

Safety of Very Early (< 3hours) Routine Percutaneous Coronary Intervention after Fibrinolysis in ST-segment Elevation Myocardial Infarction

David Larson^{ab}, Ross Garberich^a, Dan Lips^a, Nicholas Burke^a, Ivan Chavez^a, Scott Sharkey^a, Claire Donovan^a, Timothy Henry^c

^aMinneapolis Heart Institute Foundation at Abbott Northwestern Hospital, Minneapolis, Minnesota; ^bRidgeview Medical Center, Waconia, MN ^cCedars-Sinai Heart Institute, Los Angeles, California

ABSTRACT

Background: Current ACCF/AHA guidelines recommend fibrinolysis (FL) as the preferred reperfusion strategy for STEMI patients with expected delays of > 120 minutes from first medical contact to PCI followed by transfer to a PCI center with angiography/PCI within 3-24 hours. Assessment of reperfusion prior to angiography may not be accurate based on clinical and ECG criteria alone and recent data suggested increased recurrent ischemic events within the first 24 hours. The aim of this study is to assess the safety of very early PCI (< 3 hours) following FL.

Methods: The Minneapolis Heart Institute Level 1 MI program is a regional STEMI system with a standardized protocol where patients transferred from spoke hospitals with expected delays of > 120 mins to PCI receive a pharmacoinvasive (PI) therapy: half-dose FL, UFH, ASA and Clopidogrel with transfer for immediate PCI. Prospective registry data from the Level 1 database was analyzed to compare clinical outcomes related to the timing of PCI following FL: <60, 61-90, 91-120, 121-180, >180 min. patients transferred for PCI alone were available for comparison.

Results: From 01/03 to 12/15, 3453 STEMI patients were transferred from spoke hospitals for immediate PCI including 869 receiving FL. Pre-PCI IMI 2/3 flow occurred in 71%. The majority of PI patients underwent PCI 61-90 (47%) or 91-120 (28%) mins post-FL. Key clinical, time-to-treatment and outcomes are included in Table. There were no significant differences in mortality, bleeding, reinfarction or stroke related to timing of PCI between these 5 groups.

Conclusion: Very early PCI (< 3hours) following FL in patients with expected delays to PCI is safe without increased MACE. Delaying angiography for 3-24 hours following FL may not be necessary and may result in delays to reperfusion in patients who fail to reperfuse, as well as increased recurrent ischemia and length of stay.

CONTACT

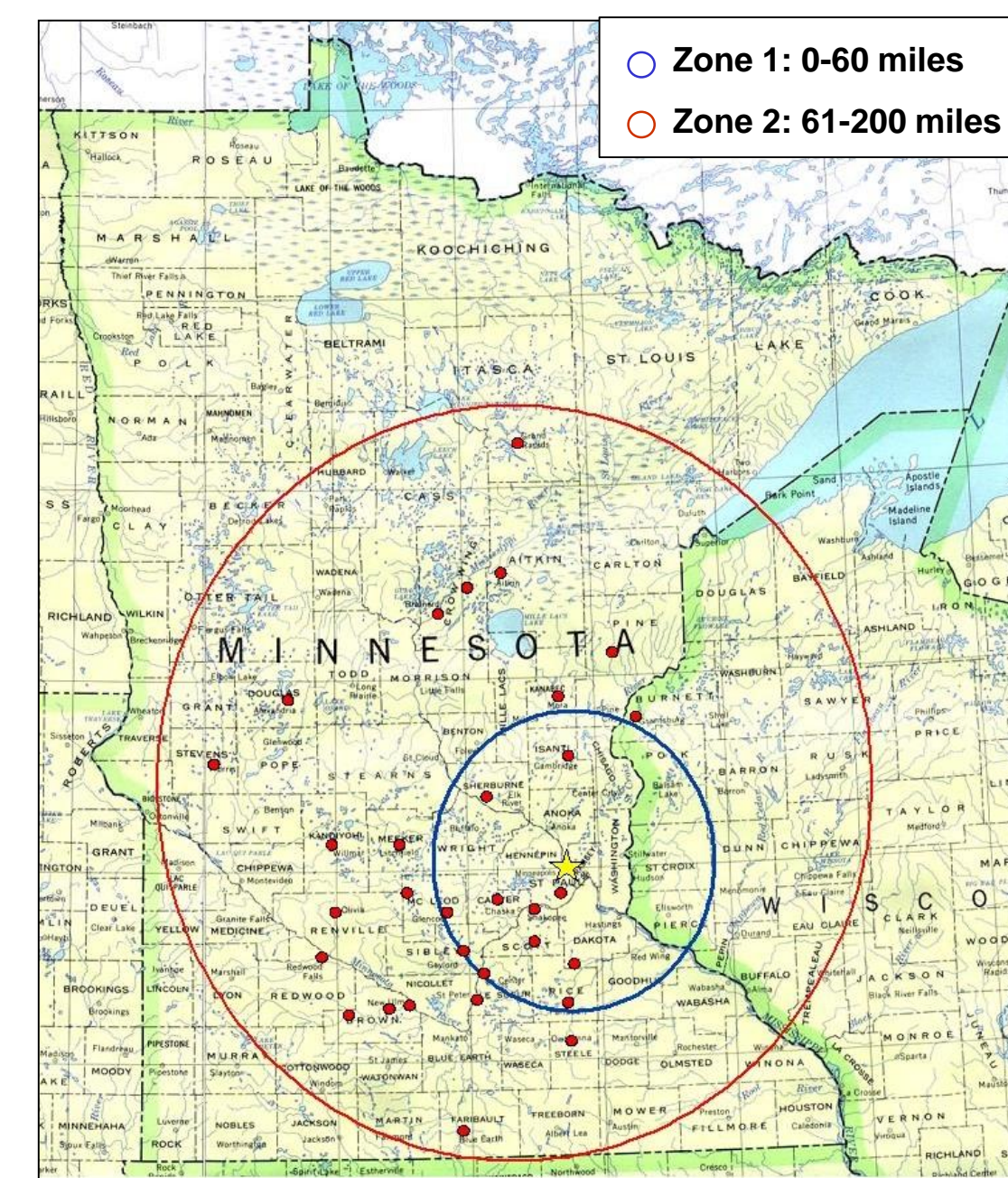
David M. Larson, MD
Minneapolis Heart Institute
Email: david.larson3@allina.com
Phone: (612) 863-3900

BACKGROUND

- Current ACCF/AHA guidelines recommend fibrinolysis (FL) as the preferred reperfusion strategy for STEMI patients with expected delays of > 120 minutes from first medical contact to PCI followed by transfer to a PCI center with angiography/PCI within 3-24 hours.
- Assessment of reperfusion prior to angiography may not be accurate based on clinical and ECG criteria alone.
- Recent data also suggest increased recurrent ischemic events within the first 24 hours in FL treated patients.
- The aim of this study is to assess the safety of very early PCI (< 3 hours) following FL.

METHODS

- The Minneapolis Heart Institute Level 1 MI program is a regional STEMI system with a standardized protocol where patients transferred from spoke hospitals with expected delays of > 120 mins to PCI receive a pharmacoinvasive (PI) therapy: half-dose FL, UFH, ASA and Clopidogrel with transfer for immediate PCI.
- Prospective registry data from the Level 1 database was analyzed to compare clinical outcomes related to the timing of PCI following FL: <60, 61-90, 91-120, 121-180, >180 min.
- Patients transferred for PCI along were available for comparison.



RESULTS

- From January 2003 to December 2015, 3453 STEMI patients were transferred from spoke hospitals for immediate PCI, including 867 receiving FL.
- Key clinical, time-to-treatment and outcomes are included in Table I.
- Pre-PCI TIMI 2/3 flow occurred in 71%.
- The majority of PI patients underwent PCI 61-90 minutes (47%) or 91-120 minutes (28%) post-FL.
- There were no significant differences in mortality, bleeding, reinfarction or stroke related to timing of PCI between these 5 groups.

DISCLOSURES

- The authors have no disclosures to report

Table 1. Demographics and Clinical Data of Patients Stratified by Time From FL to Angiography/PCI

	≤ 60 min (n=86)	61 – 90 min (n=412)	91 – 120 min (n=244)	121 – 180 min (n=105)	> 180 mins (n=20)	P-Value for Trend	Total with FL (n=867)	Transfer Patients without FL (n=2584)	P-Value
Age, Mean (SD)	62.8 ± 12.9	62.6 ± 13.7	63.9 ± 12.8	64.4 ± 12.7	68.8 ± 13.5	0.026	63.3 ± 13.3	62.5 ± 14.1	0.12
Pre-PCI Cardiogenic Shock, (%)	5 (5.8)	30 (7.3)	16 (6.6)	12 (11.4)	0 (0)	0.58	63 (7.3)	228 (8.8)	0.15
Pre-PCI Cardiac Arrest, (%)	7 (8.1)	24 (5.8)	8 (3.3)	13 (12.4)	0 (0)	0.84	52 (6.0)	315 (12.2)	<0.001
Anterior MI, (%)	30 (36.1)	159 (38.7)	90 (37.0)	30 (29.1)	6 (30.0)	0.16	315 (36.6)	859 (33.7)	0.12
Door In – Door Out (min)	44 (33, 60)	54 (44, 67)	65 (55, 80)	81 (61, 100)	99 (55, 120)	<0.001	59 (46, 78)	50 (37, 71)	<0.001
First Door to Balloon (mins)	85 (76, 105)	105 (95, 120)	135 (123, 147)	169 (157, 190)	232 (218, 292)	<0.001	121 (100, 146)	99 (83, 125)	<0.001
TIMI Flow Pre-PCI 2/3, (%)	66 (78.6)	294 (73.0)	160 (67.0)	70 (68.0)	13 (68.4)	0.043	603 (71.1)	1168 (47.9)	<0.001
TIMI Flow Post-PCI 2/3, (%)	82 (97.6)	396 (98.5)	227 (95.0)	102 (99.0)	19 (100)	0.69	826 (97.5)	2395 (98.3)	0.17
Ejection Fraction, (%)	48.2 ± 12.7	48.1 ± 13.2	47.2 ± 13.6	46.3 ± 14.4	48.0 ± 18.2	0.38	47.6 ± 13.5	47.9 ± 13.6	0.69
Any TIMI Bleeding, (%)	9 (10.5)	34 (8.3)	23 (9.4)	6 (5.7)	2 (10.0)	0.54	74 (8.6)	258 (10.0)	0.20
TIMI Major Bleed During Intervention, (%)	0 (0)	11(2.7)	3 (1.2)	2 (1.9)	0 (0)	0.80	16 (1.9)	67 (2.6)	0.21
Death in-hospital, (%)	4 (4.7)	14 (3.4)	6 (2.5)	9 (8.6)	0 (0)	0.47	33 (3.8)	154 (6.0)	0.015
Death at 30 days, (%)	4 (4.7)	14 (3.4)	9 (3.7)	9 (8.6)	0 (0)	0.33	36 (4.2)	176 (6.8)	0.005
Reinfarction at 30 days, (%)	1 (1.1)	2 (0.5)	3 (1.2)	1 (1.0)	1 (5.0)	0.23	8 (0.9)	36 (1.4)	0.29
Hemorrhagic Stroke at 30 days, (%)	0 (0)	1 (0.2)	2 (0.8)	0 (0)	0 (0)	0.74	3 (0.4)	3 (0.1)	0.16
MACE at 30 days, (%)	6 (7.0)	24 (5.8)	14 (5.7)	10 (9.5)	1 (5.0)	0.56	55 (6.3)	224 (8.7)	0.030

Figure 1: Time Interval From FL to Angiography/PCI

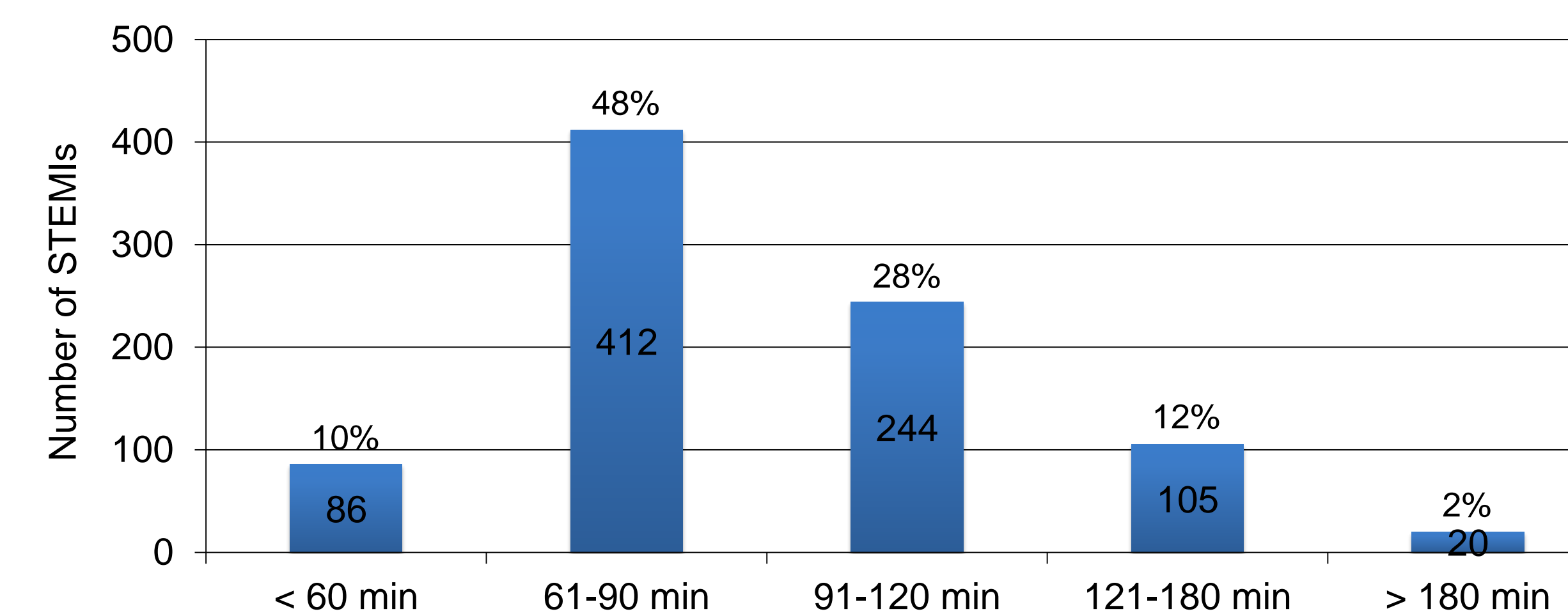


Figure 3: Survival Stratified by Time from FL to Angiography/PCI

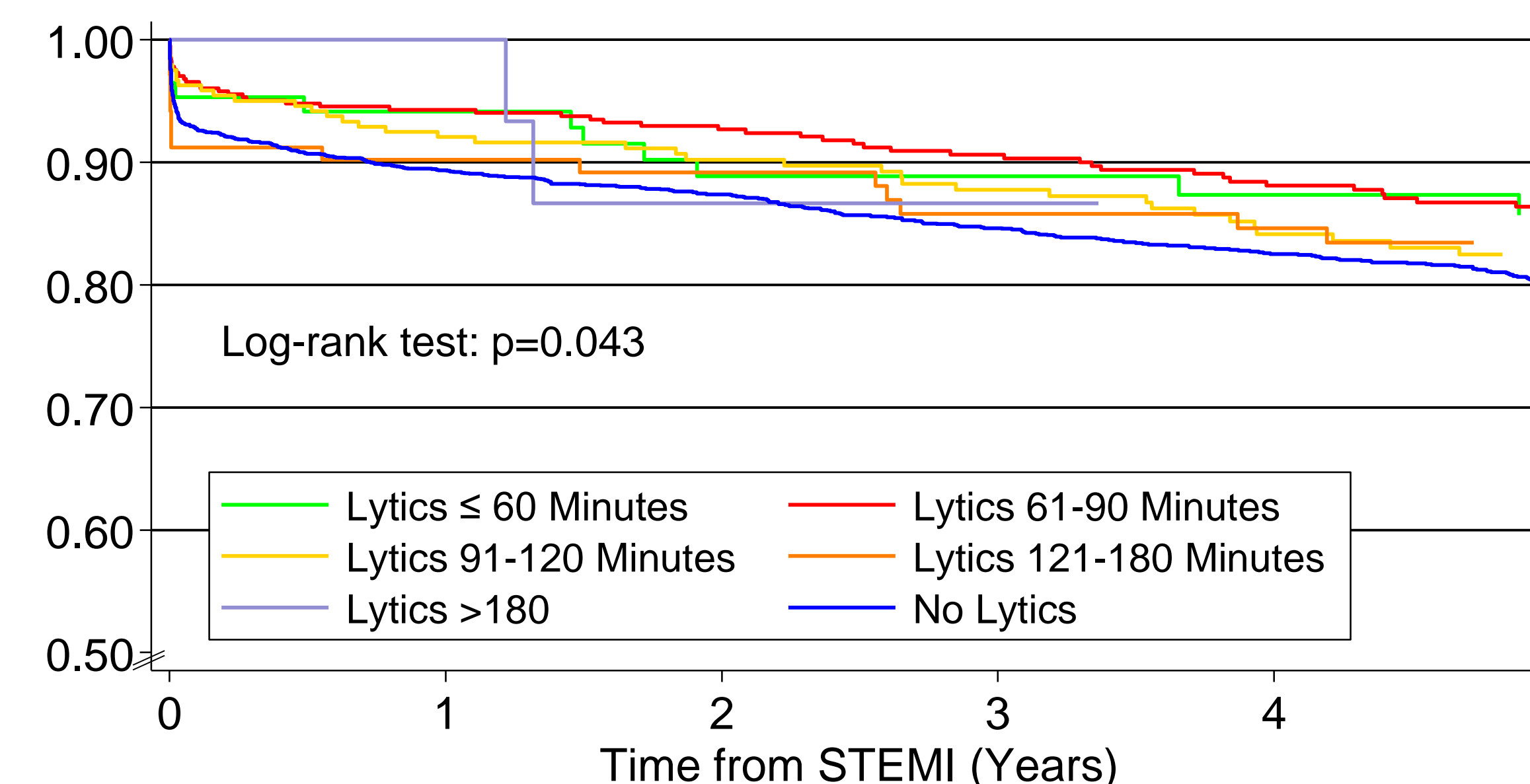
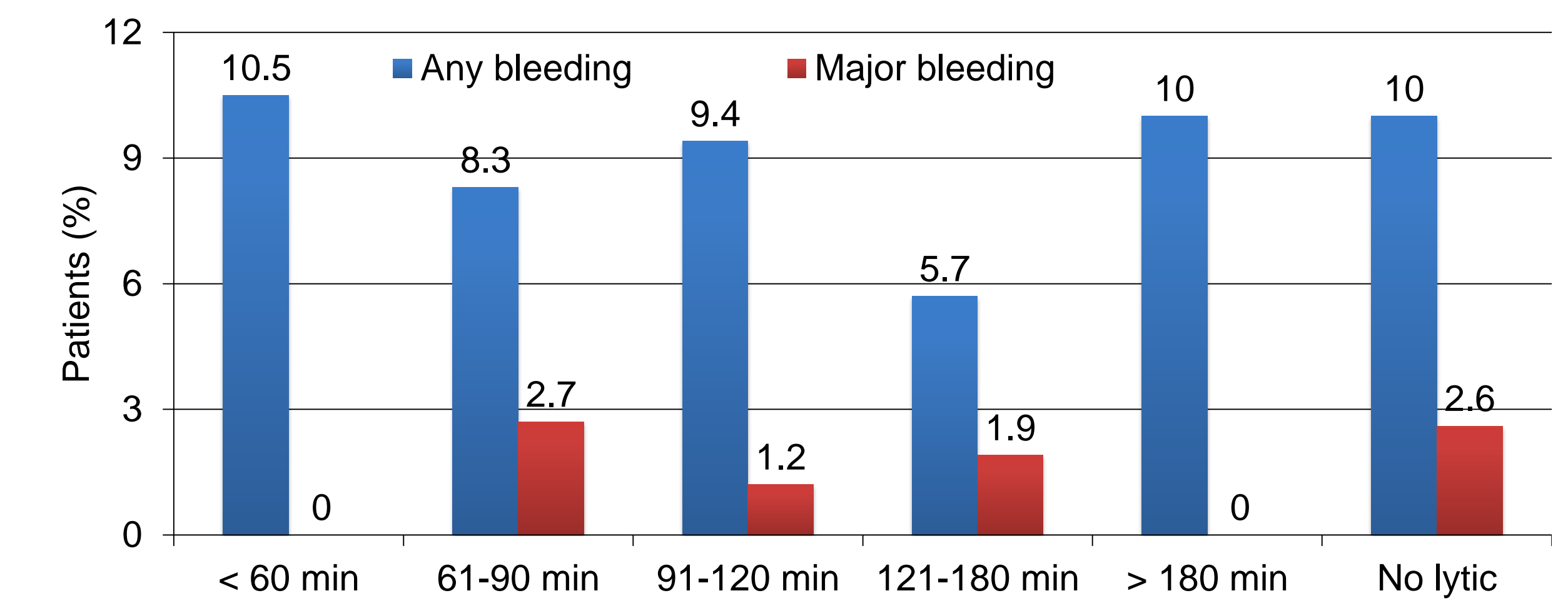


Figure 2: Bleeding Rates Stratified by Time From FL to Angiography/PCI



CONCLUSIONS

- Delaying angiography for 3-24 hours following FL may not be necessary and may result in delays to reperfusion in patients who fail to reperfuse.
- Very early PCI (< 3 hours) following FL in patients with expected delays to PCI is safe without increased bleeding or MACE.
- Pre-PCI TIMI 2-3 flow was higher in PI treated patients, but decreased as time from FL to angiography/PCI became longer.
- Despite a significantly longer D2B time, P-I patients had decreased mortality, although this likely was influenced by less pre-PCI cardiac arrest.