Trends and sex differences in characteristics and outcomes in myocardial infarction: a 20-year analysis

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Background: There are considerable sex differences in patients with myocardial infarction (MI). However, the recent temporal trends in characteristics and outcomes in women vs. men, particularly in an Asian population, remain poorly understood.

Purpose: We aim to evaluate the sex differences in characteristics and outcomes, and how have these differences evolved over the past 2 decades in patients with MI.

Methods: From a well-validated territory-wide database in Hong Kong, we included patients with incident acute MI from 1999/01/01 to 2018/12/31. Outcomes of interest include, at 30 days, all-cause death, new-onset heart failure (HF), and ischaemic stroke. Trends in sex differences in baseline characteristics were evaluated using linear and Poisson regression, while differences in outcomes were evaluated using Cox proportional hazard model, adjusted with demographics, comorbidities, and baseline medications. A Fine-Gray model was used to evaluate HF and ischaemic stroke to account for competing risk, with all-cause death defined as competing event.

Results: A total of 130,218 patients (age 73.6±13.9 years, 40.0% female) were included. Women were older (79.5±11.7 vs. 69.6±13.8 years, $P<0.001$) and had a more pronounced increasing trend in age over time (interaction $P<0.001$). Women were also more comorbid overall (Charlson Comorbidity Index [CCI] 1.25 vs 0.85, age-adjusted $P<0.001$), but the rising trend in CCI over time was less pronounced than in men (interaction $P<0.001$) (Figure 1). Women had more baseline hypertension, diabetes, and severe renal disease than men (age-adjusted $P<0.001$), while the increasing trends in these comorbidities were all more pronounced in men than in women (all interaction $P<0.001$). Women were more likely to have ST-elevation overall ($P<0.001$).

Although the crude 30-day mortality rate was higher in women (32.6% vs 23.9%), after adjustment for confounders, they had a lower risk of death (hazard ratio [HR] 0.97, 95% CI [0.96 to 0.99], P=0.003). There was no significant difference in the decreasing trend in 30-day mortality between both sexes (interaction P=0.787) (Figure 1). Women had a higher risk of developing HF (HR 1.04 [1.01 to 1.08], P=0.012) and ischemic stroke (HR 1.36 [1.24 to 1.48], $P<0.001$) in 30 days.

Among patients aged ≤55 (N=15,324), women (N=2,161, 14.1%) had higher risks of all-cause death (HR 1.61 [1.40 to 1.85], $P<0.001$), HF (HR 1.64 [1.17 to 2.32], P=0.004), and ischemic stroke (HR 1.69 [1.14 to 2.51], P=0.010) in 30 days, even after adjustment for covariates. The excess mortality in women declined over time (interaction P=0.002).

Conclusions: Women MI patients were older and more comorbid compared to men, which contributed to the higher risk of death, HF, and ischemic stroke among women. Among young MI patients, the increased risk for adverse outcomes among women was particularly pronounced, though the sex differences in mortality reduced over time.

Figure 1. Trends in comorbid profile and 30-day death according to sex.