

## EDITORIAL

## How the Gender Gap Affects the Incidence and Prognosis of Cardiovascular Disease

Maria Gazzilli<sup>1</sup> 

Nuclear Medicine - University of Brescia and Spedali Civili Brescia,<sup>1</sup> Brescia – Italy

*Editorial Referring to the article: Closing the Gender Gap in Ischemic Heart Disease and Myocardial Infarction*

The study in this issue of the Journal analyzed the sex and gender gap that exists for ischemic heart disease and myocardial infarction. The authors reviewed all the factors that differ between genders in terms of incidence, mortality, pathophysiology and clinical implications, diagnosis, and treatment.<sup>1</sup>

The article highlights firstly that there has been an increase in the annual change in proportional mortality from ischemic heart disease in women in recent years, with an age-standardized incidence of 104 per 100 000 population for males and 58 per 100 000 population for females.<sup>2-3</sup>

Although it is well known that there are important differences between men and women in the prevalence of risk factors for cardiovascular disease (CVD), studies have focused attention on older women with more comorbidities such as hypertension, dyslipidemia, diabetes, heart failure, and atrial fibrillation, demonstrating that smoking and diabetes mellitus have a more substantial impact on women. Moreover, postmenopausal hormonal changes play an important role in women's CVD.<sup>4-5</sup>

Further differences between men and women become apparent when considering the less common etiologies of cardiomyopathy. In fact, myocardial infarction with nonobstructive coronary arteries (MINOCA) is five times more likely to occur in women than in men as demonstrated by the VIRGO study.<sup>6</sup>

MINOCA occurs due to epicardial artery vasospasm, spontaneous coronary artery dissection, and Takotsubo syndrome, the last two conditions are common in young women. Tweet et al.<sup>7</sup> demonstrated that

patients with MINOCA, especially women with microcirculatory dysfunction, had a poor prognosis related also to atypical symptoms, such as atypical chest pain, or associated symptoms, such as dyspnea, fatigue, sweating, and epigastric pain, thus leading to an incorrect diagnosis.

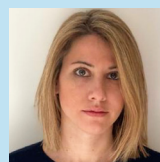
These differences in pathophysiology, clinical presentation and risk factors affect prognosis and treatment. The GUSTO study<sup>8</sup> showed how women benefit more than men from primary angioplasty and have a poorer prognosis when fibrinolysis is the initial treatment of choice, because women have more strokes, heart failure, shock, bleeding, recurrent angina, and infarction than men when undergoing thrombolysis.

Furthermore, in non-ST elevation myocardial infarction (NSTEMI), although early revascularization is favorable, the elevated marker of myocardial necrosis is a challenge in women. Slagman et al.<sup>9</sup> demonstrated that troponin had a lower positive predictive value and a slightly higher negative predictive value in women than in men.

As demonstrated by the DANAMI-3—PRIMULTI<sup>10</sup> and Acute Compare trials, fractional flow reserve (FFR) is fundamental to the decision-making for revascularization; in fact, according to these studies, an FFR < 0.80 suggests the need for revascularization, but the impact of this analysis is more significant when myocardial infarction occurs in women because they

### Keywords

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Maria Gazzilli, MD  
Nuclear Medicine  
ASST Spedali Civili of Brescia (Italy)

**Mailing Address: Maria Gazzilli**

Piazzale Spedali Civili, 1. Postal Code: 25123, Brescia – Italy.

E-mail: marinagazzilli@msn.com

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have a higher prevalence of microcirculatory dysfunction than men. In women, it is essential to consider the use of a functional assessment index of the microcirculation such as coronary flow reserve (CFR) and hyperemic microvascular resistance (HMR).

I invite you to read this article to understand all the mechanisms behind the gender gap in CVD and to discover how precision medicine must consider sex and age at a high level of decision-making to reach the correct diagnosis and treatment in CVD.

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