

PREDICTING PERIPARTUM CARDIOMYOPATHY: A SCOPING REVIEW

Are there any risk assessment tools or models (RAM) that aide in the identification of patients at high risk of developing PPCM?

Background

Peripartum cardiomyopathy (PPCM) is an idiopathic pregnancy induced systolic left ventricular heart failure. There are multiple studies detailing predictors associated with PPCM. Late diagnosis of PPCM is associated with high maternal and fetal morbidity/mortality, and early identification is paramount to improving outcomes [1]. Use of risk assessment models (RAM) in obstetrics has reduced the risk of adverse outcomes by the early identification of patients with an increased risk of adverse outcomes.

Exclusion Criteria

- Reviews, case reports or reviews are excluded
- Prognostic screening tools

Inclusion Criteria

- The study cohort must be pregnant or postpartum within 1 year of delivery.
- Cohort studies, scientific research papers, communication and conference proceedings, guidelines, and toolkits by a healthcare agencies are acceptable.
- Risk models must be based on pre-test (echocardiogram) risk factors
- All screening tools must be a primary screening for patients, the pre-screening cohort can be asymptomatic or symptomatic
- The primary outcome must be PPCM or cardiac complications in pregnancy

Search strategy

The searches were performed in a two-step approach. The first search was run on Web of Science, Pub Med and Science Direct. The second part of the search was performed on individual agency databases such as RCOG, FIGO etc.

CENTRAL ILLUSTRATION PARCCS: A Machine Learning Risk-Prediction Model

PARCCS: Peripartum Assessment of Risk for Cardiovascular Complications Score
Total 100 points

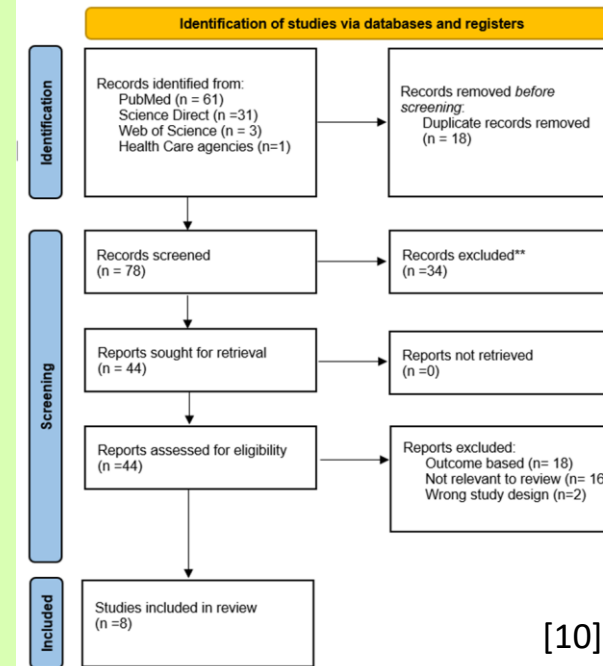
Points	Points
Pre-existing heart failure 28	Multiple gestation 4
History of stroke 22	Gestational hypertension 3
Electrolyte abnormalities 13	Age, y • <20 3 • >34 1
Diabetes mellitus • Pre-existing 6 • Gestational 2	Race/ethnicity Black 2
Coagulopathy 5	Nonelective admission 2
Obesity 5	Median income <\$49,999 per annum 1
Cesarean 4	

Score Cut-Offs and Predicted Risk

4	=	5%
8	=	10%
13	=	20%
22	=	50%

Zahid S, et al. JACC Adv. 2024;3(8):101095.

PRISMA Screening



[10]

Results & Discussion

8 studies met the review criteria with a total of 169,104 participants from 4 countries (US, Korea, Haiti and Pakistan). 4 studies/toolkits screened for cardiovascular complication in pregnancy (CCP) and 4 screened for PPCM [2-9]. Of these studies most were retrospective and locally based, 2 studies obtained their cohort from multiple hospitals (administrative data), 3 studies focused on the use of computerised ECG analysis (with or without AI) in risk stratifying and determining patients with a high pre-test (echocardiograph) probability of PPCM/CCP. Other study formats include primary echocardiograph screening of all pregnant women in a region of Pakistan, validated regression modelling and cardiovascular clinical toolkit for use of clinician for risk stratification of pregnant women. All the studies used LVEF≤45% as diagnostic of PPCM. Fett et al. study in Haiti had the lowest number of participants (25) however the study was part of a larger study to determine the risk of PPCM in which it was found a significant proportion of the asymptomatic had significant LV dysfunction [5]. The detection rates were higher in areas with higher populations of PPCM/CCP patients.

Conclusion

It is difficult to screen exclusively for PPCM and most studies often detected other cardiac pathologies such as undiagnosed valvopathies. Cardiovascular screening tools are increasingly integrating ECG analysis as a means of risk stratification, particularly with the integration of AI/computer learning. However, the ECG detection is in the developmental phase therefore not easily deployable to large populations. ECG screening is cheaper than echocardiograph screening, but will still incur an expense in comparison to patient screening via risk scoring which is already commonly used in maternity care. Risk modelling is able to identify high-risk patients based on their background characteristics and complications in pregnancy. It is likely the future of risk stratification concerning cardiovascular complications in pregnancy will involve both AI-ECG and regression modelling.

References

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