

Association between systolic blood pressure and lung water in preeclampsia – a point-of-care USG-based observational study

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Background & Hypothesis

- Early detection of pulmonary edema is essential for preventing cardiopulmonary complications in pre-eclampsia (Pre-E)
- Point-of-care lung ultrasound studies suggest that extravascular lung water (EVLW) is significantly increased in patients with pre-E who exhibit severe features (BP $\geq$ 160/110 mm Hg)^{1,2}
- Unclear if EVLW is also increased in Pre-E patients without severe features compared to healthy pregnancies, and if there is a correlation between systolic blood pressure (SBP) and EVLW
- Hypothesis: Pre-E patients with and without severe features will show increased EVLW

Study Design and Methods

- Cohort study
- ≥ 20 weeks gestation (Pre-E, controls non-Pre-E), informed consent
- Pre-E BP ≥ 140 mm Hg within 2 hours after initiation of treatment
- Exclusion: patient refusal, clinical instability, ≥ 2 h after initiation of anti-hypertensive treatment
- Simplified 4 zone lung ultrasound protocol, semi-recumbent position, curvilinear probe
- Bilateral intercostal spaces (ICS): 3rd-4th , 6th-7th ribs (within the parasternal- midclavicular lines)
- The total number of single and confluent B-lines per ICS was recorded
- Scores range from 0 to 8 per ICS, with a maximum total score of 32 across the 4 ICS
- Two providers independently validated all scans
- Spearman's correlation coefficients between variables, Groups compared: Unpaired T test, Chi square test

Results

	Pre-E [23] Mean(S.D.)	Non-Pre-E [29] Mean(S.D.)	p-value
Age	29.87(6.68)	27.59(6.32)	0.216
BMI	40.33(11.79)	33.65(9.49)	0.04
SBP	150.87(19.86)	121.34(11.99)	<0.001
DBP	87.3 (13.74)	70.59(10.78)	<0.001
US score Rt 3/4	4.48(1.12)	1.34(1.08)	<0.001
US score Lt 3/4	4.52(1.27)	1.52(1.06)	<0.001
US score Rt 6/7	4.57(1.27)	1.45(1.21)	<0.001
US score Lt 6/7	4.48(1.12)	1.76(0.99)	<0.001
Total US score	18.04(4.1)	6.07(3.76)	<0.001
Correlation of SBP>140 and Total Lung US score	0.671	NA	<0.001
Correlation of DBP>90 and Total Lung US score	0.531	NA	<0.001

No B line/ICS	0
One B line/ICS	1
Two B lines/ICS	2
Three B lines/ICS	3
Four B lines/ICS	4
Five B lines/ICS	5
Confluent B lines >50% ICS	6
Confluent B lines >75% ICS	7
Confluent B lines 100% ICS	8

Total Lung Water
Score (0-32)

- Mild(0-10)
- Moderate(11-20)
- Severe (21-32)



Conclusion and Discussion

- Our preliminary data suggest there is increased EVLW in Pre-E with SBP $\geq$ 150 mm Hg
- Even patients without severe features may be at risk for pulmonary edema
- Allow risk stratification in settings where USG is not readily available
- Next steps: subgroup analysis (Pre-E with/without severe features), correlation analysis between different SBP categories and EVLW, propensity matching for confounders altering EVLW and assessing the impact of antihypertensive therapy on EVLW

References:

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