

Serum Antimullerian Hormone levels in Precocious Puberty Girls according to the timing of GnRH agonist treatment

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Introduction

There are a few studies about any possible long-term effects of gonadotropin releasing hormone (GnRH) agonist on reproductive function including fertility.

The aim of this study was to assess the ovarian function using antimullerian hormone (AMH) levels in central precocious puberty (CPP) girls before, during, and after suppression with GnRH agonist.

Subjects and Methods

1. Characteristics of Subjects

- girls with CPP (n=505) below 20 years old.
- subdivided into 5 groups based on the timing of GnRH agonist treatment:

before treatment (n=98), 3 months after initiation (n=103), 12 months after initiation (n=101), 24 months after initiation (n=101), 6 months after discontinuation (n=102).

- 80 healthy girls as the control group and subdivided into 2 groups: control group 1 (before treatment; n=55), control group 2 (after discontinuation; n=45).

- Height SDS, weight SDS, BMI.SDS, chronological age

2. Laboratory Data

- bone age, Estradiol, LH, FSH, IGF-I levels
- AMH level using ELISA kit
- analyzed by independent t-test, ANOVA and repeated measures ANOVA, Chi-square test, Pearson's correlation.

Results

Table 1. Clinical and biochemical characteristics according to timing of GnRH agonist treatment

	Before treatment (n = 98)	During GnRH agonist treatment			6 months after discontinuation (n = 102)	P-value
		3 months (n = 103)	12 months (n = 101)	24 months (n = 101)		
CA (year)	8.4 ± 0.5	8.6 ± 0.5	9.4 ± 0.7	10.3 ± 1.5	11.8 ± 0.6	< 0.001*
BA (year)	9.9 ± 0.6	-	10.9 ± 0.8	11.5 ± 0.9	12.7 ± 0.4	< 0.001*
Height SDS	1.0 ± 0.8	1.0 ± 0.8	0.9 ± 0.7	0.8 ± 0.8	0.7 ± 0.9	0.022*
Weight SDS	0.8 ± 0.9	0.7 ± 0.8	0.7 ± 0.8	0.7 ± 0.7	0.6 ± 0.9	0.772
BMI SDS	0.4 ± 0.9	0.1 ± 0.8	0.2 ± 0.8	0.4 ± 0.8	0.4 ± 1.0	0.078
AMH (ng/mL)	5.9 ± 3.6	4.7 ± 3.2	4.9 ± 3.1	5.5 ± 3.0	5.1 ± 3.3	0.041*
Estradiol (pg/mL)	7.9 ± 1.4	6.0 ± 2.1	7.9 ± 6.8	5.7 ± 1.9	12.6 ± 15.2	< 0.001*
LH (mIU/mL)	0.4 ± 0.6	1.1 ± 1.0	0.9 ± 1.2	0.9 ± 1.0	4.7 ± 3.5	< 0.001*
FSH (mIU/mL)	3.5 ± 2.5	2.5 ± 3.0	3.0 ± 3.0	3.1 ± 1.7	4.6 ± 1.6	< 0.001*
IGF-I (ng/mL)	278.7 ± 77.4	297.9 ± 80.8	327.9 ± 98.8	367.7 ± 120.2	499.1 ± 148.5	< 0.001*

Values are mean ± SD, *P < 0.05

AMH; antimullerian hormone; BA, bone age; BMI, body mass index; CA, chronological age; E2, estradiol; FSH, follicle-stimulating hormone; IGF-I, insulin-like growth factor-I; LH, luteinizing hormone; SDS, standard deviation score.

Table 2. Comparison with normal controls before treatment and after discontinuation of GnRH agonist

	Before treatment			6 months after discontinuation		
	CPP girls (n = 98)	Control group 1 (n = 55)	P-value	CPP girls (n = 102)	Control group 2 (n = 45)	P-value
CA (year)	8.4 ± 0.5	9.4 ± 0.5	< 0.001*	11.8 ± 0.6	12.6 ± 0.7	< 0.001*
BA (year)	9.9 ± 0.6	9.8 ± 0.4	0.185	12.7 ± 0.4	12.7 ± 0.5	0.868
Height SDS	1.0 ± 0.8	0.1 ± 1.1	< 0.001*	0.7 ± 0.9	0.5 ± 1.0	0.118
Weight SDS	0.8 ± 0.9	0.2 ± 1.1	0.001*	0.6 ± 0.9	0.4 ± 1.0	0.111
BMI SDS	0.4 ± 0.9	0.3 ± 1.1	0.603	0.4 ± 1.0	0.3 ± 1.0	0.568
AMH (ng/mL)	5.9 ± 3.6	5.4 ± 3.7	0.419	5.1 ± 3.3	5.0 ± 3.1	0.834
Estradiol (pg/mL)	7.9 ± 1.4	5.4 ± 2.0	< 0.001*	12.6 ± 15.2	14.6 ± 7.8	0.504
LH (mIU/mL)	0.4 ± 0.6	0.3 ± 0.4	0.952	4.7 ± 3.5	5.7 ± 3.8	0.163
FSH (mIU/mL)	3.5 ± 2.5	2.3 ± 1.3	0.001*	4.6 ± 1.6	5.1 ± 2.0	0.176
IGF-I (ng/mL)	278.7 ± 77.4	259.8 ± 92.1	0.179	499.1 ± 148.5	465.0 ± 196.4	0.375

Values are mean ± SD, *P < 0.05.

Table 3. Comparison of normal AMH level frequencies between CPP girls and control

Group	AMH range	Lower than normal (< 2.2 ng/mL)	Normal range (2.2~6.8 ng/mL)	Higher than normal (≥ 6.8 ng/mL)
Control group 1		8 (14.5%)	32 (58.2%)	15 (27.3%)
CPP girls		76 (15.0%)	299 (59.2%)	130 (25.7%)
Control group 2		7 (16.0%)	27 (60.0%)	11 (24.4%)

Linear by linear association: 0.093 (p = 0.760). Pearson's chi-square test: 0.110 (p = 0.999).

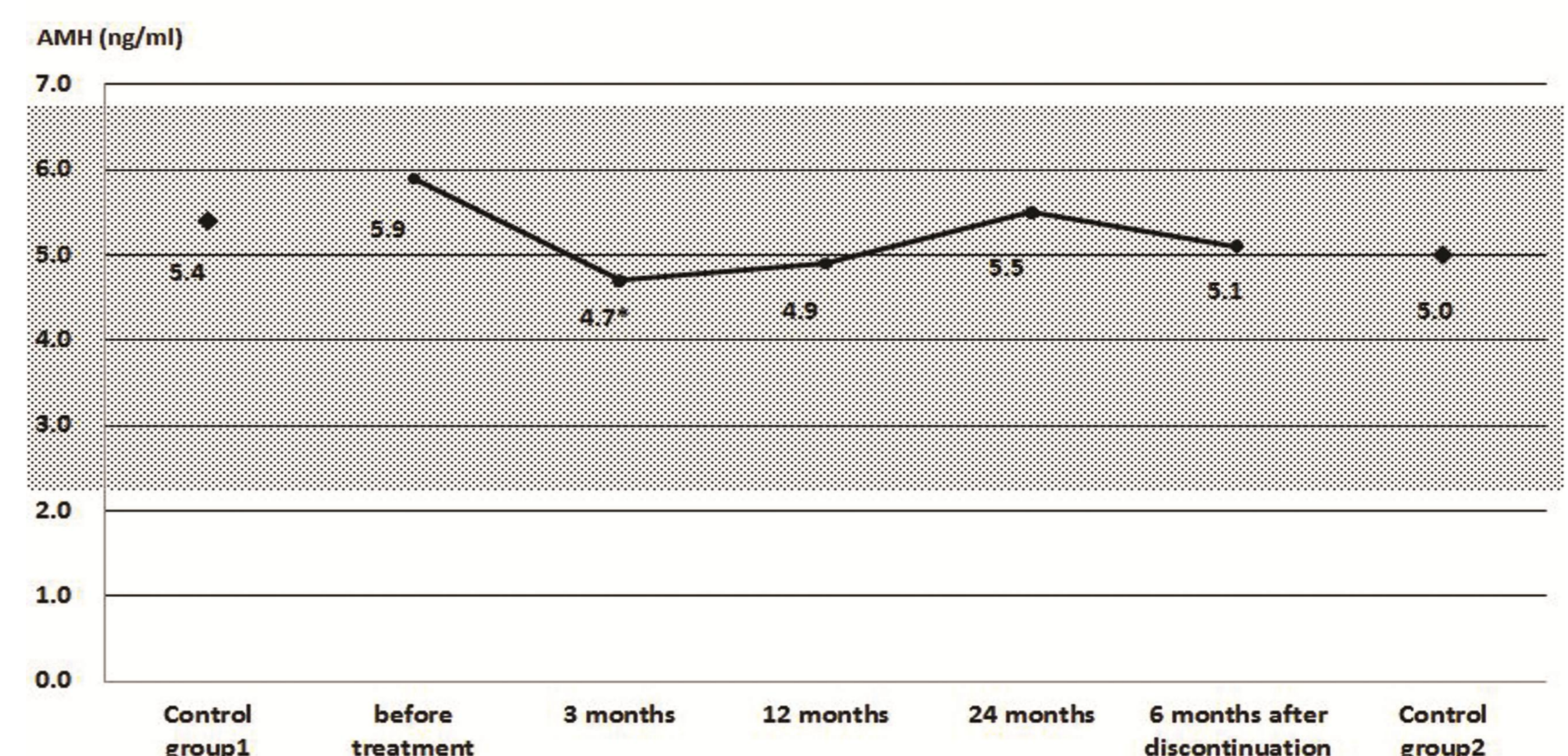


Fig. 1. AMH level according to timing of GnRH agonist treatment in CPP girls and normal controls.

Conclusions

- In precocious puberty girls, although AMH levels were partially suppressed at the early period of GnRH agonist treatment, all were in reference range and recovered to pretreatment level after discontinuation.
- Our study showed no adverse effect of GnRH agonist treatment on reproductive function.
- Further prospective studies are needed.

