

Basal Luteinizing Hormone combined with the Tanner stage of breast development can predict the Gonadotropin response following Gonadotropin-releasing hormone stimulation test.



Osnat Admoni¹, Naama Schwartz² and Yardena Tenenbaum-Rakover¹.
Pediatric Endocrine Unit¹, Clinical research unit², Ha'Emek Medical Center Afula, Israel.

Background

The GnRH test is widely used in the evaluation of precocious puberty but it requires repeated blood sampling, time-consuming and uncomfortable for the patients.

Objective and Hypothesis

To identify which parameters can be used to predict pubertal response in GnRH stimulating test for the diagnosis of central precocious puberty (CPP) in girls.

Methods

Included in the study 123 girls aged 3-9 years that underwent GnRH stimulating test due to early pubertal development. Clinical parameters were collected from the medical files. The results of GnRH tests were retrieved retrospectively. Stepwise logistic regression was used to identify which variables can predict the probability for GnRH pubertal response (Peak LH \geq 6 IU/L).

Results

Included in the final model the following variables: age, Tanner breast stage (B1-5) and basal LH with cut off point of LH $>$ 0.3 IU/L ($P <$ 0.0001, C- statistic 84.3%).

when basal LH was \leq 0.3 IU/L: the predictive probability for pubertal response in GnRH test in girls aged 3-6 years presented with Tanner B2 and in girls aged 7-9 years with Tanner B1, was less than 9%.

In girls aged 3-9 years, with Tanner B3 and basal LH $>$ 0.3 IU/L, the probability for pubertal response was more than 72%. BMI and advanced bone age were not significantly associated with GnRH pubertal response.

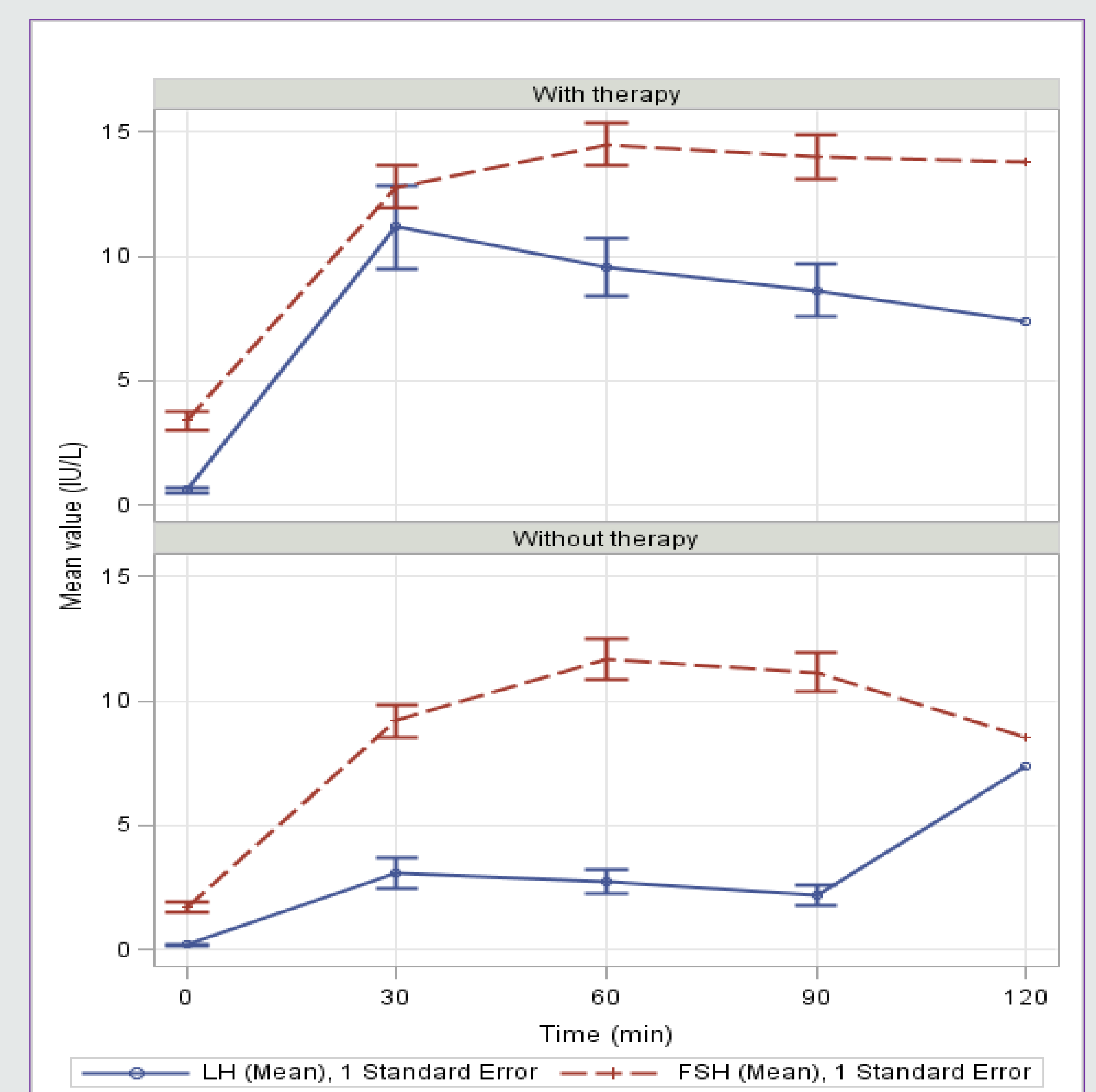
Average levels of LH after GnRH stimulation in girls eventually received GnRH analogs, compared with those who did not receive, were significantly higher at all time points of the test. P -value $<$ 0.0001 (Fig 1).

When we compare both LH, FSH and the gap between them we found a highly statistically significant difference at basal levels and especially after 30 minutes. P -value $<$ 0.0003.

Table 1 : The significant variables that predict the probability for pubertal response in GnRH test.

Variables.	Diagnosis of CPP		P-value
	No	Yes	
B3 vs. B1	20 (24.10)	27 (67.50)	0.0032
B2 vs. B1	37 (44.58)	12 (30.00)	0.0764
Age at GnRH test	7.08 \pm 1.36 [7.2]	7.81 \pm 1.30 [8.35]	0.2311
Basal LH $>$ 0.3 IU/L	23 (27.71)	29 (72.50)	0.0002

Figure 1: Comparison of LH and FSH levels after stimulation with GnRH between PP girls that eventually received therapy with GnRH analogs, with dose who didn't received therapy.



Conclusion

Basal LH combined with age and Tanner breast stage can predict the response to GnRH test, therefore GnRH test is unnecessary in the majority of the cases for the diagnosis of CPP in girls.

If there is still a need to perform GnRH test to ensure CPP or for the purpose of deciding on treatment, then one measurement after 30 minutes would be enough to give us the required information without the need for more measurements.