Pathological and Incidental Findings on Brain MRI among 200 Korean Girls with Central Precocious Puberty

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Introduction

Central precocious puberty (CPP) may result from organic lesions, but it most frequently of idiopathic origin. CPP may be either idiopathic or associated with central nervous system (CNS) abnormalities, such as hamartomas and tumors.

It is still controversial whether all girls with central precocious puberty should undergo brain magnetic resonance imaging (MRI) for unveiling intracranial pathology. Clinical or biochemical factors which could predict a pathological brain MRI in girls with CPP have been searched for.

The objective of this study was to evaluate the prevalence and type of intracranial lesions in 200 consecutive girls with CPP, and to identify possible predictive factors in girls with pathological brain MRI outcome.

Patients and methods

This retrospective study was performed in 3-tertiary care hospitals between 2005 and 2015. During this period, 200 girls with CPP who had brain MRI performed. All girls underwent a through endocrine assessment. We evaluated medical history, clinical and biochemical factors. Non of them had a history of neurological diseases, endocrine disorders or genetic disease.

Results

Brain MRI was showed no alterations in 183 (91.5%), abnormality of the hypothalamic-pituitary area in 16 (8.0%), and hamartoma in 1 girls (0.5%). Abnormality of the hypothalamic-pituitary area included microadenomas (n = 6), pituitary hypoplasia (n = 5), and cyst of pituitary pars intermedia (n =2). Three (25%) of 12 girls aged of <6 years had abnormal brain MRI findings, but 14 (9.0%) of 188 girls aged of >6 years had abnormal brain MRI findings (P = 0.054) (Table 1). Hormonal parameters overlapped extensively between girls with abnormal brain MRI findings and those with normal brain MRI finding. There was no significant difference between girls with abnormal brain MRI and those with normal brain MRI in peak LH levels (median 7.0 IU/L vs. 8.1 IU/L; P = 0.36) and peak LH to peak FSH ratio (median 0.6 IU/L vs. 0.6 IU/L; P = 0.83).

Table 1. Distribution of MRI Findings at Diagnosis in the Study Population

Characteristic	All patients (n = 200)
Normal	183 (92.5)
No relevant findings	170
Arachnoid cyst	3
Pineal gland cyst	2
Pituitary hyperplasia	2
Neuroepithelial cyst at the temporal region	1
Neuroglial cyst	1
Callosal lipoma	1
Increase in pituitary volume	2
Abnormalities of the hypothalamic-pituitary region	16 (8.0)
Microadenoma	6
Pituitary hypoplasia	5
Rathke's pouch cyst	3
Cyst of pituitary pars intermedia	2
Pathological	
Hypothalamic tuber cinerium hamartoma	1 (0.5)

Table 2. Brain MRI Findings According to the Different Age Groups

Brain MRI Findings	Onset of Puberty 2–6 year (n = 11)	Onset of Puberty 6–7 year (n = 15)	Onset of Puberty 7–8 year (n = 157)
Normal	8 (72.7)	14 (93.3)	147 (93.6)
Incidentalomas	2 (18.2)	0 (0)	7 (4.5)
Microadenomas	0 (0)	1 (6.7)	3 (1.9)
Hamartomas	1 (9.1)	0 (0)	0 (0)

Conclusion

Our data suggest that small, but not negligible proportion of girls with CPP aged 6-8 years had an abnormal brain MRI findings. Further studies are needed to identify the patients who need brain MRI.

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