

Gender Difference in Heart Failure after ST-Segment Elevation Myocardial Infarction

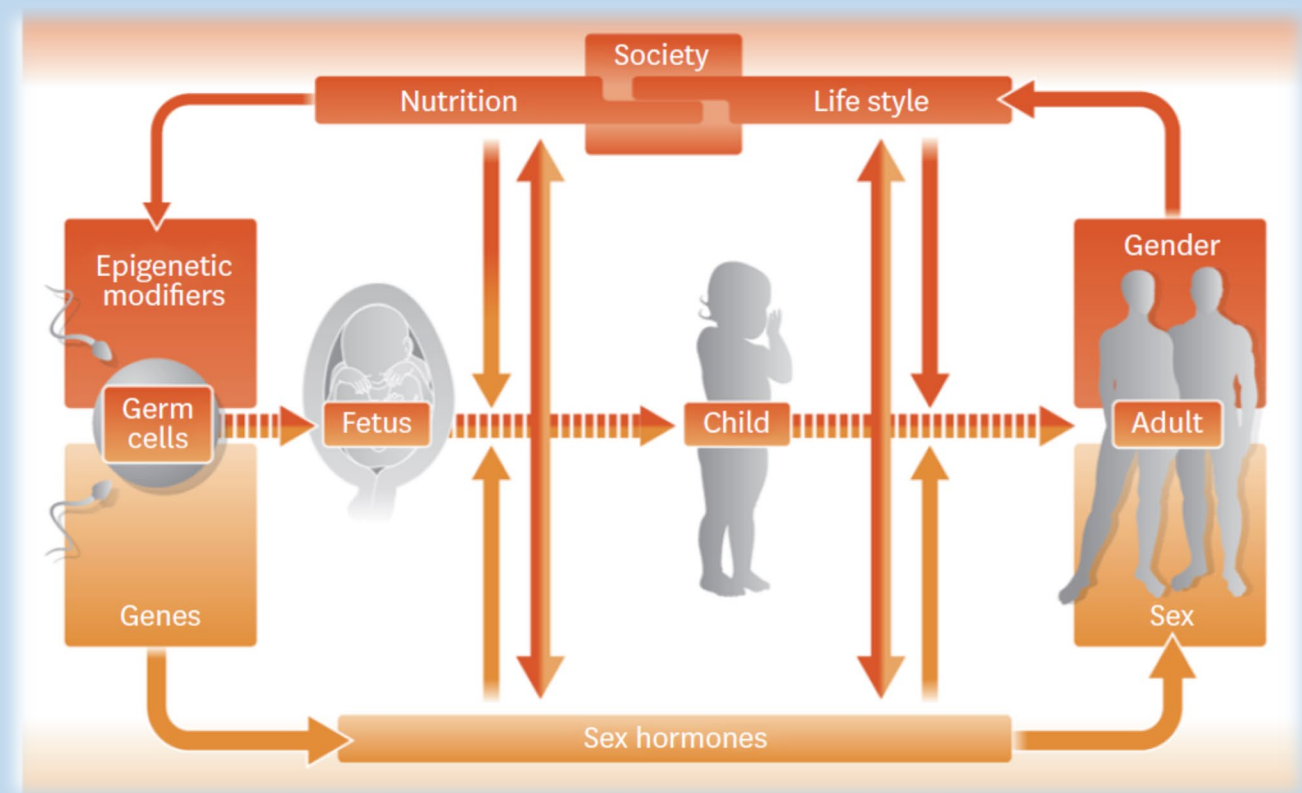
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INTRODUCTION

Growing evidence has been accumulated to demonstrate differences between women and men in epidemiology, risk factors and outcomes of cardiovascular diseases including acute coronary syndromes and more specifically ST-elevation Myocardial Infarction (STEMI).

Heart failure (HF) is a major source of morbidity, mortality, and health-care resources consumption; it is therefore important to assess its occurrence in STEMI patients undergoing primary percutaneous coronary intervention (pPCI) and understand whether any gender difference exists.



Interaction between sex and gender during lifetime, adapted from Regitz-Zagrosek 2015

OBJECTIVES

Aim of the research was to examine the relationship between gender and HF after STEMI in patients with no prior history of HF recorded at baseline.

METHODS

A literature review was performed to identify publications looking at gender differences for heart failure in STEMI patients during index hospitalization and/or follow-up. Only publications including at least 500 STEMI women treated with pPCI were retained. No restrictions were applied in terms of geography or design of study.

RESULTS

Based on the search criteria, 5 publications were identified. Very few articles report the occurrence of HF as a stand-alone outcome, and the distinction between STEMI patients with already existing HF and those developing de novo HF after the primary PCI intervention is rarely done.

Study	Design	Country	Number of STEMI patients	
			Undergoing pPCI	
			Women	Men
Ezekowitz 2020	linked administrative databases	Alberta, Canada	5387 (26.5%)	14940 (73.5%)
Cenko 2019	prospective multicenter observational study	multinational	3112 (23.9%)	7331 (72.1%)
Zheng 2019	retrospective study of patients enrolled in Singapore MI multicenter observational study	Singapore	1045 (13.8%)	6552 (86.2%)
Zachura 2018	prospective multicenter observational study	Poland	984 (36%)	1746 (64%)
Kosmidou 2017	individual patient-level pooled analysis of 10 RCTs	multinational	587 (22.3%)	2045 (77.7%)

All studies identified the same differences in baseline characteristics : women were significantly older and more likely to have diabetes and hypertension whilst men were more prone to be smokers and to have a prior history of myocardial infarction and coronary by-pass graft. Two studies (Ezekowitz et al 2020 - Cenko et al 2019) detected a difference regarding prescribed medical therapies before hospitalization. In terms of time delay between symptoms onset and presentation to the emergency room, three publications (Zheng et al 2019 - Cenko et al 2019 - Kosmidou et al 2017) reported a significant longer time lag for women whilst Zachura et al 2018 did not find any difference.

Heart failure hospitalization rates

Study	Follow-up duration	Crude outcome rates		
		Heart failure hospitalization		
		Women	Men	P value
Ezekowitz 2020	index hospitalization for primary PCI	15.2%	9.5%	< 0.0001
	12 months	22.5%	14.9%	< 0.0001
Cenko 2019	30-day	25.9%	18.8%	< 0.001
Zheng 2019	index hospitalization for primary PCI procedure	15.4%	10.2%	< 0.001
Zachura 2018	6 months	12.7%	6.6%	< 0.0001
	12 months	18.8%	11.2%	< 0.0001
Kosmidou 2017	12 months	5.6%	1.7%	< 0.0001

Risk of heart failure hospitalization

With adjustment for differences in baseline characteristics

Study	Risk of heart failure hospitalization for women compared to men	value	95% C.I.	P value
Ezekowitz 2020	adjusted OR index hospitalization	1.26	1.13 – 1.4	< 0.0001
	adjusted HR at 1 year	1.21	1.12 – 1.24	< 0.0001
	adjusted HR at 5 years	1.18	1.11 – 1.24	< 0.0001
Cenko 2019	adjusted OR at 30-days	1.34	1.21 – 1.48	0.0003
Zheng 2019	unadjusted HR at one year	1.83	1.42 – 2.35	<0.001
	adjusted HR at one year	1.05	0.79 – 1.40	0.728
Zachura 2018	adjusted HR at 6 months	1.5	1.1 – 2.03	< 0.0001
	adjusted HR at one year	1.33	1.0 – 1.75	< 0.0001
Kosmidou	adjusted HR at one year	2.28	1.50 – 3.47	< 0.001

CONCLUSIONS

Compared to men, women suffer their first acute myocardial infarction episode at an older age and with greater burden of comorbidities. They are at a higher risk of developing de novo HF after STEMI either in-hospital or after discharge, even when accounting for differences in baseline characteristics, as shown in most publications.

These findings raise awareness on the importance of studying gender as a biological variable and reinforce the need for enrollment of more women in clinical research studies.

Overall, HF remains a major challenge after STEMI in spite of technically successful revascularization. Tools or strategies for early detection of patients at risk of HF after pPCI deserve better integration in routine clinical use. Novel therapeutic interventions as adjunct to stenting are also required to address this unmet need.

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