Gender-related differences in etiological distribution of organic causes of central precocious puberty

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INTRODUCTION AND OBJECTIVE

Organic lesion underlying central precocious puberty (CPP) is common in boys, and rare in girls. We aimed to compare etiological distribution of organic causes according to gender, and define clinical-laboratory characteristics that predict an organic cause to CPP.

SUBJECT AND METHODS

Medical records of 260 girls and 120 boys with CPP were reviewed retrospectively to analyze clinical, laboratory characteristics, radiological findings, and gender related differences in organic etiology.

RESULTS

Organic pathologies were more common in boys (26/120; 21.7%) than girls (16/260; 6.2%) ($p<0.001$). Among girls 3.5% (9/260), and 5% of boys (6/120) had epilepsy and retardation with developmental anomalies of CNS on admission. None of the remaining 251 girls and 114 boys had any sign or symptom suggesting a CNS lesion, however pituitary MRI revealed a space-occupying lesion in 7.4% (27/365) of this population. A newly identified space occupying lesion was more common in boys (20/114, 17.5%) than in girls (7/251, 2.8%). Pituitary MRI also revealed incidental findings (microadenoma and pars intermedia cyst) in 22 girls and 11 boys. Overall, developmental anomalies of CNS (56.2%) is more frequent in girls, whereas space-occupying lesions (76.9%) are more frequent in boys ($p<0.05$). Arachnoid cysts were nine times (8/114 vs 2/251), and hamartomas were seven times (6/114 vs 2/251) more common in boys in comparison to girls, whereas incidental findings were similar (8.8% vs 9.6%). Age of onset was younger, bone age more advanced, height SDS corrected for bone age lower, and sex steroid levels were higher in organic vs idiopathic PP. Onset was before 6 years in all girls, and 7 years in all boys with new CNS pathology.

Space occupying lesions

Girls (n=7)
Suprasellar arachnoid cysts (2/7)
Hypothalamic hamartomas (2/7)
Hemorrhagic macroadenomas (2/7)
Chiasmatic optic glioma (1/7)

Boys (n=20)
Suprasellar arachnoid cysts (8/20)
Hypothalamic hamartomas (6/20)
Hemorrhagic macroadenoma (1/20)
Optic glioma (2/20)
Craniopharyngioma (1/20)
Pineal germinoma(1/20)
Pinealoblastoma (1/20)

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Table 1. Pituitary MRI findings of the patients

	Non- pathological		Pathological	
	Normal MRI n (%)	Incidentaloma n (%)	Known CNS pathology n (%)	Newly identified CNS pathology n(%)
Girls	222 (85.3)	22 (8.5)	9 (3.5)	7 (2.7)
Boys	83 (69.1)	11 (9.2)	6 (5)	20 (16.7)

Table 2. Pituitary MRI findings with respect to different age groups in cases with no previously known CNS pathology

Pituitary MRI	Age at onset of pubertal findings					
	Girls n=251			Boys n=114		
	0-2 yrs	2-6 yrs	6-8 yrs	0-3 yrs	3-7 yrs	7-9 yrs
Normal		30	192		12	71
Incidentaloma		4	18		2	9
Newly identified pathology	2	5		4	16	

Table 3. Clinical and hormonal characteristics of patients with organic vs idiopathic CPP

	Girls			Boys		
	Organic	Idiopathic	P value	Organic	Idiopathic	P value
CA at diagnosis (yrs)	4.6±1.1	7.8±0.8	<0.001	5.0±1.4	8.4±1.1	<0.001
Age at initiation of symptoms (yrs)	4.1±1.1	6.8±0.8	<0.001	4.4±1.4	7.4±0.9	<0.001
Bone age (BA) (yrs)	8.2±0.9	10.0±0.5	<0.001	8.5±1.3	10.2±1.2	<0.001
BA advancement (BA-CA)	3.6±1.5	2.2±0.9	<0.001	3.5±0.9	1.8±0.5	<0.001
Height-SDS	1.8±1.0	1.5±0.8	0.355	1.8±1.0	1.1±0.9	<0.001
Height-SDS for BA	-2.3±0.8	-0.7±0.7	<0.001	-1.9±0.9	-0.6±0.7	<0.001
Basal FSH (IU/L)	3.8±1.0	4.5±1.5	0.405	3.7±1.4	3.5±1.6	0.505
Basal LH (IU/L)	1.6±0.9	1.4±0.7	0.386	1.5±0.9	1.6±0.9	0.705
Basal E_2 (pg/ml)	64.8±36.2	30.6±12.6	<0.001	94.6±34.0	20.2±13.5	<0.001
Peak stimulated LH (IU/L)	16.4±5.8	15.4±5.1	0.620	26.2±4.8	13.1±5.0	<0.001

CONCLUSION

Organic cause underlying CPP is quite rare in girls older than 6 years, and boys older than 7 years. Frequency and distribution of organic etiology differ between girls and boys. It is more likely to identify a new asymptomatic space-occupying CNS lesion, mainly arachnoid cysts and hamartoma underlying CPP in boys, whereas previously known symptomatic developmental anomalies are more common underlying organic cause in girls.

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