

## Gender Equity in Access to Reperfusion in Acute Myocardial Infarction: Still A Long Way to Go

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Short Editorial related to the article: Access to Reperfusion Therapy and Mortality in Women with ST-Segment–Elevation Myocardial Infarction: VICTIM Register

Ischemic heart disease is the main cause of death worldwide, and its most severe presentation ST-elevation acute myocardial infarction (STEMI), which corresponds to approximately 1/3 of the presentations,<sup>1</sup> and early reperfusion is the main strategy for reducing mortality. Despite broad historical knowledge of gender-related differences in treatment and prognosis of patients with an acute presentation of ischemic heart disease, male individuals, in addition to having earlier access to health systems, are even more likely to undergo a diagnostic coronary angiography and urgent revascularization than women.<sup>2-4</sup> The article “Access to Reperfusion Therapies and Mortality in Women with Acute Myocardial Infarction with ST-Segment Elevation: the VICTIM Registry<sup>5</sup>” demonstrates very well this difference in access to reperfusion therapies in the Brazilian scenario. When evaluating 878 patients admitted with STEMI in the northeastern state of Sergipe, Brazil, it was observed that female individuals were less frequently submitted to reperfusion strategies when compared to males, both primary percutaneous coronary interventions (PCI) (44% x 54.5%;  $p = 0.003$ ) and fibrinolysis (1.7% x 2.6%;  $p = 0.422$ ). This scenario is in line with data from other previous studies on this topic carried out in different settings (Table 1). In the VICTIM<sup>5</sup> registry, higher in-hospital mortality was observed in the female gender (16.1% x 6.7\*;  $p < 0.001$ ), probably as a consequence of this lower access to reperfusion therapies. These data are consistent with systematic reviews of the literature on the topic.<sup>6</sup>

Would the delay in calling for help be one of the reasons why women are less frequently submitted to revascularization therapies? The aforementioned study demonstrated that this does not seem to have been the problem in Sergipe, with the time spent calling for help after symptom onset being statistically similar between the genders. However, female patients underwent a greater delay in the primary hospital, until referral to a unit with infrastructure to perform the

percutaneous reperfusion (transfer delay). These data differ in part from the findings of a recent study carried out in Italy, in which the mean time from symptom onset to presentation at the hospital was longer for women (280 x 240 minutes), with only 23.2% of women x 29.1% of men undergoing a delay  $< 120$  minutes until hospital admission ( $p = 0.002$ ).<sup>7</sup> As in the VICTIM study, there was an impact on mortality: in cases with delay  $\geq 120$  minutes, mortality rates were higher among women (5.5% x 2.8%), whereas in cases with presentation  $< 120$  minutes, mortality was considerably lower and statistically similar between genders (2.0% in women vs. 1.6% in men).<sup>7</sup>

Moreover, the present study observed that STEMI tends to affect women who are older ( $> 63$  years) and with a greater number of risk factors, when compared to men.<sup>5</sup> As demonstrated in a previous publication with data from Brazil, women also have a higher level of stress, which may increase the risk for acute events.<sup>8</sup> A similar pattern was observed in studies carried out in Australia and Italy, which showed that women are more likely to have STEMI at an older age and to have higher rates of hypertension, diabetes and/or hypercholesterolemia, in contrast to lower rates of smoking.<sup>7,9</sup> In these publications, it is questioned whether the underestimation of female cardiovascular risk may have resulted in more conservative treatments, contributing to unfavorable outcomes.<sup>7,9</sup> Similarly, other authors question whether the patients' advanced age, associated with a greater number of comorbidities, together with less typical clinical presentations, would influence the choice of conservative treatment in women.<sup>10,11</sup>

In this context, the data from the VICTIM study also draw attention to the importance of a lower threshold of suspicion for ordering tests and indicating invasive procedures for female patients.<sup>5</sup> As demonstrated in a Swiss study with 51,725 patients, over a period of 19 years (1997 - 2016), in-hospital mortality significantly decreased from 9.8% to 5.5% in men and from 18.3% to 6.9% in women, as a result of the increasing indication for reperfusion therapies (thrombolysis or PCI) in STEMI: from 60% to 93% ( $p < 0.001$ ) in men and from 45% to 90% ( $p < 0.001$ ) in women<sup>12,13</sup> – with a proportionally greater increase among men. These data reinforce the importance of a detailed and individualized clinical judgment in the emergency setting.

That said, the study implications for the medical community and attending physicians are straightforward: the multiple comorbidities, older age and atypical presentations should not be a barrier to the indication of reperfusion therapies, and the

### Keywords

Myocardial Ischemia; Myocardial Infarction; Myocardial Revascularization; Myocardial Reperfusion; Womens; Men.

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**Table 1 – Access to reperfusion therapies in acute myocardial infarction with ST-segment elevation, by gender**

Study	VICTIM Registry <sup>5</sup>	Radovanovic et al. <sup>11</sup>	Hansen et al. <sup>12</sup>	Soeiro et al. <sup>1</sup>
PCI (% men x women)	54.5 x 44	36.6 x 27.2	58 x 72	44.9 x 35.4
Fibrinolysis (% men x women)	2.6 x 1.7	18.7 x 15.2	N/A	N/A
Mortality (% men x women)	16.1 x 6.7	10.7 x 6.3	11 x 7	3.7 x 3.1

PCI: percutaneous coronary intervention.

clinical condition should be analyzed as a whole. Additionally, public policies should be proposed to allow for a faster referral of these patients to a service with intervention facilities, in addition to health education programs and awareness of

cardiovascular symptoms, focused on women. With these multifaceted actions, greater access to reperfusion may result in further reductions in mortality from cardiovascular diseases, especially among women, in the coming years.

## References

- Soeiro am, silva p, roque eac, bossa as, biselli b, leal t et al. Prognostic differences between men and women with acute coronary syndrome. Data from a brazilian registry. *Arq bras cardiol.* 2018; 111(5): 648-53.
- Radovanovic d, erne p, urban p, bertel o, rickli h, gaspoz jm et al. Gender differences in management and outcomes in patients with acute coronary syndromes: results on 20.290 patients from the amis plus registry. *Heart.* 2007; 93(11): 1.369-75.
- Soares gp. Analysis of a population-based registry of hospitalizations for acute myocardial infarction. *Arq bras cardiol.* 2020; 115(5): 925-6.
- Alves l, polanczyk ca. Hospitalization for acute myocardial infarction: a population-based registry. *Arq bras cardiol.* 2020; 115(5): 916-24.
- Oliveira JC, Barros MPS, Barreto IDC, Silva Filho RC, Andrade VA, Oliveira AM et al. Acesso à Terapia de Reperusão e Mortalidade em Mulheres com Infarto Agudo do Miocárdio com Supradesnivelamento do Segmento ST: Registro VICTIM. *Arq Bras Cardiol.* 2021; 116(4):695-703.
- Van der meer mg, nathoe hm, van der graaf y, doevendans pa, appelman y. Worse outcome in women with stemi: a systematic review of prognostic studies. *Eur j clin invest.* 2015; 45(2): 226-35.
- Centko e, van der schaar m, yoon j, kedev s, valvukis m, vasiljevic z et al. Sex-specific treatment effects after primary percutaneous intervention: a study on coronary blood flow and delay to hospital presentation. *J am heart assoc.* 2019; 8(4): e011190.
- Schmidt k, lima ads, schmitt kr, moraes ma, schmidt mm. Stress in women with acute myocardial infarction: a closer look. *Arq bras cardiol.* 2020; 115(4): 649-57.
- Worrall-carter l, mcevedy s, wilson a, rahman ma. Gender differences in presentation, coronary intervention, and outcomes of 28.985 acute coronary syndrome patients in victoria, australia. *Womens health issues.* 2016; 26(1): 14-20.
- Dey s, flather md, devlin g, brieger d, gurfinkel ep, steg pg et al. Sex-related differences in the presentation, treatment and outcomes among patients with acute coronary syndromes: the global registry of acute coronary events. *Heart.* 2009; 95(1): 20-6.
- Shaw lj, miller dd, romeis jc, kargl d, younis lt, chaitman br. Gender differences in the noninvasive evaluation and management of patients with suspected coronary artery disease. *Ann intern med.* 1994; 120(7): 559-66.
- Radovanovic d, seifert b, roffi m, urban p, rickli h, pedrazzini g et al. Gender differences in the decrease of in-hospital mortality in patients with acute myocardial infarction during the last 20 years in switzerland. *Open heart.* 2017; 4(2): e000689.
- Hansen kw, soerensen r, madsen m, madsen jk, jensen js, von kappelgaard lm et al. Developments in the invasive diagnostic-therapeutic cascade of women and men with acute coronary syndromes from 2005 to 2011: a nationwide cohort study. *Bmj open.* 2015; 5(6): e007785.



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