

Clinical Features of Myocardial Infarction in Women with a History of Preeclampsia: A Population-based Cohort Study

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Introduction

Preeclampsia is associated with an increased life-time risk of myocardial infarction. This study explored whether there is a difference in the clinical features and severity of myocardial infarction in women with previous preeclampsia compared to women with no history of preeclampsia.

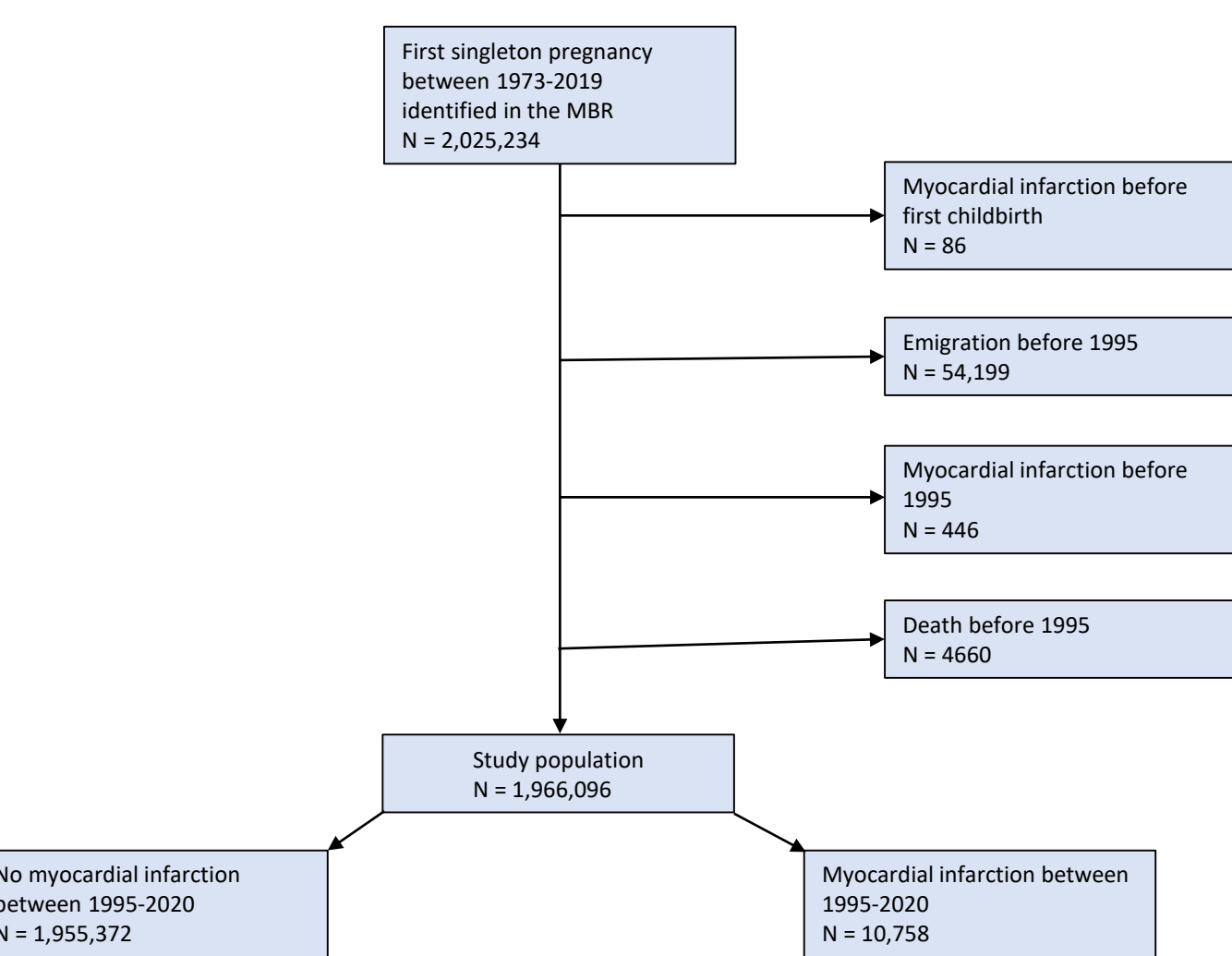


Figure 1. Study population

Methods

This register-based cohort study combined data from The Swedish Medical Birth Register with the data from the quality register SWEDEHEART. Women with a first singleton birth between 1973 and 2019 were included (figure 1). Outcome of myocardial infarction was categorized as severe if it resulted in death within seven days, cardiogenic shock, cardiac arrest, impaired left ventricular systolic function, mechanical complication, or ST-elevation myocardial infarction. The association between preeclampsia and myocardial infarction was investigated using Cox models and reported as hazard ratios (HR) with 95% confidence intervals (CI).

Results

Among 1,966,096 women with a first singleton birth, 82,980 (4.2%) had preeclampsia. Myocardial infarction was registered in 10,758 (0.5%) of the total population. One third (n=3672) of myocardial infarctions had severe features and two thirds (n=6996) non-severe. Preeclampsia was associated with increased risk of myocardial infarction, both severe (adjusted hazard ratio 1.73, [95% CI: 1.54–1.96]) and non-severe (adjusted HR 1.86, [95% CI: 1.69–1.96]) with the same proportions among women with and without a history of preeclampsia (table 2).

Table 2. Rates and risk for myocardial infarction according to severity after preeclampsia

	No preeclampsia	Preeclampsia
N (total)	1,883,116	82,980
Myocardial infarction (%)	9960 (0.5)	798 (1.0)
Sum of follow-up (years)	34,281,486	1,486,867
Mean age at end of follow-up (SD)	49.9 (13.0)	49.7 (12.8)
Rate/10,000 PYAR (95% CI)	2.91 (2.85–2.96)	5.36 (4.99–5.74)
Crude HR (95% CI)	1.00	1.87 (1.74–2.01)
Adjusted HR (95% CI)	1.00	1.81 (1.67–1.95)
Severe myocardial infarction* (%)	3413 (0.2)	259 (0.3)
Rate/10,000 person-years (95% CI)	1.00 (0.96–1.03)	1.74 (1.54–1.97)
Age at time of severe MI (SD)	57.7 (8.6)	56.2 (10.2)
Crude HR (95% CI)	1.00	1.78 (1.57–2.02)
Adjusted HR (95% CI)	1.00	1.73 (1.51–1.98)
Non-severe myocardial infarction^ (%)	6547 (0.3)	539 (0.6)
Rate/10,000 person-years (95% CI)	1.91 (1.86–1.96)	3.63 (3.33–3.94)
Age at time of non-severe MI (SD)	55.6 (9.1)	54.1 (9.0)
Crude HR (95% CI)	1.00	1.92 (1.76–2.10)
Adjusted HR (95% CI)	1.00	1.85 (1.69–2.03)

HR: hazard ratio; CI: confidence interval; PYAR: person-years-at-risk; MI: myocardial infarction
* Non-severe myocardial infarction excluded from analysis
^Severe myocardial infarction excluded from analysis
Adjusted for birth year, education level, cohabitation, comorbidities at pregnancy (pregestational diabetes, chronic hypertension, systemic lupus erythematosus, chronic kidney disease), maternal age, country of birth.

Myocardial infarction in women with prior preeclampsia compared to women without preeclampsia was associated with a higher risk of death at time of infarction (adjusted HR, 3.00 [95% CI: 1.10–8.14]), cardiogenic shock (adjusted HR 1.69, [95% CI 1.11–2.58]), and impaired left ventricular systolic function (adjusted HR 1.69, [95% CI 1.11–2.58]) (table 3).

Table 2. Clinical characteristics of women with myocardial infarction in relation to previous preeclampsia (n=10,758).

	No preeclampsia	Preeclampsia	Crude HR	Adjusted HR
Non-severe myocardial infarction	6547 (65.7)	539 (67.5)		
Severe myocardial infarction	3413 (34.3)	259 (32.5)	1.11 (0.98–1.26)	1.10 (0.96–1.25)
Death	26 (0.3)	5 (0.6)	2.29 (1.11–7.52)	3.00 (1.10–8.14)
Cardiac arrest	433 (4.3)	40 (5.0)	1.34 (0.97–1.86)	1.37 (0.98–1.93)
Cardiac shock	239 (2.4)	26 (3.3)	1.55 (1.04–2.33)	1.69 (1.11–2.58)
STEMI	2785 (28.0)	196 (24.6)	1.04 (0.90–1.20)	1.01 (0.86–1.18)
Mechanical complication*	31 (0.3)	1 (0.1)	0.48 (0.06–3.52)	0.57 (0.08–4.15)
Impaired left ventricular systolic function^	783 (7.9)	80 (10.0)	1.49 (1.19–1.88)	1.56 (1.22–1.98)

*left ventricular free wall rupture, post infarction ventricular septum defect or acute mitral regurgitation

^ De novo ejection fraction of less than 40% measured by echocardiography
STEMI: ST-elevation myocardial infarction; MI: myocardial infarction
Adjusted for birth year, education level, cohabitation, comorbidities at pregnancy (pregestational diabetes, chronic hypertension, systemic lupus erythematosus, chronic kidney disease), maternal age, country of birth.

Conclusions

- Women with a history of preeclampsia have approximately a 2-fold increased risk of myocardial infarction.
- Myocardial infarction among women with prior preeclampsia more often results in death, cardiogenic shock, and impaired left ventricular systolic function than among women without preeclampsia.