

Basal LH as a screening test for central precocious puberty

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INTRODUCTION

- Central precocious puberty (CPP) refers to the development of secondary sex characteristics before ages 8 and 9 years in girls and boys respectively. It is either due to organic brain lesion or idiopathic. Conventionally, Gonadotropin Releasing Hormone (GnRH) stimulation test is a mainstay tool for diagnosis of central precocious puberty. However, it is time consuming and expensive.
- Therefore, a single basal sample of Luteinizing Hormone is evaluated in many studies to replace GnRH stimulation test in the diagnosis of CPP in the most of these patients.

AIM

This study was aiming to find an alternative simple diagnostic modality for diagnosis of central precocious puberty in children in the form of a single basal serum LH.

METHOD

In this retrospective study, the medical records of 42 children with early secondary sex characteristics were reviewed from Jan 2019 to Jan 2021.

Their assessment included

- Careful history taking including** their age at presentation and family history of similar condition.
- Thorough clinical examination** including height, weight, Tanner staging of secondary sex characters.
- bone age, imaging studies.**
- Hormonal profile** including basal LH and GnRH stimulation test using ultrasensitive assays for all patients. According to peak LH after GnRH stimulation, patients were classified into **2 groups**, pubertal and prepubertal groups.
- Receiver operating characteristic curve (ROC) was plotted to obtain the optimal correlation of basal LH to peak LH after GnRH stimulation and to analyze a recommended cut-off value.

RESULTS

- Among the study cohort, there were 17 children with CPP, 4 children with peripheral precocious puberty and 21 children with premature thelarche.
- There was a wide variation of patients ages at presentation ranging from 7 months to 90 months.
- The patients were classified according to peak LH level after GnRH stimulation into two groups:
 - Pubertal response group** of patients who had 5 IU/L peak LH levels in the GnRH stimulation test.
 - Prepubertal response group** of patients who had peak LH levels <5 IU/L. (Table 1)
- Analysis of the correlation between basal LH and peak LH in children with premature sexual development in both males and females was done to compute the cut-off value of basal LH to differentiate between CPP patients and patients with PPP or premature thelarche.

- The calculated cut-off value for basal LH** using Youden index was 0.33 IU/L with area under the curve [AUC]=0.941, 88.24 % sensitivity, 76% specificity. (Figure 1 and table 2)

Table (1): Distribution of the studied cases according to etiology. (n=42)

Etiology	No.	%
Pubertal response group (CPP)	17	40.5
Pre pubertal response group	25	59.5
Peripheral precocious puberty	4	9.5
Premature thelarche	21	50.0

Table (2): Validity (AUC, sensitivity, specificity) for basal LH of the studied cases.

	AUC	p	95% C.I	Cut off#	Sensitivity	Specificity	PPV	NPV
Basal LH	0.941*	<0.001*	0.869 – 1.013	>0.33	88.24	76.0	71.4	90.5

AUC: Area Under a Curve p value: Probability value CI: Confidence Intervals
NPV: Negative predictive value PPV: Positive predictive value
*: Statistically significant at $p \leq 0.05$
#Cut off was choose according to Youden index

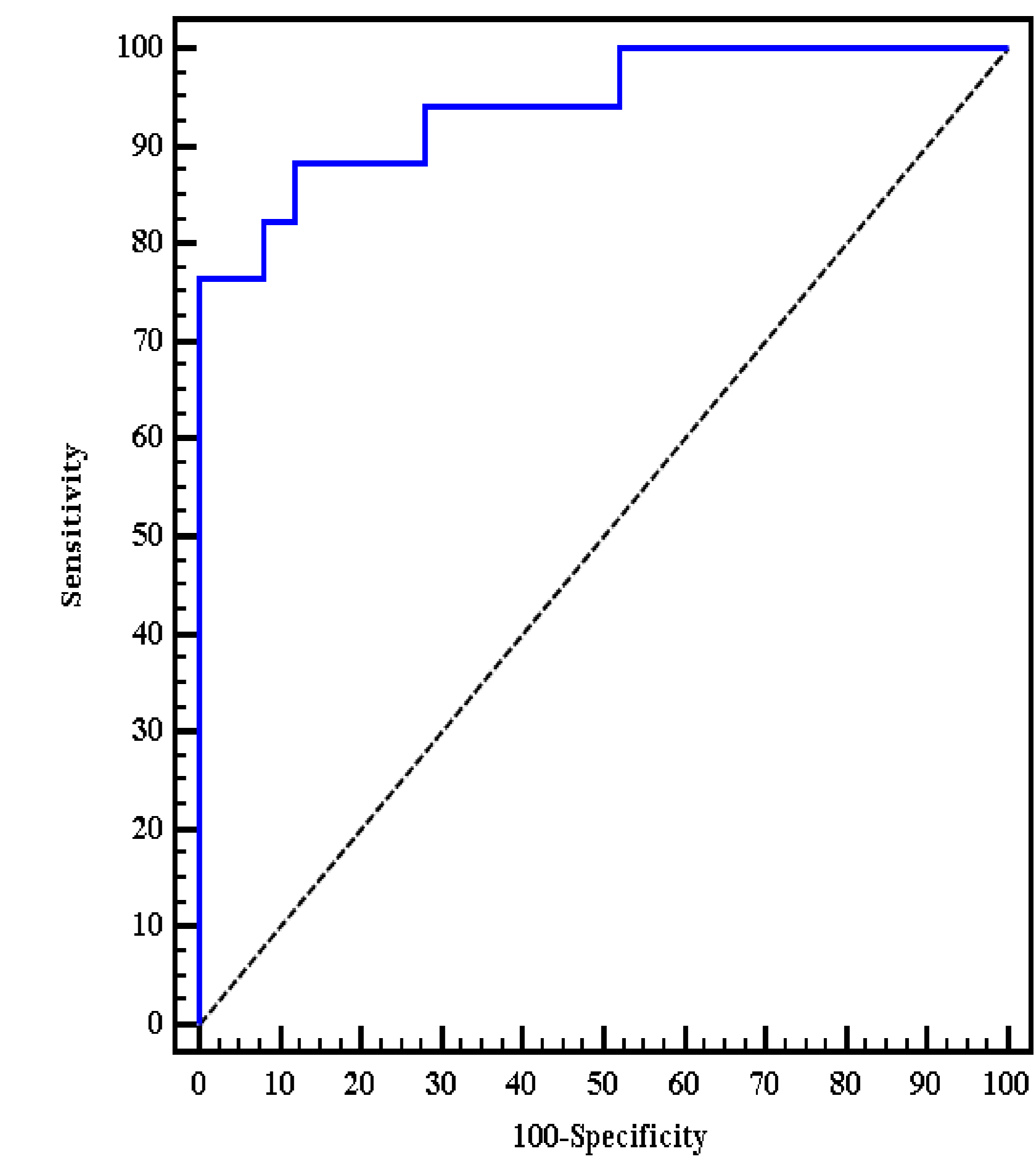


Figure (1): ROC curve for basal LH in the studied cases

CONCLUSION

Basal serum LH can be used as a valuable simple screening test for diagnosis of central precocious puberty compared to the standard inconvenient GnRH stimulation test. Therefore, basal LH could replace GnRH stimulation test in a large cohort of children with premature sexual development when it exceeds 0.33 IU/L.

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