Acromegaly Glucose Tolerance Test (Acromegaly GTT)

Roles of Acromegaly GTT, IGF1 and GH measurements.

When pituitary disease is present/suspected but there is no specific clinical suspicion of Acromegaly:- then an IGF1 should be a routine inclusion in pituitary screening tests with an IGF1 normal for age and sex being regarded as reasuring the GH axis is normal. An elevated IGF1 level or separate reason to specifically suspect acromegaly would warrant an acromegaly GTT.

When there is suspicion of Acromegaly:- the acromegaly GTT remains a key test with a GH nadir <0.5 μg/L excluding acromegaly whilst ≥0.5 is diagnostic of acromegaly.

Thus a diagnosis of acromegaly is established by:-

- IGF-1> age- and sex-matched normal range and.
- Failure of GH to suppress (to <0.5μg/litre) during a 75g GTT

A single random GH is not used in diagnosis of acromegaly. GH is normally released in pulses and random levels vary widely.

In a known acromegalic there may be a reassessment of whether 'biochemical cure' has now been achieved on no medical treatment for acromegaly, particularly after pituitary surgery which has gone well. However there is no clear place for acromegaly GTT in monitoring those on somatostatin analogue treatment (which changes normal glucose responses) or Pegvisomant (which makes GH levels uninterpretable).

Acromegaly GTT

Indication: diagnosis of acromegaly, and monitoring treatment success in confirmed cases.
Contraindications: none.
Precautions: if patient is on insulin, this should be omitted.

Procedure:

Preparation:

- unrestricted carbohydrate diet for 3 days prior to the test;
- fast from 22:00 hours the previous night – water is allowed (fast > 10 hours);
- morning medication is omitted, and taken when test completed.

Patient aspects of test:

- patient should attend at 08.30, and procedure is explained;
- patient should be seated throughout test – smoking is not permitted;
- discontinue test if any glucose is lost by vomiting;
- breakfast is given when test has been completed;
- patient should be reminded to take medication if applicable.

Technical details of test (75g GTT);

- give laboratory prior warning of test;
- place IV cannula for sample collection >10 mins prior to commencing test
- time 0 - take blood for growth hormone, IGF-1, glucose and any other bloods;
- patient then consumes 410 ml Lucozade from standard bottle (if unable to tolerate, give Polycal 120 ml as an alternative - this should be recorded);

- times +30 +60 +90 +120 min – take blood for growth hormone and glucose;
- specimens: brown top gel for GH and IGF-1, yellow top flox for glucose;
- samples including baseline bloods are sent to lab on completion of test.

Interpretation:

Growth hormone should suppress to <0.5 μg/litre in normal people (though a truly normal response is probably well below this level – some suggest <0.2 μg/litre). In acromegaly failure of suppression occurs, and there may be a paradoxical rise in GH in response to the glucose challenge.
Growth hormone may be elevated in the following conditions, so interpret with caution: stress, high catabolic states (renal and hepatic failure), pregnancy, diabetes, use of oestrogen-containing drugs, tall adolescents. If taking oestrogens and GH nadir close to 0.5 μg/L consider stopping oestrogens and repeating.

Differences in GH levels by gender and age have been repeatedly reported (both for random and GTT samples such that young women(under 40)>older women>men seemingly in some reports in a ratio as great as 3:2:1 close to 0.5 μg/l levels. Thus whilst there is little appetite currently for using gender-specific ranges and single adult thresholds are retained it may be useful to remember that close to threshold levels these matters may inform clinical judgement often making a GH just >threshold more significant in an older man than younger woman.