



ORIGINAL RESEARCH PAPER

Ayurveda

BENEFICIAL IN DIAGNOSIS TO DIABETES WITH SPECIAL REFERENCE TO GLUCOCOSE TOLERANCE TEST – A REVIEW

KEY WORDS: Beneficial in Diabetes, Glucose tolerance test.

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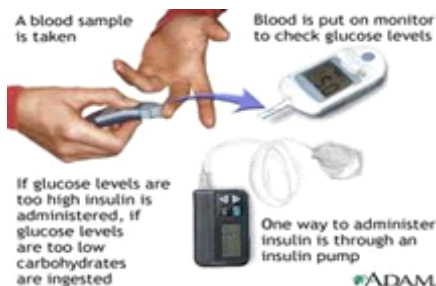
ABSTRACT

The Rise And Fall Of The Blood Glucose Concentration Following Oral Or Intravenous Administration Of Glucose--' The Glucose Tolerance Curve 'Has Long Been Widely Used Both Clinically And Experimentally In Animals And Man As An Index Of The Efficiency Of The Mechanisms Regulating The Concentration Of Glucose In The Blood. Glucose Tolerance Can Be Defined As 'The Capacity To Dispose Of Administered Glucose Under Standard Conditions. Although The Influence Of The Above Factors On The Glucose Tolerance Curve Is Well-Documented.

Introduction:

- Glucose tests are used to determine the concentration of glucose in blood, urine, cerebrospinal fluid, and other body fluids.
- These tests are used to detect
 - An increased blood glucose (hyperglycemia),
 - A decreased blood glucose (hypoglycemia),
 - Increased glucose in the urine (glycosuria),
 - A decrease in cerebrospinal, serous, and synovial fluid glucose.
- It is a laboratory method to check how the body breaks down (metabolizes) blood sugar, and how quickly it is cleared from the blood.
- It is one of the tools used to diagnose prediabetes, diabetes, insulin resistance and reactive hypoglycemia.
- A glucose tolerance test is a medical test in which glucose is given and blood samples taken afterward to determine how quickly it is cleared from the blood¹.

Equipment for Test



Objective

— To highlights the importance of OGTT and its need in Diagnosing diseases.

History:

1. In a 1975 paper Marvin Siperste in referred to the OGTT as 'a pitfall in the diagnosis of diabetes mellitus'.
2. Since the 1970s, the World Health Organization and other organizations interested in diabetes agreed on a standard dose and duration².
3. in a 1998 review, George Alberti concluded that 'IGT has come of age.

Types of GTT

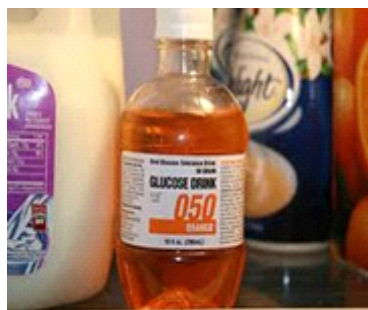
- a. Oral Glucose Tolerance Test (OGTT)
 - ingestion of glucose solution in 5 minutes.
 - most common form of GTT.
 - fasting blood sugar (FBS) is measured

before ingestion.

- b. Intravenous Glucose Tolerance Test (IGTT)
 - glucose is injected into the vein for three(3) minutes.
 - blood insulin levels are measured before the injection.

Indication:

- The test is usually used to test for diabetes, insulin resistance, and sometimes reactive hypoglycemia and acromegaly, or rarer disorders of carbohydrate metabolism.





• How to prepare for Test

Preparation of patient³:

- The patient is instructed not to restrict carbohydrate intake in the days or weeks before the test.
- The test should not be done during an illness, as results may not reflect the patient's glucose metabolism when healthy.
- A full adult dose should not be given to a person weighing less than 43 kg (94 lb), or exaggerated glucoses may produce a false positive result.
- Usually the OGTT is performed in the morning as glucose tolerance can exhibit a diurnal rhythm with a significant decrease in the afternoon.
- The patient is instructed to fast (water is allowed) for 8–12 hours prior to the tests.
- In the most commonly performed version of the test, an oral glucose tolerance test (OGTT), a standard dose of glucose is ingested by mouth and blood levels are checked two hours later

Procedure:

- A zero time (baseline) blood sample is drawn.
- The patient is then given a measured dose (below) of glucose solution to drink within a 5 minute time frame.
- Blood is drawn at intervals for measurement of glucose (blood sugar), and sometimes insulin levels.
- It is important to stress that the diagnosis criteria stated above by the World Health Organization (WHO) is for venous samples only i.e. a blood sample taken from a vein in the arm.
- An increasingly popular method for measuring blood glucose is from a capillary or finger-prick sample.

Substances measures and variations:

- If renal glycosuria (sugar excreted in the urine despite normal levels in the blood) is suspected, urine samples may also be collected for testing along with the fasting and 2 hour blood tests.

Variations:

- A standard 2 hour OGTT is sufficient to diagnose or exclude all forms of diabetes mellitus at all but the earliest stages of development.
- Longer tests have been used for a variety of other purposes, such as detecting reactive hypoglycemia or defining subsets of hypothalamic obesity.
- Insulin levels are sometimes measured to detect insulin resistance or deficiency.
- The OGTT is of limited value in the diagnosis of reactive hypoglycemia, since

- (1) Normal levels do not preclude the diagnosis
- (2) Abnormal levels do not prove that the patient's other symptoms are related to a demonstrated atypical OGTT
- (3) Many people without symptoms of reactive hypoglycemia may have the late low glucoses.

- When the glucose is given intravenously it is termed an intravenous glucose tolerance test (IVGTT) or intravenous glucose challenge test (IVGCT).
- This has been used in the investigation of early insulin secretion abnormalities in prediabetic states

Interpretation of OGTT Results⁴:

- Fasting plasma glucose (measured before the OGTT begins) should be below 6.1 mmol/L (110 mg/dL).
- Fasting levels between 6.1 and 7.0 mmol/L (110 and 125 mg/dL) are borderline ("impaired fasting glycaemia"), and fasting levels repeatedly at or above 7.0 mmol/L (126 mg/dL) are diagnostic of diabetes.
- The 2 hour OGTT glucose level should be below 7.8 mmol/L (140 mg/dL).
- Levels between this and 11.1 mmol/L (200 mg/dL)

indicate "impaired glucose tolerance".

- Glucose levels above 11.1 mmol/L (200 mg/dL) at 2 hours confirms a diagnosis of diabetes.

Normal values⁵:

Table 1: 1999 WHO Diabetes criteria - Interpretation of Oral Glucose Tolerance Test

Glucose levels	NORMAL		impaired fasting glycaemia (IFG)		impaired glucose tolerance (IGT)		Diabetes Mellitus (DM)	
	fasting	2hrs	fasting	2hrs	fasting	2hrs	fasting	2hrs
Venous plasma (mmol/L)	<6.1	<7.8	> 6.1 & <7.8	<7.8	<7.0	>7.8	>7.0	>11.1
(mg/dL)	<110	<140	>110 & <126	<140	<126	>140	>126	>200

Discussion:

In this study, we intended to identify, among twelve fasting state- and common (or recently introduced) OGTT-derived measures feasible for genetic studies in large cohorts, the indices best-suited to detect genetically determined alterations of insulin release. Since the suitability of the indices for detection of altered β -cell function may depend on the SNPs' pathomechanisms, we additionally analysed the SNPs affecting GIS separately from those affecting the incretin axis (ISIS or incretin release)⁶. It was not the primary aim of this study to evaluate the performance of the fasting state- and OGTT-derived estimates of insulin secretion by comparing them with gold standard measures derived from laborious and expensive methods, such as IVGTT or hyperglycemic clamp.

Conclusion

- We thus conclude that predicting insulin sensitivity and insulin release with reasonable accuracy from simple demographic parameters and values obtained during an OGTT is possible.
- This is less invasive, more convenient for the patient and requires minimal training to conduct

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