MULTIPLE VESSEL PCI IN STEMI PATIENTS: *Culprit Only PCI, Safety First, Choose Wisely Until Definitive Trials*



STEMI Pts have multiple complex plaques that are associated with adverse clinical outcomes and plaque instability is a generalized process Barry D. Rutherford, MD

TCTAP 2015

Multiple Vessel PCI in STEMI Pts:

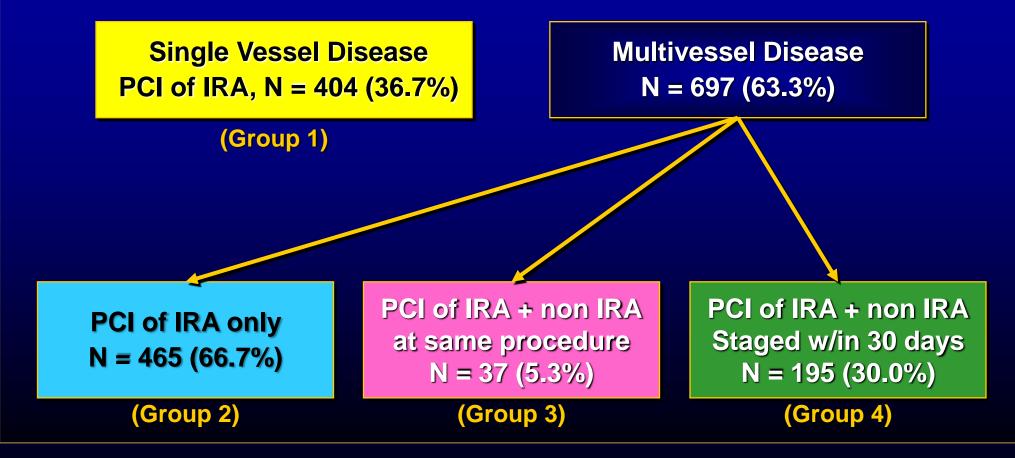
Culprit Only PCI, Safety First, Choose Wisely Until Definitive Trials

Interventional approaches to STEMI pts with MVD

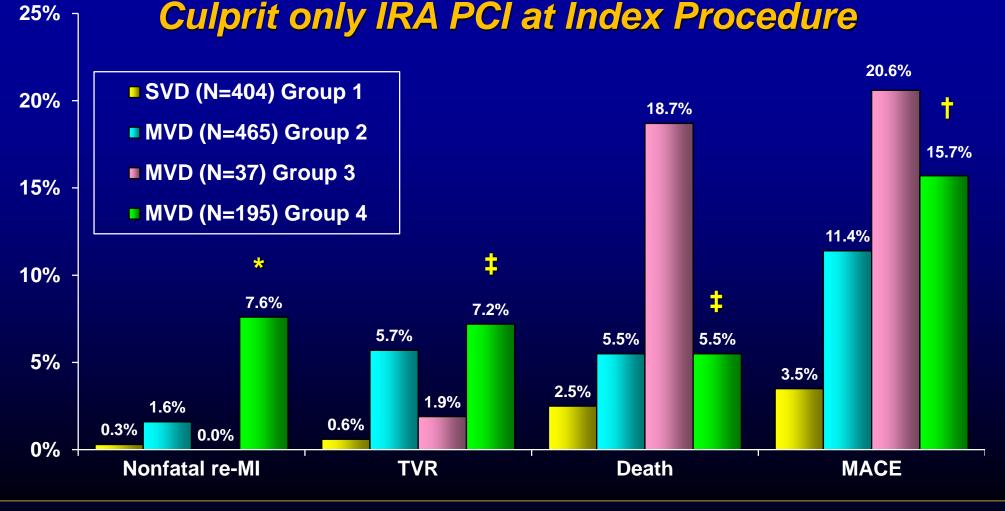
- Culprit only IRA PCI at index procedure
- Complete revascularization strategy
 - PCI to all lesions > 50% at index procedure (PRAMI and CvLPRIT Trials)
 - Staged PCI to all lesions > 50% at index hospitalization
 - Staged PCI at follow up if clinically indicated by recurring symptoms or abnormal MPI

Multiple Vessel Percutaneous Intervention in the Acute Myocardial Infarction Patient MAHI Experience – 1999-2005

1101 consecutive pts: 841 BMS; 260 DES



Multiple Vessel Percutaneous Intervention in the Acute Myocardial Infarction Patient 1101 Consecutive Pts: 841 BMS; 260 DES



* p<0.001 group4 vs group2

† p=0.02 group4 vs group2

‡ p=NS group4 vs group2

Prevalence, Predictors and In-Hospital Outcomes of Non-IRA Intervention During 1º PCI for STEMI: NCDR™

- 708,481 admissions, 638 sites, 2004-07
- 31,361 pts with MVD, 2745 pts (8.7%) staged PCI (excluded)
- 28,936 pts, 3,134 (10.8%) had MV PCI at index procedure

	Si	Single Vessel PCI		MV PCI	p-value
		N = 25,802		N = 3,134	
In-hospital mortality (%)		5.12		7.85	<0.01
Death in lab (%)		0.36		1.24	<0.01
Bleeding complications (%)		5.30		6.71	<0.01
Renal failure (%)		1.81		2.31	0.09
Pts w/ Cardiogenic Shock					
In-hospital mortality (%)		27.77		36.49	<0.01
Death in lab (%)		2.64		5.77	0.25
Bleeding complications (%)		12.48		13.81	0.44
Renal failure (%)		7.41		9.72	0.03

Conclusion: Avoid MV PCI during index procedure

MA Cavender et al. AJC 2009;104:507

Complete vs. Culprit-only Revascularization for Pts with MVD Undergoing Primary PCI for STEMI: A Systematic Review and Meta-analysis

- 26 studies (3 randomized), mean F/U 14.5 mths 46,324 pts, 7,886 MV PCI;
- 38,438 culprit only PCI
- MV PCI at index procedure in 16 studies
- MV PCI at staged index hosp in 9 studies
- MV PCI electively in 9 studies

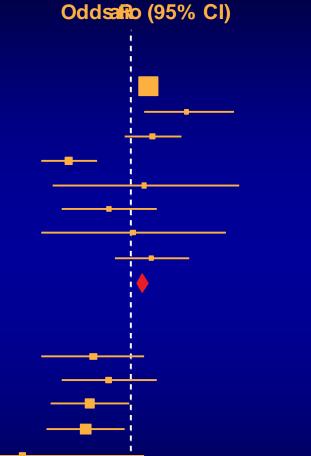
Complete vs. Culprit-only Revasc for Pts with MVD in 1^o **PCI for STEMI: A Systematic Review and Meta-analysis**

CI

IN-HOSPITAL MORTALITY **BY TIMING OF MV PCI**

Conclusion: Increased hospital mortality in those with MV **PCI** at index procedure

Study or Subgoup	M١	V PCI	Culp	orit PCI
I	Event	sTotal	Events	s T otal
Immediely - Inek	Cathe	teriztio	n	
Cavender 2009	248	3134	1321	25802
Corpus 2004	5	26	20	354
Hannan 2010	17	503	15	762
Hudzik 2009	9	457	138	1842
Jin 2007	1	215	3	905
Katayama 2005	6	20	15	36
Qarawani 2008	4	95	1	25
Varani 2008	12	147	8	158
Subtotal (95% (CI)	4597		29682
Total Events	300		1519	
Staged - lext-bsp	oitalit	ion		
Corpus 2004	3	126	20	354
Hannan 2010	3	259	15	762
Kalarus 2007	5	193	40	605
King 2006	5	632	31	1350
Rigattieri 2008	0	64	4	46 🔶
Varani 2008	1	96	8	156
Subtotal (95% (CI)	1370		3273
Total Events	17		118	



10 0.010.1 10 Favors Muttessel PCI Favors Culponly PC

KR Bainey et al. AHJ 2014;167:1-14

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Complete vs. **Culprit-only Revasc for Pts** with MVD in 1^o **PCI for STEMI:** A Systematic **Review &** Meta-analysis

Conclusion: Survival benefit with MV PCI vs. **Culprit-only PCI**

LUNG-					DY	31001		
BudyorSubgoup		PCI		orit PCI		Oddsafi	b (95% C	CI)
Randozad	Events	Total	Events	sTotal				
Dambrink 2010	2	80	0	41				
Di Mario 2004	1	52	0	41				
Politi 2009	10	130	13	84				
Subtotal (95% CI)		262		166				
Total Events	13		13					
Non-Rand ami								
Barringhaus 20	102	252	30	956	-			
Chen 2010	13	210	66	351				
Corpus 2004	17	152	42	354				
Dzeiviez 2010	11	70	57	707				
ElsvesLeureiro 201	0 1	59	25	208				
Han 2008	3	93	4	148				
Hannan 2010	105	1300	116	1300		-		
Hudzik 2009	32	457	265	1642				
Jin 2007	7	215	19	901		_	•	
Kalarus 2007	14	193	112	605				
Khattab 2008	2	25	3	45			•	
Mohamad 2009	4	19	3	30				_
Qarawani 2008	9	95	2	25			•	
Rahman 2010	51	578	122	1449		_	-	
Rigattieri 2008	1	64	7	46 -				
Roe 2001	17	25	10	61				•
Seo 2009	4	82	45	217		-		
Telsyna 2002	0	17	16	96 🔶				
Torma 2010	27	217	111	1984				
Subtotal (95% CI)		4123		11125		•		
Total Events	320		1055					

0.01

0.1

KR Bainey et al. AHJ 2014;167:1-14

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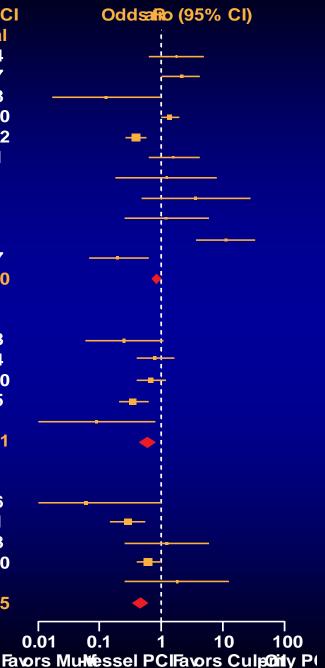
LONG-TERM MORTALITY BY TIMING OF MV PCI

Complete vs. Culprit-only Revasc for Pts with MVD in 1° PCI for STEMI: A Systematic Review & Meta-analysis

Conclusion: Trend to improved survival with MV PCI in hospital or after initial hospitalization

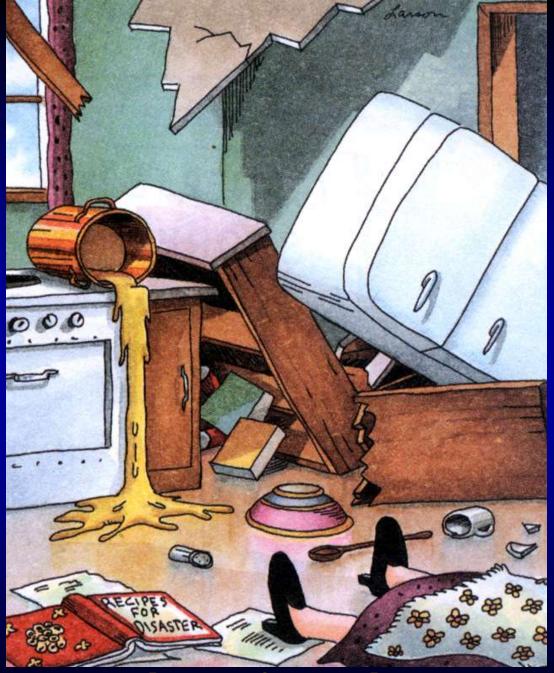
KR Bainey et al. AHJ 2014;167:1-14

tudyor Subgoup	M٧	PCI	Culp	orit PCI		
ndexCath	Events	s To tal	Events	sTotal		
Corpus 2004	5	26	42	354		
Dzewierz 2010	11	70	57	707		
ElsvesLoureiro 201	0 1	59	25	208		
Hannan 2010	59	503	116	1300		
Hudzik 2009	32	457	265	1642		
Jin 2007	7	215	19	901		
Khattab 2008	2	25	3	45		
Mohamad 2009	2	7	3	30		
Qarawani 2008	9	95	2	25		
Roe 2001	17	25	10	61		
Seo 2009	4	82	45	217		
Subtotal (95% CI)		1564		5490		
Total Events	149		587			
taged-InHospital						
Barringhaus 20	102	252	30	958		
Corpus 2004	12	126	42	354		
Hannan 2010	16	259	118	1300		
Kalarus 2007	14	193	112	605		
Rigattieri 2008	1	64	7	46		
Subtotal (95% CI)		894		3261		
Total Events	45		307			
taged Eective Outpati	ient					
Barringhaus 20	100	252	30	956		
Chen 2010	13	310	66	351		
Han 2008	3	93	4	148		
Hannan 2010	30	538	116	1300		
Mohamad 2009	2	12	3	30		
Autotal (95% CI)		1105		2785		
otal Events	48		219			
					0.01	



MV PCI in STEMI Pts at Index Procedure *"Traps for Young Players"*

- Must attain a "perfect result" in the IRA
- Multiple unstable plaques in N-IRA
- Any complication of N-IRA PCI is magnified 100% resulting in major compromise to LV function
- Complex anatomy demands time and patience N-IRAbifurcation, CTO, long diffuse disease, heavy calcification, LMCA lesions
- Increased radiation, contrast volume, procedure time all associated with increased complications
- Operator fatigue STEMI in overnight hours
- No effective evaluation of the N-IRA: IVUS, Virtual Histology, OCT, FFR, iFR

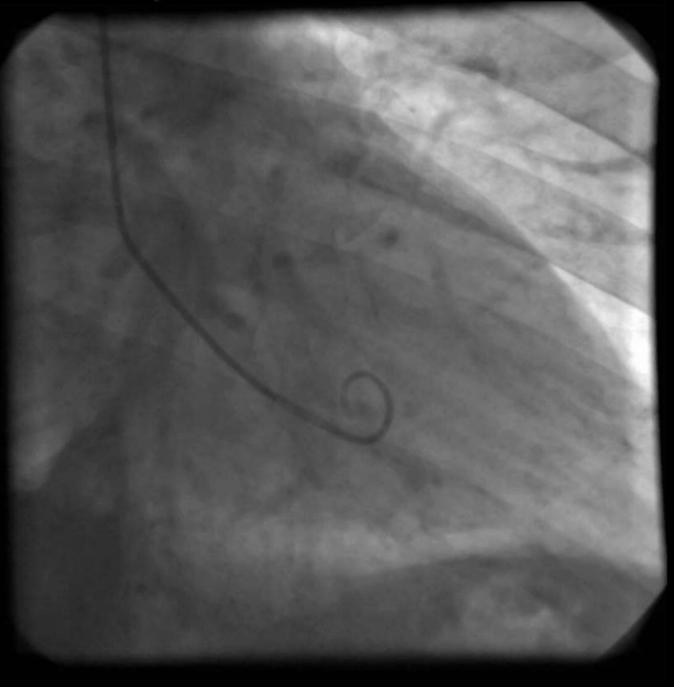


Recipes for Disaster

59-yo Male

Acute Antero-Septal Infarct

(AM)



Randomized Trial of Preventive Angioplasty in MI: PRAMI Trial

- 5 centers in UK, 2008-2013. 465 pts with STEMI randomized to preventive PCI (234 pts) or no preventive PCI (231 pts)
- Primary Outcome: Composite cardiac death, nonfatal MI, refractory angina (23 months)

	Preventive PCI No Preventive PCI p-value							
Primary Outcome (D, AMI, RA)		21 (9/100)		53 (23/100)		<0.001		
Cardiac death/AMI		11		27		0.004		
Cardiac Death		4		10		0.07		
Nonfatal AMI		7		20		0.009		
Refractory Angina		12		30		0.002		
Secondary Outcome								
Death from noncardiac cause		8		6		0.86		
Repeat revascularization		16		46		<0.001		

 Conclusion: In pts with STEMI and MVD, preventive PCI results in significant reduction in adverse cardiovascular events

Randomized Trial of Preventive Angioplasty in MI: PRAMI Trial Critique

- 2428 pts screened, 1922 not eligible
- 465 pts randomized (19%), 1122 SVD
- 465 pts (20 pts/year/center), ~2 pts per month
- Stenoses > 50% by angio, no FFR, IVUS, OCT or VH
- Procedure time, fluoro time and contrast volume increased
- Ineligible pts: unable to consent, previous CABG, 50% of LMCA or ostial LAD and LCX, cardiogenic shock, CTO
- No difference: stroke, bleeding, nephropathy

Randomized Trial of Preventive Angioplasty in MI: PRAMI Trial

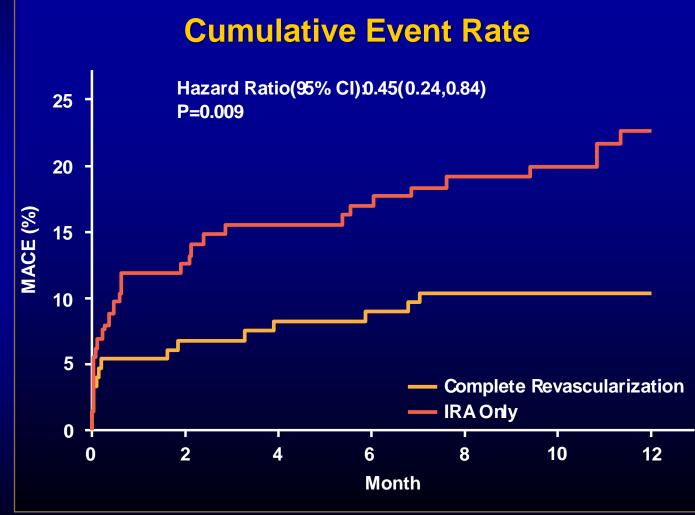
Conclusion Should Be:

"In a very highly selected group of pts with STEMI and MVD, preventive PCI may reduce adverse cardiovascular events"

Randomized Trial of Complete vs. Lesion-only Revasc in Pts Undergoing 1º PCI for STEMI & MVD (CvLPRIT Trial)

- 296 pts in 7 UK centers were randomized to either inhospital complete revasc (N=150) or IRA-only revasc (N=146)
- Primary Endpoint: Composite all-cause death, MI, HF, revasc at 12 months
- Patients were randomized after angiogram and before PCI; attempt to revasc at index procedure but operatordependent (64% of the complete revasc group, received non-IRA PCI at index procedure)

Randomized Trial of Complete vs. Lesion-only Revasc in Pts Undergoing 1º PCI for STEMI & MVD (CvLPRIT Trial)



Conclusion: In-hospital complete revasc of significant N-IRA lesions results in **improved** clinical outcomes vs treatment of culprit lesion only; however, no significant difference in death or MI

AH Gershlick et al. JACC 2015;65(10):963

Multiple Vessel PCI in STEMI Pts:

Culprit Only PCI, Safety First, Choose Wisely Until Definitive Trials

Advantages of Staged PCI of the N-IRA in STEMI Pts

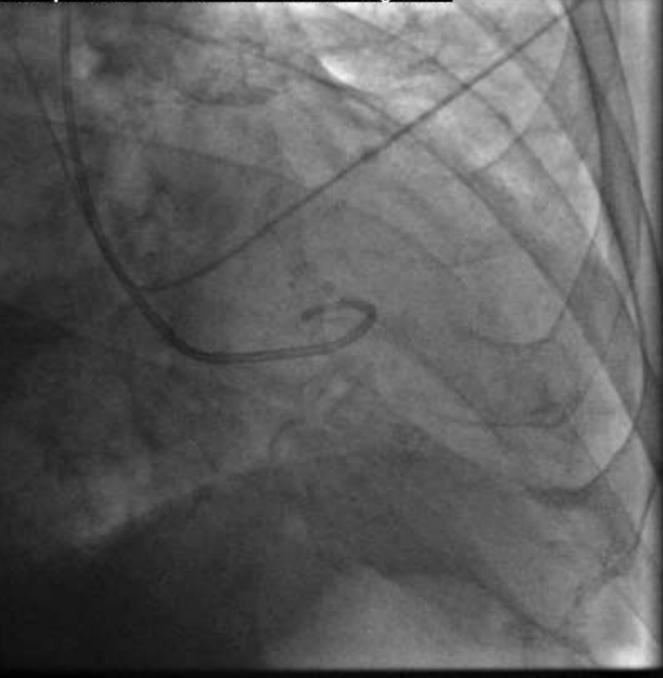
- Recovery of LV function
- Reassess the result in the IRA residual thrombus, residual lesion
- Reassess the N-IRA lesions and diameter
- Application of FFR, iFR, IVUS and Virtual Histology
- Application of PROSPECT Trial data to final decision to stent
 - o Plaque burden ≥ 70%
 - VH-TCFA
 - o MLA ≤ 4.0 mm²

Predicts MACE of 18-20% at 3 yrs

Lossy Compression - not intended for diagnosis

82-yearold Male

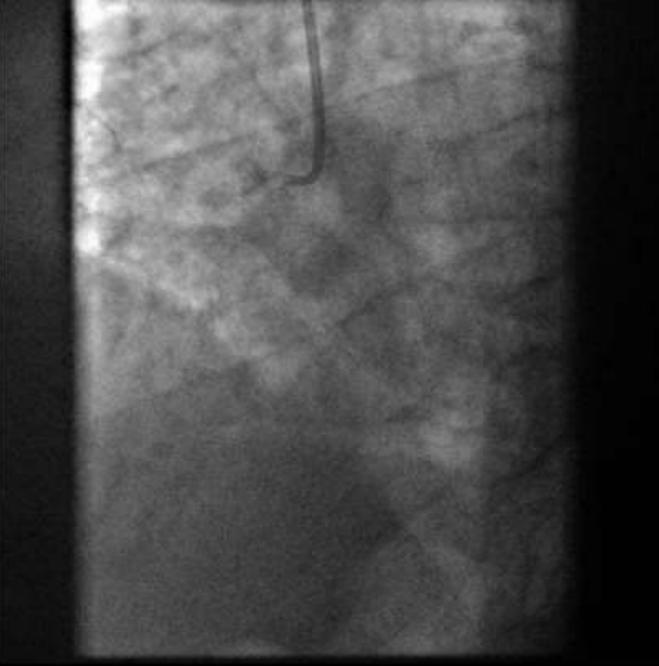
Acute Inferior MI 3/12/08



Lossy Compression - not intended for diagnosis

82-yearold Male

Acute Inferior MI 3/14/08



Multiple Vessel PCI in STEMI Patients

Final Recommendation

- Culprit only IRA PCI at index procedure
- Staged PCI to N-IRA lesions following careful reassessment at index hospitalization
- Results of 4000-pt COMPLETE Trial are pending; culprit only PCI vs. compete revascularization at staged PCI within 72 hours