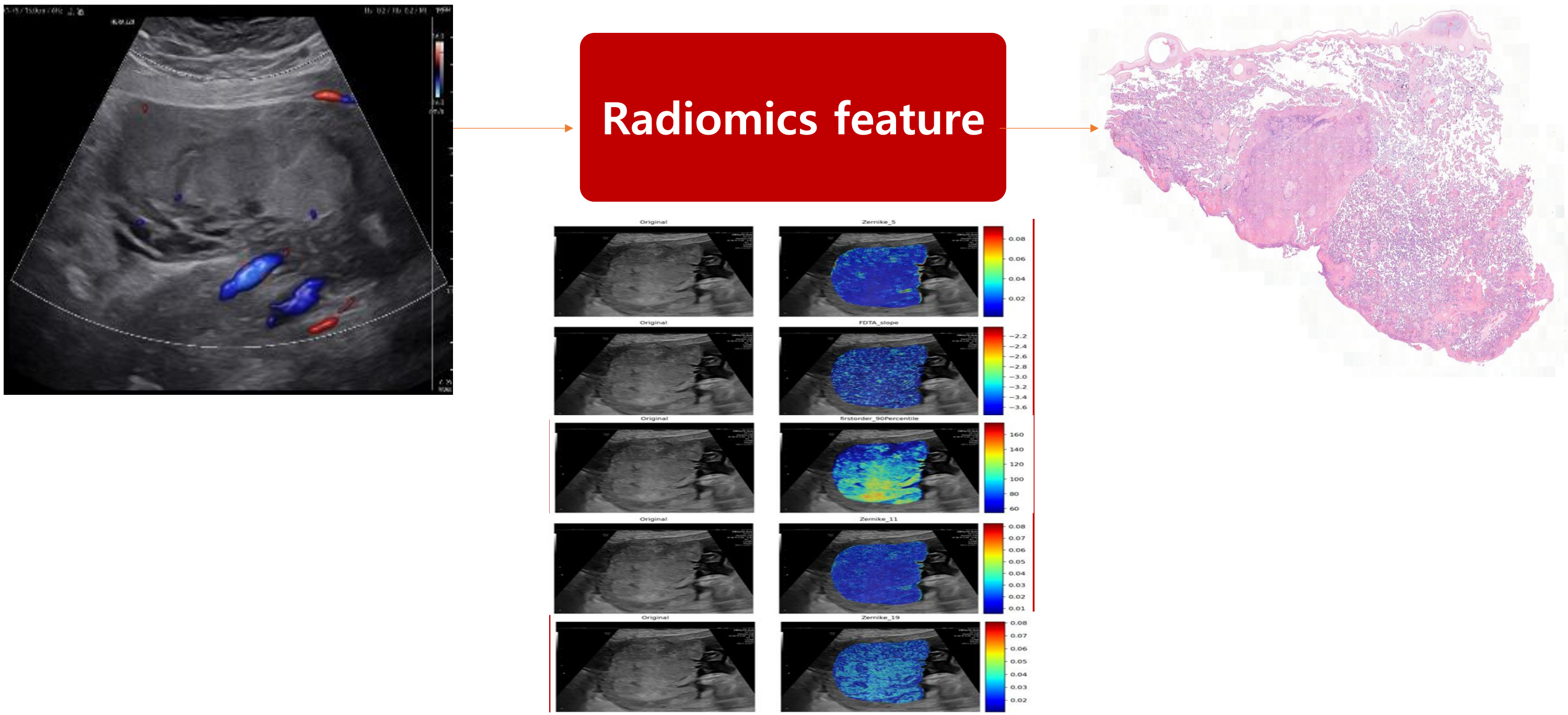


Prediction of Fetal Vascular Malperfusion using Radiomics Features from Ultrasound in Preterm Pregnancies Complicated by Fetal Growth Restriction

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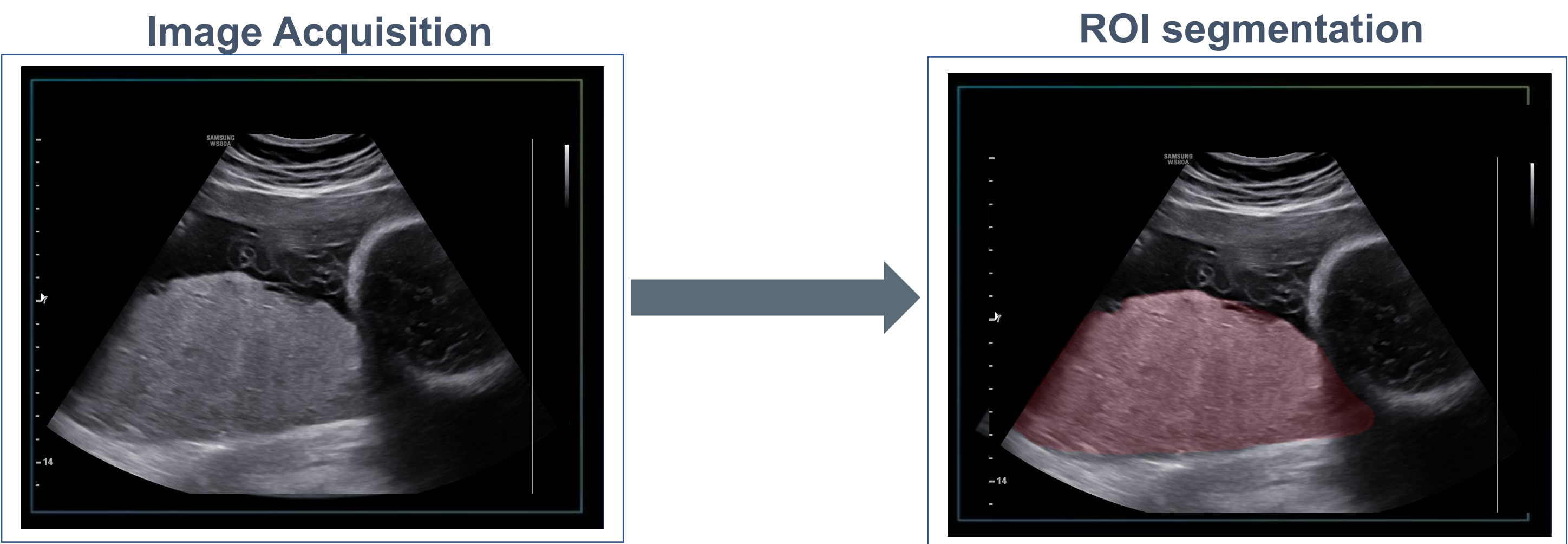
Objective

To evaluate whether radiomics features from antenatal placental ultrasound can predict histopathological findings in preterm FGR pregnancies

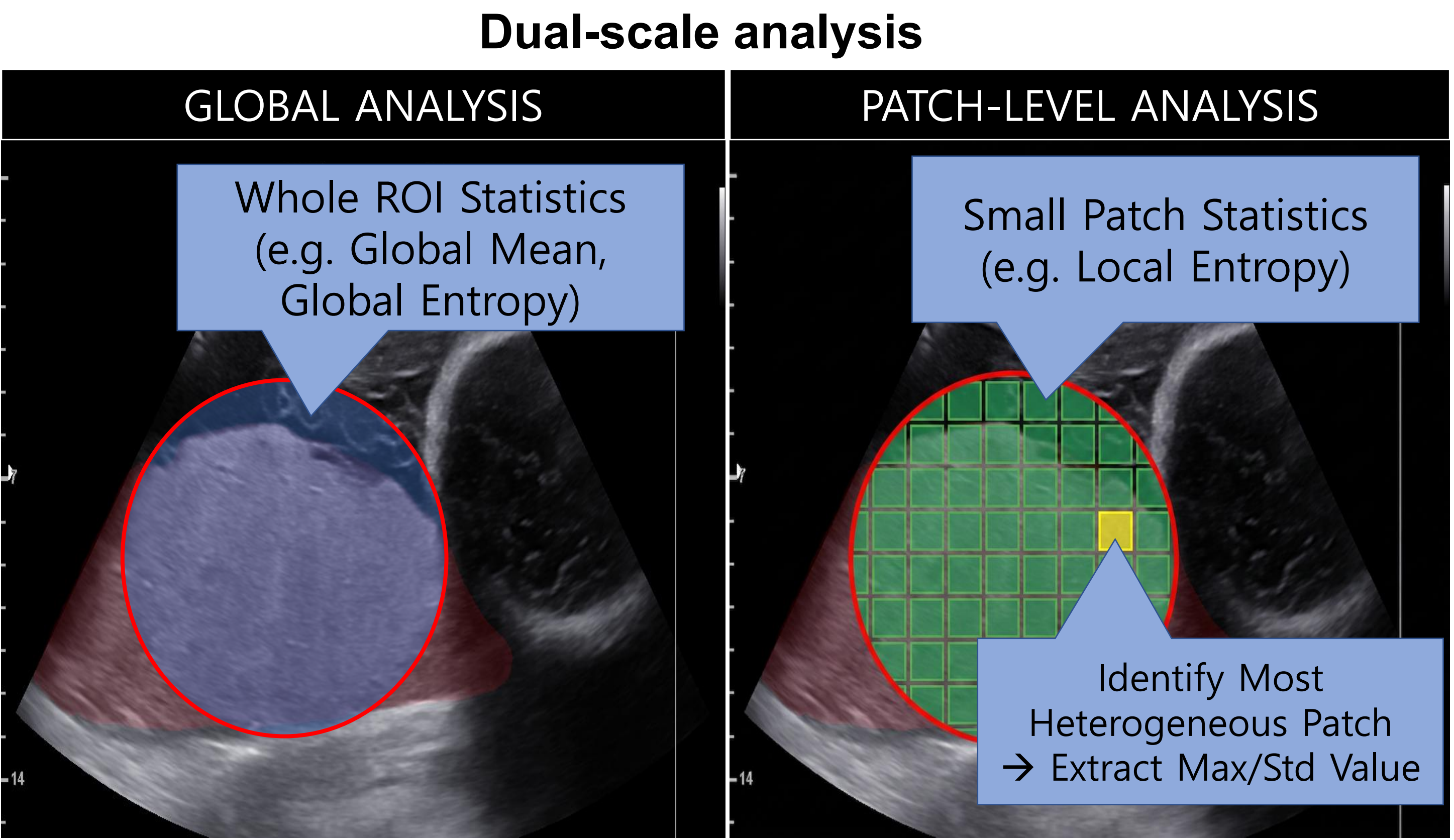


Method

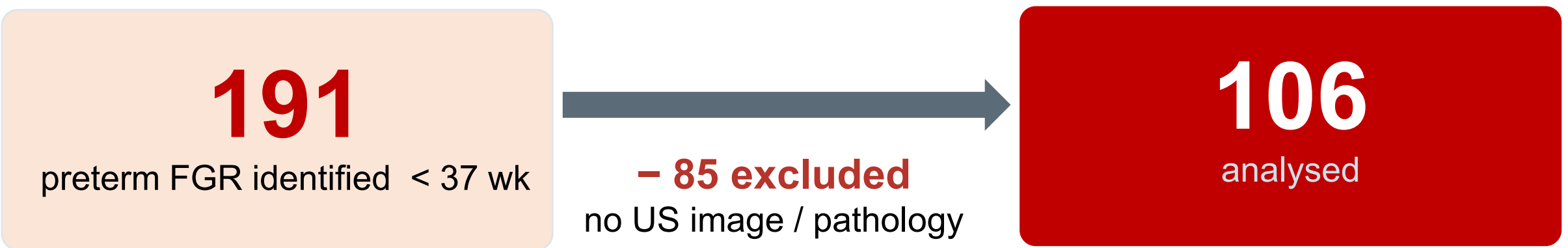
- Study participants: FGR pregnancies delivered <37 weeks of gestation from January 2019 to December 2021
- Placental ROIs manually delineated on grayscale ultrasound



- Radiomics features extraction
 - **150 features** — first-order · texture (GLCM, etc.) · wavelet · LBP
 - **Dual-scale analysis framework:** Global ROI-level statistics + Local patch-level heterogeneity → **15 features selected**



Results



- Median gestational age at delivery: 33.7 weeks
- Median neonatal birth weight: 1,400 g
- Preeclampsia in 47.2% (50/106)
- **Fetal vascular malperfusion (FVM) on pathology: 41.5% (44/106)**(27.4% villous changes, 16.0% vascular lesion, 7.5% inflammatory)

FVM prediction result

0.84

PPV

0.77

Sensitivity

0.83

Accuracy

Table1. Binary classification by FVM subtype (vs. normal)

Subtype	PPV	Sensitivity	Accuracy
Villous changes	0.79	0.61	0.70
Vascular lesion	0.79	0.72	0.86
Inflammatory	0.63	0.57	0.80

Table2. Multi-label classification

Subtype	PPV
Villous change	0.68
Vascular lesion	0.58
Inflammatory	0.27

Conclusion

- **Radiomics can identify major placental pathologies non-invasively**
- **Especially accurate for fetal vascular malperfusion**