



دانشگاه علوم پزشکی و خدمات بهداشتی درمانی گیلان


PERCUTANEOUS MYOCARDIAL REVASCULARIZATION IN LATE-PRESENTING PATIENTS WITH STEMI

AMERICAN COLLEGE OF CARDIOLOGY FOUNDATION/AMERICAN HEART ASSOCIATION GUIDELINES


primary percutaneous coronary intervention (PCI) is reasonable in patients with STEMI if there is clinical and/or electrocardiogram (ECG) evidence of ongoing ischemia between 12 and 24 hours following symptom onset (Class IIa, Level of Evidence: B). ■

THE EUROPEAN SOCIETY OF CARDIOLOGY

consider a routine primary PCI strategy in patients presenting late (12-48 hours) after symptom onset (Class IIa, Level of Evidence: B) ■



AS A RESULT, THERE IS NO REAL CONSENSUS AS TO WHETHER PCI IS ALSO BENEFICIAL IN PATIENTS PRESENTING >12 HOURS FROM SYMPTOM ONSET IN THE ABSENCE OF CLINICAL AND/OR ELECTROCARDIOGRAPHIC EVIDENCE OF ONGOING ISCHEMIA



AIM OF THIS STUDY

long-term outcomes in latecomer STEMI patients in relation with the use of revascularization in 3 sequential French surveys conducted between 2005 and 2015 ■

METHODS

were conducted over a 1-month period, 5 years apart, over a 10-year period (2005-2015) ■

FAST-MI (French Registry of Acute ST-Elevation or non STEMI 2005) ■

FAST MI 2015 ■

PRIMARY OBJECTIVES

Charactristic ■

Management ■

Out comes of acute MI ■



ALL 3 REGISTRIES CONSECUTIVELY INCLUDED PATIENTS WITH STEMI ADMITTED TO INTENSIVE CARDIOVASCULAR CARE UNITS (ICCUS) WITHIN 48 HOURS OF SYMPTOM ONSET, DURING A SPECIFIED 1-MONTH PERIOD



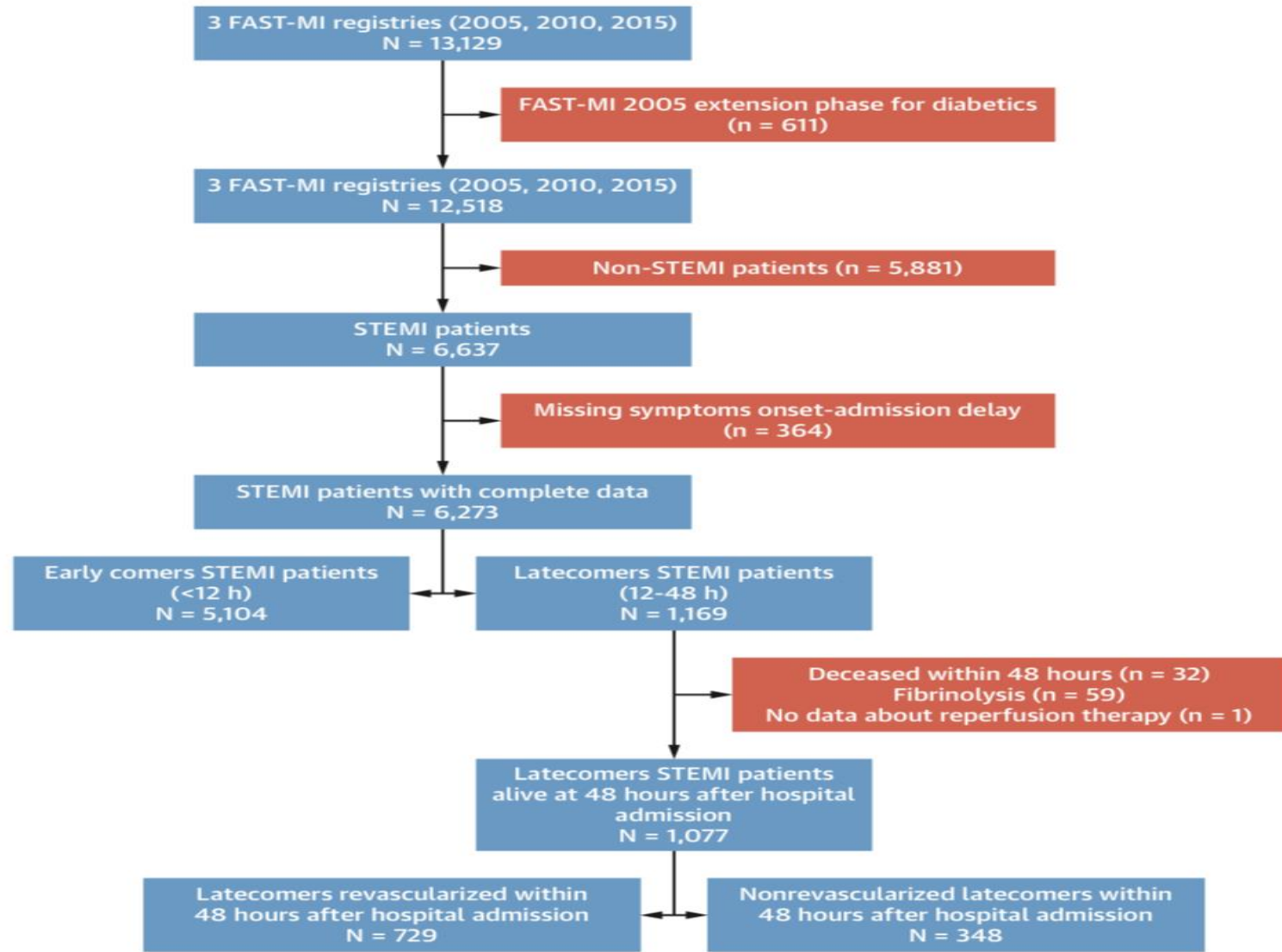
ACUTE MI

SYMPTOMS ■

CARDIAC BIOMARKERS(TROPONIN,CK-MB,CK) ■

ECG CHANGE ■

FIGURE 1 Study Flowchart



The study population was derived from 3 French nationwide 1-month registries of myocardial infarction (FAST-MI [French Registry of Acute ST-elevation and non-ST-elevation Myocardial Infarction] registries) conducted in 2005, 2010, and 2015. PCI = percutaneous coronary intervention; STEMI = ST-segment elevation myocardial infarction.

FOLLOW UP PARAMETER (30 DAYS)

- Death rate ■
- Recurrent MI ■
- Stroke ■
- All case death ■
- All case hospitalization ■
- Cardiovascular hospitalization ■
- Hospitalization for heart failure and bleeding ■

OUTCOME

Primary outcome: all case mortality ■

Second outcome: recurrent AMI, Stroke, bleeding ■

PATIENT PRESENTATION

Latecomer patients were more frequently women (30.8% vs 25.2%; $P < 0.001$) and significantly older ■

Diabetes and hypertension were more prevalent in the late comers ■

Prior history of heart failure was also more frequent among late comers ■

prior AMI or prior PCI were significantly less frequent in latecomers ■

chest pain was less frequently typical among late comers ■

Latecomers were less likely to be admitted via mobile ICU (56.3% vs 78.9%; $P < 0.001$) and were more often admitted via emergency medical service ■

TABLE 1 Comparison of Early and Latecomer Patients Characteristics and Management				
	All (N = 6,273)	Early Comers (n = 5,104)	Latecomers (n = 1,169)	P Value
Demography				
Age, y	63.1 ± 14.3	62.6 ± 14.1	65.2 ± 14.8	<0.001
Age ≥75 y	1,574 (25.1)	1,203 (23.6)	371 (31.7)	<0.001
Women	1,648 (26.3)	1,288 (25.2)	360 (30.8)	<0.001
Risk factors				
Hypertension	2,967/6,253 (47.5)	2,346/5,086 (46.1)	621/1,167 (53.2)	<0.001
Hypercholesterolemia	2,511/6,244 (40.2)	2,023/5,080 (39.8)	488/1,164 (41.9)	0.187
Diabetes	1,036/6,242 (16.6)	789/5,080 (15.5)	247/1,162 (21.3)	<0.001
Current smoking	2,517/6,120 (41.1)	2,069/4,974 (41.6)	448/1,146 (39.1)	0.120
Family history of CAD	1,570/5,928 (26.5)	1,295/4,822 (26.9)	275/1,106 (24.9)	0.176
Obesity (BMI ≥30 kg/m ²)	1,175/5,860 (20.1)	948/4,781 (19.8)	227/1,079 (21.0)	0.370
Cardiovascular history and comorbidities				
Prior AMI	730/6,221 (11.7)	621/5,061 (12.3)	109/1,160 (9.4)	0.006
Prior PCI	673/6,237 (10.8)	579/5,077 (11.4)	94/1,160 (8.1)	0.001
Prior stroke/TIA	294/6,258 (4.7)	225/5,091 (4.4)	69/1,167 (5.9)	0.030
Peripheral artery disease	321/6,253 (5.1)	248/5,086 (4.9)	73/1,167 (6.3)	0.054
History of heart failure	184/6,254 (2.9)	126/5,087 (2.5)	58/1,167 (5.0)	<0.001
Chronic kidney disease	185/6,254 (3.0)	147/5,087 (2.9)	38/1,167 (3.3)	0.505
Respiratory failure	226/6,243 (3.6)	184/5,077 (3.6)	42/1,166 (3.6)	0.971
History of cancer	491/6,243 (7.9)	383/5,077 (7.5)	108/1,166 (9.3)	0.049
Medication before AMI				
Antiplatelet therapy	1,392 (22.2)	1,131 (22.2)	261 (22.3)	0.901
Statin	1,441 (23.0)	1,168 (22.9)	273 (23.4)	0.731
Beta-blocking agent	1,289 (20.6)	1,042 (20.4)	247 (21.1)	0.586
ACE inhibitor or ARB	1,580 (25.2)	1,245 (24.4)	335 (28.7)	0.002
Clinical presentation				
SBP, mm Hg	132 ± 26 6,068	132 ± 26 4,931	135 ± 26 1,137	<0.001
Heart rate, beats/min	78 ± 18 6,037	77 ± 18 4,910	80 ± 19 1,127	<0.001
LVEF, %	50.1 ± 11.4 4,625	50.4 ± 11.3 3,716	49.0 ± 11.9 1,127	0.002
Anterior MI	2,583/5,865 (44.0)	2,102/4,793 (43.9)	481/1,072 (44.9)	0.546
Typical chest pain	5,335/6,217 (85.8)	4,432/5,066 (87.5)	903/1,151 (78.5)	<0.001
Cardiogenic shock	100/6,008 (1.7)	79/4,889 (1.6)	21/1,119 (1.9)	0.538
GRACE risk score	144 ± 35 5,851	143 ± 34 4,749	147 ± 37 1,102	0.003
Killip class >2	284/6,008 (4.7)	217/4,889 (4.4)	67/1,119 (6.0)	0.028
Out-of-hospital cardiac arrest	151/6,051 (2.5)	138/4,934 (2.8)	13/1,117 (1.2)	0.002
CRP, mg/L	5 (3-13) 4,556	5 (3-10) 3,688	9 (4-30) 868	<0.001
Delays				
Time from onset to first call or contact, h	1.3 (0.5-4.2) 6,229	1.0 (0.5-2.4) 5,076	13.5 (8.0-21.0) 1,153	<0.001
Time from first call or contact to ICU, h	2.2 (1.3-4.0) 6,242	2.0 (1.3-3.2) 5,089	4.8 (2.3-10.2) 1,153	<0.001
Time from onset to ICU admission, h	4.3 (2.5-9.0) 6,273	3.5 (2.3-5.7) 5,104	20.2 (15.4-27.9) 1,169	<0.001
Time from onset to angiography, h	5.6 (3.0-18.9) 5,816	4.4 (2.8-9.1) 4,783	27.5 (18.0-45.8) 1,033	<0.001
Time from onset to balloon, h	5.8 (3.3-18.5) 5,259	4.7 (3.0-9.5) 4,364	26.5 (17.5-45.5) 895	<0.001
Time from door to balloon, h	1.7 (0.7-6.7) 5,227	1.4 (0.6-4.4) 4,346	5.4 (1.9-24.5) 881	<0.001
Time from ICU admission to angiography, h	0.7 (0.3-7.6) 4,988	0.6 (0.3-3.1) 4,106	3.3 (0.7-22.1) 882	<0.001
Time from ICU admission to balloon, h	1.0 (0.5-7.0) 4,561	0.8 (0.5-3.2) 3,806	3.2 (0.9-22.7) 755	<0.001

Continued on the next page

TABLE 1 Continued

	All (N = 6,273)	Early Comers (n = 5,104)	Latecomers (n = 1,169)	P Value
Pre-hospital pathway				
Mobile ICU	4,667/6,247 (74.7)	4,013/5,086 (78.9)	654/1,161 (56.3)	<0.001
Patient's journey includes EMS	3,036/6,247 (48.6)	2,233/5,086 (43.9)	803/1,161 (69.2)	<0.001
Reperfusion therapy				<0.001
None	821 (13.1)	564 (11.1)	257 (22.0)	
Thrombolysis	968 (15.4)	905 (17.7)	63 (5.4)	
No thrombolysis but PCI	4,481 (71.5)	3,634 (71.2)	847 (72.6)	
Procedure during hospitalization				
Coronary angiography	5,993/6,269 (95.6)	4,920/5,101 (96.5)	1,073/1,168 (91.9)	<0.001
PCI	5,307/6,268 (84.7)	4,411/5,101 (86.5)	896/1,167 (76.8)	<0.001
Pre-PCI TIMI flow grade 2 or 3	1,289/5,258 (37.8)	1,671/4,280 (39.0)	318/978 (32.5)	<0.001
Post-PCI TIMI flow grade 2 or 3	4,686/5,384 (87.0)	3,906/4,414 (88.5)	780/970 (80.4)	<0.001
CABG	115/6,272 (1.8)	85/5,104 (1.7)	30/1,168 (2.6)	0.038
Hemodynamic and respiratory support				
IAPB	116/6,119 (1.9)	91/5,071 (1.8)	25/1,164 (2.2)	0.421
Other assistance	27/6,235 (0.4)	23/5,071 (0.5)	4/1,164 (0.3)	0.607
Assisted ventilation	166/6,205 (2.7)	133/5,045 (2.6)	33/1,160 (2.8)	0.691
Medication within first 48 h				
Aspirin	5,779 (88.9)	4,559 (89.3)	1,020 (87.3)	0.042
Clopidogrel	3,665 (58.4)	2,881 (56.5)	784 (67.1)	<0.001
Prasugrel	1,330 (21.2)	1,165 (22.8)	165 (14.1)	<0.001
Ticagrelor	1,304 (20.8)	1,110 (21.8)	194 (16.6)	<0.001
Glycoprotein IIb/IIIa inhibitors	332 (5.3)	249 (4.9)	83 (7.1)	0.002
Unfractionated heparin	2,612 (41.6)	2,117 (41.5)	495 (42.3)	0.588
LMWH	3,458 (55.1)	2,784 (54.6)	674 (57.7)	0.054
Fondaparinux	563 (9.0)	462 (9.1)	101 (8.6)	0.657
Bivalirudin	214 (3.4)	185 (3.6)	29 (2.5)	0.052
ACE inhibitor or ARB	3,824 (61.0)	3,135 (61.4)	689 (58.9)	0.116
Diuretic	1,537 (24.5)	1,202 (23.6)	335 (28.7)	<0.001
Beta-blocker	4,846 (77.3)	3,992 (78.2)	854 (73.1)	<0.001
Statin	5,316 (84.7)	4,357 (85.4)	959 (82.0)	0.004
Medication at discharge				
Aspirin	5,192/6,027 (86.2)	4,280/4,923 (86.9)	912/1,104 (82.6)	<0.001
P2Y ₁₂ inhibitor (any)	4,566/6,027 (75.8)	3,769/4,923 (76.6)	797/1,104 (72.2)	0.002
ACE inhibitor or ARB	4,386/6,027 (72.8)	3,595/4,923 (73.0)	791/1,104 (73.0)	0.353
Statin	5,137/6,027 (85.2)	4,223/4,923 (85.7)	914/1,104 (82.8)	0.011
Beta-blocker	5,014/6,292 (79.7)	4,088/5,114 (79.9)	926/1,178 (78.6)	0.306
Diuretic	1,246/6,027 (20.7)	978/4,923 (19.9)	268/1,104 (24.3)	0.001
Length of stay, days	7 (5-9)	7 (5-9)	7 (5-10)	0.003
Cardiovascular rehabilitation	641/6,026 (10.6)	524/4,922 (10.7)	117/1,104 (10.6)	0.963

Values are mean ± SD, n (%), n/N (%), n, or median (interquartile range).


ACE = angiotensin-converting enzyme; AMI = acute myocardial infarction; ARB = angiotensin 2 receptor blocker; BMI = body mass index; CAD = coronary artery disease; CRP = C-reactive protein; EMS = emergency medical service; IAPB = intra-aortic balloon pump; ICU = intensive care unit; LMWH = low-molecular-weight heparin; MI = myocardial infarction; PCI = percutaneous coronary intervention; SBP = systolic blood pressure; TIA = transient ischemic attack.

PATIENT MANAGEMENT

- Latecomer patients benefited less frequently from coronary angiographies (91.9% vs 96.5%; $P < 0.001$) and, as a result, these patients underwent less PCI
- the final angiographic result was not as good as for early comers, with a post-PCI TIMI flow grade 2/3 obtained in 80.4% of latecomers vs 88.5% of early comers.
- At discharge, aspirin, P2Y12 inhibitors, and statins were significantly less prescribed in latecomer patients.
- No differences were observed regarding angiotensin-converting enzyme (ACE) inhibitors/angiotensin 2 receptor blockers (ARBs) or beta-blockers
- diuretic agents were significantly more prescribed in late comers

COMPARISON OF REVASCULARIZED VS NONREVASCULARIZED LATECOMER PATIENTS.

- Patient treated with thrombolysis and patients deceased within 2 days after admission were excluded
- 729 patient 726 PCI, 3 CABG
- From 2005 to 2015, the use of coronary angiography in latecomers increase from 84.5 to 96.8(PCI; 66 TO 82.8)
- rate of utilization of evidence-based post-MI drugs (aspirin, P2Y12 inhibitors, beta-blockers, statins, and ACE inhibitors or ARBs) significantly increased in latecomers patients
- Revascularized latecomer patients were younger(less with HTN, more active smoker and positive FH of CAD) AND less comorbidities (history of HF,CKD)
- revascularized latecomer received significantly more ASA,P2Y12 inhibitor, astatin,ACEi,ARB, less frequently diuretics

- 
- In the latecomers group, median door-to balloon was 5.4 and it was longer in early group
 - It remains relatively short in this context and demonstrates that when revascularization was decided in a latecomer patient, it was achieved promptly in the majority of cases.

OUTCOMES OF REVASCULARIZED VS NONREVASCULARIZED LATECOMER PATIENTS.

In a multivariate analysis, after adjustment on year of admission, age, ■ smoking status, family history of coronary artery disease, prior AMI or PCI, prior stroke or transient ischemic attack, peripheral artery disease, chronic kidney disease, Killip at admission, and left ventricular ejection fraction at discharge, revascularization remained independently associated with a reduction of the occurrence of mortality

TABLE 2 Comparison of Latecomer Patients According to Their Revascularization Status

	Latecomers ^a (n = 1,077)	Revascularized ^b (n = 729)	Nonrevascularized (n = 348)	P Value
Year of admission				<0.001
2005	323 (30.0)	169 (23.2)	154 (44.3)	
2010	390 (36.2)	277 (38.0)	113 (32.5)	
2015	364 (33.8)	283 (38.8)	81 (23.3)	
Demography				
Age, y	65.1 ± 14.7	62.7 ± 14.2	70.2 ± 14.5	<0.001
Age ≥75 y	340 (31.6)	182 (25.0)	158 (45.4)	<0.001
Female	335 (31.1)	204 (28.0)	131 (37.6)	0.001
Risk factors				
Hypertension	579/1,076 (53.8)	354/729 (48.6)	225/347 (64.8)	<0.001
Hypercholesterolemia	449/1,073 (41.9)	299/727 (41.1)	150/346 (43.4)	0.490
Diabetes	227/1,071 (21.2)	142/727 (19.5)	85/344 (24.7)	0.053
Current smoking	415/1,055 (39.3)	323/716 (45.1)	92/339 (27.1)	<0.001
Family history of CAD	256/1,021 (25.1)	193/693 (27.9)	63/328 (19.2)	0.003
Obesity (BMI ≥ 30 kg/m ²)	216/1,012 (21.3)	144/692 (20.8)	72/320 (22.5)	0.542
Cardiovascular history and comorbidities				
Prior AMI	101/1,069 (9.5)	71/725 (8.4)	40/344 (11.6)	0.093
Prior PCI	84/1,070 (7.9)	56/725 (7.7)	28/345 (8.1)	0.824
Prior stroke/TIA	63/1,076 (5.9)	37/729 (5.1)	26/347 (7.5)	0.114
Peripheral artery disease	65/1,076 (6.0)	33/729 (4.5)	32/347 (9.2)	0.003
History of heart failure	53/1,076 (4.9)	23/729 (3.2)	30/347 (8.7)	<0.001
Chronic kidney disease	34/1,076 (3.2)	14/729 (1.9)	20/347 (5.8)	0.001
Respiratory failure	42/1,075 (3.9)	26/729 (3.6)	16/346 (4.6)	0.403
History of cancer	100/1,075 (9.3)	56/729 (7.7)	44/346 (12.7)	0.008
Medication prior AMI				
Antiplatelet therapy	245 (22.8)	145 (19.9)	100 (28.7)	0.001
Statin	250 (23.2)	170 (23.3)	80 (23.0)	0.904
Beta-blocking agent	227 (21.1)	141 (19.3)	86 (24.7)	0.043
ACE inhibitor or ARB	312 (29.0)	197 (27.0)	115 (33.1)	0.042
Initial presentation				
SBP, mm Hg	136 ± 26	135 ± 25	138 ± 27	0.113
Heart rate, beats/min	79.6 ± 18.6	77.4 ± 17.3	83.9 ± 20.2	<0.001
LVEF, %	49.2 ± 11.8	49.7 ± 11.2	48.2 ± 13.1	0.082
Killip class >2	54/1,036 (5.2)	27/697 (3.9)	27/339 (8.0)	0.005
Out-of-hospital cardiac arrest	9/1,031 (0.9)	6/704 (0.9)	3/327 (0.9)	1.000
Anterior MI	444/986 (45.0)	293/691 (42.4)	151/295 (51.2)	0.011
GRACE risk score	146 ± 36	142 ± 34	155 ± 37	<0.001
Medication at discharge (in patients alive at discharge)				
Aspirin	872/1,046 (83.4)	612/715 (85.6)	260/331 (78.6)	0.004
P2Y ₁₂ inhibitor	759/1,046 (72.6)	554/715 (77.5)	205/331 (61.9)	<0.001
ACE inhibitor or ARB	755/1,046 (72.2)	544/715 (76.1)	211/331 (63.8)	<0.001
Statin	870/1,046 (83.2)	616/715 (86.2)	254/331 (76.7)	<0.001
Beta-blocker	823/1,046 (78.7)	573/715 (80.1)	250/331 (75.5)	0.090
Diuretic	264/1,046 (25.2)	153/715 (21.4)	111/331 (33.5)	<0.001
Length of stay, days	7 (5-10)	6 (5-9)	9 (6-13)	<0.001
Cardiovascular rehabilitation	114/1,046 (10.9)	83/715 (11.6)	31/331 (9.4)	0.279

Values are n (%), mean ± SD, n/N (%), or median (interquartile range). ^aAlive at day 2 and after exclusion of latecomers who received thrombolysis. ^bWithin 48 hours after hospital admission.

Abbreviations as in Table 1.

TABLE 3 Early and Long-Term Outcomes of Latecomer Patients According to Their Revascularization Status

	All (N = 1,077)	Revascularized Latecomers (n = 729) ^a	Nonrevascularized Latecomers (n = 348)	P Value
Complications at 30 days				
All-cause death	3.7	2.1	7.2	<0.001
Recurrent AMI	0.9	0.6	1.7	0.060
Stroke	1.3	1.2	1.4	0.784
Bleeding (all)	1.6	1.0	2.9	0.018
Major bleeding ^b	0.9	0.4	2.0	0.016
Long-term complications				
All-cause death	44.9 (40.0-50.3)	30.4 (25.7-35.9)	78.7 (67.2-92.3)	<0.001
Recurrent AMI	7.2 (5.2-9.9)	5.4 (3.5-8.5)	11.0 (6.8-17.7)	0.031
Stroke	6.7 (4.8-9.4)	6.0 (3.9-9.1)	8.4 (4.9-14.5)	0.393
Bleeding (all)	9.8 (7.4-13.0)	8.3 (5.8-12.0)	13.1 (8.5-20.3)	0.136
Major bleeding ^b	6.4 (4.5-9.0)	5.1 (3.2-8.2)	9.1 (5.4-15.4)	0.120

Values are % or number of events per 1,000 patient-years (95% CI). ^aWithin 48 hours after hospital admission. ^bAccording to Thrombolysis In Myocardial Infarction classification.

AMI = acute myocardial infarction.

TABLE 4 Independent Predictors of All-Cause Mortality During Follow-Up in the Latecomer Patient Population

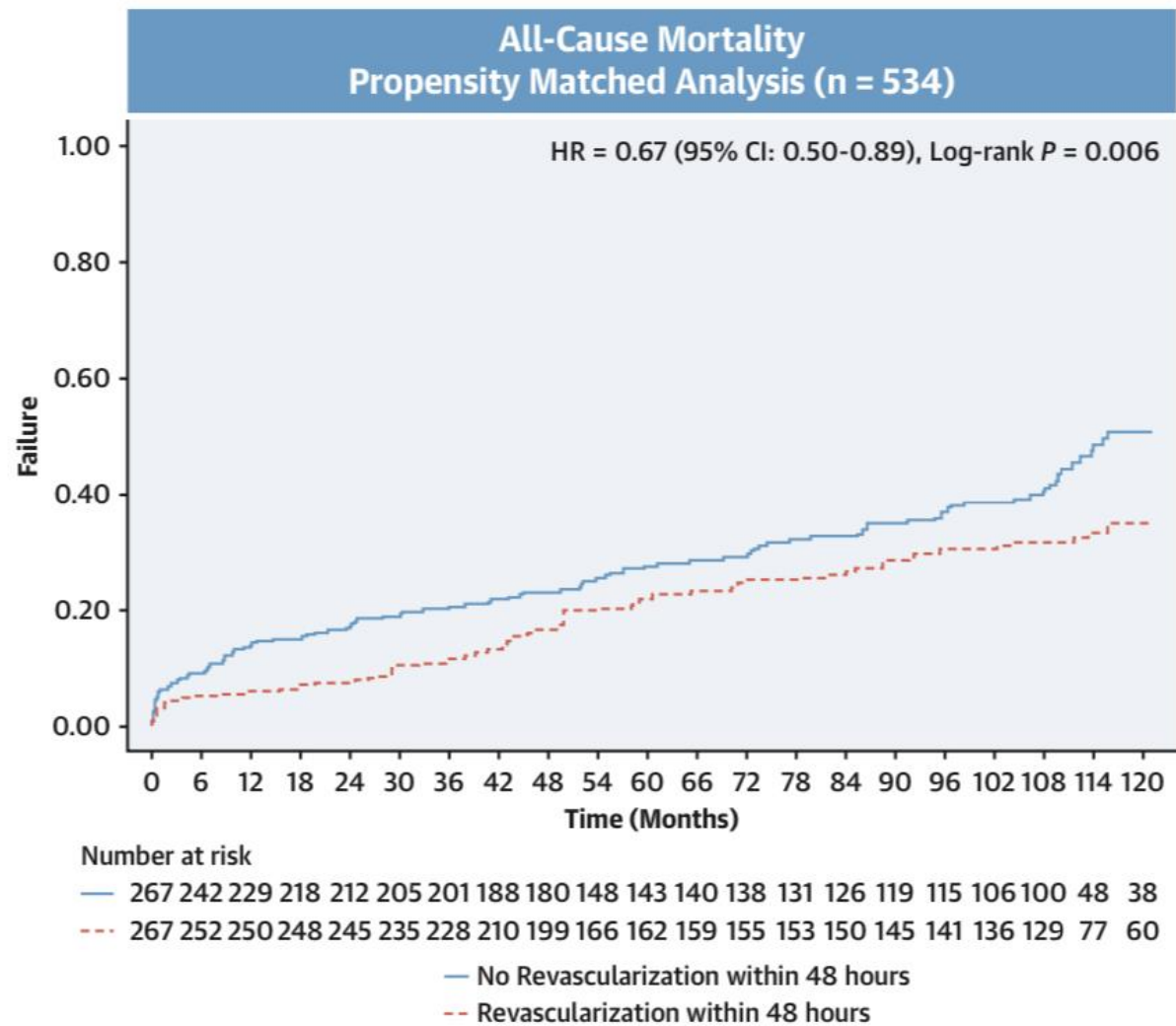
	HR	95% CI	P Value
Year			
2005	1.00		
2010	1.11	0.84-1.47	0.470
2015	0.74	0.47-1.16	0.189
Age at entry, y	1.07	1.06-1.09	<0.001
Smoking	1.50	1.07-2.10	0.018
Family history of CAD			
No	1.00		
Yes	0.55	0.37-0.80	0.002
Unknown	1.99	1.09-3.60	0.024
Prior AMI/PCI	2.10	1.57-2.80	<0.001
Prior stroke/TIA	1.61	1.10-2.36	0.015
Peripheral vascular disease	1.62	1.12-2.34	0.010
Chronic kidney disease	1.90	1.16-3.09	0.010
Killip >2 at entry	1.57	1.07-2.30	0.021
Revascularization within 48 h after hospital admission	0.65	0.50-0.84	0.001
LVEF at discharge			
≥40%	1.00		
<40%	2.01	1.44-2.79	<0.001
Unknown	1.25	0.94-1.66	0.123

LVEF = left ventricular ejection fraction; other abbreviations as in [Table 1](#).

DISCUSSION

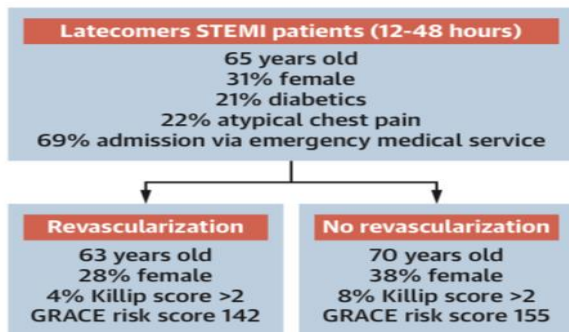
- e observed a reduction of the late comer patient proportion from 22.7% in 2005 to 16.1% in 2015, and an increase of the use of invasive strategy and evidence-based medications in this population.
- revascularization within 48 hours after hospital admission was independently and significantly associated with an improvement of short- and long-term clinical outcomes in these patients.tients

FIGURE 2 Mortality in the Latecomer Population in a Propensity-Matched Analysis

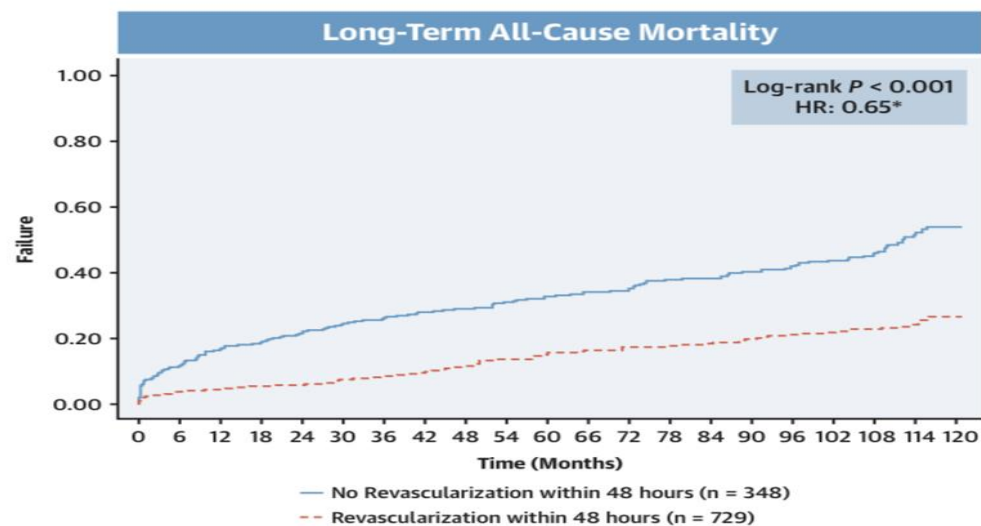


In this propensity-matched analysis, which included 2 groups of 267 matched latecomer patients, revascularization within 48 hours after hospital admission was associated with a significant reduction of mortality rate during follow-up (log-rank test *P* = 0.006; HR: 0.67; 95% CI: 0.50-0.89).

CENTRAL ILLUSTRATION Mortality Comparison in the Latecomer Population According to Revascularization Status



30-day mortality (%)	2.1%	7.2%	$P < 0.001$
Long-term mortality (for 1,000 patient-years)	30.4	78.7	$P < 0.001$



Bouisset, F. et al. *J Am Coll Cardiol.* 2021;78(13):1291-1305.


Revascularization of latecomer STEMI patients is associated with a significant reduction of mortality rate during follow-up (log-rank test $P < 0.001$; adjusted HR: 0.65; 95% CI: 0.50-0.84; $P < 0.001$). This comparison is done on latecomer STEMI patients alive at 48 hours, revascularized within 48 hours following hospital admission, and after exclusion of patients who received thrombolysis. *Immortal time bias avoided in the design and adjustment for confounders in the analysis. STEMI = ST-segment elevation myocardial infarction.

LATECOMERS PROFILE AND PREVALENCE

- E. In our population, diabetes, age, prior heart failure, and atypical chest pain are independent predictors of late arrival.
- , a prior history of AMI was, in our study, independently related to a 35% reduction in the probability of late arrival, probably caused by the patients' awareness of AMI symptoms.
- female sex was not related to late arrival in our cohort, whereas it was suggested in previous works.
- Our data describe a substantial reduction of late comer prevalence 23%(2005) to 16.1%(2015)

BENEFIT OF REVASCULARIZATION OF LATECOMER STEMI PATIENTS: PATHOPHYSIOLOGY AND CLINICAL TRIALS

- The benefit of revascularization of the infarct artery beyond 12 hours remains debated
- european guidelines on STEMI recommend the realization of PCI for patients presenting between 12 and 48 hours after symptom onset
- American guidelines :PCI in STEMI patients—without cardiogenic shock—beyond 12 hours but no later than 24 hours after symptom onset and in the concomitant presence of symptoms of ongoing ischemia



myocardium remained viable only within the first 6 hours after coronary occlusion :Canine models ■
arge trials focusing on thrombolytic therapy demonstrated a mortality benefit up to 12 hours after ■
symptom onset.

Open artery hypothesis; suggested that the benefit of revascularization beyond the first 6 hours might be ■
cause by limitation of the remodeling processes and reduction of rhythmic complications.





Antegrade blood flow: reduction of infarct size and better clinical outcome ■



collateral circulation development, induced by chronic myocardial ischemia that frequently precedes the AMI, ■
permits retrograde coronary perfusion.


in patients presenting with intermittent occlusion and recanalization before AMI allow myocardial preconditioning, ■
increasing the resistance of myocardium to ischemia.

As a result, in humans, some mechanisms can maintain a substantial myocardial viability far beyond the limit of 6 ■
hours

OTHER STUDIES

- 1990s and early 2000s, some reports suggested a potential benefit of revascularization over optimal medical treatment alone on left ventricular ejection fraction (10), quality of life (40), and long-term major adverse cardiac events (11,41) in latecomer STEMI patients.
- In 2005, the BRAVE 2 trial (Beyond 12 Hours Reperfusion Alternative Evaluation 2) included 365 latecomer STEMI patients who were randomized between a conservative therapy and an invasive strategy with PCI and showed that infarct size—assessed by single-photon emission computerized tomography—was significantly reduced in the PCI arm of the study.
- At 4-year follow-up, a significant reduction of all-cause death by 45% ($P = 0.04$) (13) was observed, suggesting a benefit of invasive strategy on mortality in latecomers.

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- The same year, however, the DECOPI (DEsobstruction COronaire en Post-Infarctus) randomized trial, which included 212 latecomer STEMI patients, reported no benefit of revascularization at 1 year on a composite primary endpoint that included cardiac death, nonfatal MI, or ventricular tachyarrhythmia
 - In 2006, the large OAT (Occluded Artery Trial), which included 2,166 stable latecomer STEMI patients randomized between a conservative therapy and PCI, failed to demonstrate any benefit of revascularization on combined criteria.
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- , in the DECOPI and OAT trials—which both reported negative results—patients were randomized with a median delay from symptom onset of 5 and 8 days.
 - positive BRAVE 2 trials, patients presented much earlier, between 12 and 48 hours after symptom onset.

STUDY LIMITATION

The main limitation of this study is its observational design. ■

confirm causality but only describes statistically significant and independent associations between observed clinical outcomes and patient management. ■

CONCLUSION

- proportion of latecomer STEMI patients decreased over the 10-year period
- Coronary revascularization of the infarct artery of latecomer STEMI patients admitted before 48 hours after symptom onset is associated with better long-term clinical outcomes
- Our results strengthen the current European guidelines that recommend performing a PCI on STEMI patients up to 48 hours after symptom onset.