

# Shear wave elastography for detecting placental abnormalities in type 1 and type 2 diabetes: a systematic review and meta-analysis.

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## Abstract

Background: Diabetes prior to conception may cause pregnancy complications through disruptions of placental function. Objectives/Key Questions: 1) To describe placental changes in women with pre-existing diabetes. 2) To determine if elastography can detect in-vivo placental changes? Search Strategy: PubMed, Embase, Medline, Cochrane database searches of English language reports published until July 2020. Selection Criteria: Question 1: Any study describing placental histopathology in women with known diabetes. Question 2: Any study using elastography to report in-vivo placental stiffness values. Data Collection and Analysis: For Key Question 1: we grouped placental pathologies using Amsterdam International Consensus Group definitions. For Key Question 2: we conducted a meta-analysis of placental stiffness scores reported in metres per second (m/s) or kilopascals (kPa). Main Results: Cumulative data from 14 studies showed no placental histopathology features pathognomonic for diabetes. Pooled analysis of 14 studies included 478 “high risk pregnancies” and 828 control/healthy pregnancies. Only one study reported stiffness scores for placentas of women with pre-existing diabetes (N < 10 women). Maternal-derived pathologies resulted in higher placental stiffness with mean difference 4.5kPa (95% CI 3.16, 5.87) compared to control / healthy pregnancies. Fetal-derived pathologies resulted in higher placental stiffness with mean difference of 6.5kPa (95% CI 1.08, 11.86) compared to control / healthy pregnancies. Conclusions: Shear Wave Elastography may provide in-vivo approximation of placental histopathology. Further studies in women with pre-existing diabetes may confirm this. Funding: primary author (AG) receives Western Sydney University Postgraduate Research Scholarship (Ainsworth Trust) and Australian Federal Government Research Training Program (RTP) Fees Offset.

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