

Prolonged Oral Glucose Tolerance Test (GTT) and Mixed Meal Test (MMT) for Hypoglycaemia - Summary Clinical Guideline

(Document Code: CHISCG37)

**THIS TEST IS ONLY TO BE PERFORMED FOLLOWING DISCUSSION
WITH A CONSULTANT BIOCHEMIST OR ENDOCRINOLOGIST**

INDICATIONS

Confirmation and differential diagnosis of suspected hypoglycaemia

CONTRAINDICATIONS

- Severe acute illness - critical illness can be associated with hypoglycaemia due to sepsis, hepatic, renal or cardiac failure- **this test should not be used in these circumstances.**
- Hypoglycaemic drugs for diabetes
- Untreated adrenal insufficiency- to be excluded prior to test

SIDE EFFECTS

Nil, but test potentially unpleasant due to severe hunger

PREPARATION

The patient should have been on a diet containing adequate amount of carbohydrate (250g/day) for at least 3 days before the test.

The patient should fast from 10p.m. the previous evening, to give a minimum 10 hour fasting period, and not eat or drink anything other than water, until the test is completed. Discontinue all non-essential medications on day of commencing test.

PROCEDURE

Substrate preparation:

- GTT
 - Prepare Polycal - this is a carbohydrate drink based on maltodextrin, a partial hydrolysate of corn starch. It is supplied by Cow and Gate in 200 mL bottles. Only 113 ml is required for each patient. This is equivalent to 75g anhydrous glucose. Measure 113 mL Polycal into a special beaker, add water up to 200 mL mark. Secure plastic cap firmly onto beaker, shake to mix. Polycal is now ready.
- MMT
 - Prepare Ensure Plus- This is a mixed drink which contains protein, fat and carbohydrates and the standard presentation is 200ml bottle. This will give 330Kcal (13.8g Protein, 10.8g Fat and 44.4g carbohydrates Abbott laboratories, Abbott Park, IL). The drink is given to the patient as it comes.

Note: A further 100 mL of water must be drunk by the patient to make the final volume 300 mL.

TIME	For each time point request: glucose, insulin, C-peptide and sample STORE
08:45	Insert the venous cannula
0 min (i.e. 09:00)	Give Substrate - as above
	Send grey top and yellow top.
30 minutes	Send grey top and yellow top.
60 minutes	Send grey top and yellow top.
90 minutes	Send grey top and yellow top.
120 minutes	Send grey top and yellow top.
150 minutes	Send grey top and yellow top.
180 minutes	Send grey top and yellow top.
210 minutes	Send grey top and yellow top.
240 minutes	Send grey top and yellow top.

Sulphonylureas will only be measured if results suggest insulin excess (on single sample).

The test ends when laboratory glucose is less than 2.5 mmol/L and the patient is symptomatic or displaying signs of hypoglycaemia (e.g. confusion if hypoglycaemia unaware patient) or when 4 hours have elapsed since Polycal. Do not end the test on the basis of a bedside sugar test. Do not end the test in an asymptomatic patient with low serum glucose. **It is important that details of symptoms including timings are documented during the test.**

If it is judged necessary to treat hypoglycaemia urgently due to severe or dangerous symptoms, obtain samples as above and then administer carbohydrate.

INTERPRETATION

The first use of the test is to compare blood glucose levels during the test with symptoms. This can help to confirm or refute hypoglycaemia as a cause of symptoms. Comparison of blood glucose and symptoms can also help to define the group of patients with severe symptoms relating to biochemically mild hypoglycaemia. This is a further group in whom underlying significant organic pathology is extremely unlikely.

A period of relative hyperglycaemia followed by symptomatic hypoglycaemia later in the test, accompanied by symptoms is indicative of 'reactive' hypoglycaemia. This pattern can be associated with abnormal glucose tolerance of 'pre-diabetes'. Reactive hypoglycaemia is not usually indicative of significant other underlying pathology and is usually best managed by dietary modification with regard to reducing intake of high glycaemic index foods. Case reports suggest that severe reactive hypoglycaemia can occasionally be a presenting feature of insulinoma.