

GROWTH HORMONE DEFICIENCY IN 52 CHILDREN WITH BRAIN MAGNETIC RESONANCE IMAGING ABNORMALITIES

OUIDAD BAZ1, Imane Lydia CHELGHOUM2, Imane kafi3, Salima kAFI3, Safia Mimouni1
1PIERRE AND MARIE CURIE CENTER, ALGIERS, Algeria.
2Hospital 1er Novembre 1954, ORAN, Algeria.
3Mustapha Bacha Hospital, algiers, Algeria.



INTRODUCTION

Magnetic resonance imaging (MRI) is the best tool in delineating pituitary anatomy and pathology. Approximately 50% of patients with idiopathic GHD have been shown to have abnormal pituitary anatomy on MRI (1). Patients with congenital hypopituitarism may have the 'classic triad' of pituitary stalk interruption syndrome, which consists of: (a) an interrupted or thin pituitary stalk; (b) an absent or ectopic posterior pituitary (EPP); and (c) anterior pituitary hypoplasia or aplasia[2,3]. MRI is an important marker for the anticipation of future endocrine dysfunction, as patients with abnormal pituitary anatomy are more likely to have multiple endocrinopathies [4].

AIM

The aim of our study is to evaluate a group of patients followed for congenital growth hormone deficiency (GHD), with pituitary malformation abnormalities such as pituitary hypoplasia, absence of the stalk and ectopy of the posterior pituitary as pituitary stalk interruption syndrome (PSIS), or empty Sella. In the present study, we described the clinical, hormonal and radiological characteristics at baseline and during follow-up.

METHOD

This is a descriptive retrospective study over a period of 4 years (2014-2017). We studied 52 children followed in our clinic of endocrinology, the reason for consultation was a growth retardation in all cases. The available radiological, clinical and laboratory records of all children with confirmed GH deficiency by dynamic testing and who had MRI brain anomaly were collected.

The diagnosis of PSIS was based on pituitary magnetic resonance imaging (MRI) findings of an absent or thin pituitary stalk associated with at least one of the following radiological features:

- 1) a nonvisible or hypoplasia of anterior pituitary lobe and
- 2) a nonvisible or ectopic posterior pituitary lobe.

RESULTS

During the period under the review, a total of 217 children were diagnosed with GHD. One hundred twenty six (58 %) were males and 91 (42 %) females with a mean age of 10.5 years (range 2-18). Most children, (76%, $n = 165/217$), had normal MRI findings. However, (24%, $n = 52/217$) had MRI abnormalities, (61 %, $n = 32/52$) had hypoplasia of the anterior pituitary and (33 %, $n = 17/52$) had "pituitary stalk interruption syndrome". However (6 %, $n = 3/52$) had aplasia of the anterior pituitary.

Of the 52 patients in this study, there were 34 boys 65 % and 18 girls 35 % with a sex ratio of 1.88 (Figure 1). Isolated GH deficiency (IGHD) was diagnosed in 30 (57.7%) and multiple pituitary hormone deficiency (MPHD) in 22 (42.3%) patients. For all patients, Regular follow-up of growth might have allowed earlier diagnosis in the children with growth hormonal and radiological characteristics. All children with aplasia of the anterior pituitary had MPHD (100%), while 21 % had hypoplasia of the anterior pituitary and 70% had pituitary stalk interruption syndrome (PSIS). The average age at diagnosis of pituitary hypoplasia is 9 years with extremes ranging from 2 years to 17 years .

After starting growth hormone (GH) treatment, children were seen every 6 months. Height and weight measurements were obtained at each visit, whereas biochemical measurements were performed every year.

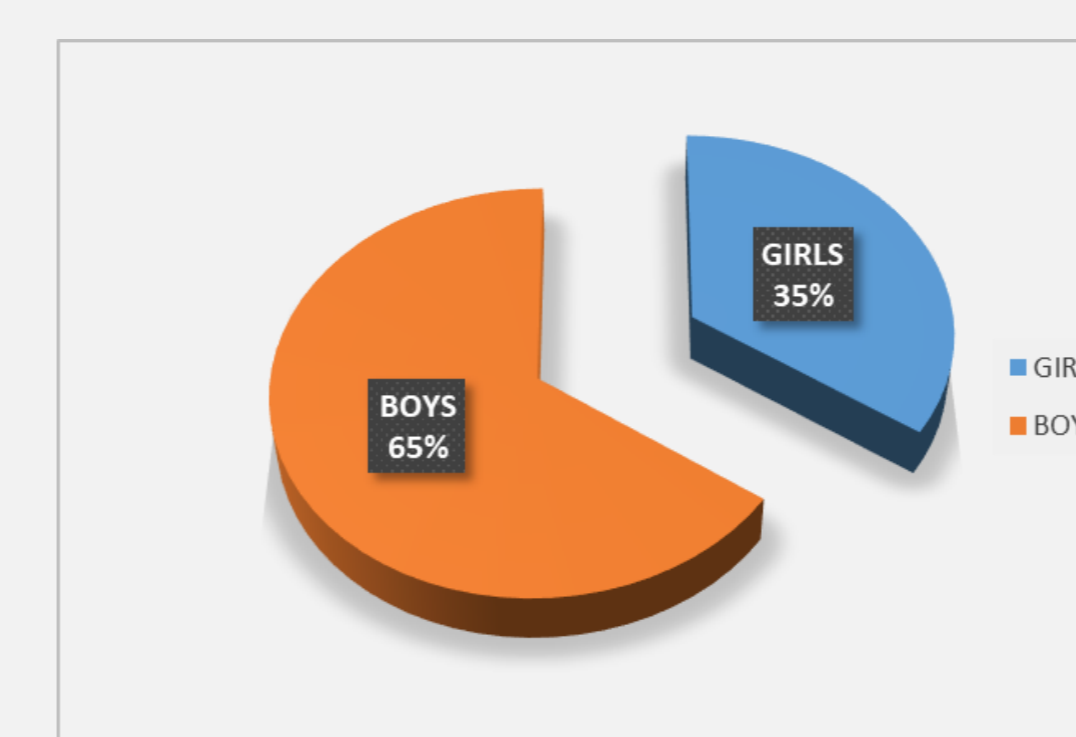
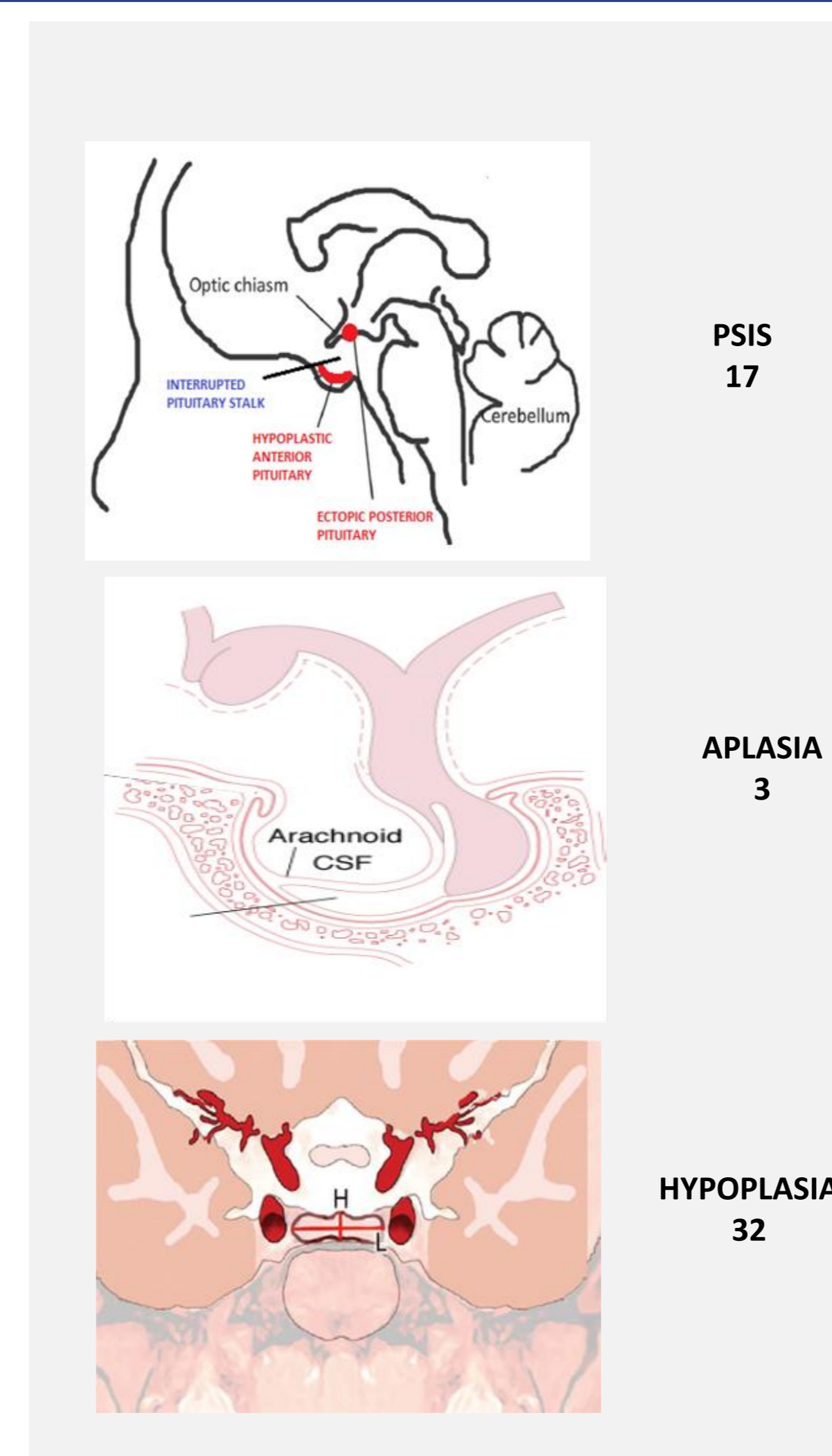


Figure 1: DISTRIBUTION BY SEX

Table 1: Final hormone deficiencies according to MRI abnormalities

MRI abnormalities	Aplasia	PSIS	Hypoplasia
Final hormone deficiencies			
Combined(%)	100%	70%	21%
ACTH	2	7	4
TSH	2	6	1
FSH / LH	0	3	2
Diabetes insipidus	0	2	0

Evaluation of the other anterior pituitary functions was performed at diagnosis and repeated during follow-up visits. The growth under GH treatment was similar in the patient groups and did not vary according to the pituitary MRI findings (figure 3). The annual growth was evaluated as well as the chronology of the appearance of the associated pituitary deficits(Table 1).

CONCLUSIONS

Neuroimaging has become a major diagnostic tool in paediatric GHD, and may represent the first-line investigation for diagnosing GHD in infancy and early childhood. The risk of progression from isolated GHD to combined PHD in children is highest displayed by children with abnormalities in the Hypothalamic-Pituitary region. The hormone abnormalities may evolve with time, necessitating frequent evaluation.

Interestingly, growth under GH treatment was similar in the patient groups and did not vary according to the pituitary MRI findings.

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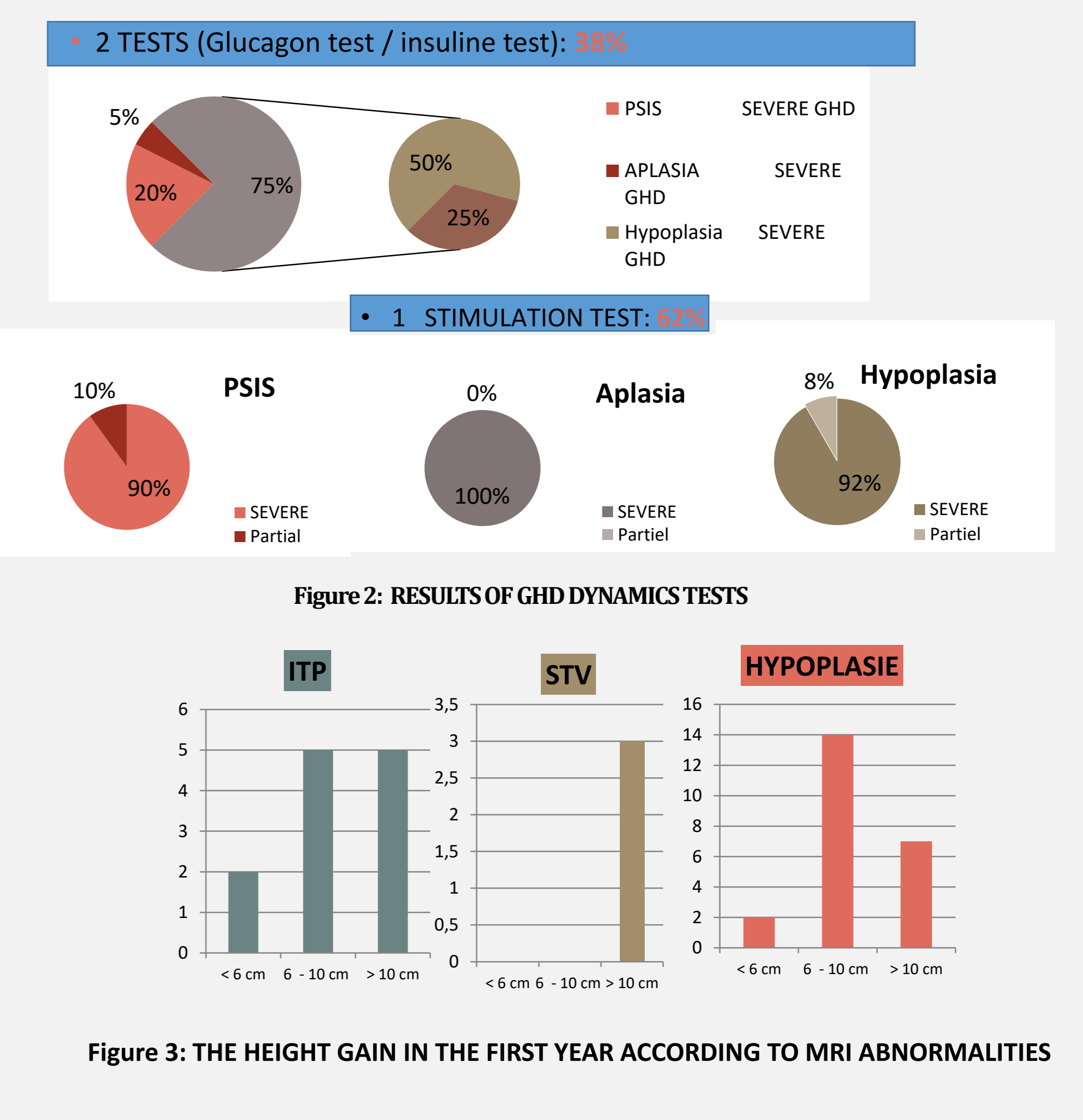
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CONTACT INFORMATION

OUIDAD BAZ
Email obazhad@gmail.com
Phone viber whatsapp 213673832212



The treatment by recombinant growth hormone concerned all patients with an initial dose of 0,035 mg/kg/day and the average height gain was 9 cm during the first year of treatment. The chronology of onset of associated pituitary deficits were evaluated too.

