423 Prognostic significance of serum Neutrophil gelatinase-associated lipocalin (NGAL) levels in pre-eclampsia and eclampsia

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OBJECTIVE: To The study aims to evaluate the levels of circulating sFlt-1 in pre-eclampsia (PE) and eclampsia patients and to assess its prognostic significance in detection of PE complications.

STUDY DESIGN: The current study was a prospective cohort study conducted in tertiary University hospital between January and December 2016. Included patients were divided into two groups; (Group I) severe PE group and (Group II) eclampsia group. Age, parity and gestational age matched women had approached to participate in the study as a control group (Group III). Serum NGAL levels were measured at inclusion with all basic investigations. Patients were followed up until delivery to record any complications. Correlation analysis was performed between the serum NGAL levels and clinical, laboratory investigations. Receiver operating characteristic analysis was constructed for the evaluation of the area under curve (AUC) as well as the sensitivity and specificity regarding the cutoff point of NGAL level that predict occurrence of complications.

RESULTS: The study included 94 women. Women with complicated severe PE showed higher NGAL levels than in non complicated cases (1149.1 $\pm$252.9 versus 845.8$\pm$270.9, p=0.04 Similarly, the mean serum level of NGAL in complicated eclampsia was higher than in non-complicated cases (2313.3 $\pm$1215.2 versus 1526.9 $\pm$821.9, p<0.001) (OR=1.004, 95% CI: 1.002-1.006, p<0.001). NGAL levels were strongly correlated with SBP (r=0.585) and DBP (r=0.564) (p<0.001 and p<0.001 respectively). At cutoff point 1099.39 ng/ml of NGAL serum levels, the sensitivity was 70% and specificity was 76.7% with AUC=0.881, 95% CI: 0.803-0.959.

CONCLUSION: Serum NGAL could be used as a prognostic marker to predict the occurrence of complications of in cases of PE and eclampsia.

ROC Curve

AUC 0.881, 95%CI (0.803-0.959)
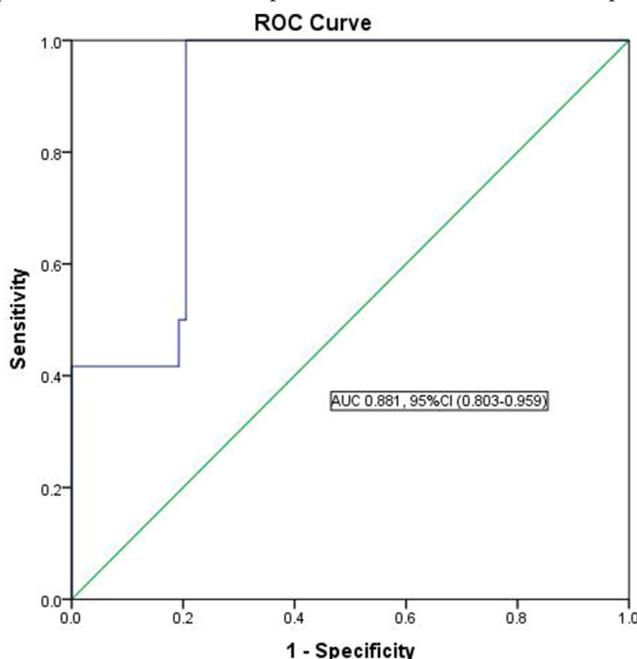
424 Increased peripheral vascular resistance and arterial stiffness one year after preeclampsia

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OBJECTIVE: Preeclampsia is associated with excess risk of future cardiovascular disease (CVD). One hypothesized mechanism is that persistent vascular dysfunction after delivery may link preeclampsia with later CVD. Our aim was to compare vascular resistance and arterial stiffness one-year postpartum following preeclampsia and uncomplicated pregnancy.

STUDY DESIGN: This is a case-control study of women with pre-eclampsia and uncomplicated pregnancies who were prospectively recruited and underwent a follow up visit one year postpartum. Women were recruited from labor and delivery with either un-complicated pregnancies or with preeclampsia. Outcomes were adjudicated by a panel of study physicians. At one-year postpartum, we used EndoPAT peripheral artery tonometry to measure micro-vascular vasodilatory response to postischemic hyperemia and arterial stiffness [augmentation index (AI) and augmentation index normalized to heart rate, with lower values reflecting more arterial elasticity]. Bioreactance cardiography was performed using the NICOM device to assess hemodynamics adjusted for body surface area, including cardiac index (CI) and total peripheral resistance index (TPRI). Statistical analysis was performed using univariate analysis.

RESULTS: Fourteen women with prior preeclampsia were compared to twenty-four controls at a mean time point of 12.8 $\pm$ 1.4 months postpartum. Demographic characteristics and blood pressure post-partum were similar between groups. Prior preeclampsia was asso-ciated with higher AI compared to uncomplicated pregnancies (median -7.6% vs. - 2.1%, p=0.04) indicating increased arterial stiffness. There was no difference in cardiac index between groups (median 3.6 vs. 3.7 L/min/m^2, p=0.9), however TPRI was signifi-cantly higher in women with prior preeclampsia (median 1781 vs. 1987 dynes-sec/cm^5/m^2, p=0.04).

CONCLUSION: In this prospective cohort followed one year post-partum we show significant differences in vascular function associ-ated with prior preeclampsia with higher vascular resistance and increased arterial stiffness using non-invasive vascular assessments. These measures have been extensively validated in a non-obstetric population and are associated with CVD risk. These findings may provide insight into mechanisms linking preeclampsia to future CVD and the identified post-preeclampsia physiology may be a target for risk-reducing interventions.

	Uncomplicated Pregnancy N=24 n (%)	Prior Preeclampsia N= 14 n (%)	p value
Demographics			
Age (mean ± SD)	29.9 ± 5.5	30.0 ± 7.1	1.0
Race			
Caucasian	20 (83.3%)	11 (78.5%)	
Non-Hispanic Black	2 (8.7%)	0	0.5
Other	2 (8.7%)	3 (21.4%)	
Body Mass Index (mean ± SD)	27.9 ± 5.2	30.8 ± 10.3	0.3
Pregnancy Characteristics			
Nulliparous	15 (62.5%)	8 (57.1%)	0.7
Gestational Diabetes	0	1 (9.1%)	0.1
Gestational age at delivery (mean ± SD)	38.3 ± 3.1	36.1 ± 2.8	0.05
Birthweight (mean ± SD)	3205 ± 745	2510 ± 783	0.02
Cesarean Delivery	3 (12.5%)	4 (28.9%)	0.2
Postpartum Characteristics			
Months Postpartum (mean ± SD)	12.6 ± 1.5	13.0 ± 1.3	0.4
Systolic Blood Pressure (mmHg)	114.0 ± 12.0	118.7 ± 9.7	0.2
Diastolic Blood Pressure (mmHg)	73.3 ± 13.8	78.3 ± 7.8	0.2
Body Mass Index (mean ± SD)	30.3 ± 7.3	33.3 ± 9.4	0.3
Any Lactation	22 (91.7%)	8 (57.1%)	0.05
Postpartum Vascular Assessments*			
Cardiac Index (L/min/m²)	3.6 (3.5, 4.1)	3.7 (3.4, 4.0)	0.9
Peripheral Vascular Resistance Index (dynes-sec/cm⁵/m²)	1781 (1533, 1974)	1987 (1809, 2131)	0.04
Stroke Volume Index (mL/beat/m²)	55.5 (53.1, 65.6)	49.5 (45, 56.3)	0.03
Abnormal Reactive Hyperemia Index (≤1.67)	9 (37.5%)	7 (50.0%)	0.3
Augmentation Index (%)	-7.6 (-11.1, -1.8)	-2.1 (-4.9, 2.2)	0.04
Augmentation Index normalized to heart rate @75 (%)	-10.7 (-14.8, -6.0)	-2.2 (-5.8, 1.7)	<0.001

*Data are median (IQR)

Figure. Vascular resistance and stiffness one-year postpartum
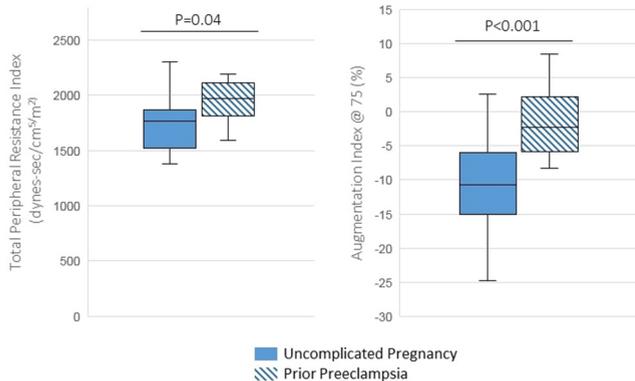
425 Early pregnancy blood pressure trajectory and risk of preeclampsia

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OBJECTIVE: Recently updated ACC/AHA guidelines redefine blood pressure (BP) categories as Stage 1 hypertension (systolic 130-139mmHg or diastolic 80-89mmHg), Elevated (systolic 120-129mmHg and diastolic <80mm) and Normal (<120/<80 mmHg), but their relevance to an obstetric population is uncertain. We sought to evaluate preeclampsia risk based on early pregnancy BP category and trajectory.

STUDY DESIGN: This is a secondary analysis from a prospective observational study of nulliparous women with singleton pregnancies conducted at eight clinical sites between 2010-2014 (nuMoM2b cohort). Women included in this analysis had no history of pre-pregnancy hypertension (HTN) or diabetes. We compared the frequency of preeclampsia and gestational HTN among women based on BP category at first study visit (Normal, Elevated, or Stage 1 HTN) and systolic BP trajectory between two study visits. BP trajectories were categorized based on systolic BP difference between visit 1 and 2 as stable (<5mmHg difference), upward (≥5mmHg) or downward (≤-5mmHg) and by change in category between visits. Associations of BP category and trajectory with preeclampsia risk were assessed via univariate analysis and multinomial logistic regression analysis including co-variates identified in a backward stepwise approach.

RESULTS: 8,924 women were included in the analysis. Study visit 1 occurred at mean gestational age (GA) 12.1 ± 1.5 weeks and study visit 2 at mean GA 19.0 ± 1.6 weeks. First trimester BP category was significantly associated with subsequent preeclampsia and gestational HTN, with increasing BP category associated with a higher risk. Stage 1 HTN at baseline was associated with an increased risk for all categories of pregnancy-associated HTN; increased in a stepwise fashion over Elevated BP at baseline (see table). Systolic BP trajectory was significantly associated with preeclampsia risk (p<0.001) as was change in BP category between visits (p<0.001). Compared with a stable systolic trajectory, an upward trajectory was associated with an aOR 1.77 (95%CI 1.45-2.17) of preeclampsia after adjustment for maternal age, race, body mass index and first trimester BP (see figure).

CONCLUSION: In nulliparous women, BP category and systolic trajectory in early pregnancy are independently associated with pre-eclampsia risk. These findings may aid in identification of women who might benefit from risk-reducing interventions in the late first and early second trimester, such as low-dose aspirin.

Table. First trimester blood pressure category and pregnancy outcomes

	Normal BP (<120mmHg/ <80 mmHg) N=7,029 n(%)	Elevated BP (120-129mmHg / <80mmHg) N=957 n(%)	Stage 1 HTN (130-139 mmHg/ 80-89 mmHg) N=938 n(%)
All Preeclampsia	497 (7.1%)	95 (9.9%)	147 (15.7%)
Preeclampsia without severe features	261 (3.7%) Ref	48 (5.0%) aOR 1.25 (95% CI 0.90-1.74)	60 (6.4%) aOR 1.73 (95% CI 1.25-2.38)
Preeclampsia with severe features	236 (3.4%) Ref	47 (4.9%) aOR 1.35 (95% CI 0.96-1.90)	87 (9.3%) aOR 2.50 (95% CI 1.85-3.39)
Gestational hypertension	901 (12.8%) Ref	192 (20.0%) aOR 1.45 (95% CI 1.21-1.75)	214 (22.8%) aOR 1.70 (95% CI 1.40-2.07)

*Data presented as adjusted odds ratios (aOR), adjusted for pre-pregnancy body mass index, maternal age, race