

# Which is the threshold glycosc value for further investigation in pregnancy?

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## Summary

The aim of this study was to investigate the lower threshold glycosc value in a 50 gr-1 hour screening test for further testing in diagnosing gestational diabetes mellitus (GDM).

Our study consisted of 602 pregnant women between 24-28 weeks of gestation, who received a 50 gr glycosc load followed by glycosc determination one hour later. After screening 273 out of 602 women showed test serum glycosc values > 125 mg/dl. All 273 women received a 100 gr 3-hour glycosc tolerance test (GTT). Thirty out of 273 women were found to have carbohydrate intolerance. The overall incidence of GDM was 4.98%. When the threshold glycosc value was  $\geq$  130 mg/dl the incidence of GDM was 17.8%, but lowering the threshold to 126 mg/dl a further 1.3% of the women showed carbohydrate intolerance. In the above threshold value the sensitivity was 100% but the specificity was only 54%. However, we recommend 126 mg/dl threshold for GTT since this threshold allows for the diagnosis of all women with carbohydrate intolerance during pregnancy.

*Key words:* Glycosc screening test; Gestational diabetes mellitus; Carbohydrate intolerance.

## Introduction

The metabolic stress of pregnancy may result in reversible carbohydrate intolerance. This problem is estimated to occur in 1-5% of all pregnancies [1].

Women who are at particular risk for gestational diabetes mellitus (GDM) must be investigated; the identification of those women is important because the disease carries a risk of increased neonatal and maternal morbidity and mortality [2, 3].

Although the importance of diagnosis and treating women with this condition is well recognized, there is still no general consensus on the selection criteria for screening and the timing of glycosc testing [4].

A 50 gr glycosc load followed by glycosc determination one hour later is the recommended screening test for all pregnant women [4, 5, 6, 7, 8]. However, the lower threshold value of a glycosc screening test for a further glycosc tolerance test (GTT) – allowing the diagnosis of all women with GDM – is dependent on the screened population, the race, the standards of the institutions and other parameters [9].

The study deals with finding the lower threshold value of glycosc screening tests for GTT in a Greek pregnant population in order to discover all the patients with GDM.

## Material and Methods

Our material consisted of 602 pregnant women aged between 24 and 32 years (mean 28  $\pm$ 4.5 yrs). Gestational age was between 24 to 28 weeks and was assigned according to menstrual history in conjunction with ultrasonographic assessment of

fetal biometry. None of the women had a personal history or clinical evidence of diabetes mellitus.

All pregnant women received a 50 gr glycosc load followed by glycosc determination one hour later, without having any preparation for testing. If the plasma glycosc value was > 125 mg/dl (glycosc oxidase), a 3-hour 100 gr GTT was performed. GTT results were interpreted according to the criteria of O'Sullivan and Mahan, as modified by Carpenter and Coustan [6].

A diagnosis of gestational diabetes was made if two or more of the following values were met or exceeded: fasting, 95 mg/dl; 1-hour test, 180 mg/dl; 2-hour test 155 mg/dl; and 3-hour test 140 mg/dl.

## Results

Table 1 shows the distribution of screening test values among all 602 patients. After a 50 gr 1-hour glycosc screening test 273 out of 602 pregnant women showed serum glycosc values > 125 mg/dl.

All 273 women received a 100 gr 3-hour glycosc tolerance test (GTT). Thirty out of 273 women were found to have two or more abnormal values in GTT (table 2). The incidence of gestational diabetes when the serum glycosc value was between 126-129 mg/dl was found to be 1.3% and 6.2% in values between 130-134 mg/dl. When the glycosc values were between 134-139 mg/dl the incidence was 9.6%, while in values  $\geq$  140 mg/dl the incidence was found to be 20%.

Table 1. — Distribution of patients after 50 gr 1-hour screening test

Patients	Glycosc values mg/dl
329	$\leq$ 125
79	126-129
32	130-134
52	135-139
110	$\geq$ 140

Received March 3, 1997

revised manuscript accepted for publication April 30, 1997

Table 2. — The incidence of abnormal GTT among patients with a 50 gr 1-hour screening test > 125 mg/dl

	Patients n	Abnormal GTT	
		n	%
	79	1	1.3
	32	2	6.2
	52	5	9.6
	110	22	20
Total	273	30	

The overall incidence of gestational diabetes among our population was 4.9%.

The sensitivity and specificity of each value over 125 mg/dl are plotted in Figure 1. The maximum specificity and sensitivity were met at plasma glucose levels between 135-140 mg/dl.

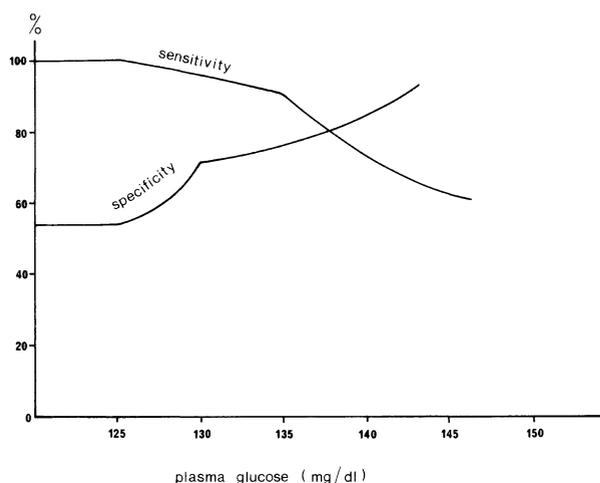


Figure 1.

## Discussion

Gestational diabetes mellitus is generally viewed by obstetricians as a potential risk factor for adverse pregnancy outcomes and its incidence is estimated to occur in 1% to 5% of pregnancies [1, 10]. Although the importance of diagnosing and treating women with this condition is well recognised many screening tests have been advised. The 50 gr screen is the best documented and most widely used test at the present time [8]. The test is convenient at any time during the pregnancy. However, the problem is, which threshold value of glucose in a 50 gr 1-hour screening test must be taken into account for further testing in diagnosing gestational diabetes [4]. When the test was originally described a cut off glucose value of 143 mg/dl yielded a sensitivity of 79% and a specificity of 87% [5].

Later other authors suggested that a lower cutoff 135 mg/dl would detect an additional 16% of gestational diabetes [6]. Indeed, occasional gestational diabetes has been found with threshold glucose values between 130-135 mg/dl [8]. After that, most authors recommend 135

mg/dl threshold for GTT, believing that this threshold allows for the diagnosis of almost all women with GDM [9].

In our population the overall incidence of gestational diabetes was 4.9% a prevalence no different than that reported in the literature [11, 12].

Furthermore, a positive screening test (PST) result was found to be 45.34% which was much higher than the reported range of 23 to 30.5% [6, 8].

On the contrary, the percentage of gestational diabetes mellitus among those with PST was 10.9% which was found to be within the range of 8.6% to 22% [6, 8, 9].

The high rate of PST could be explained by the fact that PST is dependent on the given threshold; in a given threshold of 135 mg/dl the PST in our population would be 26.9%, but 10% of women with gestational diabetes mellitus would go undiagnosed. Thus, by lowering the threshold of the glucose value to 126 mg/dl in our study, this high PST is not surprising.

The sensitivity of 50 gr 1-hour oral glucose screening test is in general about 80% and its specificity is about 90%; but the above values differ by altering the threshold value of the screening test [3].

According to our results, when 126 mg/dl was used as a threshold for further investigation, the sensitivity was 100% but the specificity only 54%.

On the contrary, when the threshold value was increased to 135 mg/dl the sensitivity and specificity were 90% and 76%, respectively. Furthermore, when the threshold was increased to 140 mg/dl the sensitivity was 80% and specificity 85%.

In this study we recommended 126 mg/dl as a threshold glucose value for a further 3-hour-GTT, although with this value the specificity was low (54%).

However, with the above value a further incidence of 1.3% of pregnant women were found to have carbohydrate intolerance during their pregnancy. Furthermore, our results confirm the finding of Rey *et al.* [14] who reported that the incidence of carbohydrate intolerance during pregnancy is higher than that usually estimated.

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