

STUDY COMPARING MATERNAL SERUM URIC ACID AND CALCIUM VERSUS UMBILICAL ARTERY DOPPLER IN PREECLAMPSIA

Tarek Abd Elzaher Karkor, Doaa Ali Abdelmonsif*, Tamer Mohamed Abdel-Aziz, Rawan Gamal Elsayed Asala

Department of Obstetrics and Gynecology, Department of Medical Biochemistry*, Faculty of Medicine, University of Alexandria

Introduction

Preeclampsia is a pregnancy-specific disorder and one of the major causes of maternal and perinatal morbidity and mortality worldwide. There have been many screening tests evaluated in the literature over the years for predicting preeclampsia. Umbilical artery Doppler assessment has been shown to reduce perinatal mortality and morbidity in high-risk obstetric situations. The umbilical arterial waveform usually has a "saw tooth" pattern with flow always in the forward direction, which is towards the placenta. An abnormal waveform shows absent or reversed diastolic flow. Evidence supporting an inverse relationship between calcium intake and blood pressure has strengthened in the past decade. The role of calcium in gestational hypertension is still not clear. Increased uric acid level is a key clinical feature of preeclampsia; higher levels correlate with significant maternal and fetal morbidity and mortality.

Aim of the work

The aim of this work was to study the role of maternal serum uric acid and calcium versus Umbilical artery Doppler blood flow in preeclamptic patients at 28-30 weeks of gestation compared to Normotensive pregnant subjects at El-Shatby Maternity University Hospital.

Patients and Methods

This study was carried out on 90 cases admitted to El-Shatby Maternity University Hospital. The study was conducted on two groups of pregnant women: **Group I:** Control: 45 normal healthy pregnant women at 28-30 weeks of gestation. **Group II:** Cases: Including 45 pregnant women who and they further divided into Mild Preeclampsia (n=20) Severe Preeclampsia (n=25). Umbilical artery Doppler (S/D ratio, RI, PI) was assessed for both groups.

- Laboratory investigations including:
- Serum total calcium concentration was determined by colorimetric test using Arsenazo – III (Sigma Aldrich, USA).
 - Serum uric acid level measurement by enzymatic color test using Uricase and Peroxidase enzymes. The analyzer used was “SIEMENS Dimension clinical chemistry system”.

Results

Table 1: sensitivity, specificity and accuracy of serum calcium and uric acid to predict severe preeclampsia from mild preeclampsia.

	AUC	P	95% C.I	Cut off	Sensitivity	Specificity	PPV	NPV
Serum calcium (mg/dl)	0.92	0.001*	0.66 – 0.93	≤7.2	95.0	90.0	92.0	93.0
Serum uric acid (mg/dl)	0.80	0.008*	0.320 – 0.9	>5.6	82.0	70.0	82.6	81.0

AUC: Area Under a Curve p value: Probability value CI: Confidence Intervals
NPV: Negative predictive value PPV: Positive predictive value
*: Statistically significant at $p \leq 0.05$

Table 2: sensitivity, specificity and accuracy of Doppler to predict severe preeclampsia from mild preeclampsia.

Doppler	AUC	p	95% C.I	Cut off	Sensitivity	Specificity	PPV	NPV
UAPI	0.90	<0.001*	0.929 – 1.0	>1.13	83.0	88.0	80.6	81.0

Table 3: Validity (AUC, sensitivity, specificity) for Serum calcium + Serum uric acid + umbilical artery Doppler to predict severe preeclampsia (n = 25) from mild preeclampsia (n = 20)

	AUC	p	95% C.I	Sensitivity	Specificity	PPV	NPV
Serum calcium + Serum uric acid + Doppler	0.98	<0.001*	1.0 – 1.0	98.0	100.0	97.0	99.0

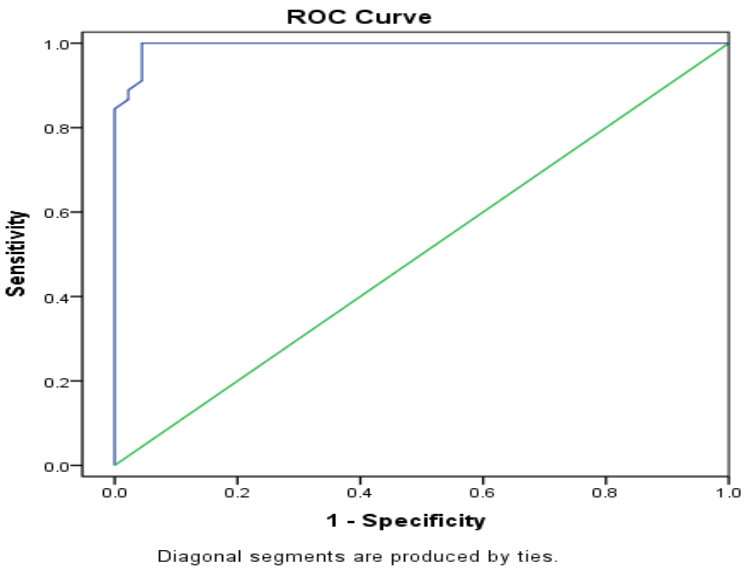


Figure: ROC curve for Serum calcium + Serum uric acid + umbilical artery Doppler to predict severe preeclampsia (n = 25) from mild preeclampsia (n = 20)

Conclusion

- There was significant decrease in serum calcium level, while there was significant increase in serum uric acid level and umbilical artery Doppler parameters among preeclampsia group.
- In conclusion, it is more convincing to take on that no single biomarker will attain 100% sensitivity and specificity and that a combination of different biomarkers together and umbilical artery Doppler indices with clinical data is more expected to be used in clinical practice.