Management of patients with acute myocardial infarction treated between 2019–2022 with 12-month follow-up: Data from comprehensive all-comers administrative database covering a whole population of Poland

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Short title: Management of patients with acute myocardial infarction: Data covering a whole population of Poland

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INTRODUCTION

Globally, cardiovascular disease (CVD) with an acute myocardial infarction (AMI) often as a first clinical presentation is the leading cause of death and morbidity [1]. Although age-adjusted AMI-related mortality has been steadily declining, Ziun et al. [2] thorough analysis of the entire European Union (EU-27) population over the past ten years revealed that AMI was responsible

for roughly 47 deaths per 1000 people, confirming that AMI is a significant cause of death in Europe both in terms of absolute numbers and proportionate mortality.

The recent report from a countrywide population-based study analyzed the data of patients hospitalized for AMI in 2018, with general conclusion that a potential for improving prognosis in patients with AMI in Poland remains considerable [3].

Dedicated and updated evaluations that measure in-hospital and early follow-up clinical outcomes are required in order to assess the impact of modern therapeutic techniques on patients with AMI. Regarding the distribution of healthcare resources and future goals for primary and secondary CVD prevention, this might be quite helpful.

Therefore, based on data from comprehensive all-comers administrative database covering a whole population of Poland, we aimed to present the current management with in-hospital and 12-month outcomes of patients hospitalized with the diagnosis of AMI in 2019–2022 in Poland.

METHODS

Patients aged 18 and older who were admitted for the first time to the hospital for AMI in Poland from January 1, 2019, to December 31, 2022, were included in the study. This cohort comprised individuals with documented non-ST-elevation myocardial infarction, nonspecific myocardial infarction, and ST-elevation myocardial infarction. Participants were required to have submitted information to the National Health Fund database during the study period, corresponding to the ICD-10 codes I21; I21.0; I21.1; I21.2; I21.3; I21.4; I21.9; I22; I22.0; I22.1; I22.8; I22.9, regardless of any prior AMI history.

The index hospitalization for AMI was characterized as a continuous hospital admission, encompassing all potential transfers between wards or hospitals for any reason until the patient was discharged home or deceased. If the time interval between hospital discharge and subsequent admission for AMI was ≤1 day, both admissions were classified as resulting from the same MI.

The National Health Fund database was utilized to ascertain patients' histories, recurrent hospitalizations, and invasive cardiac procedures. The e-Health Center (*Centrum E-Zdrowie*) Database was used to acquire information regarding the medical therapy prescribed at the discharge site. Hospitalization was defined as admission to a healthcare facility for more than 24 hours, unless the patient died within that timeframe. The mortality rates were assessed between groups covered and not covered by the National Comprehensive Care after Myocardial

Infarction (KOS) program, as well as between those treated and not treated with percutaneous coronary intervention (PCI). Follow up for clinical events and life status was censored at 1 year.

Approval from an ethics committee was unnecessary since the authors conducted an analysis of the national database. Informed consent was unnecessary.

Statistical analysis

Statistical analysis involved descriptive statistics. The normality of the distribution was verified using the Shapiro–Wilk test. The continuous variables are presented as the means, standard deviations (SD). The categorical variables are presented as percentages. The Pearson χ^2 test was utilized to compare mortality rates between the PCI+ and PCI– groups, as well as the KOS+ and KOS– groups. To calculate the admission rate for MI (number of admissions per 100 000 inhabitants) we used data provided by the Polish Central Statistical Office [4]. TIBCO Software Inc. (2017) Statistica (data analysis software system), version 13.3 was used for all calculations.

RESULTS AND DISCUSSION

During the study period, among a total of 292 284 patients hospitalized with a diagnosis of AMI in Poland, 33.6% (n = 98 318) were diagnosed with ST-elevation myocardial infarction, while 66.4% (n = 193 966) were diagnosed with non-ST-elevation myocardial infarction. The mean number of patients admitted during the course of the study was 73071, mean (SD-standard deviation) 5457 each year, which corresponds to a mean admission rate of 193.3, mean (SD) 1.4 per 100,000 inhabitants per year. The mean age was 68.1 years, with males constituting 64.5% of the sample, and AMI presented as the initial manifestation of coronary artery disease (in the absence of prior chronic coronary syndrome) in 57.7% of patients (Figure 1).

A significant proportion of patients underwent invasive management, with 92% receiving coronary angiography, 76.2% undergoing PCI, and 3.4% having coronary artery bypass grafting. Intravascular ultrasound was recorded in 5.4% of patients. Dual antiplatelet therapy was prescribed on discharge in 94% of patients. Statins were prescribed to 90% of patients. In-hospital mortality was significantly lower in the PCI+ group compared to the PCI– group (7.5% vs. 14.4%; P <0.001) (Figure 1).

Similarly, a notable difference in all-cause 12-month mortality was observed between the PCI+ and PCI– groups (14.5% vs. 27.6%; P <0.001) for the entire cohort, as well as between the KOS+ and KOS– groups (5% vs. 11.5%; P <0.001) for patients who survived initial hospitalization (Figure 1). Overall, 52583 of patients died during a follow-up period. Baseline

clinical characteristics, in-hospital and 12-month outcomes are detailed in Supplementary material (*Table S1*). Key findings of the study are summarized in Figure 1.

This analysis covered the entire country and included information on all patients who were hospitalized in Poland for AMI between the years 2019 and 2022. A total of 292 284 people were hospitalized for AMI during this time period, with a mean of 73 071 cases per year. This indicates a reduction of 2797 patients affected by AMI, representing approximately 3.7%. This finding may be supported by various observations, including alterations in physicians' habits regarding the diagnosis and reporting of AMI, increased knowledge, appreciation, and adherence to prescribed medical therapy among patients with established CVD, enhancements in the management of primary cardiovascular risk factors within the general Polish population, and a subsequent decrease in the number of patients hospitalized for AMI during the COVID-19 pandemic [5–8].

In-hospital and 12-month mortality rates, while comparable to those in 2018 and significantly lower than those observed in 2009–2010 [3, 9], continue to be elevated. Consequently, additional measures should be considered to enhance the prognosis of AMI patients, including established objectives of AMI management, aimed at reducing mortality [10]. The proportion of patients undergoing coronary angiography, PCI, and coronary artery bypass grafting was relatively high; however, the use of intravascular imaging during PCI was notably low, with only 5.4% of patients receiving it. This issue must be addressed, considering the beneficial effects of intravascular ultrasound-guided PCI on all-cause mortality and major adverse cardiac events [11]. Similarly, we observed a low utilization of cardiac rehabilitation and KOS-zawal progam, with only 30.5% and 20.2% of patients participating respectively. Though, cardiac rehabilitation and KOS-zawal have been shown to decrease mortality, morbidity, and hospital readmissions [12–14]. Although, a key strength of the present study lies in the assessment of all presented outcomes, which was conducted using a centralized, national database. This approach ensured a thorough and comprehensive capture of all events. The comparison of all-cause mortality in the KOS+ vs. KOS– and PCI+ and PCI– groups, however, is the primary limitation of our analysis that needs to be acknowledged. This comparison is only hypothesis-generating and calls for more thorough investigation.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/polish_heart_journal.

Article information

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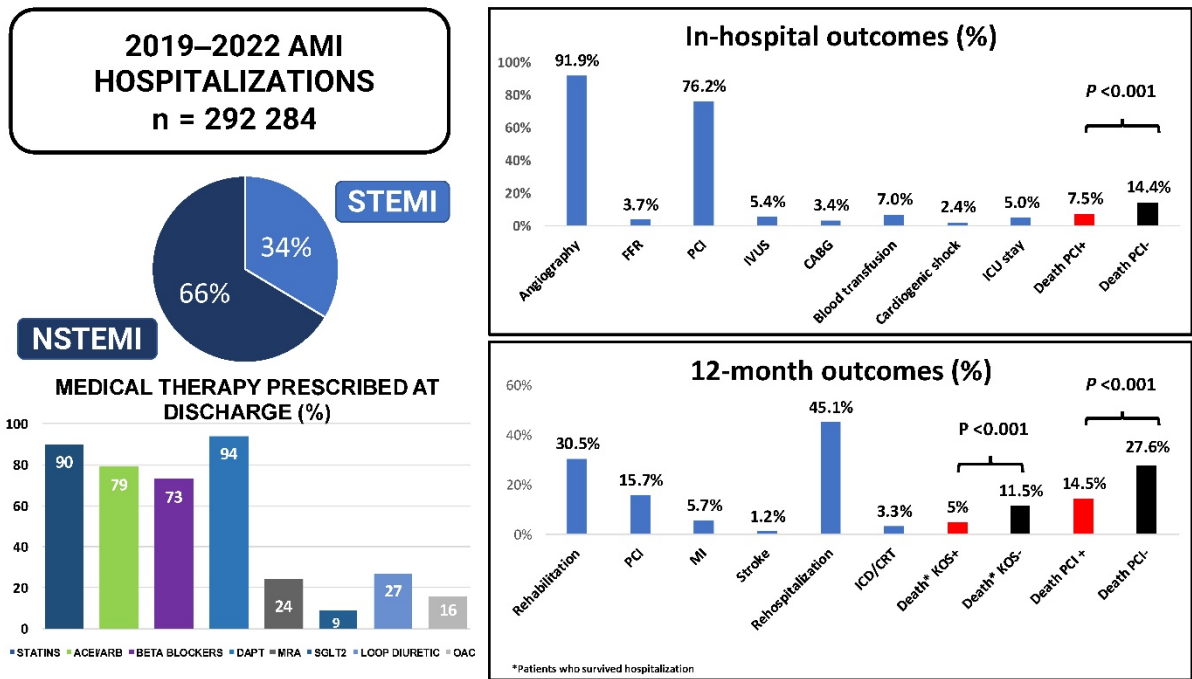
Figure 1. Graphical presentation of the major findings coming from presented study

Abbreviations: ACEI, angiotensin-converting enzyme inhibitors; ARB, angiotensin receptor blockers; CABG, coronary artery bypass grafting; CRT, cardiac resynchronization therapy; DOAC, direct oral anticoagulants; FFR, fractional flow reserve; ICD, implantable cardioverter-defibrillator; ICU, intensive care unit; IVUS, intravascular ultrasonography; KOS, National Comprehensive Care after Myocardial Infarction program (KOS-zawał); MRA, mineralocorticoid receptor antagonist; OAC, oral anticoagulants; PCI, percutaneous coronary intervention; SGLT2, sodium-glucose cotransporter-2