Growth hormone (GH) peaks versus areas under the curve in the diagnosis of adult GH-deficiency: analysis of the variables provided by the GHRH + GHRP-6 test

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Background: the diagnosis of growth hormone deficiency (GHD) relies on provocative tests of GH reserve. The aim in these tests is to obtain an objective, biochemical-based, measure of gland function, but clinicians and researchers rely on the GH peak, as a surrogate of the 24-hour pituitary secretion. However, on a mathematical basis the area under the secretory curve (AUC) should be more valid for this evaluation.

Objectives: to validate which variable provided by a provocative test of GH secretion is mathematically more robust for supporting the clinical diagnosis. Adult normal subjects and GHD patients were challenged with the combined stimulus GHRH + GHRP-6. The diagnostic efficacy of the GH peak, and the AUC were compared by the receiver operating characteristic (ROC) curve methodology.

Patients and methods: 146 patients with GH deficiency due to organic pituitary disease and 184 healthy subjects were administered GHRH 1 μg/kg iv, plus GHRP-6 1 μg/kg iv, and GH was determined. Four variables were studied: (a) the GH peak; (b) the "standard" AUC, (c) the "stimulated" AUC and (d) the basal value, used as internal control.

Results: under ROC curve analysis, the basal variable was devoid of diagnostic capability, while the other variables performed strikingly well, the ROC curve area for the GH peak was 0, 9997; and for the AUC 0,9993, with no statistical differences.

Conclusions: the variables provided by measuring the GH peak and the area under the curve were similarly effective for diagnosis, although on clinical grounds, the peak was more convenient as needed no calculation. If results for other test were similar the time-honored method of measuring the GH peak could be considered mathematically validated.