

2nd Trimester Abnormal Uterine Artery Dopplers & Adverse Outcomes when PAPP-A is normal

Dr Michelle Jie*¹, Dr Shireen Jaufuraully^{2,3}, Mr James Lambert⁴, Mr Raffaele Napolitano^{1,2}, Professor Dimitrios Siassakos^{2,3}

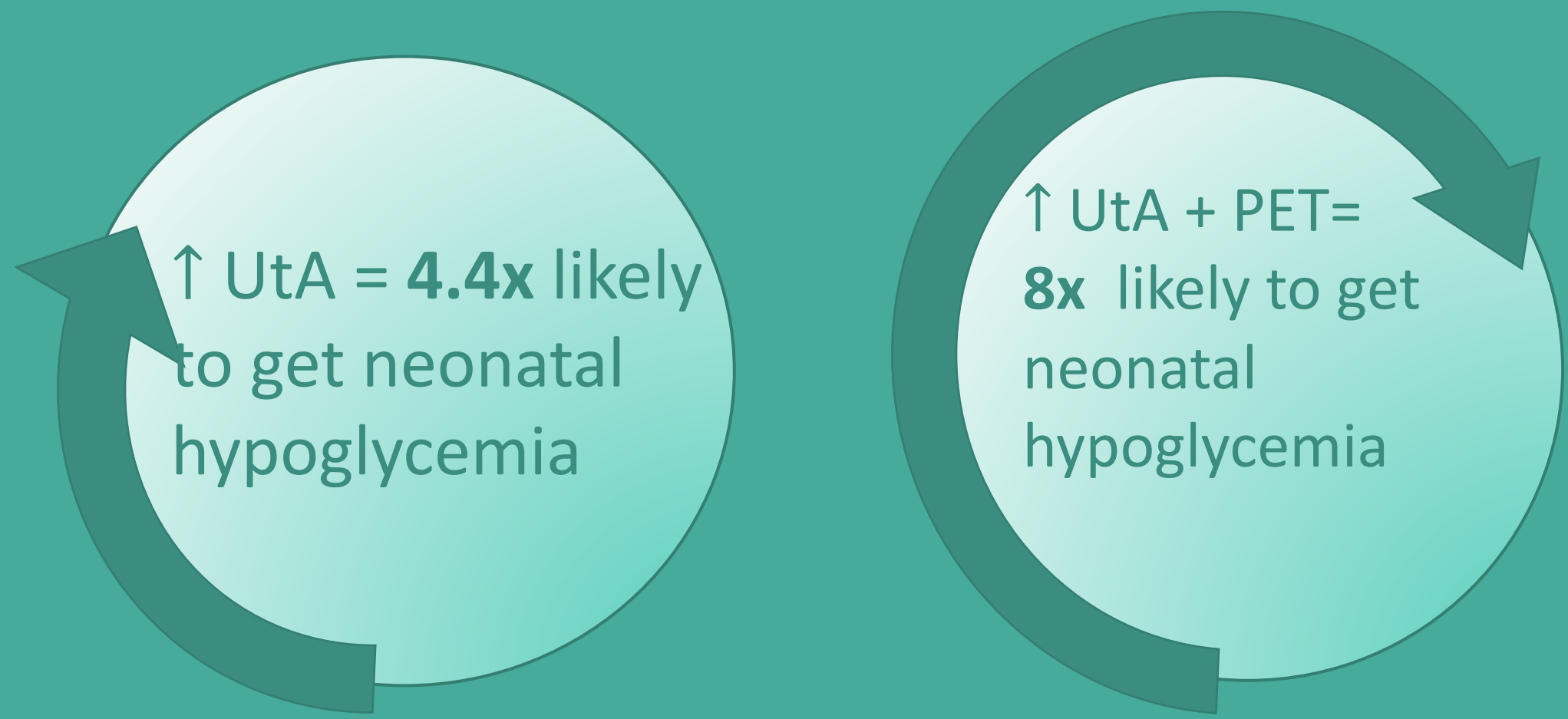
- 1. Ultrasound Screening Unit, Elizabeth Garrett Anderson Wing, University College London Hospital, 25 Grafton Way, WC1E 6DB
- 2. UCL EGA Institute for Women’s Health, UCL, London
- 3. Wellcome/EPSRC Centre for Interventional and Surgical Sciences
- 4. School of Economics and Finance, Queen Mary University of London, E1 4NS

*Correspondence:
michelle.jie@nhs.net

Results

- 400 cases & 400 controls
- No significant differences in baseline characteristics (ethnicity, pre-existing diabetes, PCOS, hypertension, thyroid problems & thrombophilias)
- No significant difference in diagnosis of GDM
- Cases had ↑ risk of adverse outcomes:

Outcome at increased risk	P value
Pre-eclampsia	0.0016955
SGA	0.00001
IUGR	0.00001
Prematurity	0.00248
Induction of Labour	0.04239
Emergency Caesarean	0.02189
NNU Admission	0.00040
Neonatal hypoglycaemia (NH)	0.00658



Background

- ↑ **Uterine Artery (UtA) Doppler PI** predicts ↑ risk pre-eclampsia (PET) & intrauterine growth restriction (IUGR)^[1]
- **Glucose dysmetabolism** linked with stillbirth & placental findings:
 - Distal Villous Immaturity (DVI)
 - Fetal Vascular Malperfusion (FVM)
- **DVI** no early signs of placental insufficiency (PAPP-A & UtA PI universally normal); **BUT FVM** associated with abnormal UtA dopplers & normal PAPP-A^[3]

Aims

- Examine association between 2nd trimester abnormal UtA PI (with normal PAPP-A) & adverse obstetric/neonatal outcomes

Methods

- Retrospective case control
- Participants: Table 1
- Controls: combined UtA PI <2.5 & PAPP-A and >0.400 MoM
- Age and BMI matched
- Multivariable regression

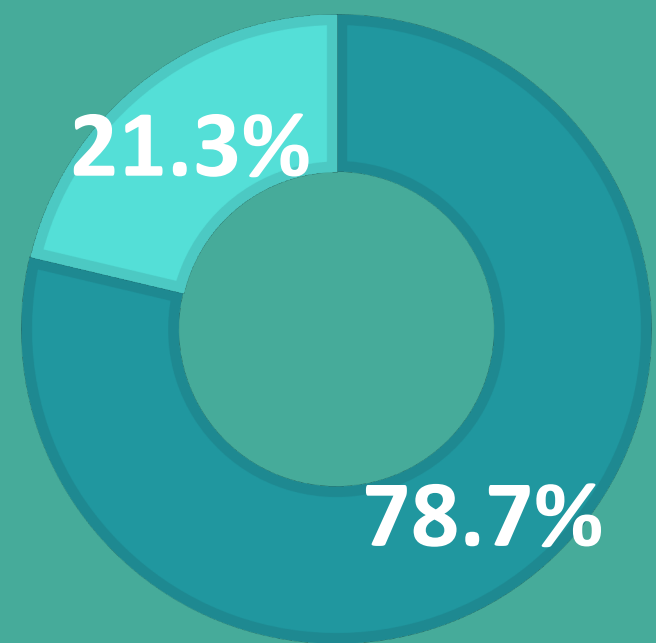
Table 1: Inclusion criteria for cases

Singleton pregnancy	PAPP-A >0.400 MoM
Nulliparous	Combined UtA Doppler ≥ 2.5 PI at anomaly scan
Nuchal scan between 1/4/19 to 1/8/21 inclusive	Delivered at UCLH

Table 2: Outcomes Assessed

Antenatal	Maternal
Age	Mode of delivery
Ethnicity	Postnatal complications
BMI	Neonatal
Medical comorbidities	Shoulder dystocia
Combined UtA PI	APGARs
Glucose challenge test	Placental histology
Glucose tolerance test	NNU admission and indication
Home blood glucose monitoring	Neonatal hypoglycaemia <2mmol/l
Diagnosis of GDM	Birth weight
Liquor volume of last scan	Birth centile
Antenatal conditions diagnosed	Gestational age at birth
Antenatal management	SGA
Intrapartum	IUGR
Intrapartum complications	Stillbirth
Intrapartum CTG abnormalities	Cord variations
Birth intervention	Neonatal problems diagnosed postnatally

- **78.7%** of those in the case group would have been considered otherwise low risk as per RCOG and not received serial scans.



Discussion

- Raised UtA PI & normal PAPP-A ↑ risk of:
 - PET, SGA, IUGR
 - NNU admission & Neonatal hypoglycaemia
- ↑ Risk of NNU admission not due to prematurity alone.
- Women with this combination previously shown to have risk of FVM & glucose dysmetabolism
- Research needed on aetiology behind risk of neonatal hypoglycaemia

- **Is this combination a marker of atypical diabetes & predictor of FVM?**

References

1. RCOG. 2014. *Small for Gestational Age. Green-top Guideline No. 31*. [online]. Available at: https://www.rcog.org.uk/media/t3lmjhn/gtg_31.pdf
2. Cohen-Overbeek T, Pearce JM, and Campbell S, The antenatal assessment of utero-placental and feto-placental blood flow using Doppler ultrasound. *Ultrasound Med Biol*, 1985. 11(2): p. 329–39.
3. Siassakos D, Bourne I, Sebire N, Kindinger L, Whitten SM, Battagliano C, Abnormal placental villous maturity and dysregulated glucose metabolism: implications for stillbirth prevention. *J. Perinatal Med*, 2022, 50(6):763-768