STEMI Case Presentation

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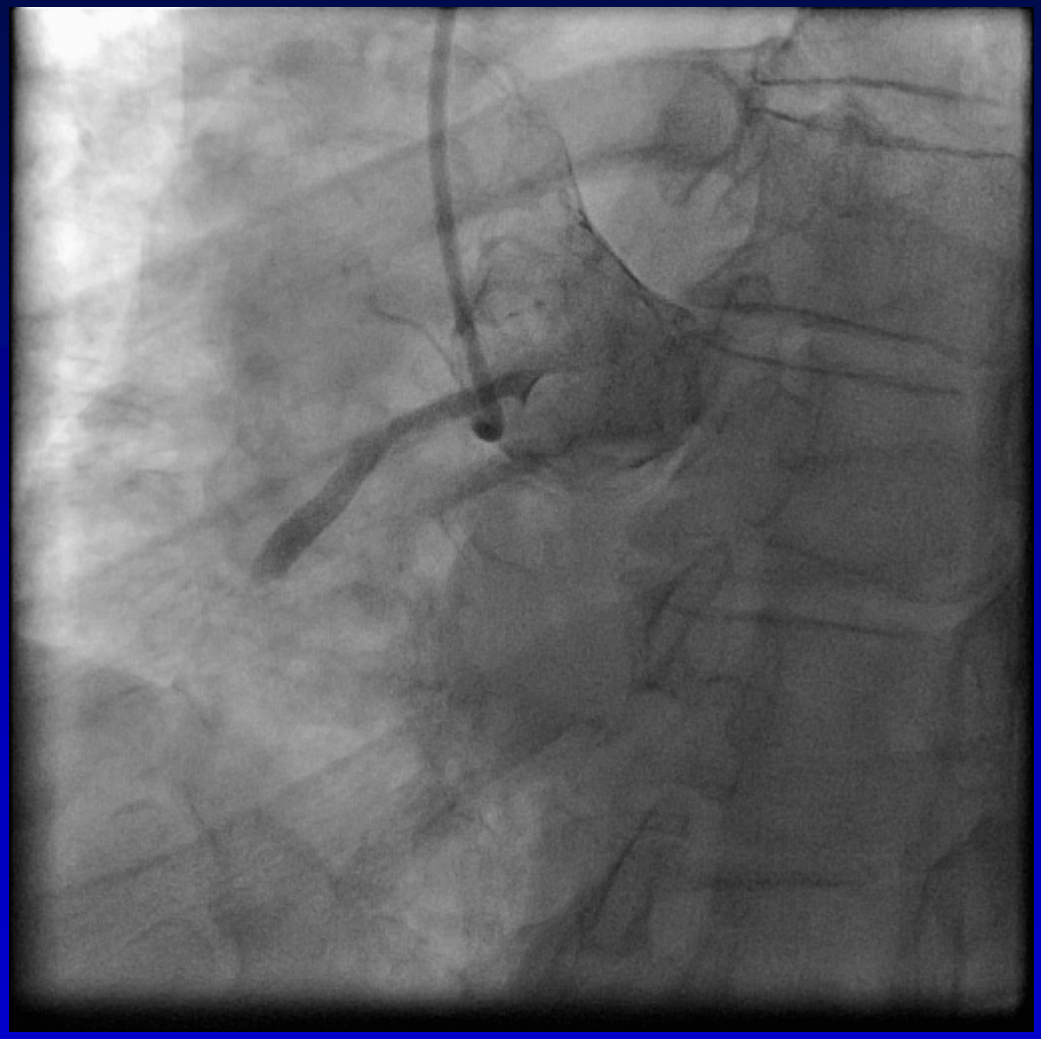
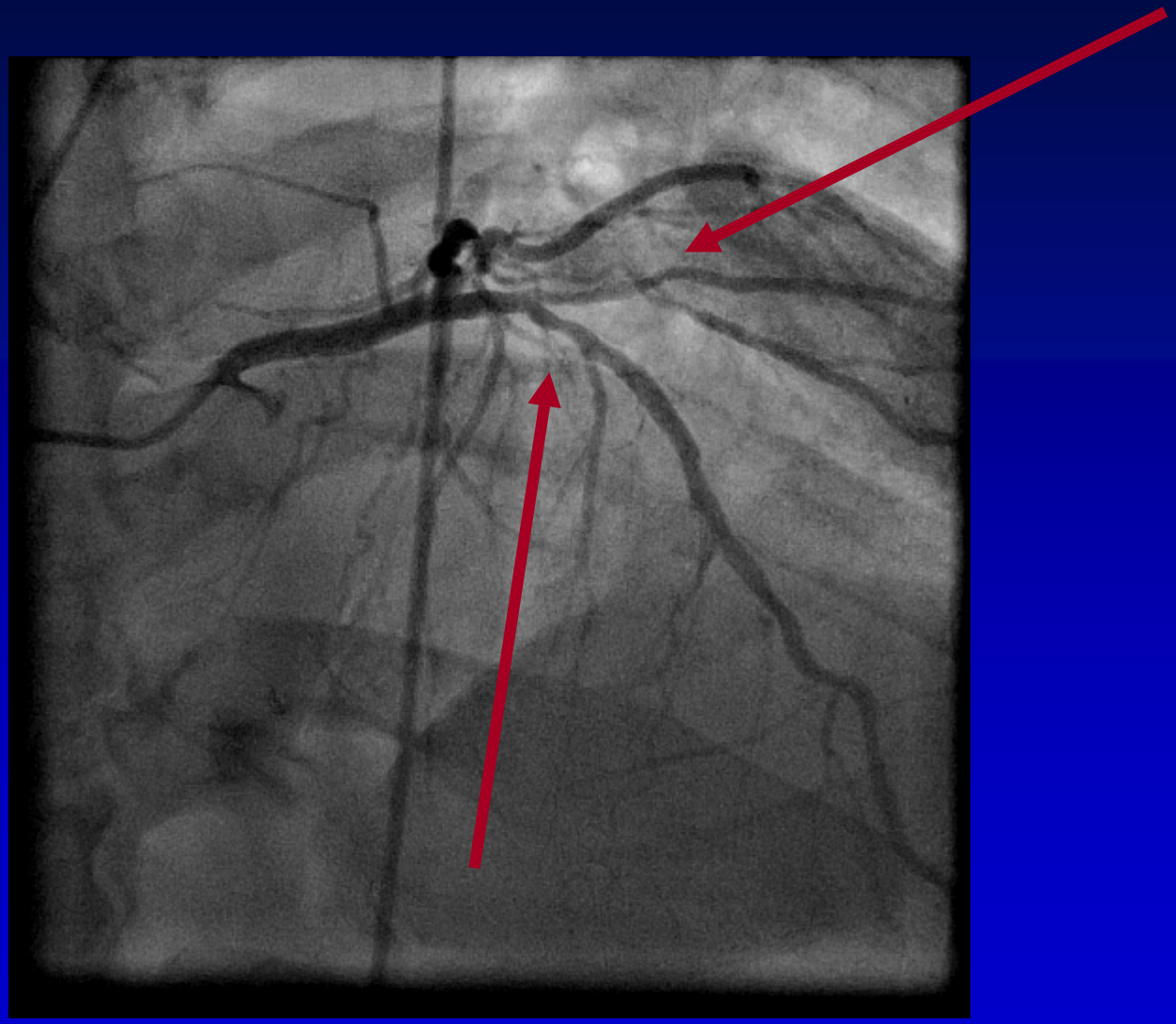
Cardiac Arrest and STEMI

- **58 year old man with hypertension, hypercholesterolemia and no previous cardiac history**
- **Occupation: Mass transit bus driver**
- **Cardiac arrest while boarding a cruise ship, found to be in VF, defibrillated, CPR x 10 minutes, with restoration of NSR and consciousness**
- **Repeat VF arrest in ER, successfully resuscitated after 15-minute CPR**
- **EKG: Inferior STEMI**

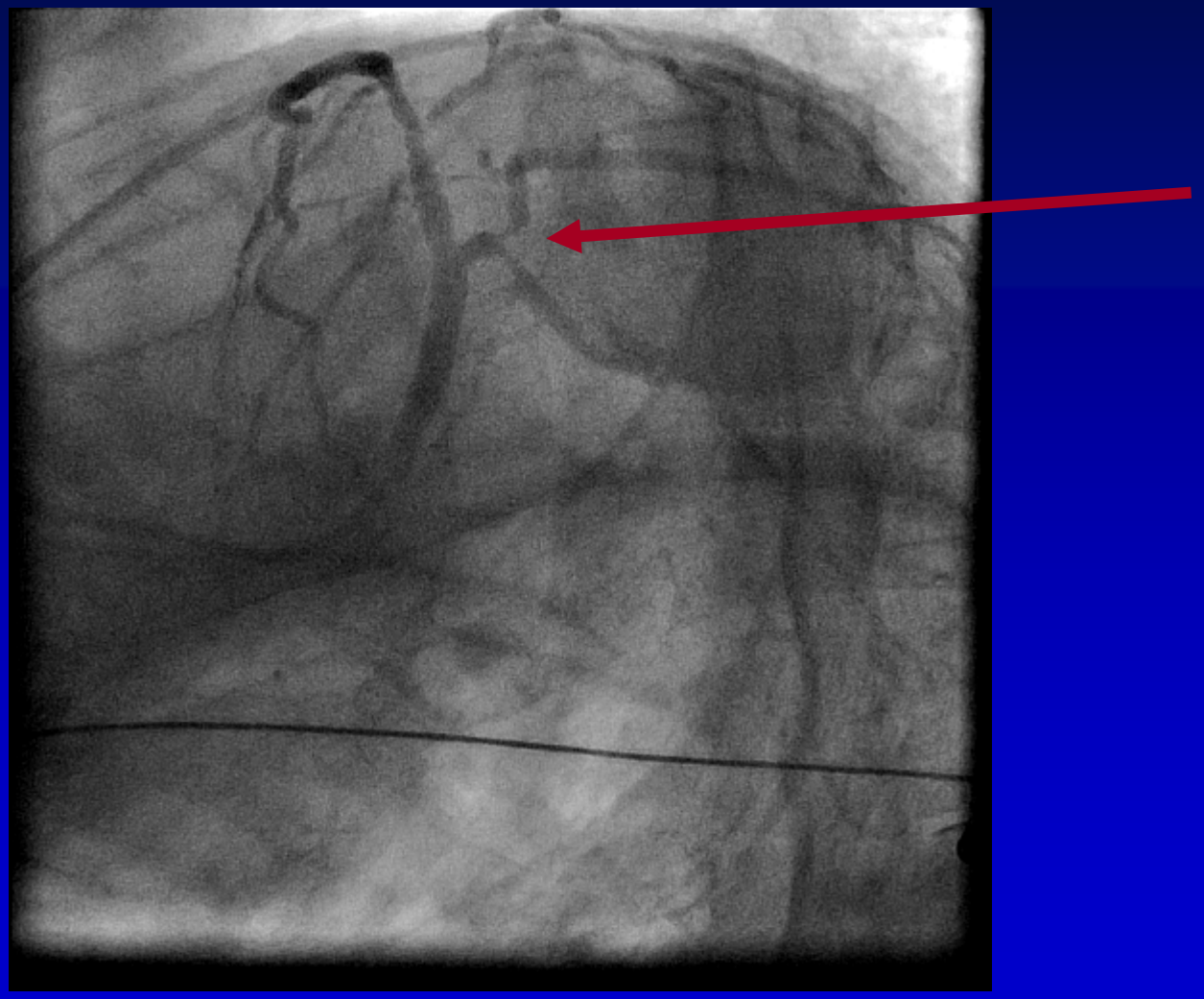
Pre-RCA



Diffuse LAD/D1 Disease

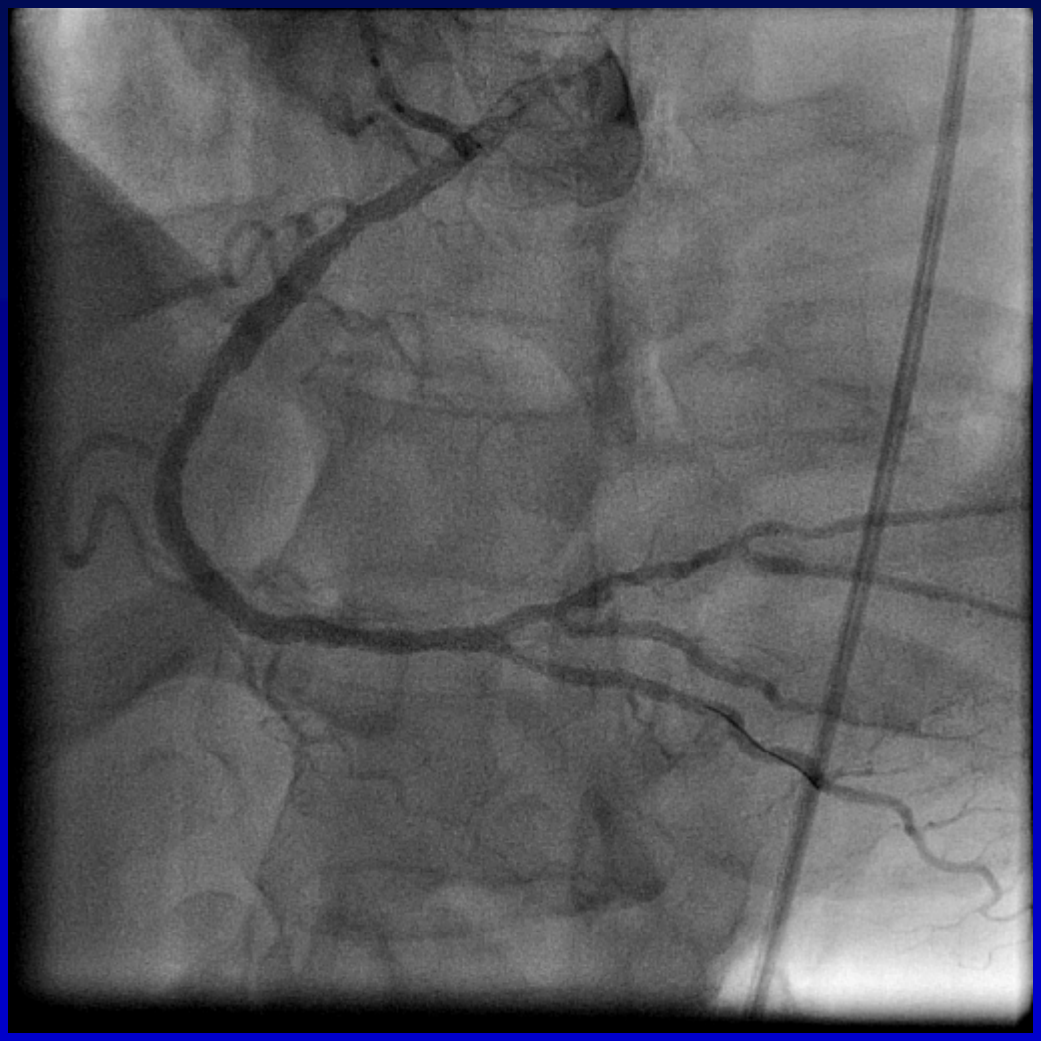


Severe LCX Disease



Optimal Revascularization Option?

RCA Recanalization with Plan for Staged PCI of left coronary lesions



LV EF = 40%

Multi-vessel CAD in STEMI patients

- **Prevalence: approximately 50% (Am Heart J 1992;124:1427-1443 & 2004;148:493-500) and greater in shock pts (JACC 2003;42:1380-6)**
- **Worse in-hospital and late outcome versus single-vessel CAD patients (NEJM 2000;343:915-922)**
- **No consensus on the optimal management of significant non-infarct related artery lesions**

2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention

Table 10. Indications for PCI in STEMI

Indications	COR	LOE	References
Primary PCI*			
STEMI symptoms within 12 h	I	A	(379–382)
Severe heart failure or cardiogenic shock	I	B	(383,384)
Contraindications to fibrinolytic therapy with ischemic symptoms <12 h	I	B	(399,400)
Clinical and/or electrocardiographic evidence of ongoing ischemia between 12 and 24 h after symptom onset	IIa	B	(401–403)
Asymptomatic patients presenting between 12 and 24 h after symptom onset and higher risk	IIb	C	N/A
Noninfarct artery PCI at the time of primary PCI in patients without hemodynamic compromise	III: Harm	B	(404–408)

JACC 2011;58:e44-122

Table I Acute multi-vessel percutaneous coronary intervention during ST-segment elevation myocardial infarction

Advantages	Disadvantages
Complete revascularization	Increased contrast load/risk of contrast-induced nephropathy
Treat ischaemia at a distance	Radiation exposure
Treat secondary unstable lesions (plaque instability may not be limited to the culprit lesion)	Complications of treating additional lesions may be potentially fatal
Patient preference/comfort	Haemodynamic and general clinical instability treating additional lesions
	Increased risk of stent thrombosis in patients with clopidogrel resistance/intolerance.
	Prothrombotic and inflammatory milieu in the acute phase of STEMI
	Coronary spasm may lead to possible overestimation of stenosis severity in non-infarct arteries

European Heart Journal 2011;32:396-403

Table 2 Infarct-related artery culprit lesions alone then monitor for ischaemia

Advantages	Disadvantages
Treat only culprit lesion	May leave behind significant ischaemia-producing lesions
Avoid complications associated with treating other lesions	May not treat other less severe unstable lesions
The indication for non-infarct artery PCI can be supported by the objective evidence for myocardial ischaemia in regions supplied by this non-infarct artery	May not prevent recurrent ischaemia
The ability to discuss with patients and their families the relative risks and benefits of treating the non-infarct related lesion vs. continued medical therapy or surgical options	Patients have to return to laboratory routinely

European Heart Journal 2011;32:396-403

Table 3 Infarct-related artery culprit lesions then staged secondary lesions

Advantages	Disadvantages
Optimize potential for complete revascularization	Economics
PCI of a stable stenosis might be intervened more safely at a later phase, after stabilization	May treat asymptomatic lesions
	Complications of treating secondary lesions early after index event
	Timing uncertain

European Heart Journal 2011;32:396-403

Unresolved Issues

- **Need for revascularization of non-IRA lesions?**
- **Concurrent vs Staged PCI of non-IRA lesions?**
- **Timing of staged PCI?**

Only Contemporary Prospective, Randomized Trial

Soon after every diagnostic angiography, the eligible patients were randomly allocated to three different strategies:

1. Culprit-only revascularisation (COR): the IRA only was dilated and the other arteries were left untreated.
2. Staged revascularisation (SR): the IRA only was treated during the primary intervention while the complete revascularisation was planned in a second procedure.
3. Complete revascularisation (CR): the IRA was opened followed by dilatation of other significantly narrowed arteries during the same procedure.

Lack of medical therapy group with ischemia-driven revascularization

Heart 2010;96:662-667

Definition of Repeat Revascularization

The primary endpoint of the study was the incidence of major adverse cardiac events (MACE) defined as cardiac or non-cardiac death, inhospital death, re-infarction, re-hospitalisation for acute coronary syndrome and repeat coronary revascularisation. For repeat revascularisation we included all PCI or CABG occurring after the baseline procedure and justified by recurrent symptoms, re-infarction or objective evidence of significant ischaemia on provocative testing.[12] Among repeat PCI we excluded staged procedures already scheduled. In the staged group we classified as repeat revascularisation only unplanned procedures. Follow-up was obtained by outpatient visits and phone interviews.

The mean time between the first and the unplanned procedure Was 42.3 ±22.8 days (but only in 11%).

Heart 2010;96:662-667

Possible Benefit of Staged Revascularization?

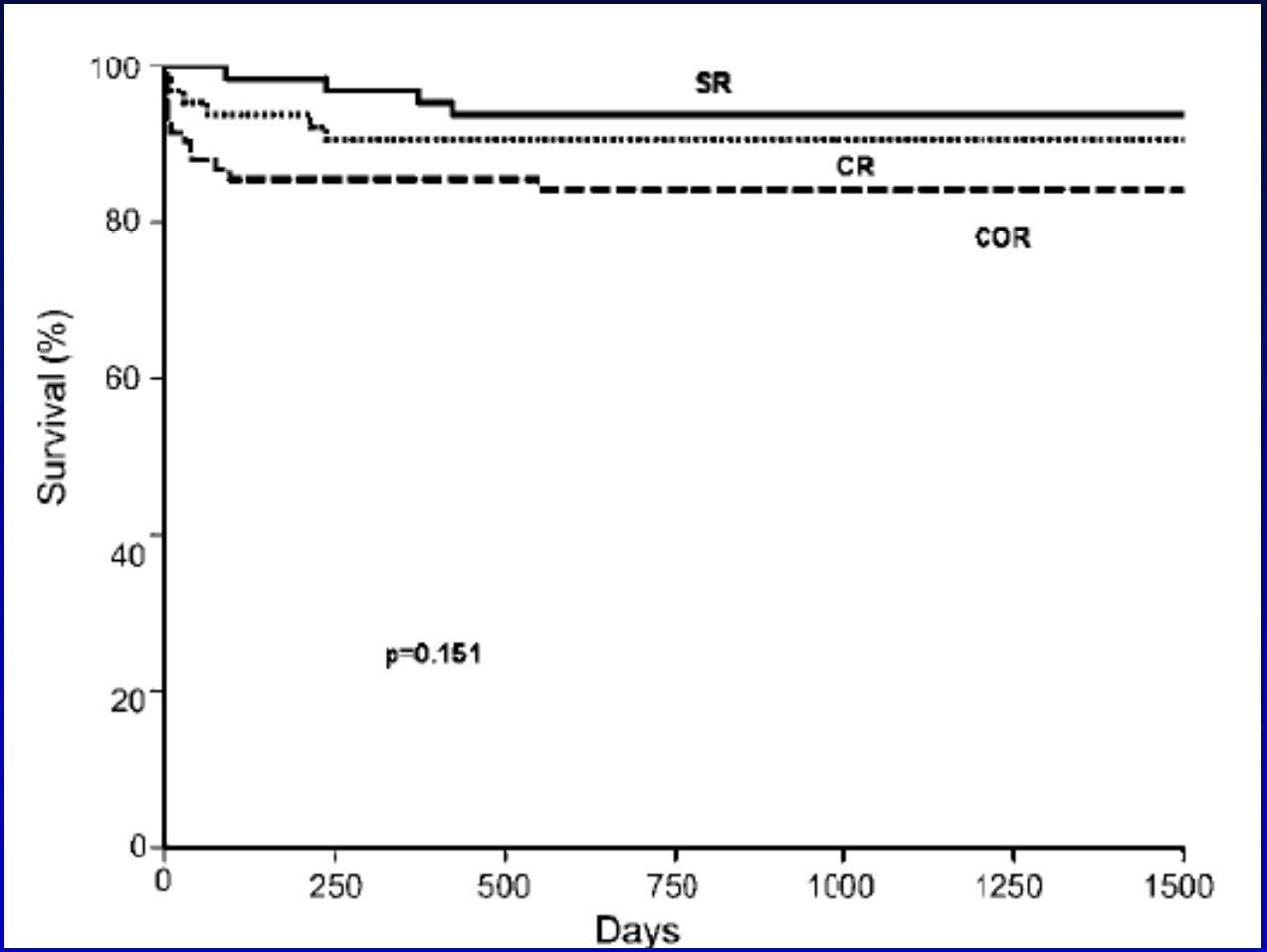
Table 2 Rate of outcomes in the three groups

Outcome	COR group	SR group	CR group	p Value
Overall MACE	42 (50.0%)	13 (20.0%)	15 (23.1%)	<0.001
Re-PCI	25 (29.8%)	7 (10.8%)	5 (7.7%)	<0.001
CABG	3 (3.6%)	2 (3.1%)	2 (3.1%)	0.980
Repeat revascularisation	28 (33.3%)	8 (12.3%)	6 (9.2%)	<0.001
Re-hospitalisation	30 (35.7%)	9 (13.8%)	8 (12.3%)	<0.001
Re-infarction	7 (8.3%)	4 (6.2%)	2 (3.1%)	0.412
Death	13 (15.5%)	4 (6.2%)	6 (9.2%)	0.170
Cardiac death	10 (11.9%)	2 (3.1%)	4 (6.3%)	0.120
Inhospital death	7 (8.3%)	0 (0%)	2 (3.1%)	0.037

CABG, coronary artery bypass grafting; COR, culprit-only revascularisation; CR, complete revascularisation; MACE, major adverse cardiac event; PCI, percutaneous coronary intervention; SR, staged revascularisation.

Heart 2010;96:662-667

Maximal Survival with Staged Revascularization



Heart 2010;96:662-667

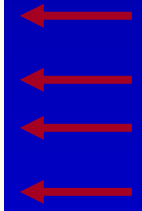
Improved Survival with Culprit-Vessel PCI only vs. Complete Revascularization

Table 5. Mortality Rates (%) for Propensity Matched Multivessel Disease STEMI Patients by Revascularization Strategy During the Index Procedure

Outcome by Subgroup	Culprit Vessel Revascularization at the Time of PPCI	Multivessel Revascularization at the Time of PPCI	Percentage Difference	p Value
All patients	n = 503	n = 503		
Death, %				
In-hospital	2.0	3.4	1.4	0.14
12 months	5.5	7.1	1.6	0.23
24 months	6.6	8.6	2.0	0.17
42 months	10.8	11.8	1.0	0.23
Patients without hemodynamic instability, LVEF <20%, malignant ventricular arrhythmia	n = 458	n = 458		
Death, %				
In-hospital	0.9	2.4	1.5	0.04
12 months	4.2	5.8	1.6	0.13
24 months	4.9	7.2	2.3	0.07
42 months	6.7	10.4	3.7	0.08

Median follow-up = 22.54 months.

LVEF = left ventricular ejection fraction; PPCI = primary percutaneous coronary intervention; STEMI = ST-segment elevation myocardial infarction.



JACC Cardiovasc Interv 2010;3(1):22-31

Improved Survival with Staged Multi-vessel PCI vs Culprit-vessel PCI only

Table 7. Mortality Rates (%) for Propensity Matched Multivessel Disease STEMI Patients With Culprit Vessel PCI With and Without Staged Revascularization Within 60 Days

Outcomes	Culprit Vessel Revascularization Patients Alive at 60 Days	Multivessel Revascularization Within 60 Days	Percentage Difference	p Value
All patients	n = 538	n = 538		
Death, %				
12 months	3.3	1.3	2.0	0.04
24 months	4.3	3.7	0.6	0.21
42 months	7.4	5.6	1.8	0.17

JACC Cardiovasc Interv 2010;3(1):22-31

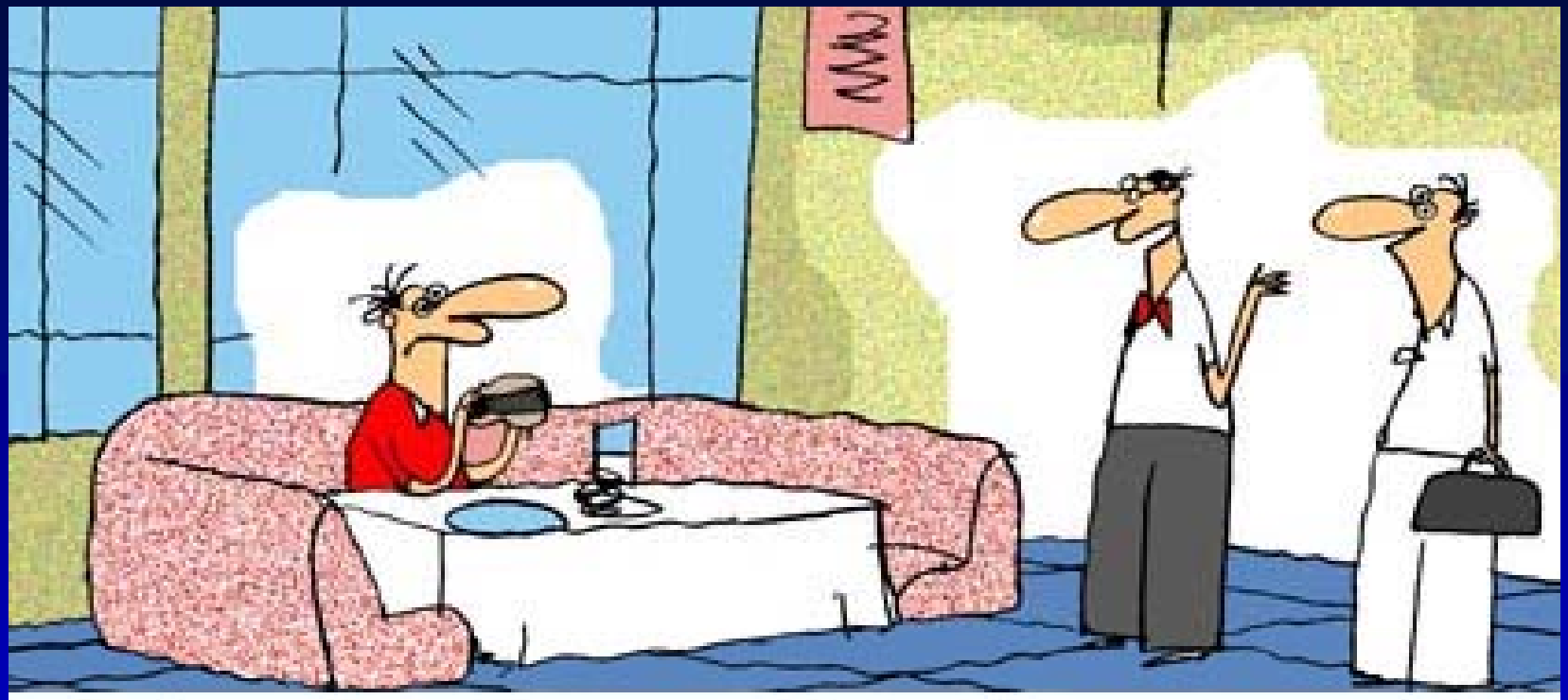
Conclusions

- **Important to revascularize significant non-IRA lesions**
- **Optimal outcome with staged PCI vs. other strategies**
- **Staged PCI scheduled within 2 months after primary PCI**

CULPRIT – Study Design

Primary objective: In patients with STEMI and MVD who have had a successful culprit lesion angioplasty, to test a strategy of staged multivessel revascularization with optimal medical therapy (MVPCI strategy) vs a strategy of optimal medical therapy alone (CON strategy). Subsequent PCI in the CON strategy will be restricted to patients who fail optimal medical therapy.

Thank you for your attention.



"To show our appreciation for eating our grease burger, our paramedic will follow you around incase you have a heart attack."