Oral extracellular vesicles in early pregnancy can identify patients at risk of developing gestational diabetes mellitus

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Aim To isolate and characterize oral extracellular vesicles from gingival crevicular fluid at 11?14 weeks and evaluate their capacity to identify patients at risk of developing gestational diabetes mellitus. Methods A case-control study was conducted, including patients who developed gestational diabetes mellitus (n = 11) and healthy pregnant controls (n = 23). Obstetric and periodontal histories were recorded at 11?14 weeks of gestation, and samples of gingival crevicular fluid obtained. Extracellular vesicles were isolated from gingival crevicular fluid by ExoQuick. Nanoparticle tracking analysis, ELISA and transmission electron microscopy were used to characterize extracellular vesicles. Results Total extracellular vesicles isolated from gingival crevicular fluid were significantly higher in patients who developed gestational diabetes mellitus later in pregnancy compared to normoglycemic pregnant women (6.3x109 vs 1.7 x1010, p value = 0.0026), and the concentration of the extracellular vesicles delivered an area under the ROC curve of 0.81. The distribution size of extracellular vesicles obtained using ExoQuick was around 148 ± 57 nm. There were no significant differences in the periodontal status between cases and controls. The exosome transmembrane protein CD63 was also detected in the extracellular vesicles of gingival

crevicular fluid. Conclusion We were able to isolate extracellular vesicles from gingival crevicular fluid using a method that is suitable to be applied in a clinical setting. Our results provide an insight into the potential capacity of first trimester oral extracellular vesicles as early biomarkers for the prediction of gestational diabetes mellitus in pre-symptomatic women.