University of Genova

Poster Topic

Pituitary, Neuroendocrinology and Puberty

Brain malformations and sellar spine as possible cause of central precocious puberty in a large monocentric study

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Background and Aim

Central precocious puberty (CPP) is defined as the secondary sexual characteristics onset before 8 years of age in females and before 9 in males, due to premature activation of the hypothalamic-pituitary-gonadal axis. The underlying cause remains idiopathic in the great majority; based on the 2009 Consensus, 2% to 7% of girls who have onset of CPP between the ages of 6 and 8 years have unsuspected pathology and only 1% have a tumor such as a glioma or astrocytoma.

Aim of our retrospective study was to assess brain MRI findings and the anthropometric, biochemical, pelvic ultrasound characteristics at presentation of a large monocentric cohort of children with CPP.

Subjects and Methods

CPP Subjects

- 147 children 130 F and 17 M, who received a diagnosis of CPP between July 2005 – June 2019 where enrolled;
- For F mean age of sexual characteristic onset (Tanner stage B2) was 6,5±1,8 yrs;
- Mean age at GnRHa therapy start was 7,7±1,5 yrs (in F 7,6±1,3 yrs and in M 8,0±2,5 yrs).

Study design:

Retrospective monocentric study

Methods:

- Antropometrics evaluations: height (cm), BMI (kg/m²), puberty (Tanner stage)
- Biochemical evaluations: baseline LH/FSH, peak LH/FSH after GnRHa stimulation, estradiol
- Bone Age (Greulich and Pyle)
- Pelvic ultrasound
- Brain MRIs with paticular attention to brain structures and hypothalamic-pituitary region (HP) were analyzed by two experienced neuroradiologists

Results

Aetiology based on brain MRI (Figures 1 and 2)

- Idiopathic: n=65, 56 F and 9 M
- Hamartomas: n=6, 4 F and 1 M
- Tumors: n=9, 7 F and 2 M
- Acquired injuries: n=16, 14 F and 2 M
- Others: n= 51, 48 F and 3 M (Figure 2)

Figure 1: Distribution of aetiology, according to MRI findings

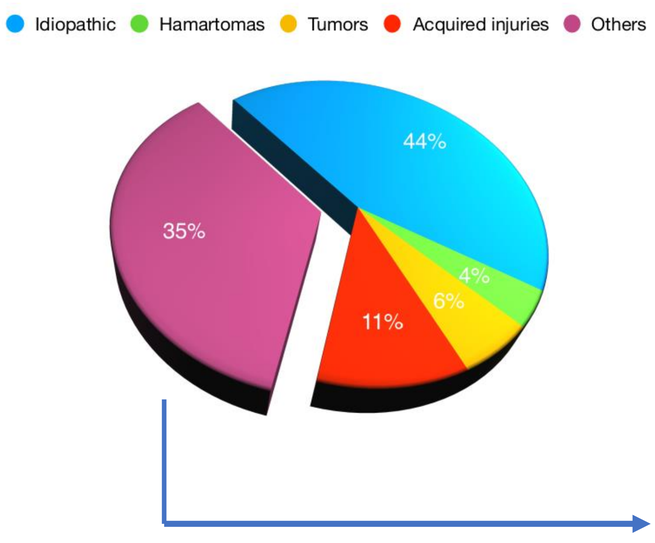

Figure 2: Principal findings among the "Other" cathegorized patients

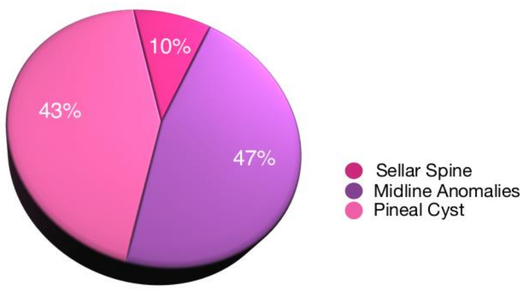

Figure 2: Aetiology distribution by sex, according to MRI findings

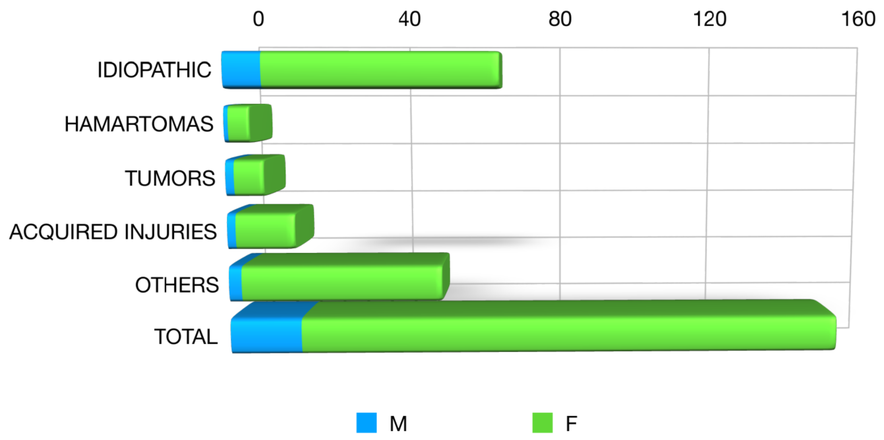

Table 1: Clinical, antropometric, biochemical and US characteristics of our cohort

	IDIOPATHIC	HAMARTOMAS	TUMORS	ACQUIRED INJURIES	OTHERS	TOTAL
Anthropometric and Ultrasound parameters						
Height (cm)	129,3 ± 10,5	122,3 ± 19,1	130 ± 13,4	120,6 ± 15,1	132,2 ± 12,1	129,3 ± 12,5
BMI (kg/m2)	18 ± 3,6	16,2 ± 1,2	21,2 ± 4,4	18 ± 4,9	17,9 ± 3,3	18,1 ± 3,7
Age at start therapy (years)	7,8 ± 1,1	6,3 ± 2,7*	7,8 ± 2,4	7,0 ± 2,1	7,8 ± 1,1	7,6 ± 1,5
Uterus LD (mm)	33,4 ± 6,1*	32,6 ± 2	40,8 ± 6,2	34,5 ± 7,2	37,3 ± 11,9	35,2 ± 8,9
Right ovary (ml)	1,5 ± 0,9	1,8 ± 1,3	1,6 ± 1,3	1,6 ± 0,8	2,3 ± 1,9	1,8 ± 1,3
Biochemical evaluations						
Baseline FSH (U/L)	4,2 ± 2,1	5,3 ± 3,4	4,2 ± 3	4,6 ± 2,6	4,5 ± 2,8	4,4 ± 2,5
BaselineLH (U/L)	1,5 ± 1,9	4,2 ± 4,8*	1,3 ± 1	2± 2,3	2,2 ± 3,3	1,9 ± 2,6
Peak FSH (U/L)	12,4 ± 6,4	29 ± 32,3*	14,6 ± 10,3	13,4 ± 7,8	13,4 ± 6,1	17,9 ± 8,8
Peak LH (U/L)	14,9 ± 9,3	20,8 ± 12,3*	22,3 ± 10,1	22,5 ± 14,8	19,9± 13,4	17,8± 11,7
Estradiol in F (pg/ml)	19,7 ± 21,6	29,5 ± 26,9	111,6 ± 204,3	29 ± 16	22,2 ± 18	26 ± 45,6
Bone age						
Δ bone age vs chronological age (yrs)	1,4 ± 1,3	1,5 ± 1,3	1,6 ± 0,9	0,7 ± 1,2	1,5 ± 1,1	1,4 ± 1,2

*P<0,05

There was no significant difference among the analyzed groups in terms of anthropometric measures, biochemical parameters, US findings and bone age, except for a younger age at CPP diagnosis and higher gonadotropins values in hamartomas.

Conclusions

- Brain abnormalities were found in 56% of patients presenting with CPP;
- Midline abnormalities, pineal cyst and sellar spines represent other finding in CPP, either in females and in males;
- in particular, sellar spine, a bony spur protruding from the central portion of the dorsum sellae, may be a not negligible potential cause of CPP due to deformation of the growing pituitary gland.

References

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