

Oral Glucose Loading Test for hypoglycaemia

Test Name: CHILD ORAL GLUCOSE LOADING TEST FOR HYPOGLYCAEMIA DFT

Principle

In contrast to fasting hypoglycaemia, postprandial hypoglycaemia occurs several hours after eating. Some disorders that cause hypoglycaemia predominantly in the postprandial state are the non-insulinoma pancreatogenous hypoglycaemia syndrome (NIPHS), post gastric bypass hypoglycaemia, and insulin autoimmune hypoglycaemia.

Please refer to the metabolic team if glycogen storage disease 0 (GSD0) is suspected.

It is important to appreciate that sometimes patients are unable to differentiate fasting from postprandial occurrences of hypoglycaemia, and some disorders can produce both fasting and postprandial hypoglycaemia.

Indication

Patients who demonstrate unexplained post prandial hypoglycaemia.

Precautions

- This test should not be performed in patients who fulfil the criteria for diabetes mellitus: Two diagnostic glucose results on separate occasions (either fasting plasma glucose ≥ 7.0 mmol/L or random plasma glucose of ≥ 11.1 mmol/L), or one diagnostic glucose result and clinical symptoms of diabetes e.g., polydipsia, polyuria, ketonuria and rapid weight loss.
- This test should not be performed on patients who are under physical stress e.g., post-surgery, trauma or infection or extreme psychological stress as these may give misleading results.
- This test should not be performed on patients with hypokalaemic periodic paralysis.

Side Effects

Some patients feel nauseated and may have vasovagal symptoms during this test.

Preparation

The patient should be fasted for a period of 3 to 8 h, the time period chosen should be dependent on the patient's age and the patient's usual interval between meals.

Protocol

1. Collect a urine sample prior to starting the test and send for organic acid analysis.
2. Insert an indwelling 22-gauge blue cannula 30 min before the expected start of the test and start the patient on a saline drip.
3. Prepare the glucose load (2 g/kg with a maximum of 50 g), as a 10% solution in water.
4. Take a basal sample for glucose, lactate, beta-hydroxybutyrate and bedside ketones. Write $t = 0$ on the tube of blood.
5. Administer the glucose load orally or through a nasogastric tube over 5–10 min.
6. Take blood samples at 30, 60, 90, 120, 150, 180 mins.
7. Write the times on the samples.
8. If the bedside glucose drops <2.6 mmol/L at any point – collect the plasma glucose, insulin and bedside ketones samples. Then **stop the test** and treat the hypoglycaemia.

Time Points:

Time (min)	Procedure	Blood Samples
0	Check blood glucose using meter. Take blood samples then administer glucose load.	Plasma glucose, lactate, beta-hydroxybutyrate and insulin
30	Check blood glucose using meter	If bedside glucose is <2.6 mmol/L take the following blood samples: Glucose, insulin, bedside ketones
60	Check blood glucose using meter	If bedside glucose is <2.6 mmol/L take the following blood samples: Glucose, insulin, bedside ketones
90	Check blood glucose using meter	If bedside glucose is <2.6 mmol/L take the following blood samples: Glucose, insulin, bedside ketones
120	Check blood glucose using meter	<u>Plasma glucose and insulin</u> (as normal OGTT protocol). If POCT <2.6 mmol/L take bedside ketones.
150	Check blood glucose using meter	If bedside glucose is <2.6 mmol/L take the following blood samples: Glucose, insulin, bedside ketones
180	Check blood glucose using meter	If bedside glucose is <2.6 mmol/L take the following blood samples: Glucose, lactate, beta-hydroxybutyrate Insulin

Samples

Glucose and lactate 1.2 mL fluoride oxalate (yellow top)

Insulin 1.2 mL lithium heparin (orange top)

The insulin samples must reach the lab within 4 hours of collection

Beta-hydroxybutyrate 1.2 mL lithium heparin (orange top)

The insulin samples will be vetted by the laboratory – only insulin samples that have concurrent laboratory glucose of <3.0 mmol/L will be analysed (except for the baseline and 120 min insulin samples – which will be analysed, as routine OGTT protocol.)

Interpretation

Detectable insulin when blood glucose is <2.5 mmol/L is inappropriate.

References

1. Permutt MA. Postprandial hypoglycemia. Diabetes. 1976 Aug;25(8):719-33.
2. Scheen AJ, Lefèbvre PJ. [Reactive hypoglycaemia, a mysterious, insidious but non dangerous critical phenomenon]. Rev Med Liege 2004; 59:237.
3. Brun JF, Fedou C, Mercier J. Postprandial reactive hypoglycemia. Diabetes Metab 2000; 26:337.
4. Bhattacharya K. Investigation and management of the hepatic glycogen storage diseases. 2015. Transl Pediatr. 2015 Jul;4(3):240-8.