
Conference or Workshop Item:
Hall, M. orcid.org/0000-0003-1246-2627, Smith, L., Wu, J. et al. (5 more authors) (2023) Health outcomes after myocardial infarction: a population study of 56 million people in England. In: ESC Congress 2023, 25-28 Aug 2023, Amsterdam, Netherlands.

https://doi.org/10.1093/eurheartj/ehad655.1212

Health outcomes after myocardial infarction: a population study of 56 million people in England

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Background: Information about the health outcomes of people with myocardial infarction (MI) is required to determine individual health needs, enable earlier detection and treatment of new onset disease, and inform health service planning. Although estimating 10 year cardiovascular disease risk is an established part of primary prevention, this is not the case for MI where comprehensive evidence for the long term impact of MI on subsequent major health outcomes is lacking. Such information is critical not only for the development of guideline recommendations, but also to underpin shared decision making.

Methods: This nationwide cohort study includes 34,116,257 adults in England, contributing 145,912,852 hospitalisations between 1st January 2008 and 31st January 2017 (final follow-up 27th March 2017). The absolute risk of 11 non-fatal health outcomes following MI (subsequent MI and new hospitalisations of heart failure, atrial fibrillation, cerebrovascular disease, peripheral arterial disease, severe bleeding, renal failure, diabetes, dementia, depression, cancer) and all-cause mortality was calculated via standardised cumulative incidence functions (CIFs) over nine years of follow-up. CIFs were estimated from flexible parametric survival models adjusted for age, sex, year, deprivation and competing risk of death. Risk-set matching by age, sex, and year of hospitalisation determined the relative risk of incident health outcomes compared with non-MI cases.

Findings: There were 433,361 individuals with MI (mean age 67·4 years (SD 14·4); n=286,728 (65·3%) male). Following MI, all-cause mortality was the most frequent event (CIF 37·8%, 95% CI 37·6–37·9%), followed by heart failure (29·6%; 29·4–29·7%), renal failure (27·2%; 27·0–27·4%), atrial fibrillation (22·3%; 22·2–22·5%), severe bleeding (19·0%; 18·8-19·1%), diabetes (17·0%; 16·9–17·1%), cancer (13·5%; 13·3–13·6%), cerebrovascular disease (12·5%; 12·4–12·7%), depression (8·9%; 8·7–9·0%), dementia (7·8%; 7·7–7·9%), subsequent MI (7·1%; 7·0–7·2%), and peripheral arterial disease (6·5%; 6·4–6·6%). Compared with 2,001,301 matched controls, first hospitalisation of all non-fatal health outcomes were increased after MI, except for dementia (HR 1·01; 0·99–1·02) and cancer (HR 0·56; 0·56–0·57).

Interpretation: Up to a third of patients with MI develop heart failure or renal failure, 7% have another MI and four in ten die within ten years. The incidence of heart failure, atrial fibrillation, cerebrovascular disease, peripheral arterial disease, severe bleeding, renal failure, diabetes, and depression, but not dementia or cancer, was higher than expected during the normal life course without MI. Improved post-MI preventative strategies, encompassing enhanced surveillance and detection, are required to tackle the high incidences of heart failure, atrial fibrillation, cerebrovascular disease, and renal failure observed in this population.