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Growth Hormone Deficiency: When is MRI Imaging Indicated?

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Participants (n=36) enrolled at 65 ± 16 days of age and median baseline hormone concentrations were within the normal ranges: TT 179 ng/dl (IQR 138-200), LH 4.0 U/L (2.9-5.0), FSH 2.3 U/L (1.8-2.9), and INHB 248 pg/ml (218-301). Baseline hormone concentrations did not correlate with baseline z-scores for weight, length, head circumference, or penile length. TT, LH, and FSH declined between 2 and 5 months; there were moderate correlations between timepoints for TT, FSH and INHB concentrations ($r=0.48$, $p=0.0049$; $r=0.76$, $p<0.0001$; $r=0.62$, $p=0.0028$, respectively), while LH values at 2 and 5 months were less well-correlated ($r=0.30$, $p=0.12$). Baseline hormone concentrations did not predict any physical or neurodevelopmental outcomes at 5 months of age (all $p>0.013$).

Conclusions

Endogenous hormone concentrations during the mini-puberty period of infancy in boys with XXY are not associated with physical nor neurodevelopmental parameters at 2 months of age, nor are they predictive of later outcomes at 5 months of age.

Growth and GH/IGF Axis

ABSTRACT ID: 6129

Growth Hormone Deficiency: When is MRI imaging indicated?

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Objectives

The diagnosis of Growth Hormone Deficiency (GHD) is made with a combination of clinical assessment, measurement of insulin-like growth factor 1 (IGF-1) and insulin-like growth factor binding protein-3 (IGFBP-3) levels, and GH stimulation tests. Provocative (stimulation) GH testing is indicated for most patients to confirm a diagnosis of GHD. Traditionally, most pediatric endocrinologists defined a "normal" response by a serum GH concentration of >10 ng/ml. After the clinical and biochemical diagnosis of GHD is made, it is typical to obtain an MRI of the brain with narrow cuts through the hypothalamic-pituitary area. The aim of our study is to assess the correlation between peak GH level on stimulation test and likelihood of pituitary MRI abnormalities. We hypothesize that likelihood of pituitary MRI abnormality is very low if peak GH is 7 ng/ml or more.

Methods

This is a retrospective review of pituitary MRI findings in pediatric patients diagnosed with IGHD, and their correlation with peak GH level on stimulation test. Data was obtained through the hospital registry for patients who have undergone growth hormone stimulation test. Variables that were addressed included: Date of birth, gender, height and weight z-scores (Center for disease control growth charts were used for children 2 years and older and World Health Organization growth charts were used for children less than 2 years of age), GH stimulation test results, and MRI results. MRI were classified into normal, incidental, uncertain, and pathogenic.

Results

A total of 120 patients were included in this study of which 101 patients have undergone MRI of the brain. Of those patients who had GH level of <3 , only 2 patients were noted to have pathogenic MRI finding. Among patients with ≥ 7 to <10 , 59.5% of the MRIs done were normal and none of these patients had pathogenic MRI findings.

Conclusions

Our data suggest similar results relayed by other studies in the literature pertaining to the occurrence of pathological pituitary findings in patients with GH level stimulation results >7 ng/mL. Whereas it is reassuring that almost 60% of patients with Growth hormone level >7 had normal MRI, more data is needed to have conclusive decisions on the cut off needed for obtaining brain imaging. Because MRI doesn't change acute management of patients presenting with GH deficiency, delaying imaging is a reasonable consideration. Cost of MRIs and MRIs with contrast constitute significant burden on families and hospitals.