Chapter 12
GHRH–Arginine GH Stimulation Test

Indication:

1. In order to evaluate patients with suspected GH deficiency
2. In order to assess growth hormone reserve when insulin tolerance test is contraindicated/not preferred

Preparation:

NPO except water after midnight and during test

Confirm testing with physician prior to proceeding.

Materials needed:

Five gold top tubes

GH:
Gold top tube

GHRH

Arginine

Confirm the medication doses with physician.

Assay for GH:

GH:Immunoenzymatic Assay

Precautions:

Facial flushing occurs immediately after administration of GHRH in about half of the patients. Paresthesias, nausea, and abnormal taste sensation occur in 5–10 % patients [1].

Interpretation:

Serum growth hormone (< 4.1 ng/mL) confirms the diagnosis of growth hormone deficiency with 95 % sensitivity and 91 % specificity compared to 96 % sensitivity and 92 % specificity of ITT (GH < *5.1* ng/mL) in patients with BMI > 30 [1].

A. B. Ergin et al., *The Cleveland Clinic Manual of Dynamic Endocrine Testing,*
DOI 10.1007/978-3-319-13048-4_12

Suggested GH cut-offs based on BMI [2]

BMI < 25 kg/m^2	Peak GH < 11.5 mcg/L
BMI 25–30 kg/m^2	Peak GH < 8 mcg/L
BMI > 30 kg/m^2	Peak GH < 4.1 mcg/L

Caveats:

- The ARG–GHRH test performs equally well in diagnosing GHD, indicating that it provides an ideal alternative to the ITT [1].
- This test can give a falsely normal GH response in patients with GHD of hypothalamic origin, e.g., those having received irradiation of the hypothalamic-pituitary region because GHRH directly stimulates the pituitary [3].
- Decreased responsiveness to stimulation tests such as GHRH, ITT, and ARG–GHRH has been demonstrated in subjects with obesity and/or abdominal adiposity [4].

Procedure: Completed as outpatient.

1. Check the *Dynamic Testing Order Sheet.*
2. Establish hep-lock.
3. Draw baseline, timed samples after 30 min of patient rest for GH
4. Inject 1 mcg/kg of GHRH IV in a single push followed immediately by 0.5 g/kg (to a maximum of 30 g) of arginine HCl IV infusion over 30 min as ordered by physician and followed by 10 cc saline flush.
5. Note the time of GHRH and arginine injection.
6. Obtain samples for GH at: 30, 60, 90, and 120 min.

Patient label:_____

Documentation for medication orders:_____

Ordering provider's signature: _____Date:_____

GHRH–arginine test	Time	Growth hormone
Basal (after 30 min of rest)		
Post-30 min		
Post-60 min		
Post-90 min		
Post-120 min		

References

1. Biller BMK, Samuels MH, Zagar A, et al. Sensitivity and specificity of six tests for the diagnosis of adult GH deficiency. J Clin Endocrinol Metab. 2002;87(5):2067–9.
2. Corneli G, Di Somma C, Baldelli R, et al. The cut-off limits of the GH response to GH-releasing hormone-arginine test related to body mass index. Eur J Endocrinol. 2005;153(2):257–64.
3. Darzy KH, Aimaretti G, Wieringa G, Gattamaneni HR, Ghigo E, Shalet SM. The usefulness of the combined growth hormone (GH)-releasing hormone and arginine stimulation test in the diagnosis of radiation-induced GH deficiency is dependent on the post-irradiation time interval. J Clin Endocrinol Metab. 2003;88(1):95–102.
4. Vizner B, Reiner Z, Sekso M. Effect of l-dopa on growth hormone, glucose, insulin, and cortisol response in obese subjects. Exp Clin Endocrinol. 1983;81(1):41–8.