases were matched for gestational age, parity, area of origin (urban & rural) and the like.

Once enrolled in the study each mother was subjected to fasting blood sugar (FBS) and post glucose two hour blood sugar (PG$_2$BS).

FBS, PG$_2$BS & RBS was carried out at mid trimester in all enrolled cases between 24-28 weeks. However, Repeat FBS/PG$_2$BS examination was carried out at 28 weeks if the patient was screened very early during pregnancy.

For all patients enrolled in the study of all the three groups urine sugar estimation were also carried out concurrently.

Variations in blood and urinary sugar levels

in all the three groups were analysed and studied in the light of available literature.

RESULTS

In all, there were 50 mothers, who could be grouped in group A (cases). For each of the mother in group A, a matching control was enrolled in group B (High Risk for diabetes) and group C (Controls). Thus there were 50 mothers each in all the three groups.

Table I shows RBS values of all the three groups measured between 24-28 weeks of pregnancy. As shown in group A, RBS values were distinctly higher in group A as compared to group C (Controls). Also it was significant to know that mothers with a high risk history for suspecting diabetes had a marginally higher RBS value, albeit the levels of group B were less than 110 mg%.

As shown in the table II, in group A - RBS values were distinctly higher than group B and C. But the difference between group B and C though present, was not statistically significant.

As shown in table III, PG$_2$BS value proved to be the most sensitive amongst all groups and group A had highest PG$_2$BS value compared to the other two groups. The difference between group B and C again though present, was not statistically significant.

As shown in this table urine sugar estimation has a limited role in diagnosis of diabetes in pregnancy as the difference in presence of sugar in urine in all the three groups was statistically insignificant. However if at all, this parameter is to be employed, then it may

Table I

Pattern of RBS Values (mg%)

n = 50	Mean RBS	S. D.	Range	
Group A	163.4	28.24	134.66	- 102.14
Group B	103.78	16.90	78.59	- 120.65
Group C	94.36	9.32	90.04	- 108.68

have some help at urine sugar +++. At this level there were two cases in group A but none in group B and C.

DISCUSSION

From the results of this study it is evident that not only random blood sugar levels but subtle variations in blood sugar levels at different intervals of time are mandatory to understand for those who are interested in managing a pregnant diabetic, scientifically. At mid trimester RBS is expected to be around 163.4 mg% in a diabetic mother, whereas an FBS - PG_2BS variation is of 112.9 mg% to 176.0 mg%. However one point that was found in this study was at the end of two hours, all patients in group A remained above 150 mg%. This is a very vital observation for labelling a GTT as abnormal. this has also been shown by Buchanan and Douglas (1989).

Table II

Pattern of FBS Values (mg%)

n = 50	Mean RBS	S. D.	Range		
Group A	112.9	27.97	101.03	-	156.97
Group B	92.0	11.39	80.61	-	103.39
Group C	84.9	11.13	73.77	-	96.03

Table III

Pattern of PG_2BS Values (mg%)

n = 50	Mean RBS	S. D.	Range		
Group A	176.00	26.74	150.80	-	197.39
Group B	109.00	18.90	79.20	-	150.61
Group C	110.00	9.32	92.40	-	106.31

Table IV

Pattern of Urine Sugar

Urine Sugar	Group A		Group B		Group C	
	No.	%	No.	%	No.	%
+	06	12	08	16	09	18
++	05	10	01	02	02	04
+++	02	04	00	00	00	00
Total	13	26	09	18	11	22

At PG_2BS the difference between group B and group C for mean values of blood sugar got abolished. Also this difference was insignificant at RBS as well as FBS levels. Therefore it is safe to conclude from the present study that mothers with history for high risk factors for diabetes may not shown subtle variation in blood sugar levels at midtrimester. So employing blood sugar as only criteria, to pick up possible diabetics from group of patients with positive history may not be a very fruitful exercise.

This study also shows the futility of the use of urine sugar for diagnosis and to that extent even management of a pregnant mothers with diabetes. It was found that amongst the control groups who were not expected to register urine sugar positive, 21.5% did show presence of sugar in urine, if at all this investigative parameter may be of some help, then this help will be at urine sugar levels +++. However only two cases testing positive at 3+ level in group A is too small a number to draw any valid conclusion. Similar results were shown by Deshmukh (1967).

CONCLUSIONS

On the basis of the results of the present study, we can draw some subtle conclusions. $PG_{2B}S$ is a sensitive parameter at mid trimester to diagnose a pregnant diabetic. RBS values may not be of much help. All diabetic mothers never touch levels of 150 mg% and below at the end of two hours. Blood sugar values are not significantly different in controls and mothers with high risk for diabetes. Urine sugar is a very poor investigative parameter for diagnosis as well as treatment of diabetes in pregnancy.

ACKNOWLEDGEMENT

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