Glucose Suppression Test for Growth Hormone

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Indication

- This test is used to investigate clinical suspicion of acromegaly or gigantism.
- Baseline GH values cannot be used to exclude acromegaly

Principle

Acromegaly is caused by persistent growth hormone (GH) hypersecretion.
GH secretion is part of the counter-regulatory defence against hypoglycaemia and physiological GH secretion is inhibited by hyperglycaemia. In acromegaly, GH secretion is autonomous and does not suppress and may paradoxically rise with hyperglycaemia.

Precautions

! This test is unnecessary in diabetics who have already shown GH suppression in the presence of hyperglycaemia.
! Do not perform this test on patients with hypokalaemic periodic paralysis.

Side Effects

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

Preparation

➲ The diet over the preceding 3 days should contain adequate carbohydrate (approx. 60% of calories).
➲ Patient should fast overnight for 10 to 14 hours (water only allowed) and should rest throughout the test.
➲ Physical exercise is not allowed in the morning prior to and/or during the test
➲ The test should be performed in the morning

Protocol

Time post glucose drink (min)	Procedure	Blood Sample
0	-	Growth hormone, glucose, IGF1 and IGF-BP3
30	-	Growth hormone, glucose
60	-	Growth hormone, glucose
90	-	Growth hormone, glucose
120	-	Growth hormone, glucose

1. Prepare the glucose load using the following:

   Rapilose: contains 75g anhydrous glucose in 300 ml. For children weighing less than 43kg, give 7 ml/kg (1.75g/kg anhydrous glucose). Total dose should not exceed 75g anhydrous glucose. If the volume is less than 200ml, add water to make up to 200 ml.

   NB. If Rapilose is unavailable, other options include:

   - **POLYCAL®** (Nutricia Clinical) liquid (contains 0.66g anhydrous glucose per mL; 1.51 mL = 1g anhydrous glucose): Dose of POLYCAL must be adjusted for the weight at a dose of 2.64 mL POLYCAL/kg body weight (maximum dose 113 mL POLYCAL, equivalent to a 75g glucose load). Add water to make up to a volume of 200 mL.
   - **Anhydrous glucose**: Dose 1.75 g/kg body weight (maximum dose 75g diluted in 200 mL water).

2. Insert a Blue 22G cannula and take a basal blood sample for lab glucose, growth hormone, IGF1 and IGF-BP3 (t = 0).
3. Give the child the Rapilose after the basal sample. They should drink the glucose load over a period of no more than 5 min.
4. Take further blood samples for glucose and growth hormone +30 min, +60 min, +90 min, +120 min post administration of the glucose drink.

Samples

Growth Hormone, IGF1 + IGF-BP3 2 mL clotted blood (yellow / gold top)
Glucose 0.5 mL venous blood in a fluoride oxalate tube (grey top)

Record actual sample collection times on the printed labels.

Interpretation

- Normal subjects are likely to exhibit suppression of GH to < 0.5 µg/L during the test but the results should be interpreted in conjunction with IGF-1 results.
- High basal levels which fail to suppress, sometimes with a paradoxical rise in GH levels is characteristic of GH hypersecretion.
- A paradoxical rise in GH may occur during the OGTT during normal adolescence.
- GH may fail to suppress due to chronic renal failure, liver failure, active hepatitis, anorexia nervosa, malnutrition, hyperthyroidism, diabetes, and adolescence.
- Basal IGF-BP3 levels may be a useful adjunct. Patients with untreated acromegaly consistently have significantly raised random serum IGF-1 and IGFBP-3 levels, showing no overlap with normal individuals.

References

1. Freda P.U. (2009) Monitoring of acromegaly: what should be performed when GH and IGF-1 levels are discrepant? *Clin Endocinol* **71**: 166 – 170