

The pregnancy-related complications and neonatal outcomes in preeclampsia with left atrial cavity dilatation on echocardiography

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Purpose

- In preeclampsia, we aimed to learn the relationship between left atrium(LA) dilatation on 2D-echo and pregnancy-related complications or neonatal prognosis, and furthermore, to find out factors that can predict maternal cardiovascular complications.

Methods

- This is a retrospective study including 187 singleton pregnant women with preeclampsia who performed echocardiography and delivered at 24+1-40+2 weeks of gestation between March 2014 and December 2021 at our institution.
- We excluded fetal demise, major anomaly, and the cases where there were no results of urine collection for 24 hours.
- The subjects were divided into preeclampsia without LA dilatation (Group 1) (N=121) and preeclampsia with LA dilatation (Group 2) (N=66).
- We compared the maternal characteristics, pregnancy related complications, laboratory results and echocardiographic findings between two groups. And 1-, 5- minute APGAR score and the rate of neonatal composite morbidities between two groups were analyzed, too.
- Notably, the logistic regression model was used to know the factors that can predict LA dilatation in preeclampsia

Results

Table 1. Maternal characteristics and pregnancy related complications between two groups.

	Group 1 (N=121)	Group (N=66)	p-value
Maternal age (years)	34.07 ± 5.40	34.41 ± 4.60	0.671
Nulliparous, n (%)	70 (57.85%)	38 (57.58%)	1.000
ART, n (%)	18 (14.88%)	6 (9.09%)	0.367
Maternal height (cm)	159.46 ± 5.81	162.74 ± 6.45	< 0.001*
Pre-pregnancy body weight (kg)	64.30 ± 13.15	74.61 ± 21.70	0.001*
Body weight at diagnosis of preeclampsia (kg)	72.71 ± 11.92	85.70 ± 20.43	< 0.001*
Pre-pregnancy BMI (kg/m ²)	25.04 ± 5.31	27.54 ± 7.79	0.022*
BMI at diagnosis of preeclampsia(kg/m ²)	28.38 ± 5.28	32.22 ± 6.57	< 0.001*
Overt DM, n (%)	15 (12.40%)	9 (13.64%)	1.000
Gestational DM, n (%)	22 (18.18%)	13 (19.70%)	0.996
Oligohydramnios, n (%)	8 (6.61%)	7 (10.61%)	0.518
Cause of delivery, n (%)			0.058
elective delivery	16 (13.22%)	14 (21.21%)	
spontaneous	24 (19.83%)	4 (6.06%)	
iatrogenic, maternal	53 (43.80%)	31 (47.00%)	
iatrogenic, fetal	28 (23.14%)	17 (25.76%)	

Table 2. Laboratory finding and echocardiography

	Group 1 (N=121)	Group (N=66)	p-value
SBP (mmHg)	155.07 ± 23.32	165.41 ± 25.08	0.005*
DBP (mmHg)	92.62 ± 16.86	98.67 ± 18.37	0.024*
24hr urine collection (ml)	1535.41 ± 814.43	1395.81 ± 742.41	0.250
24hr excretion protein (mg/day)	1193.16 ± 1860.68	2494.29 ± 4233.70	0.020*

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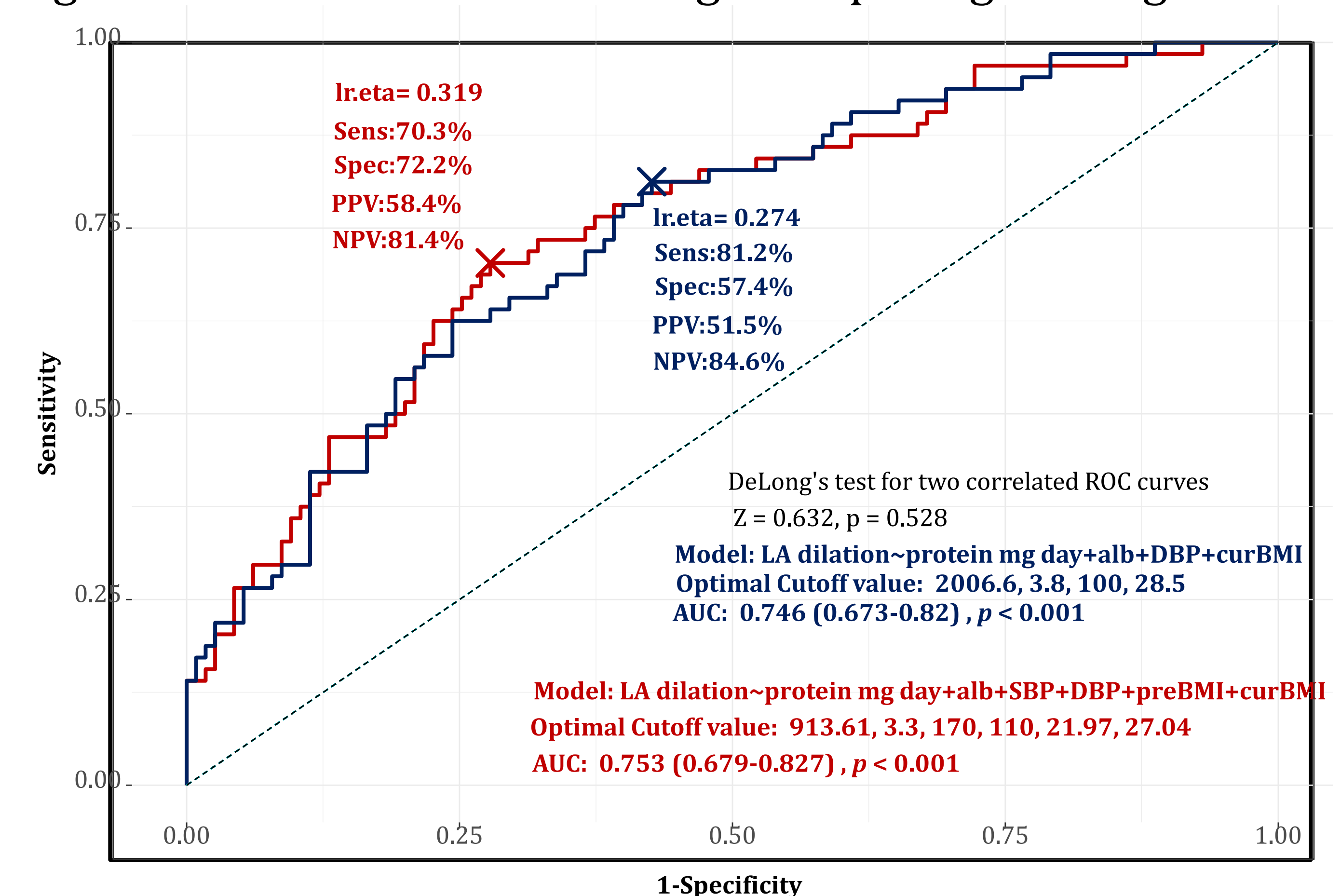
platelet (10 ³ u/L)	227.14 ± 74.19	216.89 ± 72.71	0.371
albumin (g/dL)	3.48 ± 0.46	3.31 ± 0.39	0.015
AST (U/L)	29.68 ± 27.55	31.72 ± 50.63	0.766
ALT (U/L)	21.88 ± 31.87	20.86 ± 34.85	0.843
creatinine (mg/dL)	0.71 ± 0.62	0.68 ± 0.37	0.684
LDH (U/L)	428.31 ± 455.07	415.85 ± 263.49	0.830
proBNP (pg/mL)	303.77 ± 724.03	212.66 ± 264.17	0.248
Fibrinogen (mg/dL)	422.41 ± 97.12	414.95 ± 100.69	0.653
Antithrombin III (%)	85.24 ± 16.46	85.57 ± 18.20	0.908
D-dimer (ug/ml FEU)	2.47 ± 4.11	1.95 ± 2.10	0.296
LVEF (%)	58.75 ± 5.27	59.55 ± 4.78	0.311
Diastolic dysfunction of LV	32 (26.45%)	27 (40.91%)	0.062

Table 3. neonatal outcomes between two groups

	Group 1 (N=121)	Group (N=66)	p-value
Delivery, GA (weeks)	34.21 ± 3.75	33.77 ± 3.23	0.425
C-sec	113 (93.39%)	64 (96.97%)	0.484
Male gender	59 (48.76%)	26 (39.39%)	0.282
Neonatal birth weight (g)	2126.78 ± 875.51	2124.62 ± 829.43	0.987
Cord pH	7.29 ± 0.11	7.31 ± 0.06	0.113
AS 1min	6.46 ± 1.82	6.58 ± 1.34	0.629
AS 5min	8.34 ± 1.02	8.26 ± 0.79	0.520
NICU admission	99 (81.82%)	58 (87.88%)	0.524

Gestational age, GA; cesarean section, c-sec; apgar score, AS; neonatal intensive care unit, NICU

Figure 1. Prediction model using multiple logistic regression.



Discussion

- Between two groups, maternal age, gestational age of delivery and laboratory results such as platelet, albumin, LDH, proBNP and fibrinogen did not show statistically significant differences.

- Compared to Group 1, Group 2 had a high systolic blood pressure, a heavier pre-pregnancy body weight. There was a higher amount of 24-hour urine protein in Group 2.

- The neonatal outcomes including composite morbidity did not show significant differences.

- In multiple logistic regression of expecting LA dilatation of echocardiography, the cutoff value of 24-hour urine proteins and diastolic blood pressure was 2206.6 and 100 (AUC 0.753; p<0.001)

Conclusion

In preeclampsia with left atrial cavity dilatation, higher systolic blood pressure, higher urine protein excretion and heavier maternal body weight was confirmed. And we can expect the cardiovascular risk according to several markers without echocardiography.