

INTRODUCTION

Fetal growth restriction (FGR) is often linked to **placental insufficiency**, with fetal hypoxemia inducing **hemodynamic redistribution**, reflected by the cerebroplacental ratio (CPR). However, some fetuses show isolated flowmetric abnormalities despite normal CPR, raising uncertainty about their prognostic value.

OBJECTIVES

To evaluate whether isolated umbilical artery (UA) or middle cerebral artery (MCA) doppler abnormalities with normal CPR predict adverse obstetric and perinatal outcomes in late-onset FGR.

RESULTS

A total of **78 fetus** met the criteria for the statistical analysis.

Composite Adverse Outcome:

Normal Doppler Group: **37.0%**
Isolated Abnormal UA Doppler Group: **100.0% (p=0.031)**

Urgent C-Section:

24.6% in Group 1 vs. **75.0% in Group 2 (p=0.044)**

Isolated UA PI >95th centile demonstrated

Odds Ratio (OR) = 6.82
for adverse outcomes
(CI 95%: 1.42–32.70; p=0.016)

Multivariate logistic regression analysis adjusted for gestational age and estimated fetal weight percentile

METHODS

STUDY DESIGN: Single-center retrospective cohort conducted between January 2022 and December 2024 at the Department of Obstetrics and Gynecology, ULS Região de Leiria, Portugal.

INCLUSION CRITERIA

- Singleton pregnancy
- Gestational age ≥ 32 weeks
- Estimated Fetal Weight (EFW) or Abdominal Circumference (AC) < 10 th percentile
- Normal CPR

EXCLUSION CRITERIA

- Active congenital infections
- Fetal structural abnormalities
- Chromosomal anomalies

STUDY RETROSPECTIVE COHORT

Final Sample:
n = 78 cases

GROUP 1: NORMAL DOPPLER

Normal UA PI (Pulsatility Index), MCA PI and CPR
n= 73 cases (93.6%)

GROUP 2: ISOLATED ABNORMAL UA

PI ≥ 95 th percentile | Normal MCA and CPR
n= 4 cases (5.1%)

GROUP 3: ISOLATED ABNORMAL MCA

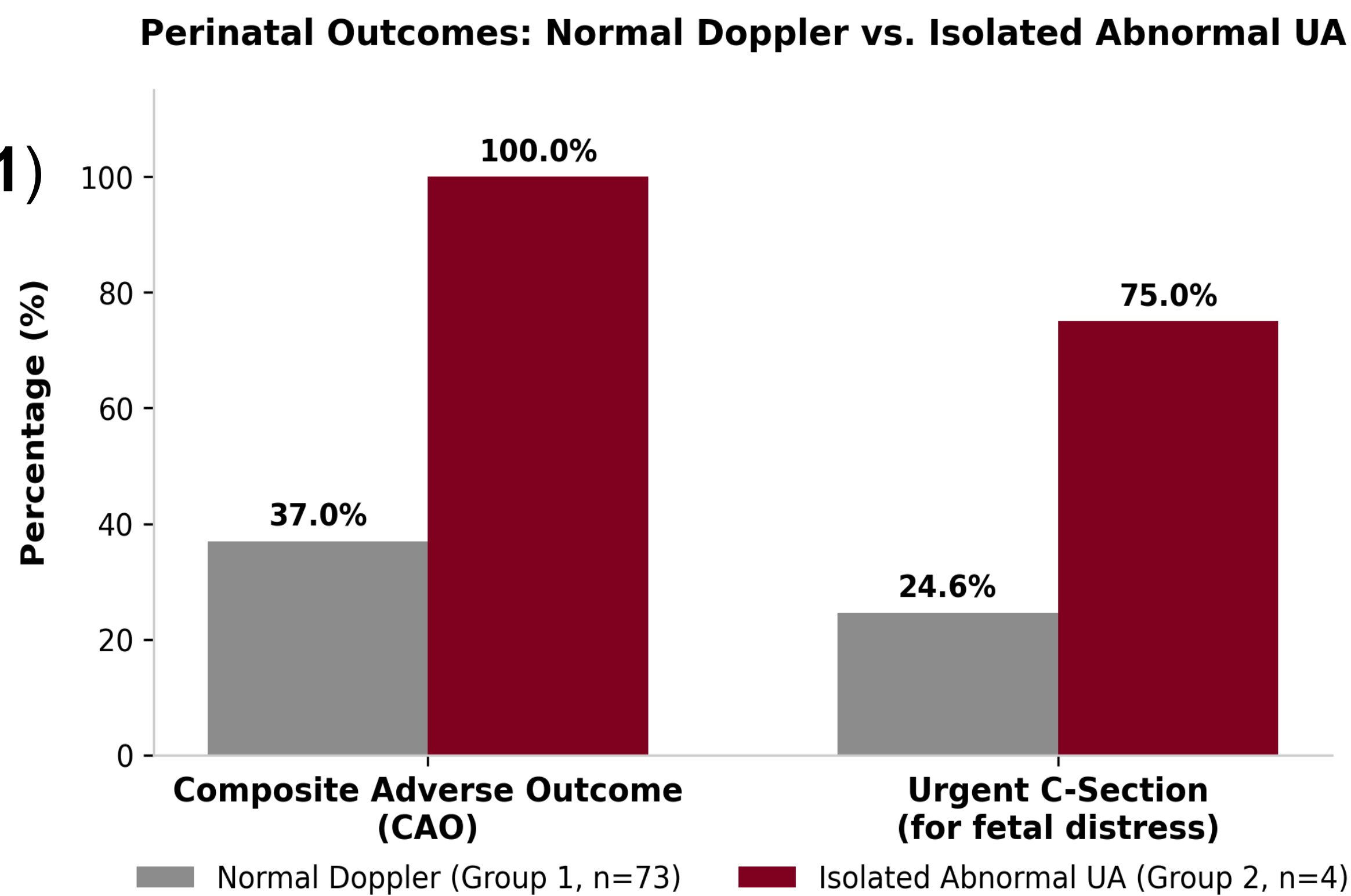
PI < 5 th percentile | Normal UA and CPR
n= 1 case (1.3%)

COMPOSITE ADVERSE OUTCOME (CAO) (≥ 1)

- Preeclampsia (PE)
- Placental Abruption
- Fetal/neonatal death
- Emergency caesarean delivery for non-reassuring fetal status
- 5-minute Apgar score ≤ 7
- Neonatal Intensive Care Unit (NICU) admission.

DISCUSSION AND CONCLUSION

- ✓ In late-onset FGR, **isolated increased UA PI reflects placental compromise**, identifying risk despite normal CPR
- ✓ In our cohort, **CAO occurred in 100% of fetuses with isolated abnormal UA Doppler** versus 37.0% (p=0.031), highlighting CPR's limitations alone.
- ✓ These findings suggest that **UA PI could be interpreted independently, with abnormal values potentially warranting closer surveillance** and earlier delivery.
- ✓ A key limitation of our study was the limited sample size. Larger prospective multicenter **studies are needed** to validate these findings and define intervention thresholds.



VARIABLE	Group 1 (Normal) (n=73)	Group 2 (UA >P95) (n=4)	Group 3 (MCA <P5) (n=1)	P-VALUE
Maternal Age (years)	31.9 ± 6.6	28.2 ± 3.8	29.0	0.451
GA at Diagnosis (weeks)	34.2 ± 1.5	33.8 ± 1.2	35.0	0.612
EFW Percentile	6.4 ± 2.8	4.1 ± 1.9	3.0	0.082
Composite Outcome (n,%)	27 (37.0%)	4 (100%)	0 (0%)	0.031*
Emergency Cesarean section	18 (24.6%)	3 (75.0%)	0 (0%)	0.044*
NICU Admission	9 (12.3%)	1 (25.0%)	0 (0%)	0.410