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Preconception lifestyle intervention in obese women improves echocardiographic indices of cardiovascular function in their offspring: follow up of a randomised controlled trial

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INTRODUCTION
Maternal obesity has emerged as a risk factor for cardiovascular disease (CVD), as offspring of obese mothers are prone for hypertension, ischemic heart disease and type 2 diabetes. Animal studies and small observational human studies suggest that maternal obesity directly affects fetal cardiovascular development, which may explain the increased health risk in the offspring. This also suggest that a preconception lifestyle intervention among obese women may improve cardiovascular health in the offspring. In the present study we assess the effects of a preconception lifestyle intervention in obese women on echocardiographic indices of cardiovascular function in the offspring at the age of 6 years.
METHODS
This study is embedded in the WOMB project (www.womb-project.nl), which is a follow up of a randomised controlled trial that included 577 obese sub/infertile women. A 6 months preconception lifestyle intervention aimed at weight loss prior to fertility care was given to the intervention group and a control group received fertility care as usual. We conducted complete transthoracic echocardiograms in the offspring at age 6-7 years using a Vivid E95 Ultrasound System (GE Healthcare, Australia). The clinician performing the echocardiograms and offline measurements was blinded to group allocation. We used EchoPAC analysis software (GE Vingmed) for offline measurements of dimension, mass and stroke volume of the cardiac chambers.
RESULTS
We included 44 children, mean age 6.1 years (SD 0.9), 57% girls. Children of women in the intervention group (n= 17) had a thinner interventricular septum (Z-score -0.6% [SD 0.7] vs 0.2% [SD 0.4], p <0.001) a lower left ventricular mass index (53.4 g/m2 [SD 9.1] vs 59.9 g/m2 [SD 7.0], p= 0.01) and an increased ejection fraction (60.9% [SD 3.5] vs. 56.6% [SD 4.6], p=0.004) compared to children of controls (n=27).
CONCLUSION
Preconception lifestyle intervention in obese women results in a thinner interventricular septum, a lower left ventricular mass and higher ejection fraction in the offspring at age 6, suggesting improved cardiac development and better cardiovascular function. This is the first direct human evidence of the effect of improving (pre)pregnancy maternal lifestyle to enhance cardiovascular function and potentially reduce CVD risk in the next generation.