BRAIN MAGNETIC RESONANCE IMAGING IN CHILDREN WITH ISOLATED GROWTH HORMONE DEFICIENCY

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INTRODUCTION AND AIM

Diagnosis of growth hormone deficiency (GHD) is not straightforward. Nowadays growth hormone (GH) stimulation tests play a key role in the diagnosis but they are controversial due to the lack of normative data, poor reproducibility and poor disease concordance.
Magnetic resonance imaging (MRI) is also a tool in the study of patients with short stature. Structural alterations of the hypothalamic-pituitary region have been described on brain MRI from 20 to 44% in children affected by isolated GHD (IGHD).

AIM: To know the prevalence of hypothalamic-pituitary abnormalities in patients with GHD.

METHOD

Retrospective study of IGHD patients diagnosed in a tertiary hospital's Pediatric Endocrinology Unit from February 2013 to December 2017. It is standard of care in our unit to obtain a cranial MRI on all patients prior to starting the GH treatment.

Inclusion criteria: patients with harmonic short stature (height <-2 SD below the mean for age, sex and reference population), brain MRI with or without contrast with specific attention to the pituitary, at least one GH stimulation test and GH treatment indication.

Patients were defined as GHD if they had a peak of GH <7,4 ng/dL in response to stimulation tests (exercise, L-dopa or glucagon test).
In patients with dissociated (normal and pathologic) tests, therapeutic trial with GH was indicated if height was <-2,5 SD and growth velocity <-1 SD.

Exclusion criteria: histories of cranial radiation, other hypothalamic-pituitary hormone deficiencies, previously known hypothalamic-pituitary abnormalities, chronic diseases and disharmonic short stature.

MR imagin study: after obtaining informed consent from each patient or parent, they were performed using a 1.5 or 3-T scanner (Magnetom Vision or TRIO; Siemens, Berlin, Germany). Sag MPR T1, Cor T2, ax FLAIR, ax SWI, ax Dif and Sag CISS 3D +/- postcontrast Sag MPR T1 weighted images were obtained, with 3 mm thickness for sagittal and coronal images, and 4 mm thickness for axial images".

RESULTS

Total of patients and brain MRI results

	Normal pituitary region N (%)	Adenohypophyseal hypoplasia N (%)	Ectopic neurohypophysis N (%)	Pars intermedia cyst N (%)	Other findings* N (%)
IGHD (n:160)	108 **(67,5%)**	33 **(20,6%)**	6 **(3,8%)**	6 **(3,8%)**	7 **(4,3%)**

IGHD: isolated growth hormone deficiency.

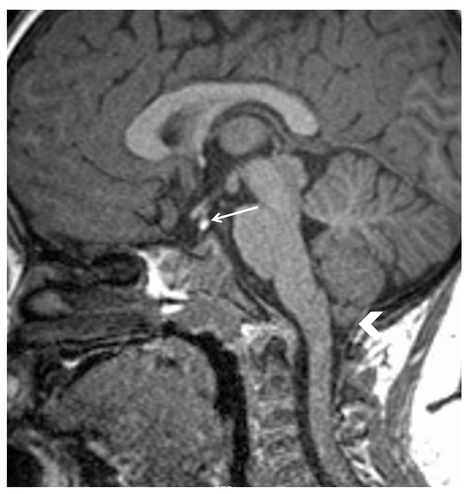
*Other findings, all were type 1 Chiari anomalies.

160 patients were included (67 girls), all patients were diagnosed as IGHD.

One patient with anterior pituitary hypoplasia also had type 1 Chiari anomaly.

Five of the patients with ectopic neurohypophysis presented pituitary hypoplasia, two of them also had pituitary stalk hypoplasia and another had a type 1 Chiari anomaly.

The mean SD of height for all patients at the beginning of GH was -3,07 SD.



Sag MPR T1 image obtained from a 5-y boy with IGHD. Ectopic neurohypohysis (arrow) can be seen in the middle of pituitary stalk, with adenohypophyseal hypoplasia. Note the associated Chiari 1 malformation with small posterior fossa and descended cerebellar tonsils (arrowhead).

CONCLUSIONS

- Brain MRI is helpful in the study of children with IGHD and ISS.
- The prevalence of abnormalities in the hypothalamic-pituitary region in these children is higher than in general population.
- The main IGHD-related brain pathology encountered was adenohypophyseal hypoplasia (20,6 %).

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