

The Effect of Previous AMI on Mortality Following Subsequent AMI

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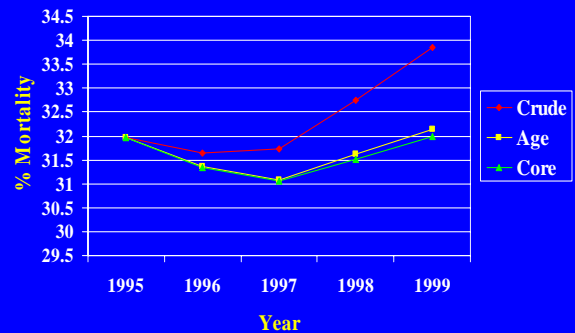
Acknowledgements

- Arlene Ash, Ph.D.
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Acute Myocardial Infarction (AMI)

- Also known as Heart Attacks
- Leading cause of death in U.S.
 - One-year post-AMI mortality is 30% (in Medicare)
- High Prevalence
 - 1.1 million people in U.S. have AMI each year
 - 395K AMI hospitalizations in Medicare population
- Expensive
 - Estimated \$3.6 billion in costs

Post-AMI Mortality Trend in Medicare



Original Hypothesis about the Role of Previous AMI

Advances in practice and technology

More survivors

More admissions for second AMIs

More deaths

Methods - Case Identification

- All Medicare patients with a principal inpatient diagnosis code of AMI in 1995
 - ICD9-CM code 410xx, except 410x2
 - Using MedPAR
- Include only if eligible for part A (HI) and part B (SMI) for entire prior year
 - To ensure data completeness
 - Excluded/included similar with respect to gender, age, race, comorbidity
- Transfers (11.3%) rolled up into one record
 - Admission within 1 day of discharge
 - In line with published literature

Methods - Comorbidity Burden

- Diagnoses observed in the 365 “pre-” period
 - Using MedPAR, Outpatient, Carrier (Not labs)
- DCG Score
 - Hierarchical categorization of diagnoses
 - Relative Risk score: expected cost in the upcoming year, relative to average cost
 - RR = 2.0 → “expected to cost 2 times average”
- Calculated based on pre and index separately
 - Index diagnoses may reflect complications caused by the admission

Methods – Identifying Previous AMI

- Inpatient admission for AMI
 - Principal MedPAR diagnosis 410xx (not 410x2)
- Sensitivity Analyses
 - 1. Any MedPAR diagnosis 410xx (not 410x2)
 - 2. Any diagnosis (MedPAR, outpatient, carrier) of 410xx (not 410x2)
 - 3. Any diagnosis of 410xx or 412xx (old MI)

Methods - Statistical Analysis: Multiple Logistic Regression

- Outcome: One-year mortality
- Exposure: previous AMI
- Covariates:
 - Age
 - Gender
 - Original Reason for Entitlement (aged vs ESRD/disabled)
 - DCG score (in categorical ranges)

Results - Population Characteristics

Cases	305,468
People	287,358
Female	48%
White	90%
Age (mean)	75.5
ESRD/Disabled ORE	17%
Mean DCG (pre)	1.66
Mean DCG (index)	1.91
prev AMI (Inpt Adm)	18.6%
prev AMI (Any Dx)	31.4%
Diabetes	38%
CHF	48%

Results - Bivariate Analysis

- AMI in previous year (n=56,889)
 - 27% died
- No AMI in previous year (n=248,579)
 - 33% died
- Crude estimate: 25% lower odds of dying within one year of an AMI for those with previous AMI relative to those without a previous AMI

*Note: p-values are always significant in huge data sets
(χ^2 p-value = 2.24×10^{-166})*

Results - Multivariate Analysis

	Odds Reduction	c-stat
Crude	25%	0.52
Core	15%	0.65
+index	26%	0.77
+pre	44%	0.71

Odds Reduction = % reduced odds of post-AMI mortality with previous AMI

Results – Sensitivity Analysis

	Main Analysis	Sensitivity Any Dx
Crude	25%	6%
Core	15%	-2%
+index	26%	10%
+pre	44%	38%

Table presents Odds Reductions

Conclusions/Discussion

- Previous AMI is protective against mortality following subsequent AMI
- Examining what changed between first and second AMI might help understand what factors are associated with increased survival following AMI

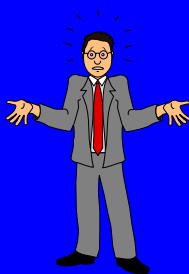
Possible Explanations

- Change in Personal Habits or Lifestyle
 - Diet
 - Exercise
- Change in Medical Profile
 - Medication
- Change in AMI awareness
 - Early Identification of onset of AMI
- Subsequent AMIs are different
 - Side-effects of interventions (re-stenosis)
 - Recurrent AMIs are milder?
- “Hardy person” effect

Impact on Medical System

- Identify when someone is at risk
 - “Missed Opportunities” Paper (under review)
 - Further research
- Targeted group - modify behavior/knowledge
 - Diet
 - Exercise
 - Medicines
 - Detection

Questions?



CMS Project on AMI Trend

- Apply risk-adjustment models to explain trend
 - “Risk Adjustment Models to Examine AMI Mortality Trend”
 - Ash, Posner, Chaisson, Speckman, Franco, Yacht, Caldwell, Hadad, Moskowitz
 - Report to CMS (HCFA) in 2001, updated in 2002
 - “Using Claims Data to Examine Mortality Trends Following Hospitalizations for Heart Attack in Medicare”
 - Ash, Posner, Speckman, Franco, Yacht, Bramwell
 - Health Services Research (2003), vol. 38, no.5, pp.1253-1262