

EP07.45 Machine learning-based prediction of fetal growth restriction before 32 weeks using placental microvascular flow imaging

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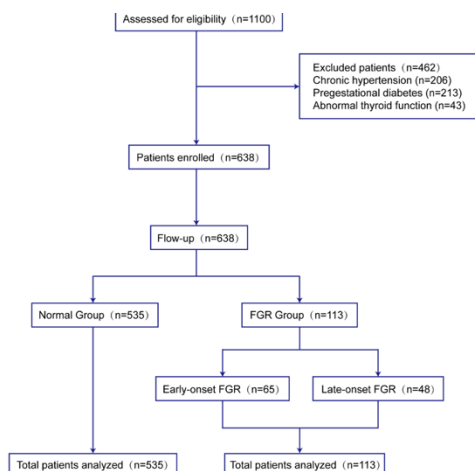
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01. Study Rationale & Design

FGR is a major obstetric complication with high perinatal risk. Conventional Doppler lacks sensitivity for late-onset FGR. This prospective cohort (n=638) explored placental microvascular flow (MV-Flow) as a novel predictive biomarker.

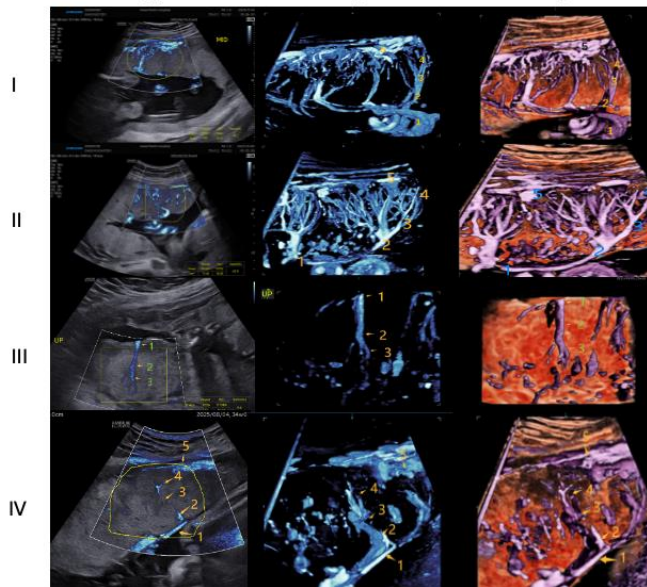
Key Methodology:

- Prospective (2019-2025)
- 638 Singleton Pregnancies
- XGBoost Classifier
- 5-Fold Cross-Validation



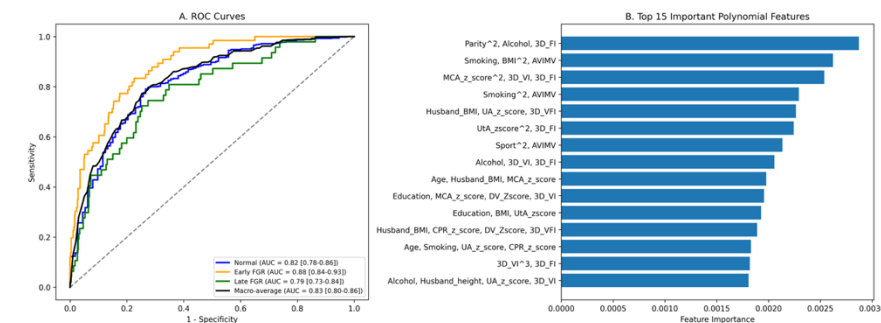
02. Biomarkers & Cohort Analysis

FGR incidence: **17.7%** (113/638). Early-onset FGR showed elevated Doppler indices, but late-onset FGR had **no significant Doppler differences** vs controls. MV-Flow indices (AVIMV, 3D-FI) were significantly reduced in both subtypes.



03. ML Performance & Implications

The XGBoost model achieved **AUC=0.88** for early-onset FGR and **AUC=0.79** for late-onset FGR, outperforming single markers (AVIMV AUC=0.75). Placental MV-Flow indices were the top predictive features.



Conclusion: MV-Flow into ML models Integrating improves FGR risk stratification, especially for late-onset cases, enabling earlier intervention.

Insight: Rigorous cohort design and feature engineering ensure the robustness of ML model training.

Insight: MV-Flow imaging detects placental hypoperfusion even when conventional Doppler is normal.