Original Research Article

A Study on Glucose Tolerance Test at Different Stages

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Abstract

The glucose tolerance signifies the ability of the body to dispose off an additional load of glucose given. This test is useful in distinguishing a person with a normal glucose tolerance from people who have increased tolerance in disease conditions. Aim of the study to study on glucose tolerance test. Approximately 40% of subjects who will develop type 2 diabetes are within the NGT range at OGTT, indicating that there is a large number of NGT subjects who constitute the larger reservoir of future type 2 diabetes. OGTT detects diabetes more efficiently than FPG as it recognizes altered post-prandial metabolism.
Keywords: glucose tolerance, diabetes, NGT, OGTT.

INTRODUCTION

In the world the prevalence of type 2 diabetes is increasing at an disturbing rate. The number of people with type 2 diabetes globally is projected to increase from 171 million in 2000 to 366 million by the year of 2030 [1]. This increase, closely linked to the upsurge of obesity, represents a global health care problem for the related micro- and macro-vascular complications [2].

The glucose tolerance signifies the ability of the body to dispose off an additional load of glucose given. This test is useful in distinguishing a person with a normal glucose tolerance from people who have increased tolerance in disease conditions [3].

Each normal individual displays a characteristic time related blood glucose response following ingestion of a known amount of glucose. It essentially involves body's ability to absorb glucose and metabolize it by secreting adequate insulin. This response is altered many a time and indicates several abnormalities of carbohydrate metabolism [4].

INDICATIONS

- In diagnosis of diabetes mellitus and impaired glucose tolerance in doubtful subjects.
- Evaluation of non – diabetic glycosuria.
- Confirmation of gestational diabetes [5].

PRE – REQUISITES:

- The patient should be on a normal unrestricted diet containing at least 150g of carbohydrate for 3 days.
- Test should preferably be performed after an overnight fast in the morning on an empty stomach. In case of emergency it can be done after 4 -5 hrs of last meat. A weak tea without sugar and milk can be allowed.
- The patient should be relaxed, seated and not involved in physical activity. There should be no smoking before and during the test.
- All medicines affecting carbohydrate metabolism should be stopped e.g. insulin and other anti diabetic drugs, steroids, oral contraceptives etc [6].

PROCEDURE

GTT can be performed in two ways depending upon the route of glucose load administration i.e. oral GTT and intravenous GTT.

After an overnight fast (12-14 hrs after the last meal) the subject is ready for the test. In the early morning fasting blood and urine samples are collected. The subject is administered an oral dose of glucose, normally 75gm glucose dissolved in about 200ml water and flavoured, is given. The time is noted. At intervals of 60 and 120 minutes blood samples are withdrawn and urine specimens are collected. Blood glucose levels are determined quantitatively in samples. Sugar in urine specimens is tested quantitatively. The blood glucose values are plotted on a graph sheet as a function of time [7].
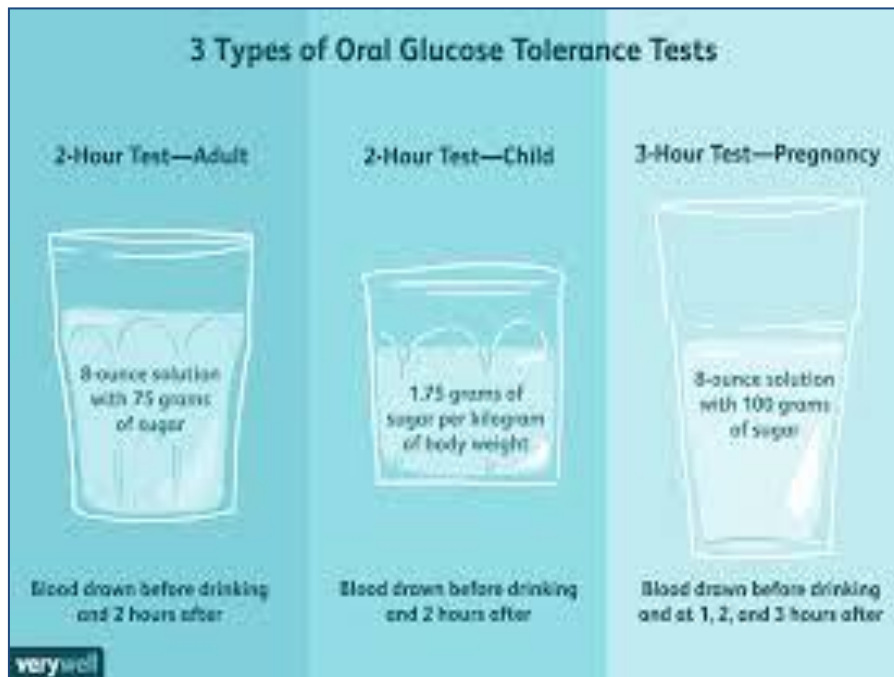
Fig-1: Shows types of oral glucose tolerance test

Normal response

The fasting blood glucose levels will be in the range of 60-100mg% .30 -60 minutes after glucose administration the blood sugar levels rises peak value of 100 – 130 mg%. The peak value does not exceed the renal threshold level of 180 mg% and there will be no glucose in the urine samples. The initial rise is observed because the quantity of glucose absorbed from the intestine exceeds the capacity of liver and other tissues to use it. Increased glucose levels in blood stimulates insulin secretion which facilities the enhanced utilization of glucose by the peripheral tissue. As a results the blood glucose levels starts declining and may dip to a value slightly lower than the fasting levels at the end of 2 hrs [8-10].
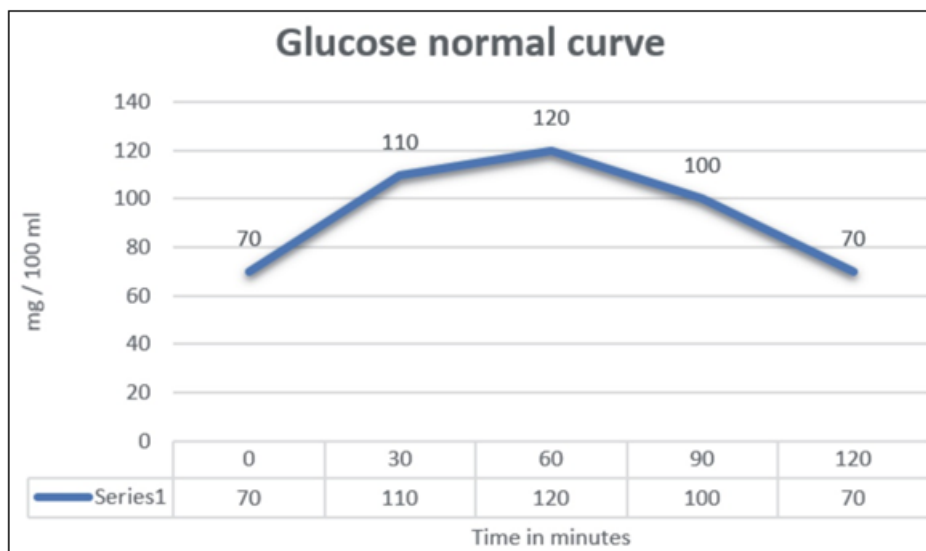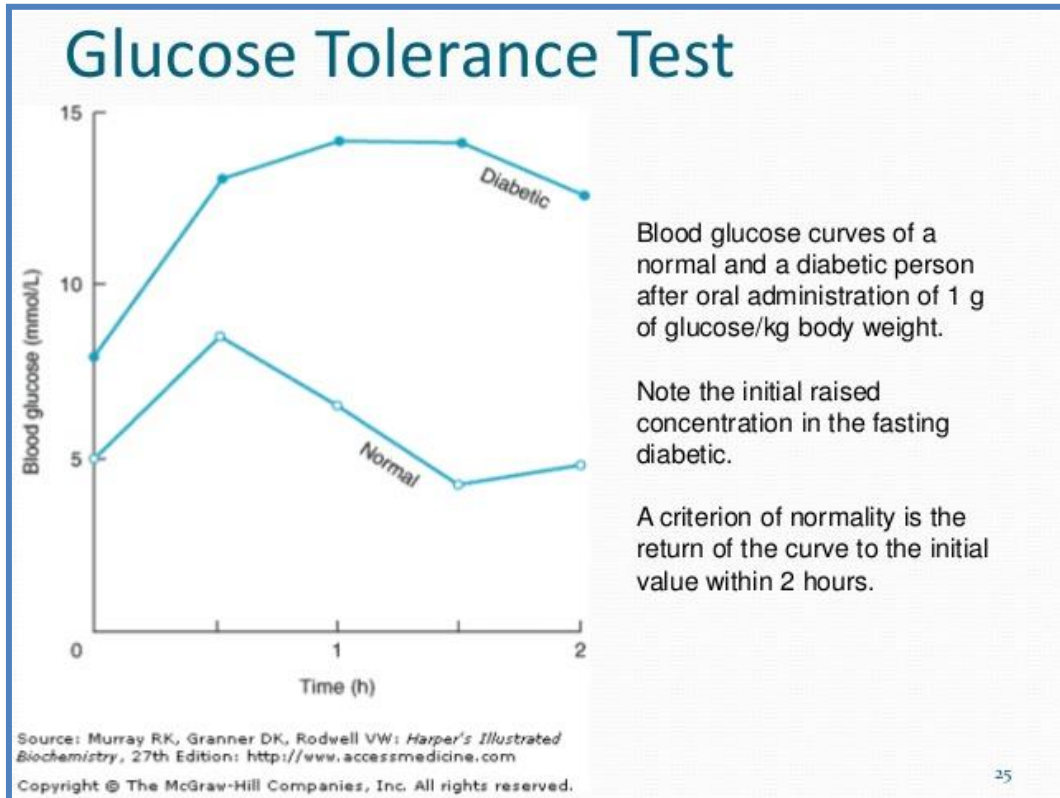

Graph-1: Shows normal glucose curve

DECREASED TOLERANCE

Decreased tolerance is found in diabetes mellitus. Fasting blood sugar values above 126 mg % and 2 hrs value above 200mg% are characteristic of diabetic mellitus. Diminished glucose tolerance is also observed in hyperthyroidism, in hyper activity of adrenals and in severe liver disease [11, 12].
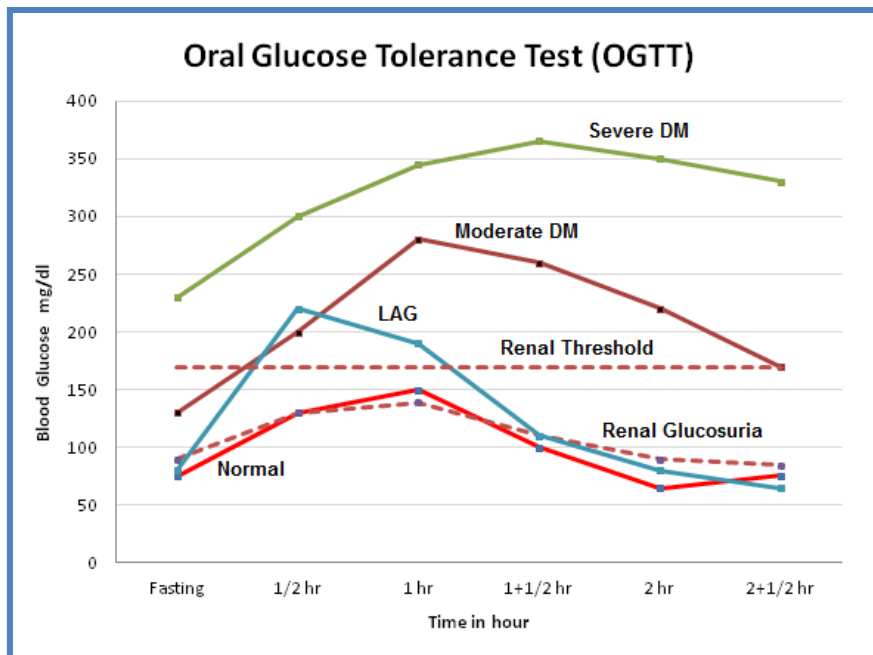
Graph-2: Shows Glucose tolerance test in diabetes

INCREASED TOLERANCE

The graph will appear flatter than a normal response curve. Even in some normals such a profile is found. Increased tolerance is observed in hyperthyroidism, hypoadrenalism and hypopituitarism [13]. Increased tolerance can also be observed in patients with intestinal disorders like idiopathic steatorrhoea, sprue and coeliac disease, the abnormal response in these latter cases reflects an impaired absorption of glucose. In such conditions the intravenous glucose tolerance test is performed to assess the ability of the body to dispose off an additional glucose load [14, 15].

Graph-3: Shows oral glucose tolerance test

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