

Middle cerebral artery Dopplers and adverse neonatal outcomes among pregnant women with Zika virus infection

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Background

- Zika virus (ZIKV) infection in pregnancy causes a spectrum of adverse perinatal outcomes
 - Fetal demise
 - Fetal growth restriction
 - Abnormalities of the central nervous system
- Evidence for methods of prenatal surveillance of ZIKV infected pregnancies is limited

Objective

To investigate the **role of MCA Doppler** measurements for the prediction of **abnormal neonatal outcomes** in pregnancies affected by **Zika virus**

Study Design

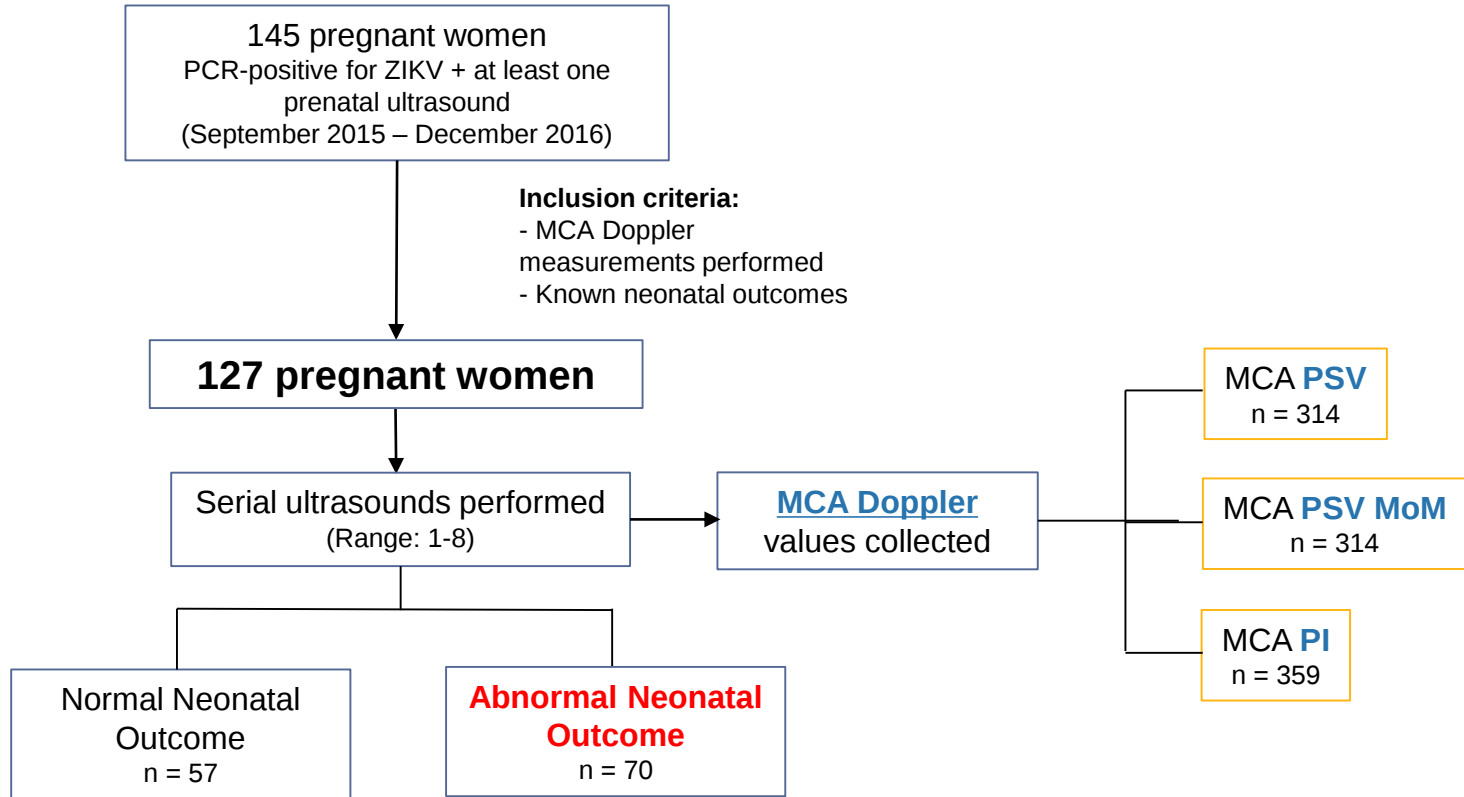
- Secondary analysis of a prospective cohort study
 - Women diagnosed with ZIKV during pregnancy
 - September 2015 to December 2016
 - Single regional referral center in Rio de Janeiro, Brazil
- Each patient underwent prenatal ultrasonography and **MCA values** were collected
 1. **Peak systolic velocity (PSV)**
 2. **PSV multiple of the median (MoM)** calculated for gestational age
 3. **Pulsatility index (PI)**
- Perinatal data collect at time of birth and each neonate underwent complete physical exam

Study Design

- Primary outcome was a **composite adverse neonatal outcome**
 - Perinatal death
 - Abnormal neonatal outcome:
 - Physical exam
 - Fundoscopy exam
 - Hearing exam
 - Abnormal postnatal neuroimaging
 - Ultrasound
 - CT
 - MRI

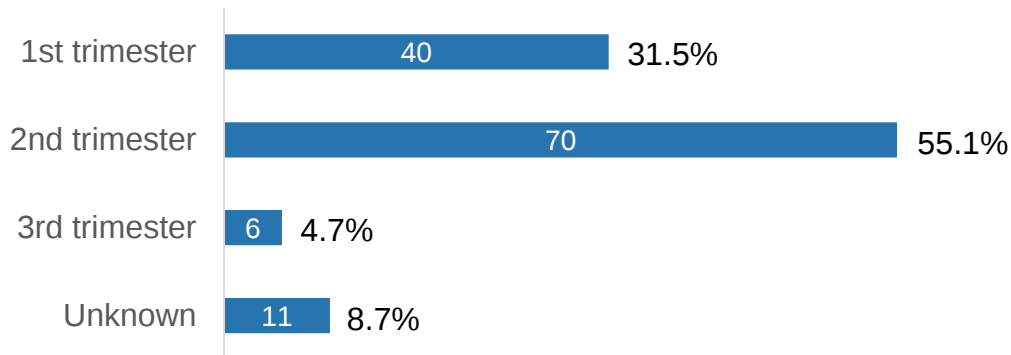
Statistical Analysis

- MCA Doppler values of normal and abnormal neonatal outcomes were compared with **Wilcoxon rank sum test**
 - Analytic weight incorporated to account for multiple ultrasound measurements
- Predictive value of MCA Dopplers for the development of abnormal neonatal outcome in ZIKV-affected pregnancies was calculated by **logistic regression**



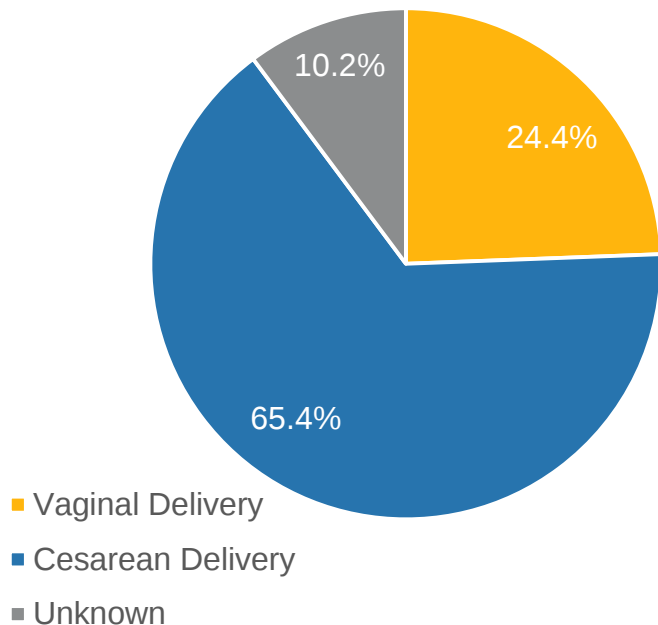
Pregnancy Characteristics

- Median maternal age = 29 years (IQR 24-33)
 - 24 (18.9%) advanced maternal age (> 35 years)
- Trimester of infection
 - Over half the patients developed infection in the 2nd trimester



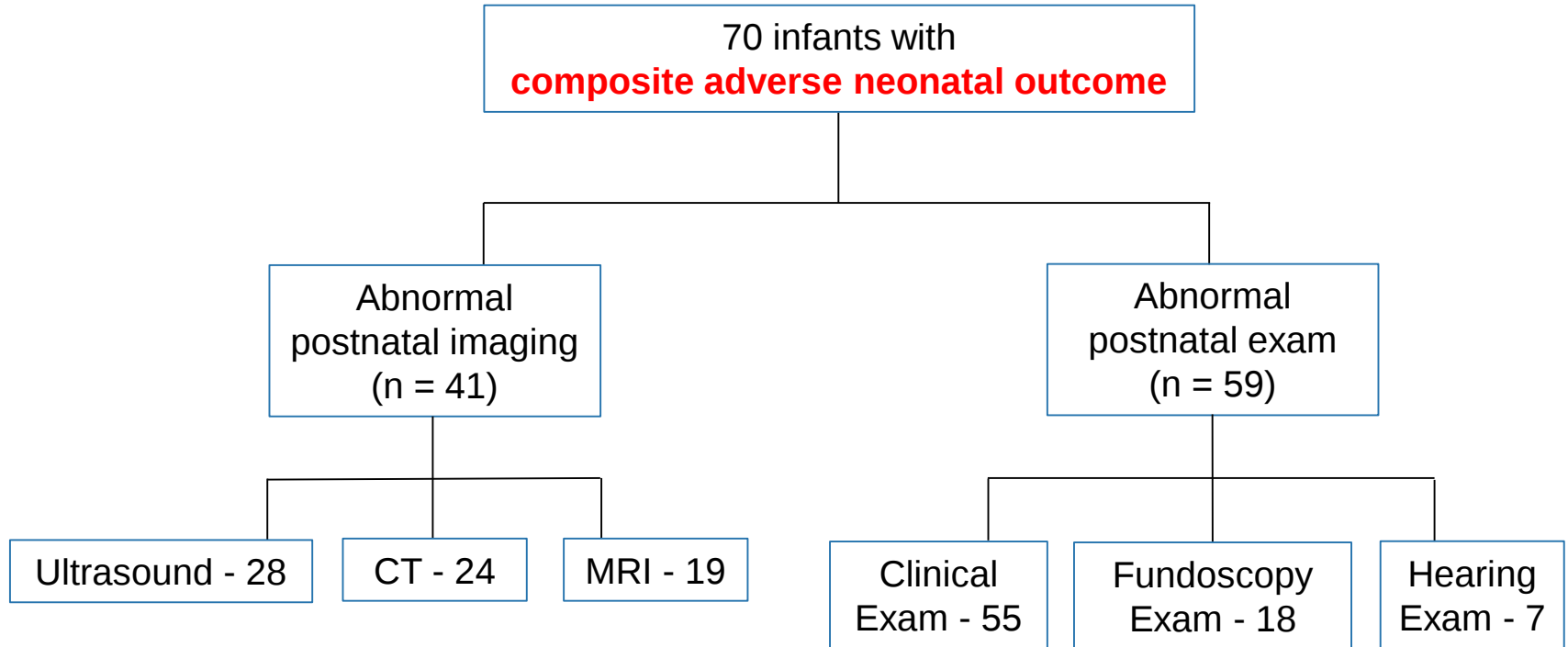
Pregnancy Outcomes

Mode of Delivery



- Median gestational age at delivery
38 weeks 4 days (IQR 37.75 – 39.47)
- Median birthweight
3145 grams (IQR 37.75 – 39.47)
- 44 NICU admissions – median length of stay
9 days (IQR 5 – 16)

Adverse neonatal outcomes

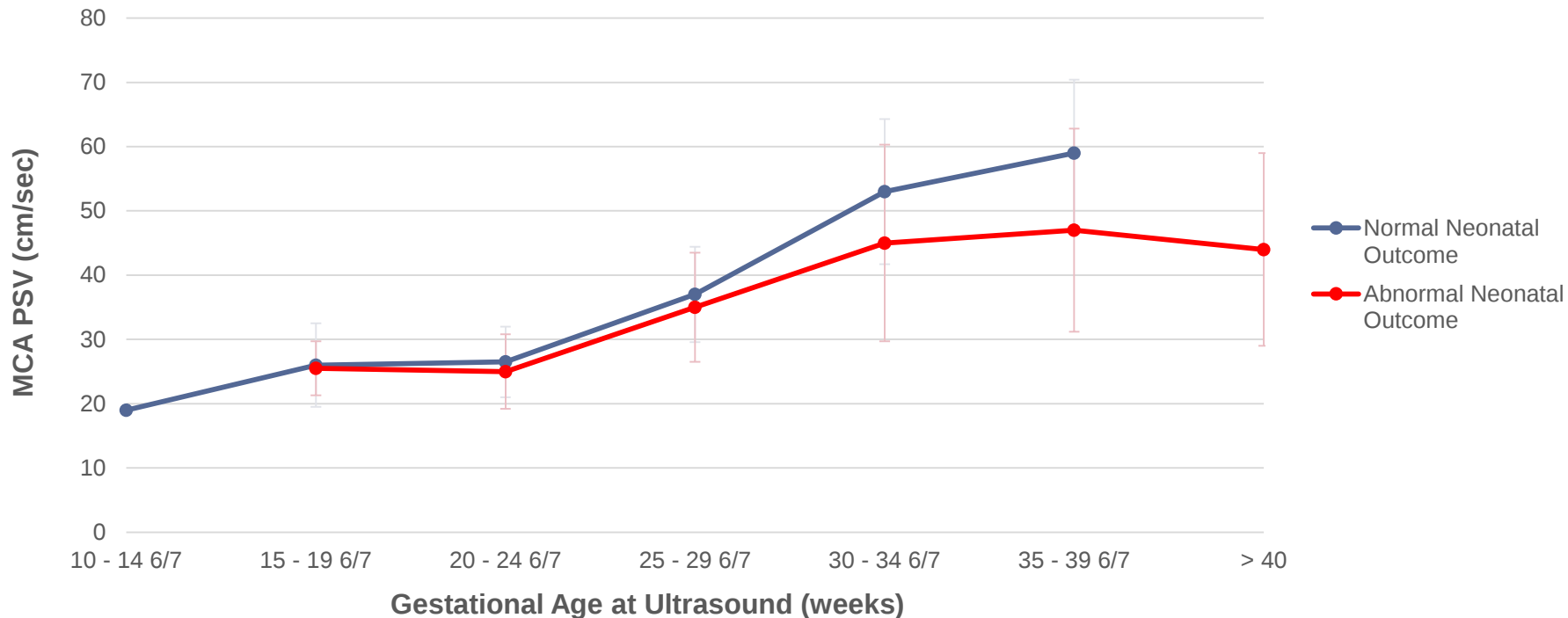


Middle cerebral artery Doppler values in ZIKV-infected pregnancies

	Normal Neonatal Outcome (n = 57)	Abnormal Neonatal Outcome (n = 70)	p - value
MCA PSV (cm/sec)	46.5 (34.0 – 58.0)	42.0 (27.0 – 53.0)	0.009
MCA MoM	1.04 (0.92 – 1.21)	0.98 (0.71 – 1.12)	0.006
MCA PI	1.87 (1.65 – 2.14)	1.88 (1.57 – 2.11)	0.998

- **Lower MCA PSV values** and **MoM** associated with **abnormal neonatal outcomes**
- No significant difference in neonatal outcomes based on MCA PI

Middle cerebral artery Doppler values in ZIKV-infected pregnancies



Lower MCA PSV measurements associated with abnormal neonatal outcomes



Each **1 cm/sec decrease** in MCA PSV associated with a **6.2% increased probability** of abnormal neonatal outcome



MCA PSV of 30 cm/sec with a **75% predicted probability** of an abnormal neonatal outcome
(95% CI: 62%-88%)

Conclusion

- **Lower MCA PSV** measurements are associated with **abnormal neonatal outcomes** in **Zika Virus** infected pregnancies
- Evaluation of MCA Dopplers may be of clinical utility in the surveillance of ZIKV-affected pregnancies

Questions?

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