



The Effect of Gestational Diabetes Mellitus on Antepartum Fetal Heart Rate Monitoring

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Objective:

- Gestational diabetes mellitus (GDM) is increasingly prevalent and can lead to adverse pregnancy outcomes including fetal growth restriction and stillbirth.
- Antepartum fetal heart rate (FHR) monitoring evaluates fetal wellbeing; however, the effects of GDM on FHR patterns are poorly understood.
- We investigated whether GDM alters antepartum cardiotocography (CTG) patterns in otherwise normal pregnancy outcomes (NPO).

Design:

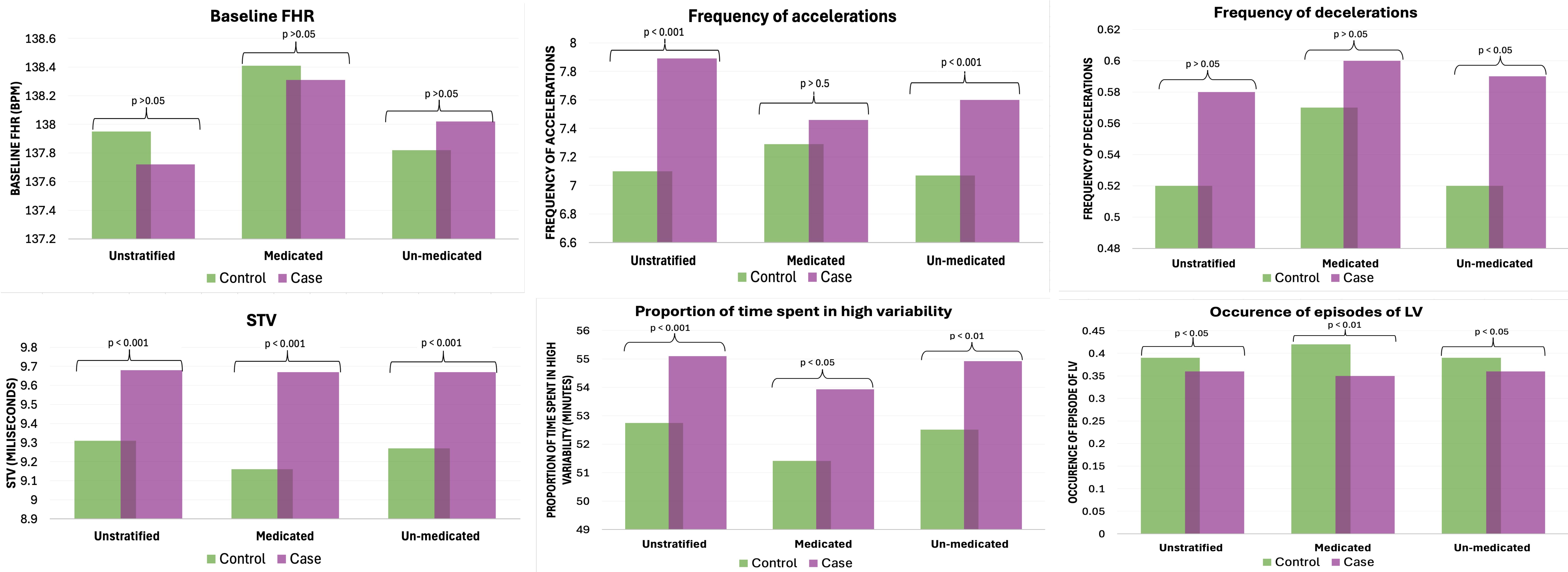
- This is a retrospective case-control study comparing CTGs in women diagnosed with GDM.
- Data was extracted from the Oxford Maternity dataset which includes clinical and CTG data of pregnancies recorded at Oxford University Hospitals from 1991 to 2024.

Methods:

- The GDM cohort was identified using ICD-10 codes. Those without codes for GDM, or other diabetes-related conditions, formed the control cohort.
- Propensity score matching (PSM) produced case-control pairs matched for maternal age, BMI, parity, ethnicity, fetal sex and CTG duration.
- PSM was repeated for the GDM cohort to produce separate matched groups for those GDM who were prescribed anti-hyperglycaemic medication and those who were not.
- CTG patterns included basal FHR, accelerations, decelerations, duration of episodes of high (HV) and low variation (LV), deceleration magnitude (DM), and short-term variability (STV). These were identified using the Dawes-Redman algorithm.

Results:

PSM resulted in three matched groups: unstratified GDM (n=3,307 pairs), medicated GDM (n= 980 pairs) and un-medicated GDM (n=2,339 pairs). Standardised mean difference for all groups < 0.10 - indicating well-matched groups.



Key findings:

- No significant difference in baseline FHR between groups.
- Significant increase in STV in all GDM groups.
- Significant increase in proportion of time spent in high variability in all GDM groups.
- Significant decrease in episodes of low variability in all GDM groups.

Conclusion:

- Our results suggest that GDM does affect FHR patterns.
- Recognising the impact of GDM on CTG can help us better understand the physiological impacts of GDM on fetal autonomic and cardiovascular functions.
- This could potentially help guide clinical practice to evaluate fetal wellbeing during GDM.