



Pilot study assessing the impact of preeclampsia with severe features and fetal growth restriction on maternal inferior vena cava collapsibility index

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Background

Preeclampsia with severe features and fetal growth restriction are major complications of pregnancy associated with altered maternal hemodynamics. The inferior vena cava (IVC) collapsibility index, a simple, non-invasive ultrasound measure, has been proposed as a surrogate marker of preload and intravascular volume status.

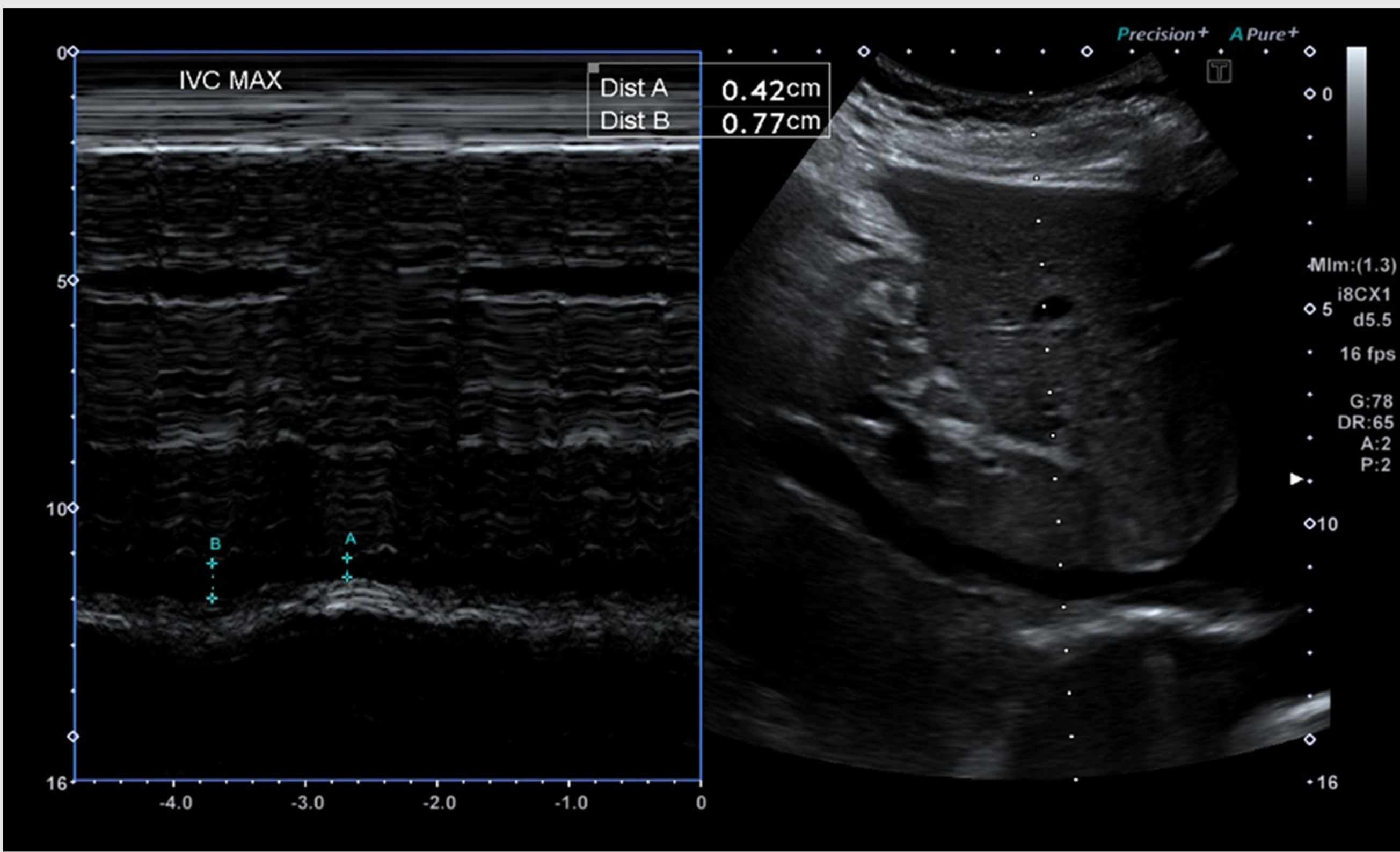
Objective

We sought to assess the association between the presence or absence of preeclampsia with severe features (PECS) and/or fetal growth restriction (FGR) and maternal inferior vena cava collapsibility index (cIVC) patterns.

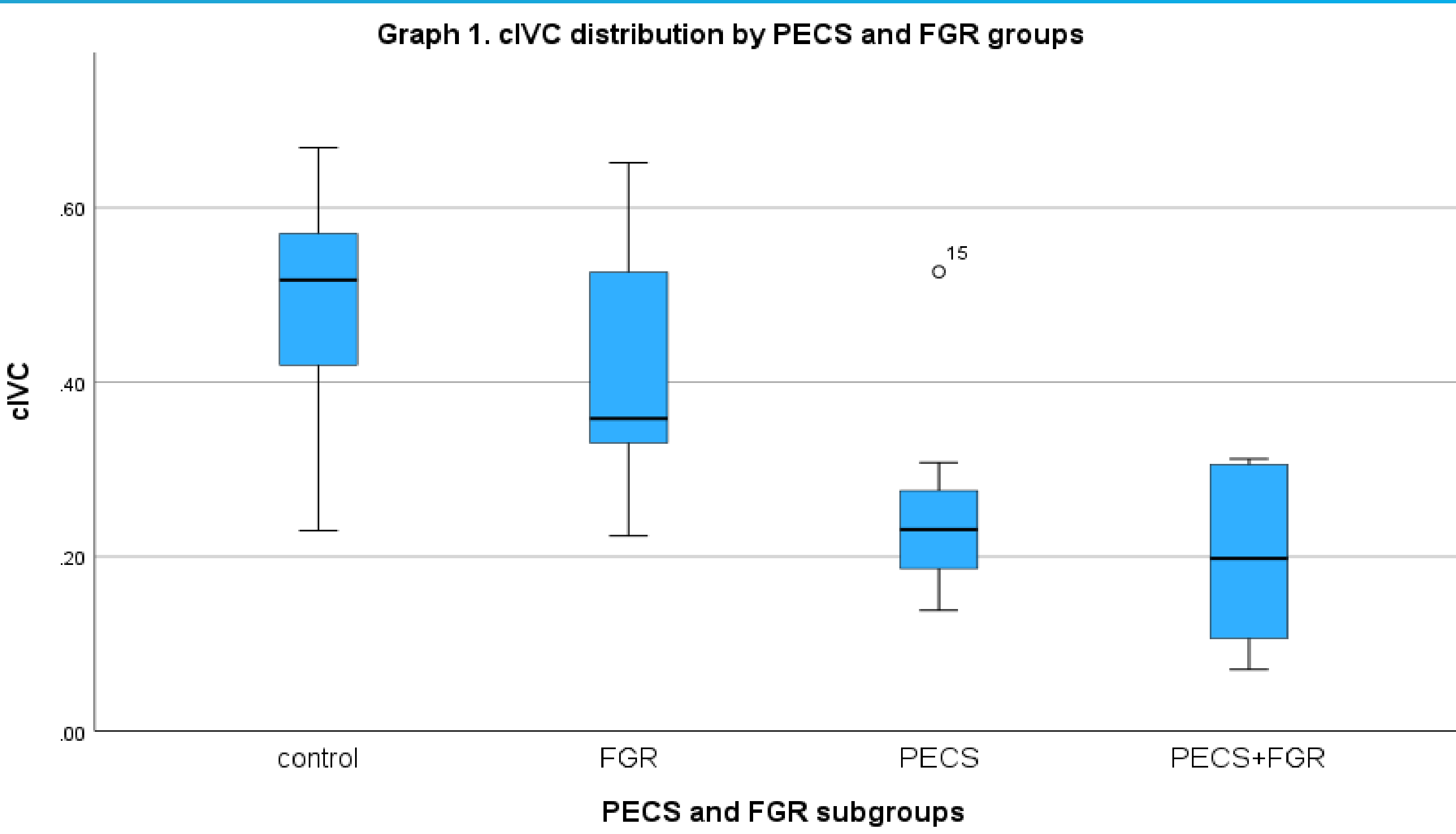
Table 1. Association between preeclampsia with severe features, fetal growth restriction, and cIVC.

	BETA COEFFICIENT	(95% CI)	P- VALUE
COMPOSITE OF PECS AND FGR (N=24)	-0.18	(- 0.29, - 0.07)	< 0.001
PECS ALONE (N= 7)	- 0.22	(- 0.35, - 0.10)	0.001
FGR ALONE (N= 9)	- 0.06	(- 0.18, 0.06)	0.299
PECS + FGR (N= 8)	-0.28	(- 0.4, - 016)	< 0.001

PECS, preeclampsia with severe features; FGR, fetal growth restriction
cIVC, inferior vena cava collapsibility index; CI, confidence interval



There was an inverse association between IVC-CI and B-lines on days 1 and 2.



Methods

This study enrolled 36 pregnant participants. Of these, 12 controls without PECS or FGR were compared to 7 patients with PECS-only, 9 with FGR-only, and 8 with both PECS and FGR. Maternal cIVC was evaluated as the primary outcome, assessed with M-mode through the subxiphoid window 2-cm from the right atrium using a curvilinear probe. The diameter of the IVC was measured during inhalation and after exhalation and cIVC was calculated. Descriptive statistics and bivariate analyses were utilized to evaluate baseline characteristics of the study population. Linear regression was utilized to assess the association between maternal cIVC and the respective subgroups.

Results

- The composite of PECS and/or FGR had a significant reduction in cIVC of 18% compared to controls. Among the subgroups, the PECS-only showed 22% decline in cIVC, while PECS+FGR had a more substantial 28% reduction, both statistically significant compared to controls.
- In contrast, FGR-only exhibited a 6% decrease in cIVC against controls, which was not significant.

Conclusions

The maternal IVC adapts to hemodynamic changes, reflecting venous responsiveness. Our data shows cIVC differs among PECS and/or FGR when compared to controls. This pilot analysis suggests that the presence of PECS with or without FGR is associated with reduced maternal cIVC during pregnancy. This supports a distinction between hemodynamic patterns characteristic of PECS and FGR.

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