GESTATIONAL DIABETES: WHAT SIZE THE PROBLEM?

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SYNOPSIS

Diabetes Mellitus is a common chronic disease in Singapore. Its occurrence in pregnant women was 1.3% in a previous report. In a survey of 145 consecutive pregnant women registered at Alexandra Hospital the incidence of gestational diabetes was 13.1% when a total screen with 75 gm oral glucose challenge was used. The mean age of this sample was 27 years and the mean gestation at screening 33 weeks. There was an excess of Malay and Indian patients. Fifty percent had traditional risk factors for gestational diabetes. Whether this higher incidence is a result of more stringent screening and/or increased occurrence remains to be confirmed.

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INTRODUCTION

Diabetes mellitus is a common disease affecting 5.3% of the general population(1). It is largely a disorder in the older age group being most common in those above the age of 40. It may, however, occur temporarily in a subset of young patients as gestational diabetes and if it is not recognised in time it will adversely influence the outcome of the pregnancy. The incidence of diabetes in pregnancy was reported to be 1.3% in a survey done at the Kandang Kerbau Hospital (KKMH) (2). The rate was obtained by screening pregnant women with high risk factors. Many reports have shown that pre-screening with risk factors diminish the sensitivity of the programme(3). Furthermore, such method is partly retrospective subjecting the first pregnancy to the risk of diabetes before a high risk can be recognised.

In order to obtain an estimate of the true incidence of diabetes in the general pool of pregnancy, the Department of Obstetrics and Gynaecology (O&G) and the Department of Medicine, Alexandra Hospital started a pilot programme to challenge the glucose tolerance of an unselected group of pregnant women seen at this hospital.

PATIENTS AND METHOD

A consecutive number of 145 pregnant women registered at the Department of O&G were told of the need to screen for diabetes if they were not aware that they had the disease. They were questioned for historical risk factors and had their urine tested for glycosuria and their blood for random blood glucose level. All women had a 75 gm oral glucose tolerance test (OGTT) if they were past the 28th week gestation. Those women with high risk markers as listed in table 1 had a 75 gm OGTT was negative for glucose in tolerance, a repeat OGTT was performed after the 28th week gestation as in those without high risk markers.
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OGTT was performed as described in the WHO report, 1985(4). The blood was collected in fluoridated tubes and assayed for plasma glucose concentration with the Beckman glucose analyser using a glucose oxidase method. Abnormal glucose tolerance was classified as stated in the abovementioned report (table 2). All women found to have abnormal glucose tolerance were referred to the diabetic pregnancy clinic at the hospital for management. Women with a known diagnosis of diabetes mellitus were not challenged further if documentation of this condition was available. They were excluded in the computation for rate of gestational diabetes. Gestational diabetes was defined as carbohydrate intolerance of variable severity with onset or first recognition during the present pregnancy.

TABLE 1
HIGH RISK MARKERS

History of diabetes in first degree relatives
Previous babies with birth weight 4 kg and above or 2 kg or below
Previous unexplained perinatal losses
History of > 2 consecutive spontaneous abortions immediately prior to present pregnancy
Glycosuria in present pregnancy
Maternal obesity
History of Gestational diabetes
Acute polyhydramnios
Big foetus
Elderly (> 35 years)
Others; eg. previous baby with gross congenital anomaly, ingestion of diabetogenic drugs etc

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TABLE 2
DIAGNOSTIC VALUES FOR THE ORAL GLUCOSE TOLERANCE TEST

	Glucose concentration, mmol/litre (mg/dl) PLASMA	
	Venous	Capillary
Diabetes mellitus		
Fasting value	⩾ 7.8 (⩾ 140)	⩾ 7.8 (⩾ 140)
2 hrs after glucose load	> 11.1 (⩾ 200)	⩾ 12.2 (⩾ 200)
Impaired glucose tolerance		
Fasting value	< 7.8 (< 140)	< 7.8 (< 140)
2 hrs after glucose load	7.8–11.1 (140–200)	8.9–12.2 (160–220)

TABLE 3
AGE SPECIFIC INCIDENCE RATES OF ABNORMAL GTT

	Number of cases	Rate %
Under 20 years	0/5	0.0
Between 20 and 24 inclusive	3/44	6.8
Between 25 and 29 inclusive	9/55	16.4
Between 30 and 34 inclusive	6/32	18.8
Between 35 and 39 inclusive	1/8	12.5
40 and above	0/1	0.0

TABLE 4
INCIDENCE RATES OF ABNORMAL OGTT BY RACE

	Number of cases	Rate %
Chinese	5/48	10.4
Malay	9/78	11.5
Indian	4/17	23.5
Others	0/2	0.00

RESULTS

A total of 145 women were screened for abnormal glucose tolerance during pregnancy over a period of 4 months. Their ages ranged from 17 to 40, the mean age was 27. There were 48 Chinese, 78 Malays, 17 Indians and 2 others. Their gestation at screening varied from 17 to 44 weeks with a mean of 33 weeks.

The fasting plasma glucose level was 76 ± 24 mg/dl (mean ± 2 SD), the 1 hour postload 137 ± 59 mg/dl and the 2 hour postload 119 ± 62 mg/dl. Abnormal glucose tolerance based on criteria of the WHO recommendation 1985 was found in 19 women without previous history of overt diabetes mellitus. Of them, 4 had diabetic OGTT curves and 15 qualified as impaired glucose tolerance. The incidence of gestational diabetes mellitus in the population studied was 13.1%.

The age specific incidence is shown in table 3, no case was discovered in those less than 20 years and more than 40 years but the number in these groups was small.

The highest incidence was seen in the group 30–34 years. The breakdown by race is listed in table 4. The distribution did not show a significant difference in this sample which has a higher number of Malays and Indians compared with the general population.

Complete risk factor profile was obtained for 127 patients out of the original 145. Of these 127, 18 were found to have gestational diabetes. Nine of these gestational diabetics, or 50% did not have any risk factors at all.

DISCUSSION

A surprisingly high incidence of gestational diabetes 13.1% was found in this study. This contrasts markedly with the previously reported rate of 1.3% which included both established and gestational diabetes.

This difference may be accounted for by several factors. The most apparent is the methodology. In the KKMH study, only women with high risk factors had an OGTT done and the results were then extrapolated onto the general pregnant population. In the current study, we did OGTT on all pregnant women who registered with the department of O&G at Alexandra Hospital. A breakdown in terms of risk factors revealed that 50% of our gestational diabetics did not have any risk factors at all. This proportion would have been missed in any study which does not involve a universal screening programme. Furthermore, the interpretation of the OGTT results differs. In the KKMH study, screening OGTT was based on a 50 g glucose load. The diagnostic value was a 2 hour post load value of 140 mg% and above. In our protocol, a 75 g glucose load was used, and a 2 hour post load value of 140 mg% and above was used. Nevertheless, using the WHO suggested correction factor of 15 mg% our incidence rate remained high at 10%.

Another important contributory factor was our sample profile. We have a disproportionately large number of Malays (54%) and Indians (12%) in our study. A population based study on the prevalence of diabetes in Singapore(1) showed that the prevalence in Indians and Malays was higher than in Chinese, our rate could have been partially influenced by the racial distribution. It is important to note that this difference in the general population was established for diabetes after the age of 40. This racial difference may not be relevant for the gestational diabetics in our study whose mean age was 27. Indeed our racial breakdown did not show any significant difference. The previous study has also shown a rise in prevalence of diabetes mellitus from 1.99% in 1978 to 5.3% in 1985. If gestational diabetes heralds subsequent development of overt diabetes mellitus(5) then our study may have revealed a true rise in the incidence of gestational diabetes. This rise being simply a reflection of the population trend.

This pilot study has shown an unexpectedly high incidence of diabetes in pregnancy. The sheer magnitude of the problem demonstrated in this study demands further corroboration for confirmation. There is indication that a more comprehensive screening programme is required to detect the significant number of gestational diabetics without historical risk factors.

We need also to ascertain whether earlier screening will produce the same rate of gestational diabetes. It is more useful to identify this problem at an earlier stage such as between 24–28th week gestation to have adequate time for effective intervention.

The weight of evidence favours early recognition of gestational diabetes to reduce foetal morbidity and mortality(6). In the context of Singapore with a falling birth rate(7) this objective is of pressing importance.

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