The Influence of pituitary MRI findings on clinical presentation and growth in GH-Treated Children with Congenital Hypopituitarism

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Background: MRI is the technique of choice in the diagnosis of children with hypopituitarism. Marked differences in MRI pituitary gland morphology suggest different etiologies of GHD, different clinical and endocrine outcome and different prognoses.

Methods: Data were collected from the case notes of all patients followed for GHD in two paediatric endocrine centers in Algiers from 2008 to 2018. Patients who had undergone pituitary MRI examination were included in this study. Abnormal imaging was defined as the presence of one or more of the following three anomalies: hypoplastic anterior pituitary, truncated/absent pituitary stalk, or ectopic posterior pituitary (EPH). Patients were divided into those with normal MRI findings (group 1) and abnormal MRI (group 2).

Objective : To investigate the auxological, clinical and hypothalamic pituitary-MRI features in children with non-acquired growth hormone deficiency (GHD); and determine the correlation between clinical presentation and response to treatment, and MRI findings.

Results:

Of 355 patients followed for GHD, 242 (170 boys and 72 girls), mean ± SD age at diagnosis 8.38±4.1[0.2-19] were eligible for study.

MRI was normal in 135 (56%) patients (97 boys), and abnormal in 107 (44%) patients (73 boys), comprising 49 (20%) with EPH. Significant between-group differences were found for Caesarean and breech delivery, neonatal asphyxia, and hypoglycemia (p<0.005), these being more frequent in Group 2.

Group 2 patients had more multiple pituitary hormone deficiency (MPHD) than Group 1(45% vs 9%, p<0.007). At presentation Group 2 differed significantly from Group 1 for:

- Age 7.76±4.3 *vs* 8.85±3.9 years, p<0.04;
- Bone age delay: -3.16±1.6 *vs* -2.44±1.3 years p<0.01;
- Height (Ht) SD: -3.72±1.2 *vs* -3.14±1.1 SDS p<0.0001;
- Pretreatment Ht velocity: -3.16±1.7 *vs* -2.1±1.8 SD <0.001;
- and peak GH: 6.15±6.1 *vs* 10.99 mUI/l p<0.0001;
- but not for serum IGF1 SD: -2.29±1.9 *vs* -1.99±1.5.

Catch-up growth at one and two years was better for Group 2 (1.24±0.9 and 1.72±1.04 SD) vs Group 1 (0.72± 0.8 SD and 1.02±0.94, *p*< 0.001 and p < 0.0001.

EPH was significantly associated with MPHD (60% vs 28%, p<0.001), severe GHD (89% vs 46%, p <0.0001) and better catch-up growth (p<0.005).

Conclusions:

Our data indicates that pituitary MRI findings, particularly EPH, are helpful in predicting response to GH therapy in children with non-acquired GHD. MRI examination should therefore be performed in all cases of proven GHD.

Table 1: Characteristics of the patients treated for GHD

	Global N=242	Norma MRI N=135	Abnormal MRI N=107	p
Male/female	170/72	97/38	73/34	**0,540**
Familial case	13(5%)	8(6%)	5(5%)	**0,280**
Consanguinity	28(12%)	10(7%)	18(17%)	**0,023**
Age at Diagnosis (yr)	8.38±4.1[0.2-19]	8.85±3.9 [0.2-16.5]	7.76±4.3 [0.3-19.7]	**0,04**
Height at evaluation (SD score)	-3.39±1.2 [-7.2,-0.14]	-3.14±1.1 [-7.2 ,-0.14]	-3.72±1.2 [-7.1,-0.19]	**<0,001**
Growth velocity (SD score)	-2.57±1.9 [-7,3.72]	-2.1±1.8 [-7, +3.72]	-3.16±1.7 [-6.7, 0]	**0,008**
Bone age delay (yr)	-2.63±1.7 [-8,0]	-2.44±1.3 [-7,+1.5]	-3.16±1.6 [-8,-0]	**0,011**
ΔTarget height (SD score)	-2.41±1.2 [-5.97 , +0.45]	-2.1±1.1 [-5.9,0.45]	-2.8±1.1 [-5.2,-0.3]	**<0,001**
Duration of Follow-up (yr)	4.36±2.5	4.21±2.44	4.58±2.6	**0,272**
Duration of treatment (yr)	3.55±2.3	3.13±2.2	3.95±2.3	**0,511**

Fig1: Characteristics and comparison of the patients treated for GHD

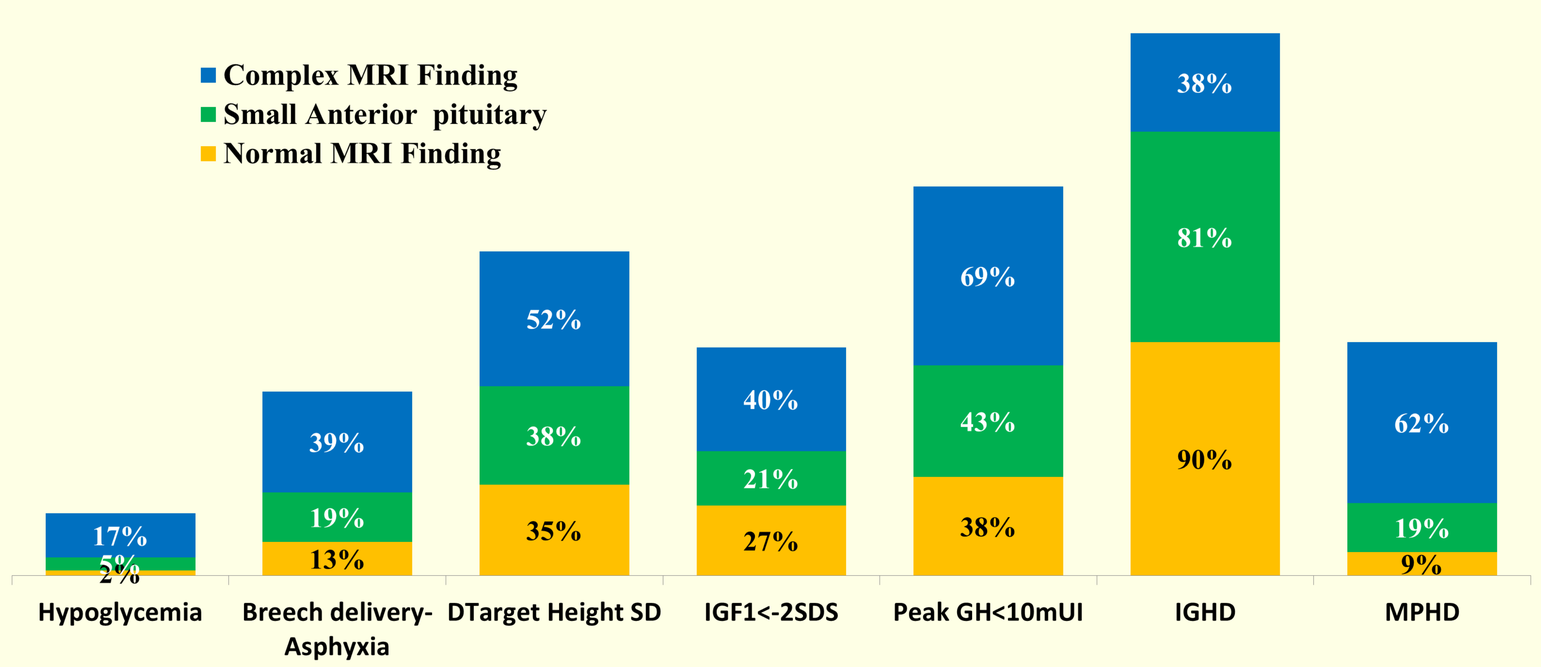
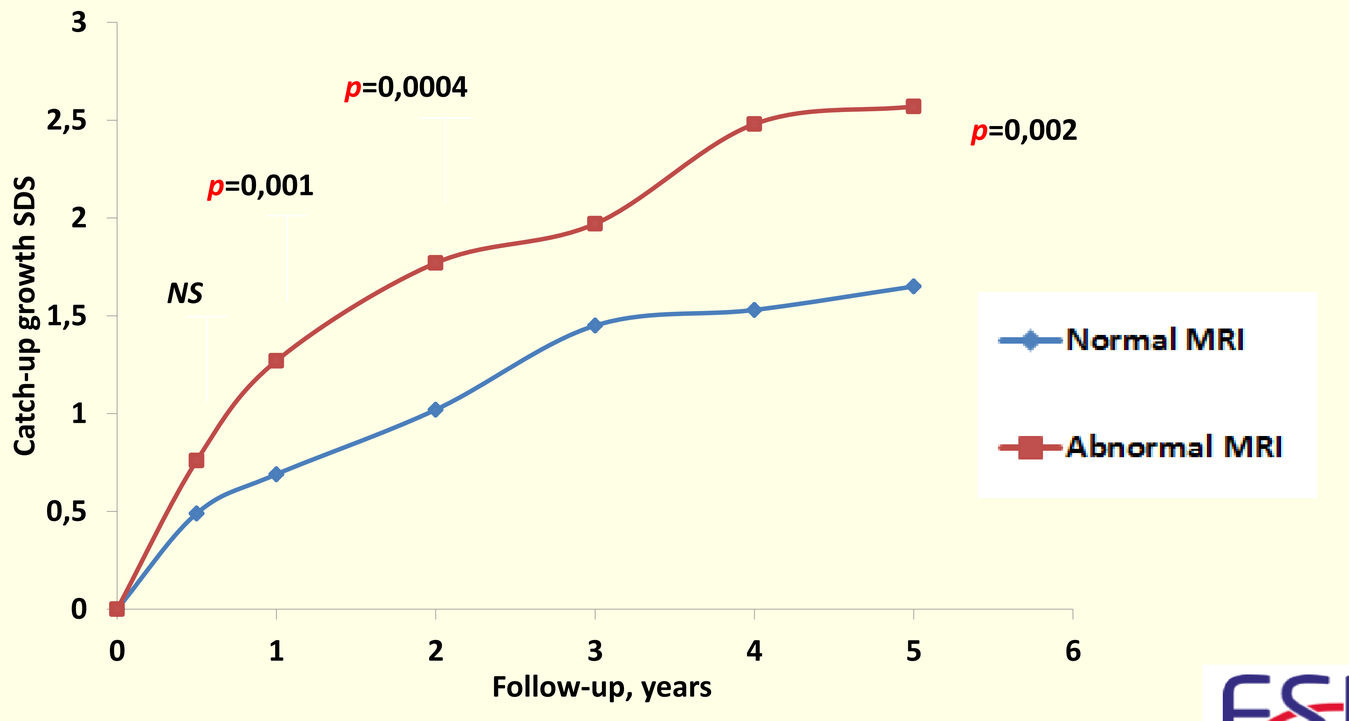


Fig2: Height Catch-up SDS score during the first 5 years of hGH treatment



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