Growth Hormone Suppression Test - Full Clinical Guideline

Reference no.: CHISCG20

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

1. Introduction

Acromegaly is caused by the autonomous overproduction of growth hormone (GH). In over 99% of cases this is associated with a pituitary adenoma.

The clinical effects are due to:

(i) the slowly expanding tumour
(ii) biological effects of prolonged hypersecretion of GH

Common symptoms of acromegaly are facial changes, increase in ring and shoe sizes, excess sweating, headaches, hypertension, visual field defects, menstrual disturbance and impotence.

Hyperglycaemia following oral glucose in normal subjects leads to a suppression of growth hormone secretion from the anterior pituitary. In patients with acromegaly due to a GH-secreting adenoma this suppression does not occur and may be replaced by a paradoxical rise.

2. Guideline

INDICATIONS

The diagnosis and management of acromegaly

CONTRAINDICATIONS

None

SIDE EFFECTS

Occasional nausea, vomiting or diarrhoea as solution is hyperosmolar.

PRECAUTIONS

In view of (a) the dietary requirements for this test (see below) and (b) the need to fast patients on the day of the test, appropriate arrangements should be made in patients with diabetes. A basal blood glucose must be checked in such patients before proceeding with the investigation (i.e. the -30 minute glucose sample).

PREPARATION

Planning

This procedure requires insertion of an indwelling venous cannula and therefore requires supervision.

Patient

The patient should maintain a normal diet for three days prior to the test.

The patient should fast from 22:00 hours prior to the test, to give a 10-16 hour fasting period, and not smoke, eat or drink anything except tap water until the test is completed. The patient should be at rest before and during the test.

Equipment

a. **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 75 g 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.

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

In exceptional circumstances, when a patient has an allergy to the lemon flavouring, a 'Polycal neutral liquid' is available but prior notice may be required to obtain this.

b. Specimen tubes required: Indwelling venous cannula
6 SST tubes (Yellow Top)
6 fluoride oxalate tubes (Grey top)

PROCEDURE

Growth hormone is a stress hormone and it is therefore important that the patient must be rested throughout the procedure and that the protocol is followed properly.
Samples must be labelled clearly with patient name, date and **time** of sampling.

TIME	**BLOOD SAMPLES** for glucose (Grey top) and GH (Yellow top)
Insert the venous cannula. Samples collected at 30 minute intervals as follows:	
- 30 minutes	8 mL blood: 6 mL in SST tube (yellow top) 2 mL in fluoride oxalate tube (grey top)
0 minutes	8 mL blood: 6mL in SST tube (for GH and IGF1) 2 mL in fluoride oxalate tube (grey top)
Immediately after time zero sample give glucose solution to be drunk within 5 minutes or Polycal drink, followed by 100 ml water, to be drunk within 5 minutes.	
+30 minutes	8 mL blood: 6 mL in SST tube (yellow top) 2 mL in fluoride oxalate tube (grey top)
60 minutes	8 mL blood: 6 mL in SST tube (yellow top) 2 mL in fluoride oxalate tube (grey top)
90 minutes	8 mL blood: 6 mL in SST tube (yellow top) 2 mL in fluoride oxalate tube (grey top)
120 minutes	8 mL blood: 6 mL in SST tube (yellow top) 2 mL in fluoride oxalate tube (grey top)

Send all samples together with a completed Chemical Pathology request form, to the laboratory. Request should be for glucose and growth hormone and should state that it is a Growth Hormone Suppression Test. The 0 minute sample will be sent for IGF1 assay.

INTERPRETATION

In normal subjects basal levels of GH can vary from undetectable to greater than 20 µg/L, with higher levels especially in stressed subjects. GH levels fall to less than 0.4 µg/L following the Oral Glucose Tolerance Test in normal subjects.

Failure of GH to fall to less than 0.4 µg/L in at least one sample is diagnostic of acromegaly except false positives may be seen in uraemia, cirrhosis, acute intermittent porphyria, malnutrition and anorexia nervosa. In acromegaly, paradoxical rises in GH levels and impaired glucose tolerance are common.

A nadir GH level of <0.4 µg/L rules out the diagnosis. Fasting GH may be normal in 8% of acromegalic subjects but GH does NOT suppress to undetectable levels during the test.
The GH suppression test may also be used to assess the efficacy of surgical treatment. Disease relapse is unlikely if nadir levels of GH during an oral glucose tolerance test remain under 0.4 µg/L and IGF-1 levels are normal for age and sex. The Oral Glucose Tolerance Test with GH levels is not a useful test to monitor patients on medical therapy - random GH levels or Day Curves are more appropriate.

TURNAROUND TIME

4 weeks

3. References

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4. Documentation Controls

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