

URINARY VITAMIN D-BINDING PROTEIN AS A MARKER OF OVARIAN RESERVE

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Introduction

Ovarian reserve traditionally refers to the store of eggs a woman has in her ovaries that have the potential to produce mature follicles for ovulation to sustain the menstrual cycle and/or create a pregnancy. Several predictors of ovarian reserve have been identified, including patient age, basal levels of FSH, AMH, and AFC.

Aim of the work

The aim of this study was to detect the predictive value of urinary vitamin D-binding protein as a marker of ovarian reserve.

Patients and Methods

The study was conducted on 150 females in the fertile age group (20-37 years) after approval of the local ethical committee. A written informed consent was obtained from every female included in the study. Females were classified based on the preliminary measurement of AMH into 50 patients with high AMH suggested to be PCOS, 50 patients with low AMH suggested to be poor ovarian reserve and 50 females with normal AMH as a control group.

Inclusion criteria:

- 1- 50 patients with polycystic ovary syndrome (PCOS).
- 2- 50 patients with diminished ovarian reserve.
- 3- 50 normal control (NC) participants.

Exclusion criteria:

- 1-Use of Vitamin D supplements or medication likely to affect the levels of vitamin D and ovarian reserve determinants in the past 3 months.
 - 2-History of oophorectomy, ovarian surgery, or chemotherapy and/or radiotherapy.
 - 3-Cigarette smoking.
 - 4-History of endometriosis.
 - 5-Women with autoimmune diseases (like autoimmune thyroid disease, autoimmune liver diseases, systemic lupus erythematosus).
- AMH blood level (66)
High (often PCOS): over 4.0 ng/ml Normal: 1.5-4.0 ng/ml Low normal: 1.0-1.5 ng/ml Low: 0.5-1.0 ng/ml Very low: less than 0.5 ng/ml.

Results

Urinary VDBP/Creatinine Ratio

Urinary VDBP / creatinine ratio ranged from 0.02–2.89ng/mg in control groups with a median of 0.85ng/mg, and from 0.04–2.50ng/mg in PCO patients with a median of 1.34ng/mg. In DOR patients, it ranged from 0.08–1.58 ng/mg with a median of 0.48ng/mg. There was statistically significant difference between the three groups ($p<0.001$). Table (1) Figure (1)

Table: Comparison between the three studied groups according to urinary VDBP / creatinine ratio

	DOR (n=50)	PCO (n=50)	Control (n=50)	H	P
Urinary VDBP/ creatinine ratio (ng/mg)					
Min–Max.	0.08–1.58	0.04–2.50	0.02–2.89		
Mean±SD.	0.59±0.33	1.35±0.53	1.07±0.89		
Median (IQR)	0.48 (0.36–0.82)	1.34 (1.02–1.65)	0.85 (0.55–1.27)	42.321*	<0.001*
Sig. bet. grps.	p1<0.001*, p2=0.002*, p3=0.001*				

IQR: Inter quartile range
SD: Standard deviation
H: H for Kruskal Wallis test, Pairwise comparison bet. each 2 groups was done using Post Hoc Test (Dunn's for multiple comparisons test)
p: p value for comparing between the three studied groups p1: p value for comparing between DOR and PCO
p2: p value for comparing between DOR and control p3: p value for comparing between PCO and control
*: Statistically significant at $p \leq 0.05$

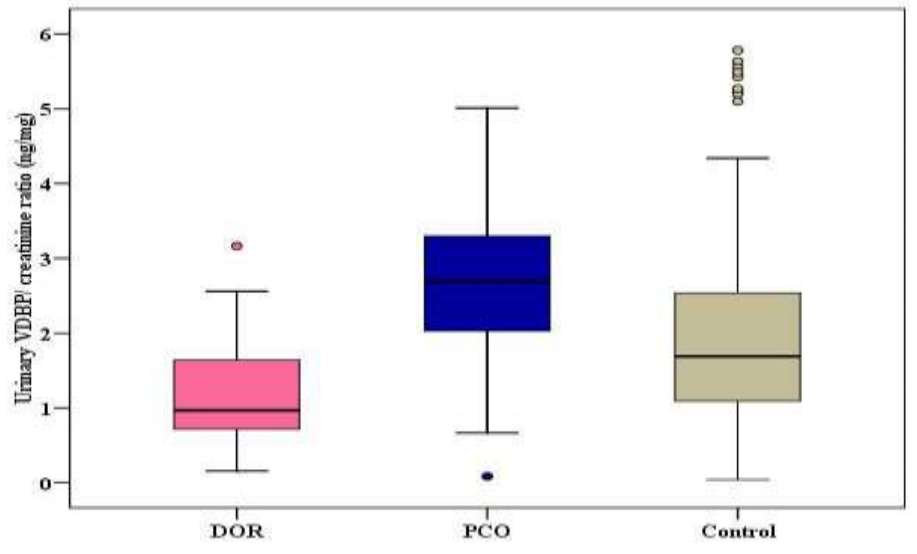


Figure: Comparison between the three studied groups according to urinary VDBP / creatinine ratio. The upper and lower borders of the box represent the 25th and 75th percentiles. The horizontal line in the box represent the median 50th. Circles represent the outliers. Data were analyzed using kruskal wallis test. Statistically significant at $p<0.05$.

Conclusion

- Urinary VDBP is closely associated with ovarian reserve and can be considered as a novel non-invasive biomarker of ovarian reserve.
- There are several predictors of ovarian reserve including patient age, FSH, AFC and AMH.
- Urinary VDBP had a sensitivity of 68.0% and a specificity of 65.0% for DOR, and a sensitivity of 80.0% and a specificity of 66% for PCOS.
- The urinary VDBP had PPV for DOR 60.7% and NPV 63.6% and PPV for PCO 70.2% and NPV 76.7%.
- The urinary VDBP is additive to diagnosis but not significant.