

Late Gestation MRI to Assess Maternal Pelvimetry, Fetal Biometry, and Placental Oxygenation

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BACKGROUND

- **MRI widely used antenatally**
 - fetal brain / body
 - placental conditions
- **No studies integrate MRI assessments of** fetus, maternal pelvis & placenta to predict mode of birth

OBJECTIVES

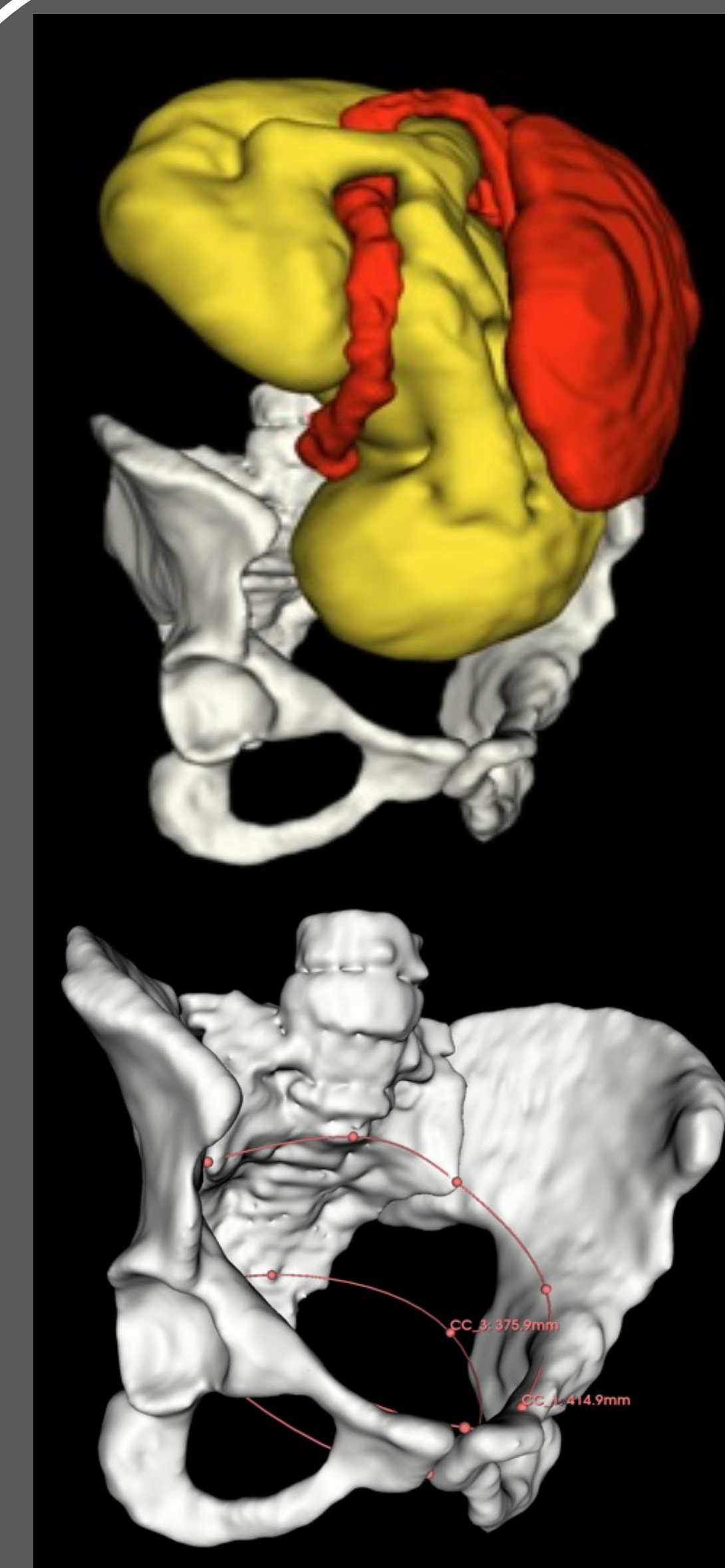
- Feasibility of **late 3rd trimester MRI**
- **Pre-labour:**
 - maternal pelvimetry & fetal biometry with 3D MRI reconstructions
 - measures of placental function

METHODS

- Tertiary centre in London
- 2017-2019
- Clinical Philips 1.5T & 3T scanners
- Placental multi-echo data segmented
- Placental volume, mean T2* & kurtosis with in-house analysis scripts
- Deformable slice-to-volume registration to reconstruct 3D images of the pelvis
- 3D models in 3D Slicer
- Pelvimetry and fetal measurements (manual vs calculated)
- Clinical outcomes

RESULTS

- **29 women**
- **Average gestation at MRI 37+1 weeks $\pm$ 5 days**
- **Delivered at 39+5 weeks $\pm$ 11 days**
- **Easy to obtain** pelvimetry values, fetal position & biometry, placental location
- Kappa: -0.2 to 0.725 = **Interrater variability** differs per measurement
- Spearman: 0.75 to 0.95 = strong correlation between manual vs calculated measurements
- **Correlation between:**
 - mean placental T2* - BMI & birth weight
 - placental volume - BMI & gestational age at birth



CONCLUSIONS

- **It is feasible to perform 3D maternal pelvimetry, fetal biometry & assess placental oxygenation in late gestation MRI**
- **A prospective study of individualised assessment for high-risk individuals and their risk of assisted birth or caesarean section now planned**