



# Central precocious puberty: is routine brain MRI screening necessary for girls?: Commentary on “Brain magnetic resonance imaging (MRI) findings in central precocious puberty patients: is routine MRI necessary for newly diagnosed patients?”

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See the article “Brain magnetic resonance imaging (MRI) findings in central precocious puberty patients: is routine MRI necessary for newly diagnosed patients?” via <https://doi.org/10.6065/apem.2244192.096>.

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Central precocious puberty (CPP) is defined by the early activation of hypothalamic-pituitary-gonadal axis before the age of 8 years in girls and 9 years in boys.<sup>1,2)</sup> With a ratio of 1:5 to 1:10, precocious puberty is more common in girls than in boys. The onset of puberty is a multifaceted phenomenon influenced by a combination of genetic and environmental factors, including factors such as obesity and endocrine disruptors. In addition, the onset of typical puberty shows individual variability and is determined by a variety of genetic factors, including both rare and common variations.<sup>3-7)</sup>

Approximately 90% to 95% of girls have idiopathic form of CPP, but approximately 40% to 75% of boys with CPP have pathological brain lesions, including hypothalamic hamartoma, pituitary adenoma, and germinoma. Therefore, magnetic resonance imaging (MRI) of the brain can be performed to evaluate children with CPP and rule out the possibility of pathological brain lesions. In global consensus statement on CPP, all boys with CPP and girls younger than 6 years of age with CPP should undergo a brain MRI as a part of etiological investigation.<sup>8)</sup> However, there is controversy as to whether brain MRI should be performed on girls with precocious puberty between the ages of 6 and 8.

The numerous studies have investigated the prevalence and types of intracranial lesions in CPP cases, as well as the benefit of brain MRI in girls with age at puberty onset older than 6 years without neurological abnormality. Yoon et al.<sup>9)</sup> reported that when brain MRI was performed on girls diagnosed with precocious puberty at an average age of 6.8 years, 91.8% showed normal findings. Also, any pathological lesions among girls with CPP were not detected. In recent systematic review, the prevalence of brain lesions in patients with CPP was 12% in girls younger than 7 years old and only 3% in girls between 7–8 years old.<sup>10)</sup> In a recent study by Oh et al.,<sup>11)</sup> a pathological brain lesion which was diagnosed as hypothalamic hamartoma was only detected in one girl (6.1 years of age) out 199 girls with CPP. The detection rate of brain lesions not only in girls but also in boys is not higher in recent studies compared to previous literature.<sup>12)</sup> Out of 138 boys with CPP who underwent brain MRI, brain lesions including pituitary hyperplasia, thickening of the pituitary stalk, and Rathke cleft cyst were found in 10 boys (7%). Oh et al.<sup>11)</sup> reported that 4 of 24 boys (16.6%) with CPP had pituitary abnormalities, but no pathological brain lesions were not observed.

Recent westernized eating habits and the increase in obesity are thought to be related to the increased incidence of precocious puberty. As the degree of obesity increases, the incidence of precocious puberty in obese children is higher than in children of normal weight. Therefore, alterations in an individual's nutritional status may affect the lowering the risk of presenting pathological brain lesions.

In conclusion, true pathological brain lesions in patients with CPP are relatively rare, especially in girls diagnosed with CPP between the ages of 6 and 8. Therefore, routine MRI of

the brain in patients with CPP should be carefully considered in girls with CPP who are older than 6 years of age.

**Conflicts of interest:** No potential conflict of interest relevant to this article was reported.

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