

Assessing Placental Oxygenation using MRI in Women Reporting Reduced Fetal Movements

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Objective

To compare **T2*-weighted MRI** assessment of **placental oxygenation** in late gestation pregnant women **with and without reduced fetal movements** (RFMs), in different maternal positions and presence of painless uterine contractions.

Background

- Perception of RFMs has been associated with risk of FGR, SGA, placental insufficiency and stillbirth
- The majority of women with perceived RFMs go on to have a healthy pregnancy
- The incidence of RFMs is 22%
- 43% of women are induced, 11% have a planned caesarean birth
- There is no current method to predict birth outcomes with RFMs

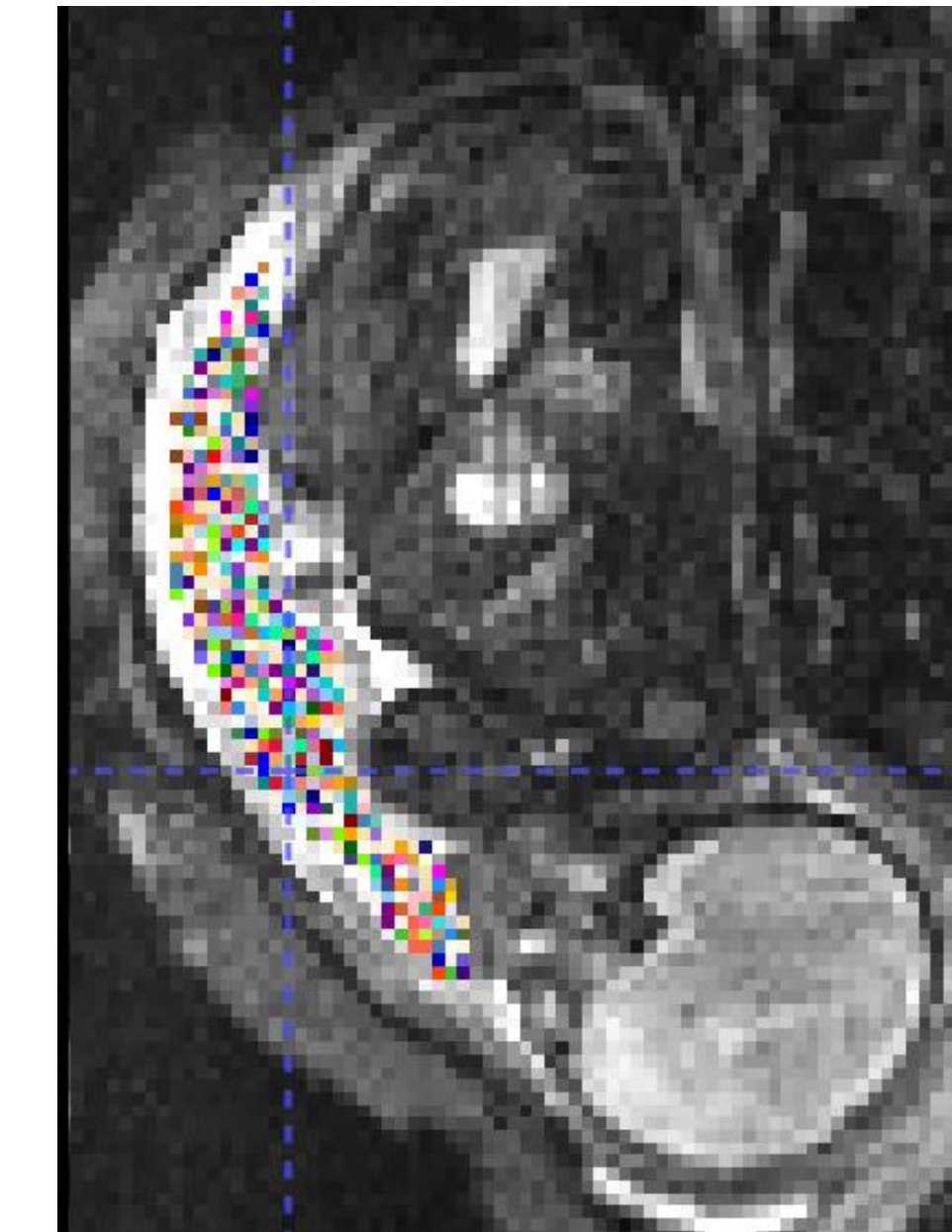
Method

MRI T2* mapping

- MRI placental T2* mapping to determine paramagnetic deoxyhaemoglobin was calculated as a surrogate for placental oxygenation
- Values were recorded with women in **supported anterior supine tilt (n=80)** and **left lateral positions (n=84)**



Anterior supine tilt ~45° with pillow



Each colour pixel represents a T2* value, mean T2* for the placenta is calculated from this

- Presence of painless uterine contractions during T2* sequence was detected visually

Statistics

- Generalised linear regression models in 'R' were used to investigate correlation between maternal history of RFMs with demographic and ultrasound features.
- Mean placental T2* values were compared for cohorts according to RFMs, maternal positioning and painless uterine contractions in Microsoft Excel.

Results

47.5% self-reported RFMs, 34% had multiple episodes

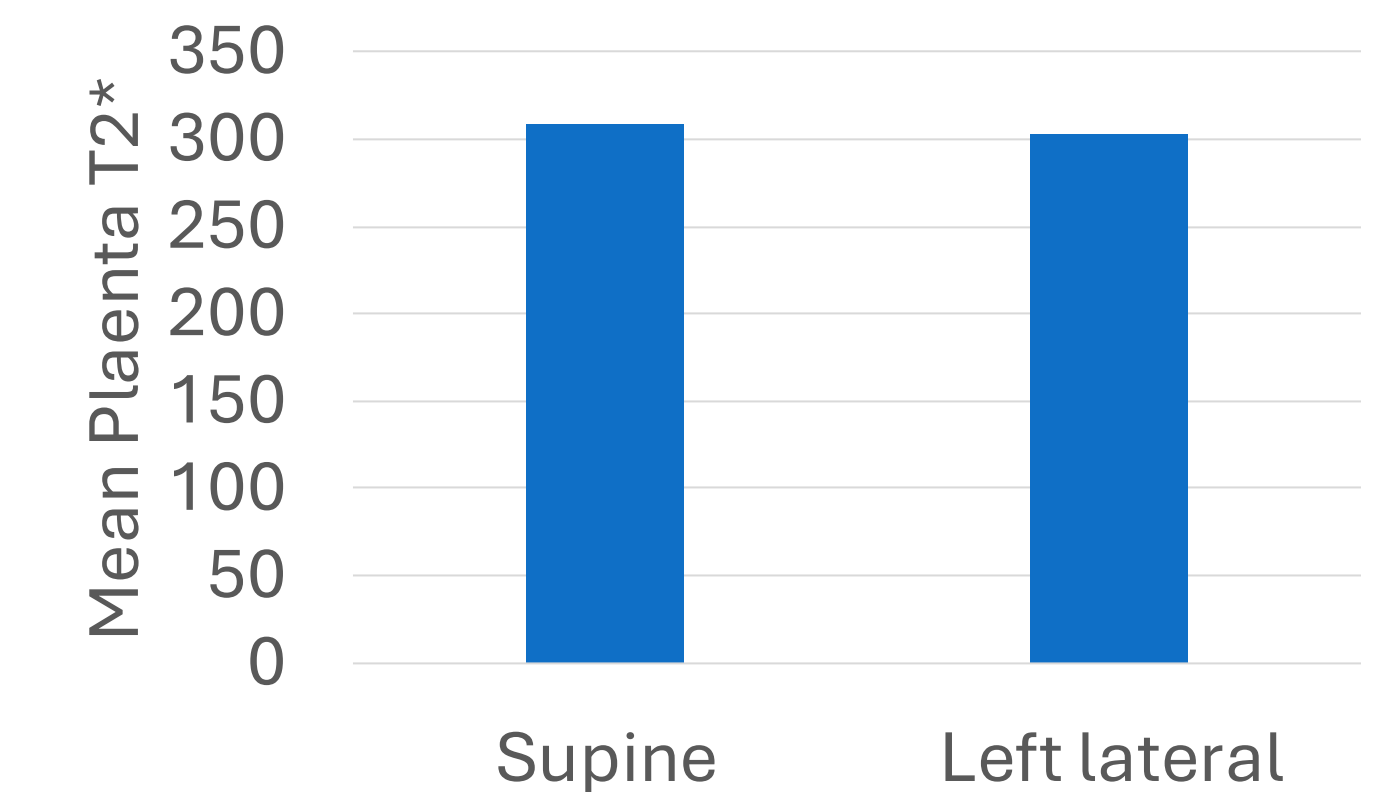
100% had normal CTG and US growth, liquor and dopplers at time of presentation with RFMs

100% had normal US growth, liquor and dopplers at time of MRI

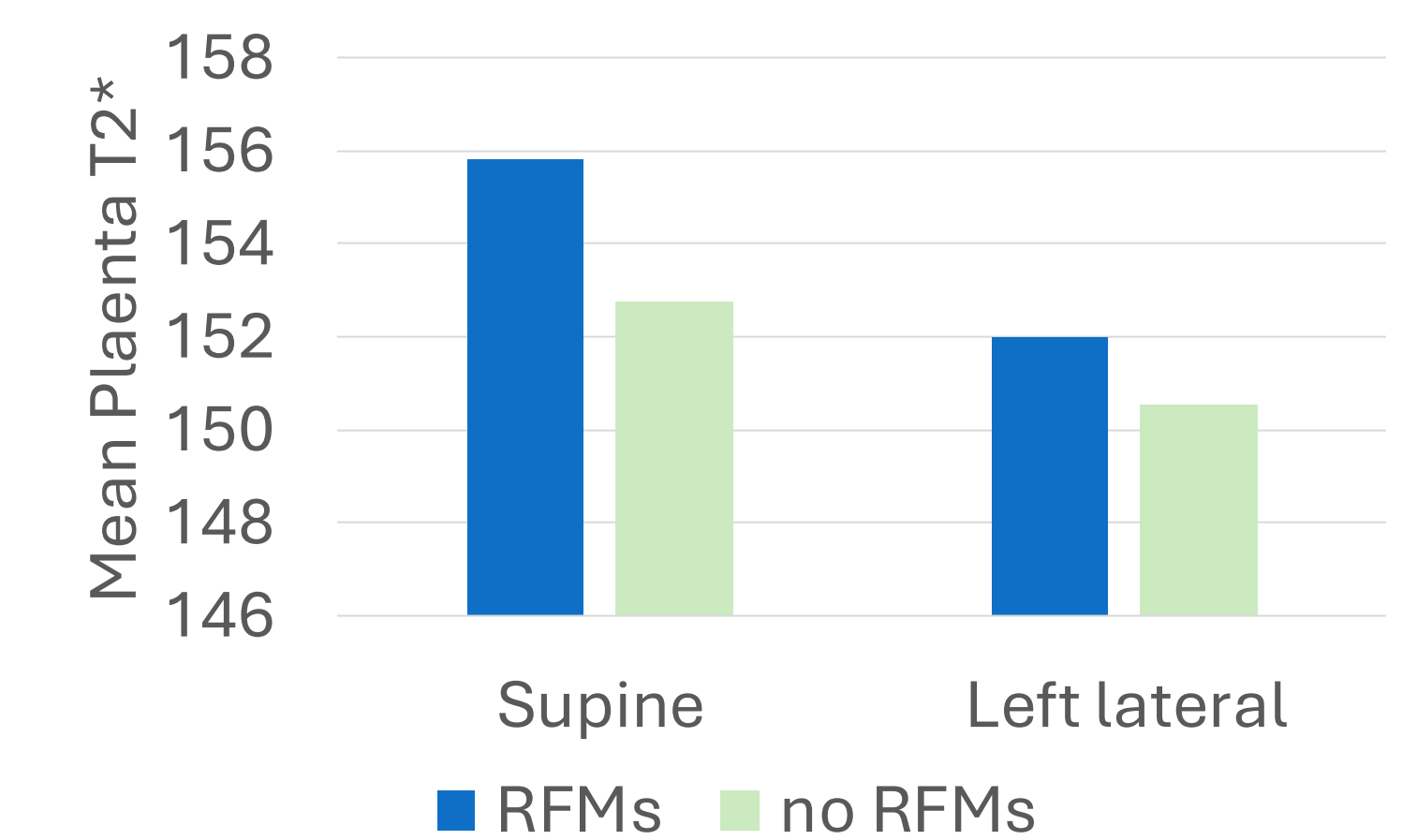
Results

- There was no correlation between RFMs and demographic or placental ultrasound features (placental site, grannum grading, umbilical artery, middle cerebral artery and doppler indices)

- There was no significant difference in mean placental T2* between the supine and left lateral positions



- There was no significant difference in mean placental T2* between the RFM and no RFM cohorts



- There was a tendency to lower mean T2* when uterine contractions were present (p=0.07; moderate evidence)
- Placenta T2* was significantly higher in women with a posterior placenta (p<0.001)

Conclusions

- Self-reporting of RFMs is not associated with a change in placental oxygenation as measured by MRI T2* mapping
- Lying supine with anterior support does not appear to decrease placental oxygenation
- Posterior placenta T2* changes require further investigation
- Further data is needed to confirm preliminary findings

Method

MiBirth Study



Pregnant women at 35-41w gestation planning vaginal birth had an MRI for the MiBirth study (**n=141**)



MRI was performed on a low field (0.55T) Freemax scanner



Transabdominal fetal growth ultrasound occurred within 48 hours of MRI.



Antenatal data was collected on a REDcap database, including prior maternal presentation to hospital with self-reported RFMs.