

Caveats for Assessing Growth Hormone Deficiency in Normal-Height Adults

Table 1. Caveats for Assessing Growth Hormone Deficiency in Normal-Height Adults.*

Growth hormone measurements have several confounders

Growth hormone and IGF-1 assays have not been rigorously standardized and have poor reproducibility

Pulsatility of growth hormone secretion precludes single-measurement interpretation

Postprandial growth hormone levels are suppressed

“Normal” adult baseline values for growth hormone levels are inadequate

Provocative testing is required to rigorously assess the adequacy of growth hormone production

Awareness of physiologic and pathologic phenotypic growth hormone suppressors is crucial

Normal aging is associated with declining growth hormone levels

Obesity, central adiposity, and elevated body-mass index suppress growth hormone levels

Hyperglycemia or uncontrolled diabetes dysregulates growth hormone production

Elevated free fatty acid levels suppress growth hormone levels

Chronic illness is associated with suppressed growth hormone levels

Intact hypothalamic–pituitary function usually precludes diagnosis

Pituitary mass ruled out by MRI

No history of hypothalamic–pituitary disease

Reproductive, thyroid, and adrenal function intact

* IGF-1 denotes insulin-like growth factor 1, and MRI magnetic resonance imaging.

Provocative Testing for the Diagnosis of Growth Hormone Deficiency in Adults

Table 2. Provocative Testing for the Diagnosis of Growth Hormone Deficiency in Adults.*

| Test | Diagnostic Cutoff Level <i>per liter of serum</i> | Considerations |
|---|---|--|
| Insulin-tolerance: insulin, 0.05–0.15 U/kg, intravenous | 5 μ g | Hypoglycemia symptoms may occur, precluding use in patients with epilepsy or ischemic heart disease, pregnant women, and patients >65 years old; test requires close medical supervision |
| GHRH–arginine: GHRH, 1 μ g/kg (maximum, 100 μ g), intravenous; and arginine, 0.5 g/kg (maximum, 30 g), intravenous infusion | 11 μ g if BMI <25 8 μ g if BMI 25–30 4 μ g if BMI >30 | Not available in the United States; hypothalamic disease may not be accurately diagnosed |
| Glucagon: 1 mg (1.5 mg if body weight >90 kg), intramuscular | 3 μ g | Nausea, vomiting, headache, and delayed hypoglycemia may occur |
| Ghrelin receptor agonist: 0.5 mg/kg, oral solution | 2.8 μ g | Avoid concomitant use with drugs known to prolong QT interval; hypothalamic disease may not be accurately diagnosed |
| IGF-1: random serum level | Below the level in age-matched controls | Useful if patient has \geq 3 pituitary hormone deficits; values may be normal in adult growth hormone deficiency |

* Data are from Yuen et al.³¹ and Garcia et al.³² Lower cutoff values may improve sensitivity and specificity, especially in obese patients. The body-mass index (BMI) is the weight in kilograms divided by the square of the height in meters. GHRH denotes growth hormone–releasing hormone.