

# Changes of Thyroid Function in Girls with Central Precocious Puberty after 6-month GnRH Agonist Treatment

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## INTRODUCTION

- 1247 girls aged 6-9 years who underwent GnRH stimulation test for evaluation of precocious puberty.
- Serum fT4 concentration in CPP group was notably lower than that of non-CPP group.
- The prevalence of hyperthyrotropinemia was higher in CPP group compared to non-CPP group.

Variables	CPP (n=554)	Control (n=693)	P-value
TSH (mIU/L)	3.19 ± 1.55	2.58 ± 1.34	<0.001
fT4 (ng/dL)	1.38 ± 0.14	1.44 ± 0.18	<0.001
Hyperthyrotropinemia, n (%)	87 (15.7%)	62 (8.9%)	<0.001

- TSH concentrations were positively correlated with age, height, weight, BMI, bone age, IGF-1, basal and peak LH, and basal FSH.
- TSH concentrations were negatively correlated with fT4.
- Multiple linear regression analysis showed that age ( $\beta=0.548$ ,  $P<0.001$ ) and peak LH ( $\beta=0.019$ ,  $P=0.008$ ) were independently associated with serum TSH concentration.
- Hyperthyrotropinemia in girls with CPP should be associated with pubertal LH elevation.

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## OBJECTIVES

To evaluate the causal relationship between serum TSH and LH levels in girls with CPP treated with GnRH agonist

## SUBJECTS AND METHOD

- Prospective longitudinal study
- A total 68 girls aged 6-9 years with CPP
  - ✓ Treated with GnRH agonist for 6 months
  - ✓ No clinical hypothyroidism
  - ✓ No organic reason for CPP
- Hyperthyrotropinemia
  - ✓ Defined as elevated TSH with normal fT4
  - ✓ TSH > 5.0 mIU/L and fT4 ≥ 0.8 ng/dL
- LH suppression
  - ✓ Peak LH < 3 IU/L after GnRH agonist
- Characteristic and laboratory data between baseline and 6 months after GnRH agonist were compared.
- Correlations of characteristic and laboratory data with TSH concentration change were evaluated.

## RESULTS

Table 1. Clinical characteristics and laboratory results of subjects between baseline and 6 months after GnRH agonist treatment

Variables	Baseline	6-months	P-value
Age(years)	8.2 ± 1.1	8.8 ± 0.6	<0.001
Height(cm)	130.5 ± 5.5	134.0 ± 5.4	<0.001
Weight(kg)	31.1 ± 5.7	33.4 ± 6.4	<0.001
BMI(kg/m <sup>2</sup> )	18.1 ± 2.4	18.4 ± 2.6	0.003
Bone Age(years)	10.2 ± 0.4	10.3 ± 0.4	<0.001
ALP(IU/L)	268.9 ± 61.9	262.6 ± 58.0	0.185
Peak LH(IU/L)	13.72 ± 13.13.	1.70 ± 0.85	<0.001
Peak FSH(IU/L)	14.91 ± 4.23	3.86 ± 2.57	<0.001
TSH(mIU/L)	2.36 ± 1.21	1.76 ± 0.84	<0.001
fT4(ng/dL)	1.30 ± 0.19	1.38 ± 0.14	0.001
Hyperthyrotropinemia, n(%)	5(7.4%)	0(0.0%)	<0.001
LH suppression, n(%)		65(95.6%)	

Table 2. Correlation of characteristics and laboratory data with changes in TSH level ( $\Delta$ TSH) 6-months after GnRH agonist treatment

Variables	r	P-value
Age	-0.080	0.517
Height	0.014	0.908
Weight	0.052	0.673
BMI	0.058	0.636
Bone age	0.185	0.131
ALP	0.273	0.025
TSH	-0.739	<0.001
fT4	0.143	0.246

Table 3. Multiple Linear Regression Analysis of Factors Associated with  $\Delta$ TSH

Variables	Unstandardized coefficient $\beta$	S.E	p-value
Age	0.020	0.075	0.796
TSH	-0.622	0.070	<0.001
fT4	-0.058	0.529	0.914
ALP	0.005	0.002	0.004
Peak LH	-0.160	0.098	0.106
$\Delta$ LH	-0.166	0.098	0.094
$\Delta$ ALP	0.004	0.003	0.159

## CONCLUSIONS

- GnRH agonist treatment in CPP girls has decreased serum TSH level and suppressed LH elevation.
- No causal relationship between TSH and LH suppression was found from this study.
- Further large-scaled and longer longitudinal studies with normal control groups are needed.