

## Detecting cardiomyopathies in pregnancy and the postpartum period using ECG

D. Adedinsewo<sup>1</sup>, P.W. Johnson<sup>1</sup>, E.J. Douglass<sup>1</sup>, Z.I. Attia<sup>2</sup>, S.D. Phillips<sup>1</sup>, R.M. Goswami<sup>1</sup>, M.H. Yamani<sup>1</sup>, H.M. Connolly<sup>2</sup>, C.H. Rose<sup>3</sup>, E.E. Sharpe<sup>4</sup>, F. Lopez-Jimenez<sup>2</sup>, P.A. Friedman<sup>2</sup>, R.E. Carter<sup>1</sup>, P.A. Noseworthy<sup>2</sup>

<sup>1</sup>Mayo Clinic, Jacksonville, United States of America; <sup>2</sup>Mayo Clinic, Cardiovascular Medicine, Rochester, United States of America; <sup>3</sup>Mayo Clinic, Obstetrics and Gynecology, Rochester, United States of America; <sup>4</sup>Mayo Clinic, Anesthesia and Perioperative Medicine, Rochester, United States of America

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**Background:** Cardiovascular disease (CVD) has been identified as a major threat to maternal health in the US and UK with cardiomyopathy being one of the most common acquired CVD in the pregnant and postpartum period. Diagnosing cardiomyopathy in pregnancy is challenging due to an overlap of cardiovascular symptoms with normal pregnancy symptoms.

**Purpose:** The purpose of this study was to evaluate the effectiveness of an ECG based deep learning model in identifying cardiomyopathy among pregnant and postpartum women.

**Methods:** We utilized an ECG based deep learning model to detect cardiomyopathy in a cohort of pregnant or postpartum women seen at multiple hospital sites. Model performance was evaluated using area under the curve (AUC), accuracy, sensitivity, and specificity. We compared the diagnostic probabilities of the deep learning model with natriuretic peptides and a multivariable model consisting of demographic and clinical parameters.

**Results:** 1,807 women were included. 7%, 10% and 13% had LVEF  $\leq 35\%$ ,  $<45\%$  and  $<50\%$  respectively. The ECG based deep learning model identified cardiomyopathy with an AUC of 0.92 for left ventricular ejection fraction (LVEF)  $\leq 35\%$ , 0.89 for LVEF  $<45\%$  and 0.87 for LVEF  $<50\%$ . For LVEF  $\leq 35\%$ , AUC was higher in Black (0.95) and Hispanic (0.98) women compared to white (0.91). Natriuretic peptides and the multivariable model had AUCs of 0.85 and 0.72 respectively.

**Conclusions:** A deep learning model effectively identifies cardiomyopathy in pregnant or postpartum women, outperforms natriuretic peptides and traditional clinical parameters with the potential to become a powerful initial screening tool for cardiomyopathy in the obstetric care setting.