

The uterine artery pulsatility index in evaluation of the GnRH-analog treatment efficacy in Central Precocious Puberty

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Background

Gonadotropin-releasing hormone analogs (GnRHa) have been used in the management of central precocious puberty (CPP). The response to GnRHa treatment could be evaluated by clinical, hormonal and ultrasonographic criteria. However, there is no consensus about monitoring the adequacy of therapy. The uterine artery pulsatility index (PI), defined as systolic peak - diastolic peak / average speed of maximum flow, is an expression of vascular compliance in the uterine artery. PI values are different during puberty. In fact circulating estrogen reduce vascular resistance and, consequently, the PI values.

Objective and Hypotheses

We aimed to evaluate the PI accuracy in the monitoring of GnRHa treatment in patients with CPP.

Methods

56 girls referring to our hospital from September 2005 to March 2013 for CPP were enrolled. Tanner stage, LH peak measurement after GnRH stimulation, uterine and ovarian diameters and volumes, and PI values were compared at baseline and 6 months after treatment beginning. Paired t-test analysis was performed.

Results

Before and after 6 months of treatment:

- PI values were 3.9 ± 1.19 and 5.6 ± 1.44 ($P < 0.0001$)
- longitudinal uterine diameter (mm) were 41.3 ± 6.57 and 36.7 ± 5.4 ($P < 0.0001$),
- LH peak values (mU/ml) were 19.4 ± 12.8 and 0.8 ± 0.82 ($P < 0.0001$)
- breast development were 2.75 ± 0.97 and 2.0 ± 1.17 .

After 6 months of treatment:

- PI increased in 48 patients (86%)
- longitudinal uterine diameter decreased in 46 patients (82%)
- LH peak value decreased ≤ 3 mU/ml in 54 patients (96%)
- Tanner stage decreased or was stable in 53 patients (95%).

	Before therapy	After therapy
N	56	56
Age (years)	8.0 ± 1.13	8.7 ± 1.13
B (n)	1 = 3 2 = 25 3 = 12 4 = 16 5 = 0	1 = 4 2 = 39 3 = 3 4 = 10 5 = 0
LH peak (mU/ml)	19.4 ± 12.18	$0.8 \pm 0.82^*$
Longitudinal uterine diameter (mm)	41.3 ± 6.57	$36.7 \pm 5.40^*$
Antero-posterior uterine diameter (mm)	14.3 ± 5.12	$11.3 \pm 3.30^*$
Transverse uterine diameter (mm)	15.6 ± 3.91	$12.6 \pm 3.10^*$
Uterine volume (mm ³)	5183.2 ± 3064.22	$3022.6 \pm 2095.94^*$
Right ovary D1 (mm)	21.5 ± 3.81	$18.6 \pm 3.23^*$
Right ovary D2 (mm)	11.1 ± 2.00	$9.3 \pm 2.18^*$
Left ovary D1 (mm)	21.2 ± 3.51	$18.7 \pm 3.08^*$
Left ovary D2 (mm)	11.2 ± 2.24	$9.3 \pm 1.98^*$
Right ovarian volume (mm ³)	1456.8 ± 639.0	$914.7 \pm 578.22^*$
Left ovarian volume (mm ³)	1483.3 ± 740.7	$917.7 \pm 515.9^*$
Mean ovarian volume (mm ³)	1470.1 ± 670.44	$916.2 \pm 536.14^*$
PI	3.9 ± 1.19	$5.6 \pm 1.44^*$

All data (except B) are expressed as mean \pm standard deviation.
*Significantly different from before therapy: $P < 0.001$.

Conclusions

The PI, together with longitudinal uterine diameter and clinical evaluation, could be an accurate and non-invasive parameter for the evaluation of the GnRH-analog treatment efficacy, avoiding the need for a stimulation test.

References

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