

# CAN THE DETERMINATION OF BASAL LUTEINIZING HORMONE (LH) REPLACE THE GNRH TEST IN THE DIAGNOSIS OF PRECOCIOUS PUBERTY?

Juan Pablo Llano MD<sup>(1)</sup>, William Javier Morales C MD<sup>(2)</sup>, Teresa Ortiz MD<sup>(1)</sup>, Catherine Pineda<sup>(1)</sup>, Gladys Arbelaez<sup>(1)</sup>, Nayibe Gil<sup>(1)</sup>, Sonia Castro MD<sup>(1)</sup>, Mauricio Llano MD<sup>(1,2)</sup>.

<sup>(1)</sup>Laboratorio de Investigación Hormonal

<sup>(2)</sup> Universidad El Bosque  
Bogotá, Colombia

## Introduction

The diagnosis of precocious puberty (PP) is based on the appearance of secondary sexual characteristics before 8 years of age in girls and 9 in boys, along with an acceleration in bone age and growth rate. The greater sensitivity of gonadotropins has led to the statement that their measurement in base could replace the use of the GnRH test.

## Objectives

- To determine the sensitivity, specificity of basal LH measurement compared to the GnRH test in patients with PPC.
- Determine the cut off point for basal LH to diagnose PPC

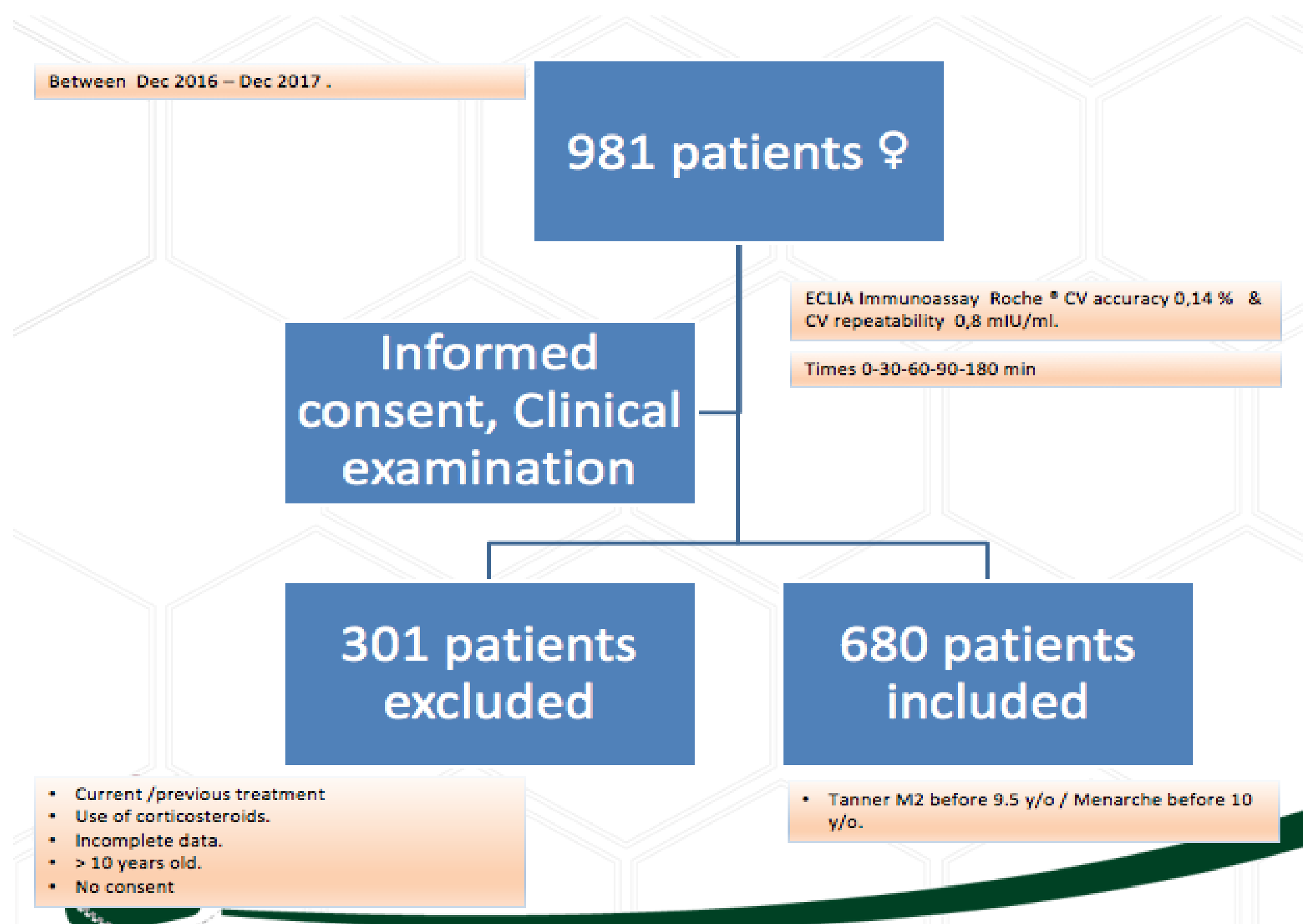
## Material and Methods

680 patients were referred for presumptive diagnosis of central precocious puberty in the city of Bogota. All patients went through a GnRH test, using a Roche immunoassay for Luteinizing hormone (LH) and follicle stimulating hormone (FSH). The method is calibrated under the 2 international standard NIBSC 80/552. For LH, the detection limits are 0.1 mIU/ml for LH and FSH. The precision CV 0.14% and CV repetitivity 0.8 mIU/ml. For FSH the CV of 5.3% accuracy and CV repetitivity of 1.8 mIU/ml. Cross-reactions with TSH, hCG, hPL and hGH were less than 0.1% for both tests.

The stimulus used was triptorelin pamoate measured at 0,30,60,90,180 minutes.

The correlation between basal LH values and the peak with the stimulus was performed to confirm the presence of gonadotrope axis activity at any of the test times.

The SPSS statistics software version 27 was used for data analysis.



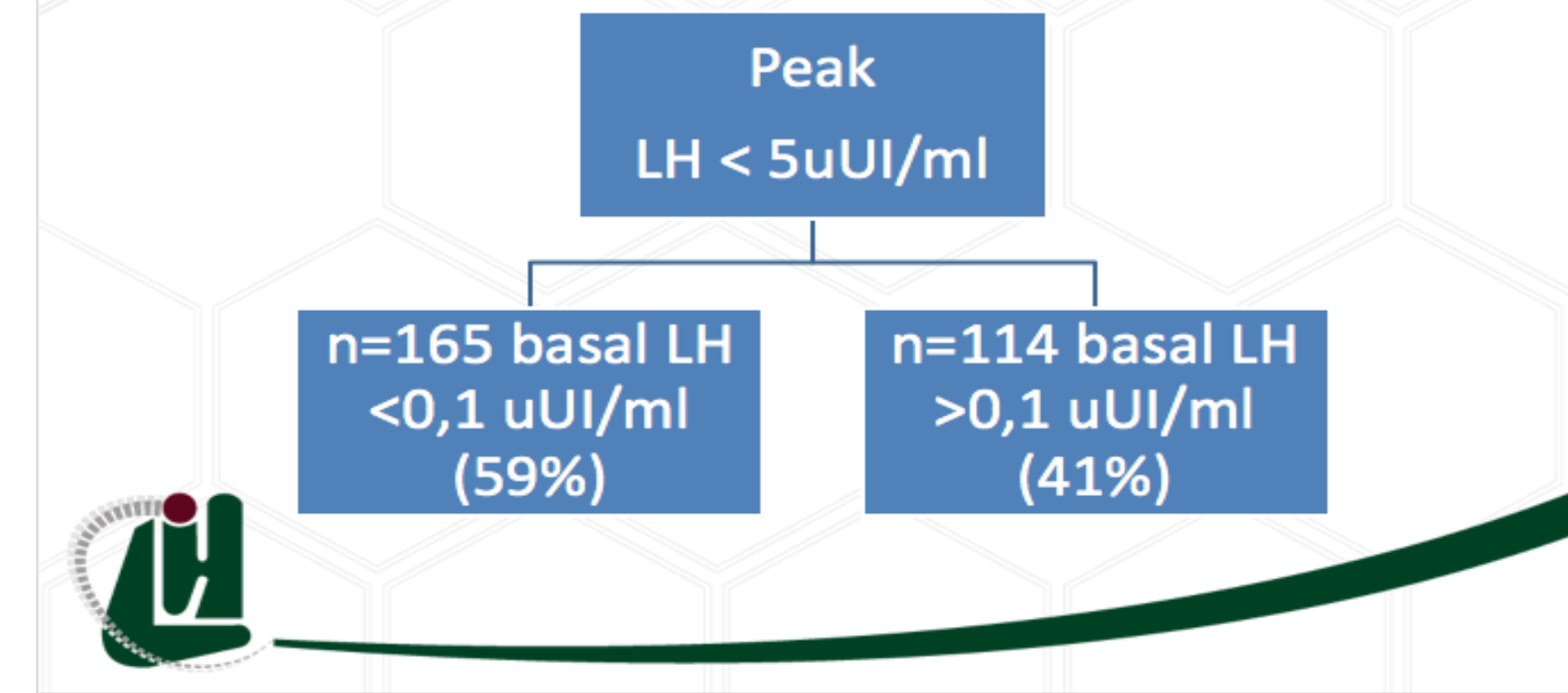
## Results

680 tests of GnRH were performed. The result was positive for central early pubescents (peak LH greater than 5 uUI/ml) in 401 patients (59%). In 114 patients (16.8%) the basal HL result was positive (greater than 0.1 uIU/ml) with a response peak lower than 5 uUI/ml. In 95 (14%) patients, the basal LH was negative with a time later than 5 uIU / ml, which explains why the test was considered reactive for CPP. 306 patients (45%) had basal LH higher than 0.1 uIU/ml and the peak was higher than 5 uUI / L once, confirming the test as reactive.

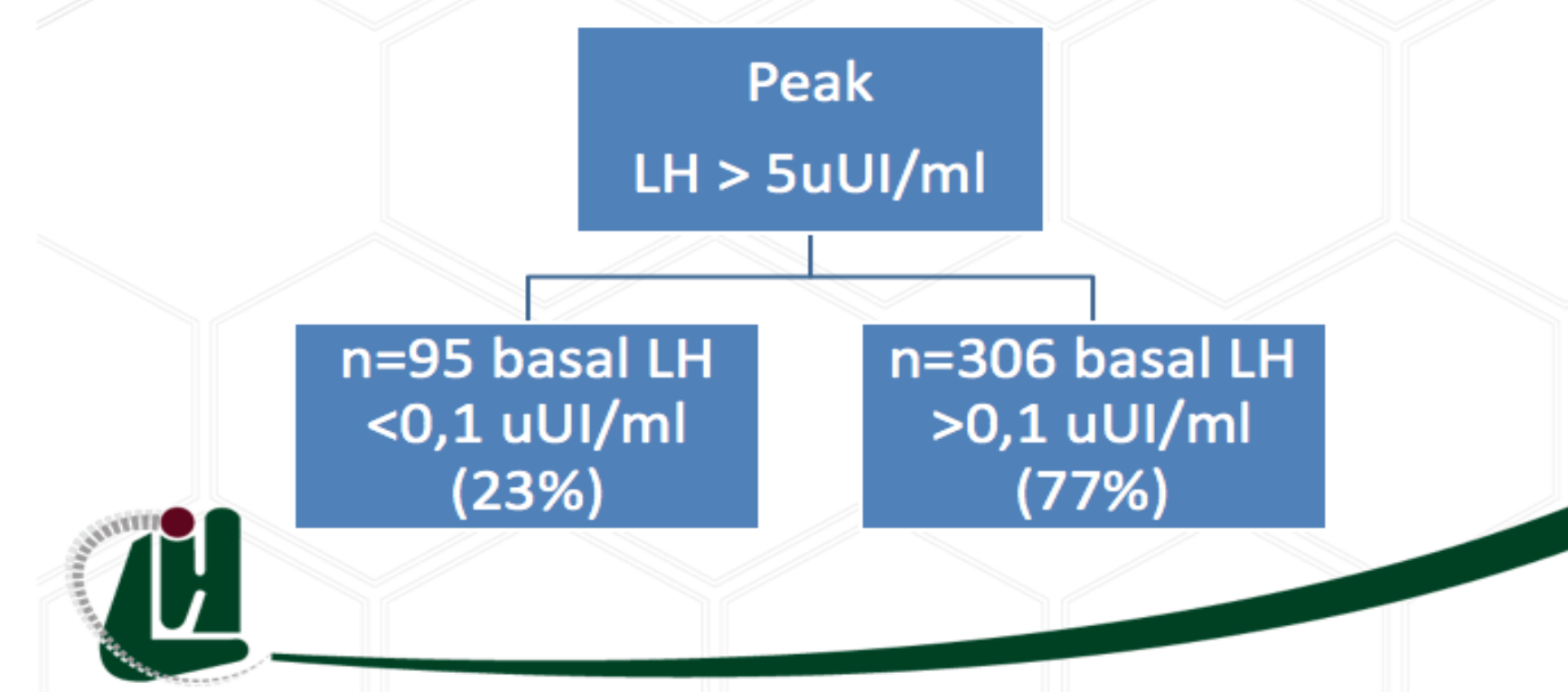
The sensitivity of the basal LH is 76%, specificity 59%, positive predictive value 72% and negative predictive value 65%.

The sensitivity increases with a cut-off point higher than 0.7 uIU / ml of basal LH, which is 92% in patients at puberty stages Tanner 4-5.

### Cutoff <5 uUI/ml\*



### Cutoff >5 uUI/ml\*



### Basal LH vs GnRH test (cutoff 5 uUI/ml)

- Sensibility 76,3%
- Specificity 59,1%
- Positive predictive value 72,8 %
- Negative predictive value 63,4%
- AUC 62%

## Conclusions

The diagnosis of precocious puberty requires a judicious evaluation of clinical parameters, diagnostic images such as bone age and pelvic ultrasound, and the determination of activity of the hypothalamic-pituitary-gonadal axis. With the arrival of more sensitive of gonadotropin measurements, the replacement of dynamic tests for basal measurement of gonadotropins to determine the presence of ovarian or testicular activity was proposed. This study shows how the sole measurement of gonadotropins has a low sensitivity and specificity, with high sensitivity values at puberty stages greater than Tanner 3. The measurement of basal gonadotropins has an important role in monitoring the treatment for precocious puberty but it is not considered to be a good marker for the patient with suspected precocious puberty.

Conclusion: The determination of basal LH is not a good indicator of pubertal onset in patients with suspected precocious puberty, mainly in the early stages.