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Metabolic profiling of gestational diabetes in obese women during pregnancy

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Aim

The aim of this study was to describe the biomarker profiles of gestational diabetes (GDM) in an obese cohort at two pregnancy time-points

Background

Pre-existing insulin resistance in obese women is implicated in GDM risk, yet not all obese women develop the disorder.

The prevalence of antenatal obesity is increasing alongside attendant maternal and offspring complications.

The metabolic pathways leading to GDM in obese women are not well understood.

Methods

This prospective cohort study was a secondary analysis using data from the UPBEAT trial (ISRCTN 89971375), a multicentre RCT of intervention in obese pregnant women undertaken in the UK between 2009 and 2014.

646 women (median BMI 35.2kg/m^2) with complete metabolite data at time-point 1 (mean 17^{+0} weeks') and time-point 2 (at oral glucose tolerance test, mean 27^{+5} weeks') were included. 198 (30.6%) women developed GDM.

163 metabolites reflecting insulin resistance pathways were measured at both time-points including 147 from a targeted magnetic resonance (NMR) metabolome and 16 candidate biomarkers (selection shown below).

Multivariate analyses were performed to compare obese GDM women with obese non-GDM women using FDR adjustment for multiple measures.
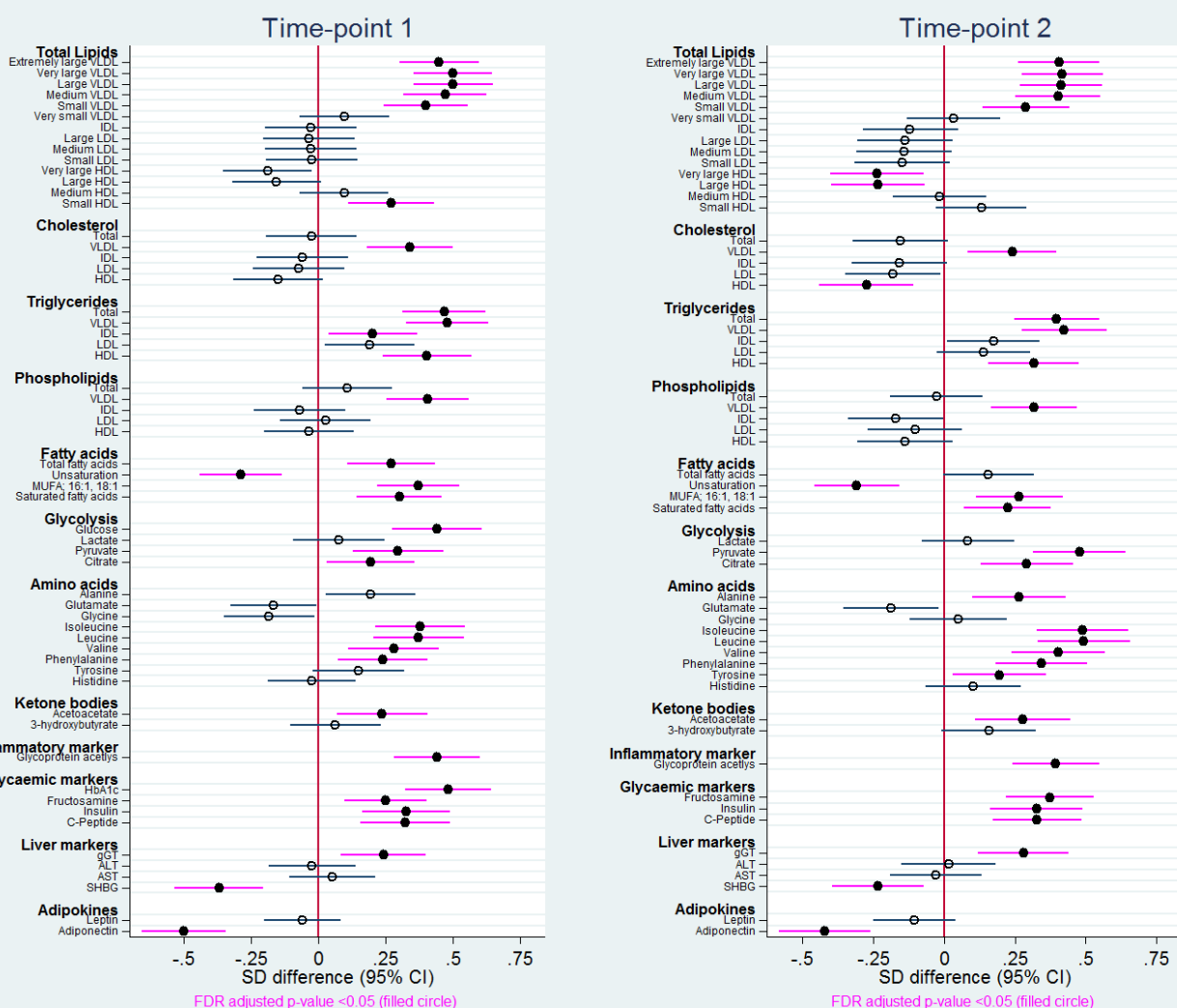
Results

Figure 1: Metabolite association with GDM in obese women

Interpretation and conclusions

- Multiple significant differences were evident between GDM and non-GDM obese women in diverse pathways. Notable differences were found in VLDL subclass lipid constituents, triglyceride content, branched chain and aromatic amino acids, glycaemic and fatty acid profiles, adipokines, ketone bodies, liver and inflammatory markers.
- Similar differential patterns are evident both prior to diagnosis and at the time of disease. This supports the earlier identification of women at risk or diagnosis of GDM than currently practised.
- Improved characterisation should contribute to better risk stratification for GDM risk, and targeted intervention or treatment.

References & Funding

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