

Mortality 30 days after acute myocardial infarction:

focus on the validation of a national indicator

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INTRODUCTION

Since 2015, the Haute Autorité de santé (HAS) – or French National Authority for Health – has been developing outcome indicators based on national medico-administrative databases, using a robust method conceived to improve care quality and safety. This work is achieved through a partnership with multidisciplinary working groups of healthcare professionals, medical information coding doctors and patients.

In 2020, the validity of an outcome indicator in cardiology measuring mortality 30 days after acute myocardial infarction (AMI) was assessed. As 95% of mortality is detected in hospitals, the validation study was based on the French national discharge database.

Aim of this retrospective study: to assess the performance of this new indicator via its positive predictive value (PPV) using a hospital discharge database algorithm (see 4 of figure 1).

METHODS

- Creation of the database**
- Inclusion criteria: Adult patients admitted for AMI (principal diagnosis ICD-10 codes: STEMI I21.0, I21.1, I21.2, I21.3; NSTEMI I21.4; Non-specific AMI I21.9), between January 1st and November 30st, 2018;
 - Exclusion criteria: patients not admitted from their home, with death not related to in-hospital care and/or stays with data or linkage problems;
 - In-hospital mortality detected from the date of admission up to 30 days.
- Patient’ records analysis**
- Identification of patient records with observed death 30 days post-AMI, within the AMI stays or within readmissions in the hospital where AMI stay was coded;
 - Records review carried out by clinicians in volunteer hospitals having at least 1 death 30 days post-AMI observed in the hospital discharge database.
- Tools provided to hospitals**
- Software to identify the patients, retrieve and review their records;
 - A grid to analyse each patient record;
 - Description of the tested algorithm;
 - Cardiovascular disease coding guidelines.
- Algorithm performance assessment:** positive predictive value (PPV), percentage of deaths 30 days post-AMI observed in the database that were confirmed in the corresponding patient records.

RESULTS

Over the study period, 536 hospitals were selected, providing 32% of the deaths detected in 2018. Overall, in-hospital 30 days post-AMI mortality rate was 5%.

Among the 536 hospitals with at least 1 death, 149 participated in the reviewing process.

- They represent 26% of the public general hospitals (N = 87), 22% of the teaching hospitals (N = 14), 46% of the non-profit hospitals (N = 12), 33% of the private hospitals (N = 36);
- 1,086 patient records were reviewed corresponding to 31% of 3,495 observed deaths 30 days post-AMI in 2018 (table 1). A clinician participated to the review of 84% of the patient records.

AMI detection reliability: 84,5% (918 AMI confirmed/1,086 reviewed records). Coding quality of AMI was correct, but not at the subtype level (STEMI vs NSTEMI) (table 2).

PPV = 83,5%, good reliability of the tested algorithm.

Cause of death: 89% were cardiovascular (acute and severe complications: cardiogenic choc, cardio-respiratory arrest, coronary/ventricular rupture, rhythm dysfunction...).

	At least 1 stay of AMI	At least 1 death observed 30 days after AMI	
Hospitals	787	536 hospitals (68,1%) concerned by the reviewing process: 337 were public general hospitals, 65 teaching hospitals, 28 non-profit hospitals, 108 private hospitals	
Stays Discharge data 2018	77,237	74,624 AMI stays (96,6%)	3,495 observed deaths, 3,338 (95,5%) detected during AMI stays

Table 1. Stays and hospitals concerned by the patient record reviewing

Type of AMI	Number of AMI confirmed in the files	Type of AMI coded in the database
STEMI	645	552 STEMI, 52 NSTEMI and 41 Non-Specific
NSTEMI	263	80 STEMI, 157 NSTEMI and 26 Non-Specific
Non-Specific AMI	10	7 STEMI, 1 NSTEMI and 2 Non-Specific
All types of AMI	918	639 STEMI, 210 NSTEMI and 69 Non-Specific

Table 2. Codage quality of the 918 reviewed AMI

CONCLUSION

According to the HAS method, a PPV between 75% and 85% validates the indicator for in-hospital quality improvement and risk management. Since then, the adjustment model was validated, and the “ratio of observed on expected 30 days post-AMI mortality”, including observed death out of hospitals, was calculated using claim data for 2018, 2019, 2020 and 2021.

Results were provided to hospitals for quality and safety improvement purpose (see 5 and 6 of figure 1).

As the PPV is less than 85%, a second patient record review is required to end the development. Currently, this QSI is to be used as a trigger tool, integrated in a surveillance system for alerts. In the event of a result deviating from the expected value, professionals are expected to analyse their results and practices, and to implement improvement actions.

Figure 1. Strategy for the development, validation and use of HAS’ outcome quality and safety indicators (QSI)

