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Neither rule-in nor rule-out of myocardial infarction: characterization of the greyzone

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Background: Application of high-sensitivity troponin assays enables the application of rapid algorithms to triage patients with suspected acute myocardial infarction (AMI) after only 1 hour. This approach requires lower troponin cutoff concentrations, which results in an increasing number of patients, who neither match criteria for rule-out nor rule-in of AMI. Current guidelines recommend further observation of these "greyzone" patients, but little is known about this population.

Objective: To characterize this heterogeneous patient population in terms of underlying diagnoses and follow-up events.

Methods: In total, 33,904 patients with acute onset chest pain not matching criteria to rapidly rule-in or rule-out of AMI were divided into rule-in, rule-out and "greyzone" according to a recently published 1-hour algorithm based on high-sensitivity troponin I. Final diagnoses were adjudicated by two trained cardiologists. 75 Patients with ST-elevation AMI were excluded. Follow-up was performed up to 12 months after admission. Overall mortality, coronary death and cardiac non-coronary death during follow-up were assessed.

Results: 1 hour after admission 652 of 1625 patients were classified as "greyzone". When compared to all patients, "greyzone" patients were older (75 years vs 65 years) and had more often classical cardiovascular risk factors. The final diagnosis of these patients was AMI in 13.6%, while unstable angina was diagnosed in 12.7%. Cardiac but non-coronary chest pain was observed in 42.8% (among these 42.5% hypertension, 14.9% heart failure, 19% atrial fibrillation). The overall mortality of "greyzone" patients after 12 months was 8.4% (n=47) compared to 1.3% and 7.24% in the rule-out and the rule-in population. Most of these patients died from non-cardiac reasons (5.5%; n=31) Cardiac but non-coronary death occurred in 2.0% (n=11), while cardiac death was rare with only 0.9% (n=5).

Conclusion: Patients with acute onset chest pain not matching criteria to rapidly rule-in or rule-out AMI require meticulous evaluation, since 1 out of 8 patients has acute myocardial infarction. Future clinical studies are needed to establish evidence based treatment recommendations for this heterogeneous population.

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Purpose: Several international studies have shown that patients admitted with an acute myocardial infarction (AMI) on weekends had a higher mortality rate than patients admitted on weekdays. In the current study we aimed to assess this “Weekend-effect” one year after acute myocardial infarction in all hospitals in the Netherlands.

Methods: In the Netherlands, all inhabitants are by law obliged to have health insurance and all claim data are centrally registered. In 2012 and 2013, all national diagnosis-codings of STEMI and NSTEMI patients were acquired. One-year mortality rate and treatment with percutaneous coronary intervention (PCI) were compared between weekdays and weekends (holidays included) in STEMI and NSTEMI patients.

Results: In total, 59,524 patients (57±13 years, 66% male) were included of whom 33,904 (57%) had a STEMI. Overall 6,857 (12%) patients died in the year following acute myocardial infarction. In STEMI patients, no differences in one-year mortality rates were observed between admission on weekdays or weekends. In NSTEMI patients, one-year mortality was higher in those admitted during weekends (weekdays 11% versus weekends 13%, p<0.001). Furthermore, STEMI patients admitted during weekends are more often treated with PCI (weekdays 77% versus weekends 81%, p<0.001). Conversely, NSTEMI patients admitted during weekends are less often treated with PCI (weekdays 35% versus weekends 32%, p<0.001).

Conclusion: In the Netherlands, NSTEMI patients admitted during weekends have a higher mortality rate compared with patients admitted during weekdays.

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Gender differences in the decrease of in-hospital mortality in patients with acute myocardial infarction in Switzerland

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Background and purpose: Little is known about gender differences in the temporal trend of mortality related to acute myocardial infarction (AMI) over the last decades. To that purpose, we retrospectively analysed prospective data collected from the Swiss nationwide acute myocardial infarction registry AMIS Plus.

Methods: All AMI patients enrolled from January 1997 through December 2016 were included in the analysis. Patients were categorized as STElevation myocardial infarction (STEMI) or non-ST-elevation myocardial infarction (NSTEMI) as well as women or men.

Adjusted in-hospital mortality rate were calculated logistic regression analyses.

Results: Among 51,725 patients, 30,398 (59%) had STEMI and 21,327 (41%) NSTEMI; 73% were males (mean age 63±12 years) and 27% were females (71±12.5 years). Women were older than men both in STEMI group (71.3y±12.7y vs. 62.8y±12.8y; p<0.001) and in the NSTEMI group (72.2y±12.2y vs. 65.6y±12.6y; p<0.001).

From 1997 to 2016, crude in-hospital mortality decreased from 9.8% to 5.5% in STEMI men and from 18.3% to 6.5% in STEMI women (p trend<0.001 for both).

In NSTEMI men it decreased from 7.1% to 2.1% in NSTEMI women from 11.0% to 3.6% (p trend<0.001 for both). The quadratic model of logistic regression for mortality of STEMI and NSTEMI patients demonstrated a significance for non-linear trend of age p<0.001 and p=0.001, respectively.

After adjustment for gender and age, early mortality reduction was 4% per additional admission year for STEMI (OR 0.96, 95% CI 0.95–0.97; p<0.001) and 6% per additional admission year for NSTEMI patients (OR 0.94, 95% CI 0.93–0.96; p<0.001). A borderline interaction between admission year and gender was observed in STEMI patients (p=0.019), but not in NSTEMI patients (p=0.75).

Age-adjusted mortality decreased per additional admission year in men with STEMI at a rate of 3% (OR 0.97, 95% CI 0.96–0.98; p<0.001), in STEMI women 5% (OR 0.95, 95% CI 0.93–0.96; p<0.001), in NSTEMI men 6% (OR 0.94, 95% CI 0.93–0.96; p<0.001) and in NSTEMI women 5% (OR 0.95, 95% CI 0.93–0.97; p<0.001).

In patients aged below 60 years a decrease in early mortality per year of STEMI was seen in women (OR 0.94, 95% CI 0.90–0.99; p=0.025) but not in men (OR 0.98, 95% CI 0.98–1.04; p=0.46) (interaction between sex and admission year: p=0.019). Even greater differences were seen in STEMI patients. Mortality per year dramatically decreased in NSTEMI women (OR 0.87, 95% CI 0.80–0.94; p<0.001) but was not significant in men (OR 0.98, 95% CI 0.94–1.03; p=0.41) (interaction between sex and admission year: p=0.009).

Conclusions: During the last 20 years, in-hospital mortality of AMI patients in Switzerland has halved and the gender gap has been reduced. The reduction was more prominent in females, particularly in the population below 60 years of age.

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Impact of gender on 30-day readmission after a primary diagnosis of NSTEMI. A nationwide analysis in the United States

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Background: Non-ST-elevation myocardial infarction (NSTEMI) is a major cause of vascular and cardiac death in western countries. While studies have shown higher inpatient mortality in females than males during admission, there is limited data on whether gender also plays a role in readmission after NSTEMI.

Purpose: We aim to identify gender differences among patients hospitalized with NSTEMI and the etiologies for readmission.

Methods: Using the 2014 National Readmission Database we included patients admitted with a primary diagnosis of NSTEMI and divided them into two groups (male and female). ICD9 codes were used to identify NSTEMI (410.7x), patient characteristics and inpatient procedures, as well as the reasons for readmission based on their primary diagnosis. We used logistic regression to assess for statistical significance.

Results: A total of 158,312 patients were included in the analysis, 94,110 were...