29º CONGRESSO DE CARDIOLOGIA DO ESTADO DA BAHIA

10 a 13 de maio de 2017
Bahia Othon Palace

Hospital SANTA IZABEL — SantaCasaBA

Dr. Joberto Sena
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Diarista da UTI Cardiovascular do Hospital Santa Izabel
Diretor de Promoção de Saúde Cardiovascular da SBC Bahia

11/04/2017

HISTÓRIA DO CATETERISMO CARDÍACO
O BALÃO DE GRUENTZIG

THE LANCET, FEBRUARY 4, 1978

Letters to the Editor

TRANSLUMINAL DILATATION OF CORONARY-ARTERY STENOSIS

The New England Journal of Medicine

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Volume 301 JULY 12, 1979 Number 2

NONOPERATIVE DILATATION OF CORONARY-ARTERY STENOSIS

Percutaneous Transluminal Coronary Angioplasty

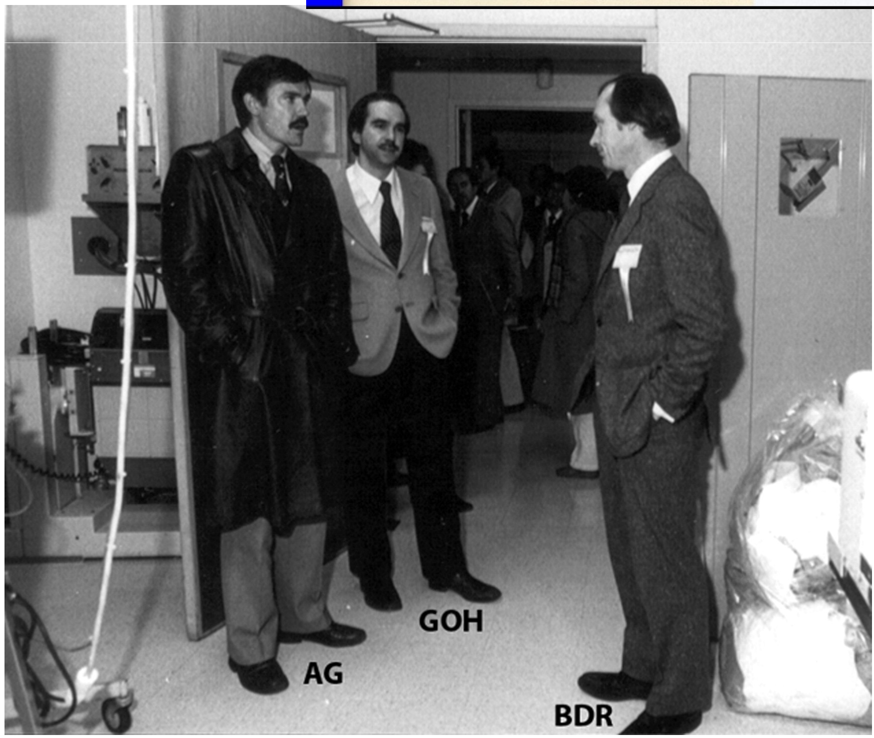
Andreas R. Grüntzig, M.D., Åke Senning, M.D., and Walter E. Siegenthaler, M.D.

Abstract In percutaneous transluminal coronary angioplasty, a catheter system is introduced through a systemic artery under local anesthesia to dilate a stenotic artery by controlled inflation of a distensible balloon.

Over the past 18 months, we have used this technic in 50 patients. The technic was successful in 32 patients, reducing the stenosis from a mean of 84 to 34 per cent (P<0.001) and the coronary-pressure gradient from a mean of 58 to 19 mm Hg (P<0.001). Twenty-nine patients showed improvement in cardiac function during follow-up examination. Because of acute deterioration in clinical status, emergency bypass was later necessary in five patients; three showed electrocardiographic evidence of infarcts.

Patients with single-vessel disease appear to be most suitable for the procedure, and a short history of pain indicates the presence of a soft (distensible) atheroma likely to respond to dilatation. We estimate that only about 10 to 15 per cent of candidates for bypass surgery have lesions suitable for this procedure. A prospective randomized trial will be necessary to evaluate its usefulness in comparison with surgical and medical management. (N Engl J Med 301:61-68, 1979)

CAMG – IC/ FUC



Angioplastia Primária – Evidências Pioneiras

The NEW ENGLAND JOURNAL of MEDICINE

Volume 328:673-679 March 11, 1993 Number 10

A Comparison of Immediate Angioplasty with Thrombolytic Therapy for Acute Myocardial Infarction

Cindy L. Grines, Kevin F. Browne, Jean Marco, Donald Rothbaum, Gregg W. Stone, James O'Keefe, Paul Overlie, Bryan Donohue, Noah Chelliah, Gerald C. Timmis, Ronald E. Vlietstra, Michelle Strzelecki, Sylvia Puchrowicz-Ochocki, William W. O'Neill, for The Primary Angioplasty in Myocardial Infarction Study Group

Volume 328:680-684 March 11, 1993 Number 10

A Comparison of Immediate Coronary Angioplasty with Intravenous Streptokinase in Acute Myocardial Infarction

Felix Zijlstra, Menko Jan de Boer, Jan Hoorntje, Stoffer Reiffers, Johan Reiber, and Harry Suryapranata

Volume 328:685-691 March 11, 1993 Number 10

Immediate Angioplasty Compared with the Administration of a Thrombolytic Agent Followed by Conservative Treatment for Myocardial Infarction

Raymond J. Gibbons, David R. Holmes, Guy S. Reeder, Kent R. Bailey, Mona R. Hopfenspirger, Bernard J. Gersh, for The Mayo Coronary Care Unit and Catheterization Laboratory Groups

Procedimento: Estratégia	Classe	Nível de evidência
A realização de ECG de 12 derivações pela equipe da ambulância no local do primeiro atendimento médico	I	B
Reduzir o tempo pré-hospitalar para o diagnóstico e o tratamento inicial do IAMCST	I	B
Pacientes que são levados por ambulâncias às instituições emergenciais com disponibilidade para ICP primária devem ter um tempo entre o "primeiro contato médico-balão" não maior do que 90 minutos	I	B
Pacientes que chegam por ambulância ou por meios próprios às instituições emergenciais sem disponibilidade de ICP primária podem ser imediatamente transferidos para uma instituição com sua disponibilidade se o tempo "primeiro contato médico-balão" previsto não for maior que 120 minutos	I	B
Pacientes que chegam por ambulância ou por meios próprios às instituições emergenciais sem disponibilidade de ICP ou expectativa de transporte/ transferência (tempo "primeiro contato médico-balão") > 120 minutos para hospital com ICP, devem permanecer na primeira instituição e receber o fibrinolítico em até 30 minutos desde sua chegada	I	B

Estratégias de Reperfusão no IAM ST Supra

IAM ST Supra <12 hrs de Sintomas

Hospital com Hemodinâmica
Cardiologia Intervencionista
24 horas/7 dias
Equipe Experiente
(>12 casos IAM/ano)
Retardo porta/balão <90 min

MINORIA DOS CASOS

ICP Primária

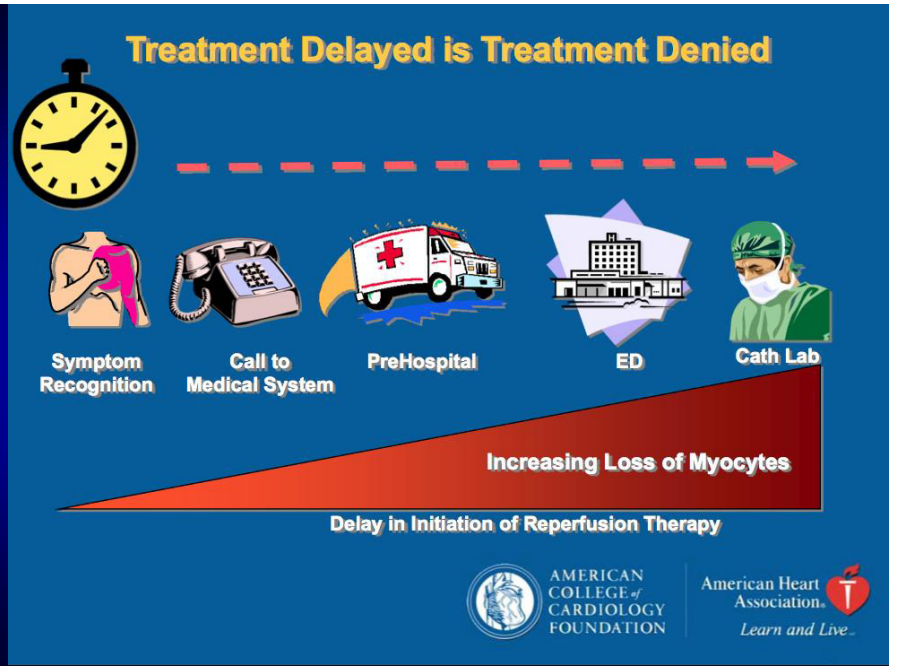


Tabela 2.9 – ICP primária – estratégias de revascularização do miocárdio

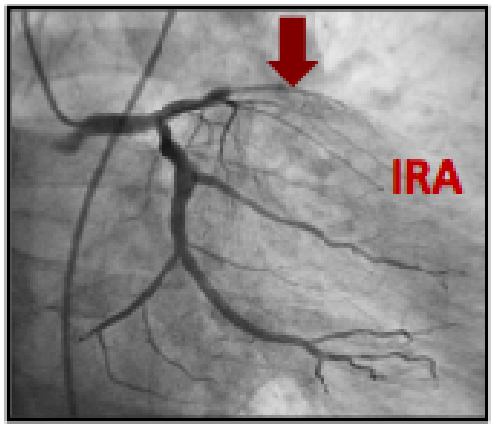
Procedimento: ICP primária – estratégias de revascularização do miocárdio	Classe	Nível de evidência
ICP primária deve ser limitada ao tratamento apenas do vaso-culpado pelo IAM, com exceção de pacientes em choque cardiogênico ou com sinais de isquemia persistente após o tratamento do vaso culpado	IIa	B
Pacientes portadores de doença multiarterial grave (estenose > 70%) devem ser submetidos à revascularização miocárdica adicional (percutânea ou cirúrgica), para abordagem das estenoses não tratadas no evento agudo	IIa	B
Revascularização imediata de outras esteroses coronárias não culpadas pelo evento índice durante a realização da ICP primária pode ser considerada em pacientes selecionados	IIb	B
A cirurgia de revascularização deve ser considerada em pacientes com isquemia miocárdica persistente na qual a ICP primária do vaso-culpado não pode ser realizada ou foi insucesso	IIa	C

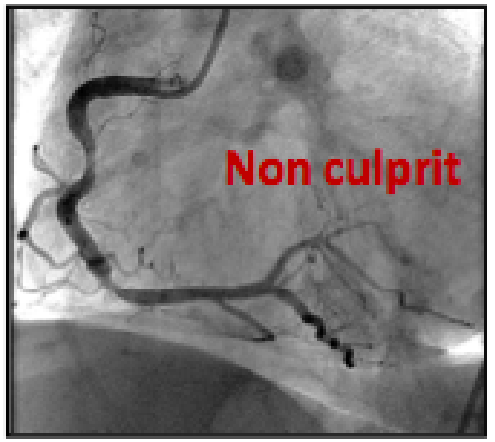
Background

30-50% of STEMI patients have additional stenoses other than the infarct related artery[1,2]

Current guidelines support culprit vessel PCI only

Contemporary studies have, however, suggested preventive revascularisation[3,4]





[1] Jong JA *al.* Coronary Artery disease 2006
[2] Muller DW *et al.* Am Heart J 1991
[3] Wald *et al.* NEJM 2013
[4] Gershlick *et al.* ESC 2014

Randomized Trial of Preventive Angioplasty in Myocardial Infarction

David S. Wald, M.D., Joan K. Morris, Ph.D., Nicholas J. Wald, F.R.S., Alexander J. Chase, M.B., B.S., Ph.D., Richard J. Edwards, M.D., Liam O. Hughes, M.D., Colin Berry, M.B., Ch.B., Ph.D., and Keith G. Oldroyd, M.D., for the PRAMI Investigators*

THE NEW ENGLAND JOURNAL of MEDICINE

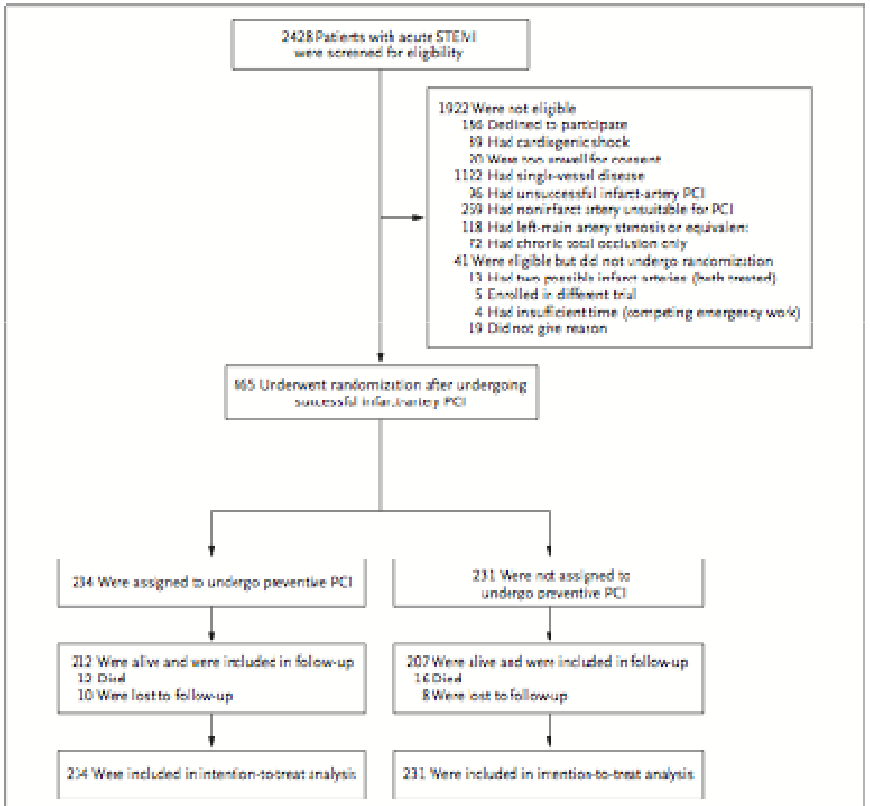


Figure 1. Enrollment and Follow-up.

Reasons for unsuccessful PCI in the infarct artery were a low coronary flow (Thrombolysis in Myocardial Infarction [TIMI] grade, ≤2) or clinical deterioration including death, pulmonary edema, cardiac arrest, or other procedural problem. Patients with a noninfarct artery that was unsuitable for PCI were treated medically or with coronary-artery bypass surgery.

Table 3. Prespecified Clinical Outcomes.*

Outcome	Preventive PCI (N=234)	No Preventive PCI N=231)	Hazard Ratio (95% CI)	P Value
	no. of events			
Primary outcome				
Death from cardiac causes, nonfatal myocardial infarction, or refractory angina†	21	53	0.35 (0.21–0.58)	<0.001
Death from cardiac causes or nonfatal myocardial infarction†	11	27	0.36 (0.18–0.73)	0.004
Death from cardiac causes	4	10	0.34 (0.11–1.08)	0.07
Nonfatal myocardial infarction	7	20	0.32 (0.13–0.78)	0.009
Refractory angina	12	30	0.35 (0.18–0.69)	0.002
Secondary outcomes				
Death from noncardiac causes	8	6	1.28 (0.38–4.35)	0.36
Repeat revascularization	16	46	0.30 (0.17–0.56)	<0.001

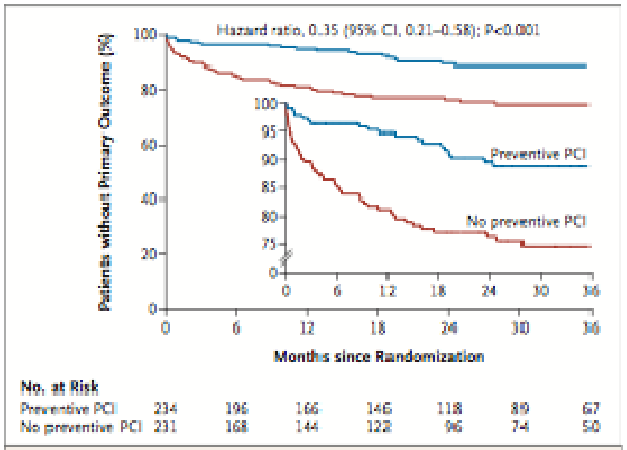


Figure 2. Kaplan–Meier Curves for the Primary Outcome.

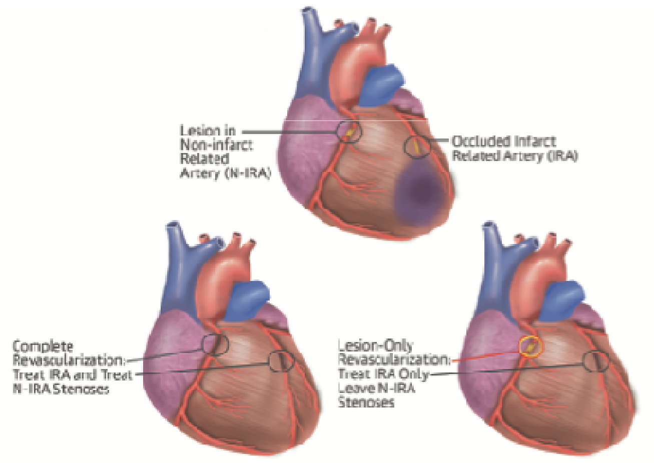
The primary outcome was a composite of death from cardiac causes, nonfatal myocardial infarction, or refractory angina. The inset graph shows the same data on a larger scale. All patients in the trial underwent infarct-artery PCI immediately before randomization.

Randomized Trial of Complete Versus Lesion-Only Revascularization in Patients Undergoing Primary Percutaneous Coronary Intervention for STEMI and Multivessel Disease

The CvLPRIT Trial

Anthony H. Gershlick, MBBS, Jamal Nasir Khan, MB ChB, Damian J. Kelly, MB ChB, MD,
John P. Greenwood, MB ChB, PhD, Thiagarajah Sasikaran, BSc, PhD, Nick Curzen, BM, PhD,
Daniel J. Blackman, MD, Miles Dalby, MBBS, MD, Kathryn L. Fairbrother, BA, Winston Banya, MSc,
Duolao Wang, PhD, Marcus Flather, MB BS, Simon L. Hetherington, MB ChB, MD,
Andrew D. Kelion, BM BCh, DM, Suneel Talwar, MB BS, MD, Mark Gunning, MD, Roger Hall, MD,
Howard Swanton, MB BChir, MD, Gerry P. McCann, MB ChB, MD

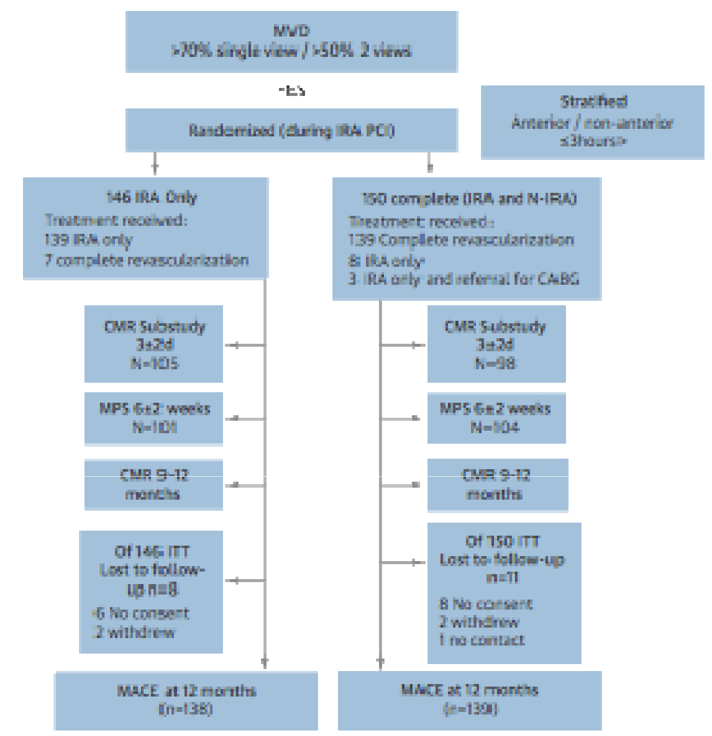
CENTRAL ILLUSTRATION Complete Versus Lesion-Only Revascularization in Acute MI



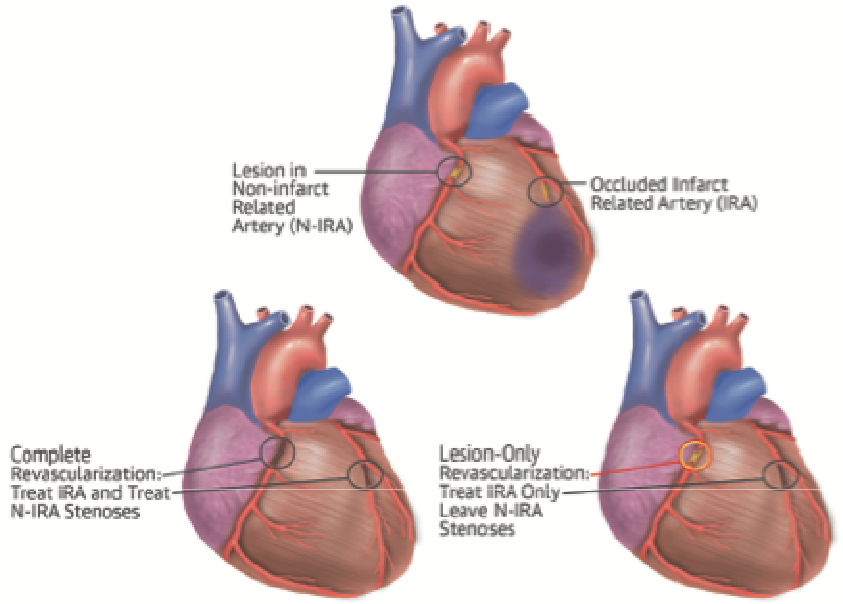
Event	N = 150 (%)		N = 146 (%)	HR (95%)	P
Total MACE	15 (10.0)		31 (21.2)	0.45 (0.24, 0.84)	0.009
Mortality	2 (1.3)		6 (4.1)	0.32 (0.06, 1.60)	0.14
Recurrent MI	2 (1.3)		4 (2.7)	0.48 (0.09, 2.62)	0.39
Heart Failure	4 (2.7)		9 (6.2)	0.43 (0.13, 1.39)	0.14
Repeat Revascularization	7 (4.7)		12 (8.2)	0.55 (0.22, 1.39)	0.2

Gershlick, A.H. et al. J Am Coll Cardiol. 2015; 65(10):963–72.

FIGURE 1 Patient Flow Diagram



CENTRAL ILLUSTRATION Complete Versus Lesion-Only Revascularization in Acute MI



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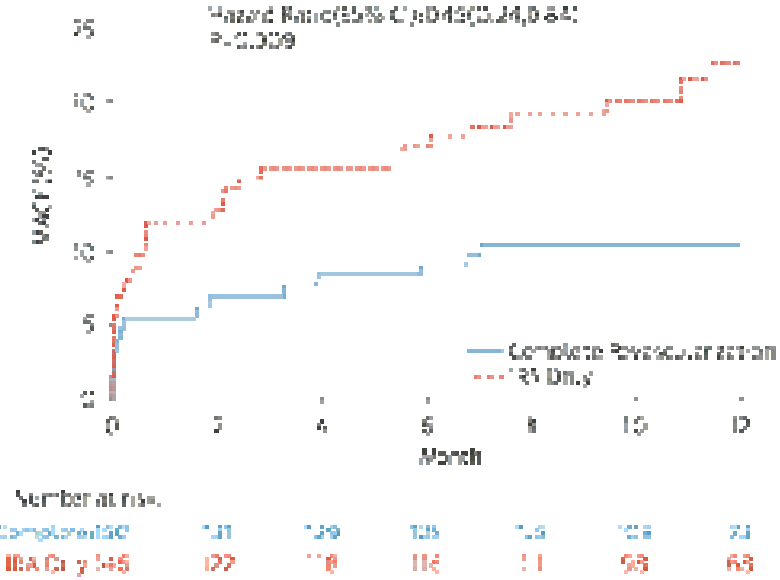
Gershlick, A.H. et al. J Am Coll Cardiol. 2015; 65(10):963-72.

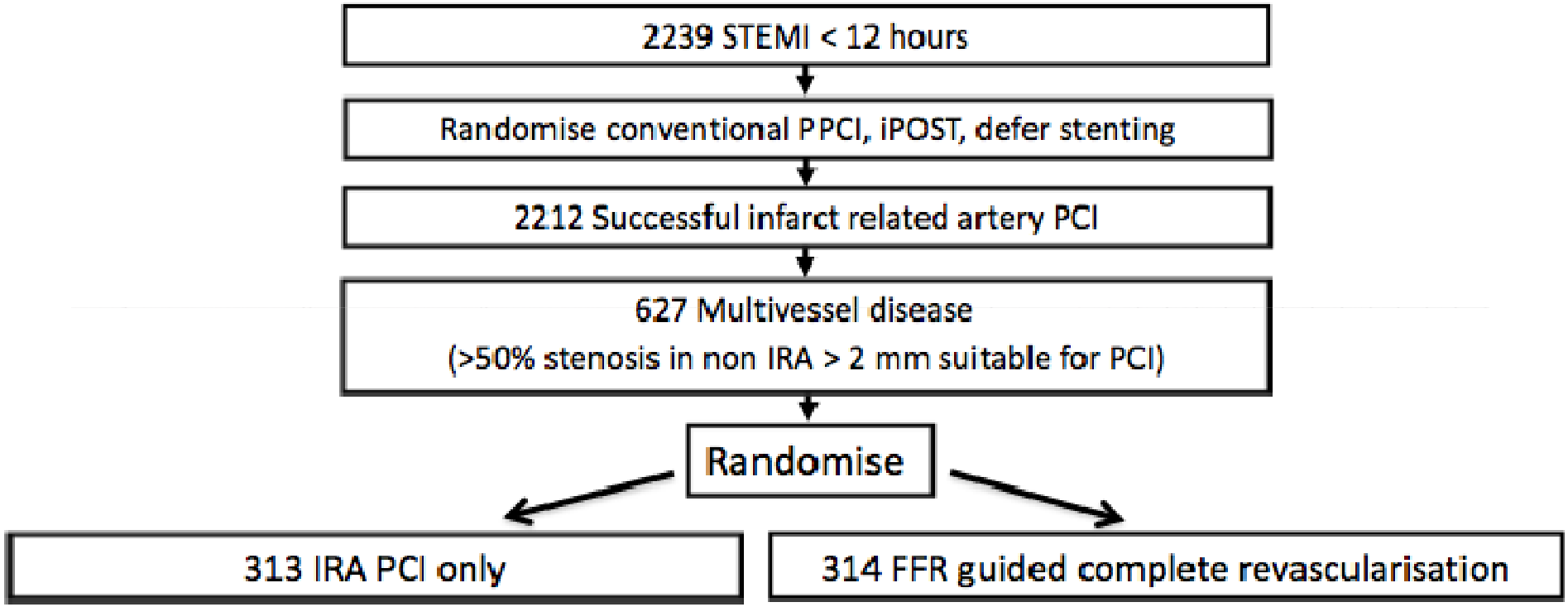
FIGURE 2 Kaplan-Meier Curves



Number at risk

The Third DANish Study of Optimal Acute Treatment of Patients with ST-segment Elevation Myocardial Infarction

DANAMI3-TRIAL PROGRAM



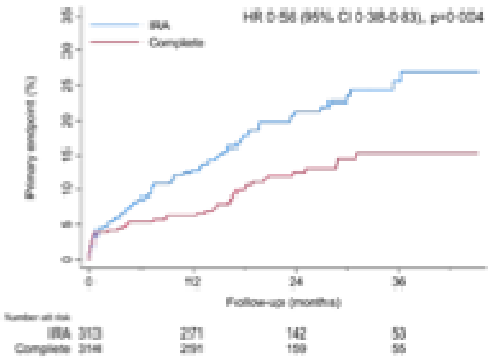
Primary endpoint

Composite

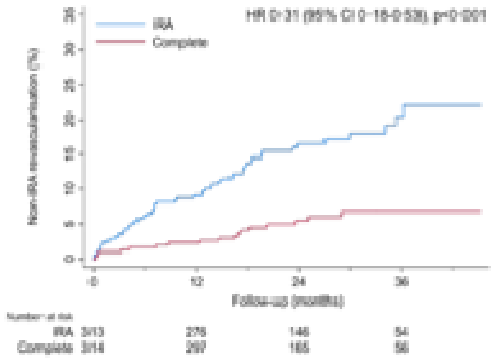
- All-cause mortality
- Nonfatal myocardial infarction
- Ischemia driven revascularisation of non IRA lesions

Assessed when the last included patient had been followed for 1 year

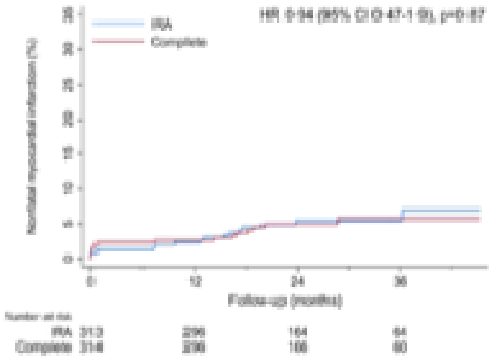
Individual components of primary endpoint



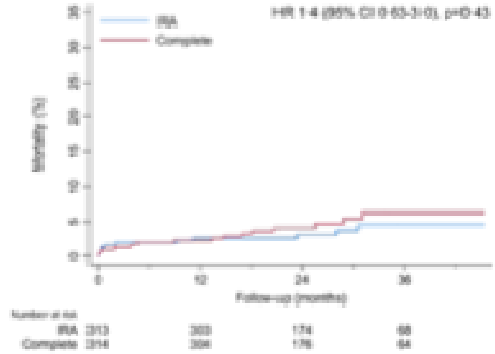
Composite



Revascularisation



Non fatal MI



All cause death

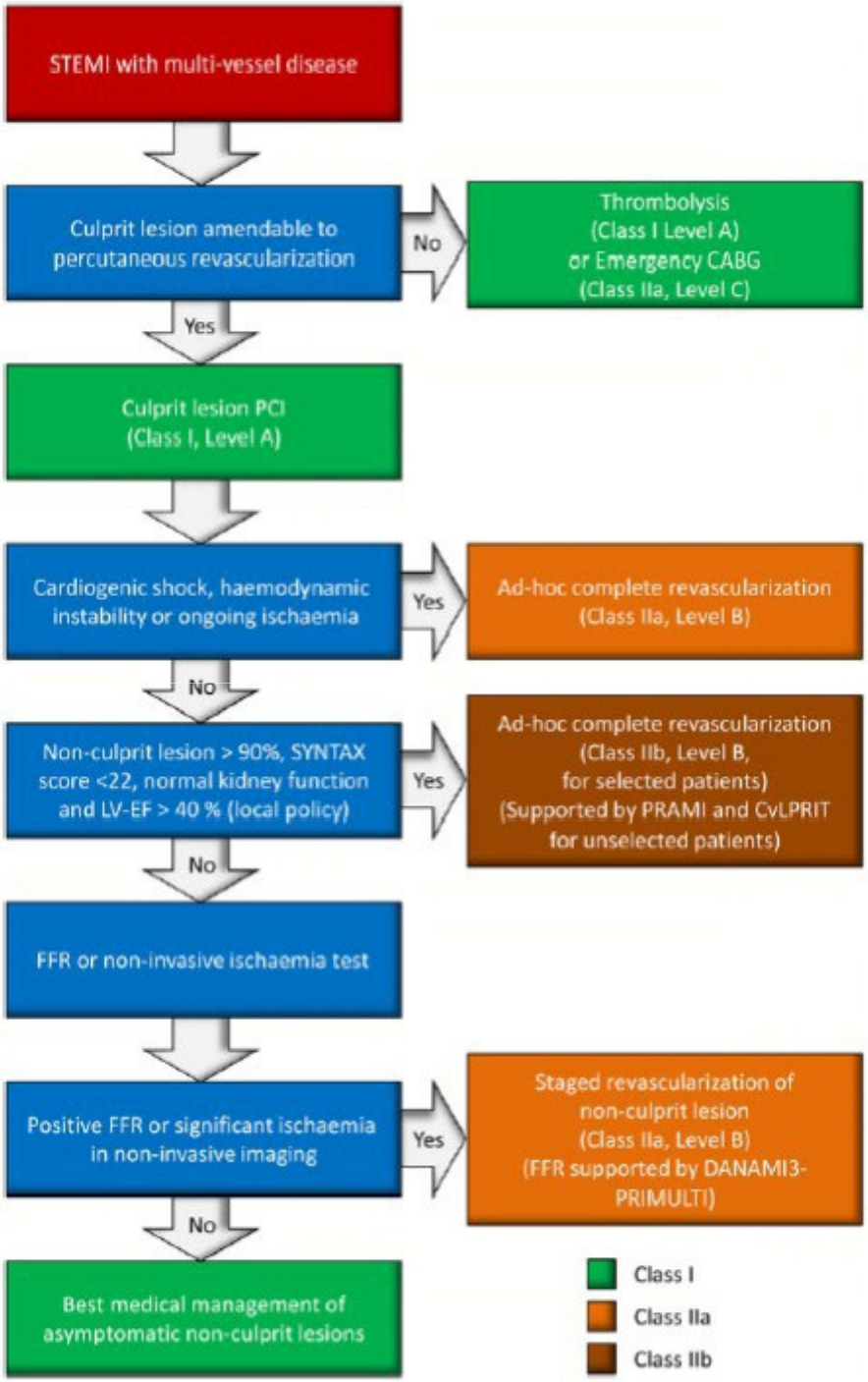
Conclusions

Complete FFR guided revascularisation of multivessel disease in STEMI patients, staged within the index admission, reduced the primary endpoint of all cause death, reinfarction and repeat revascularisation

40% of repeat revascularisations were urgent

However, the reduction in the primary endpoint was driven by repeat revascularisations and not by hard endpoints

Therefore, although complete revascularisation should be recommended, any condition that makes complex PCI unattractive may support a more conservative strategi of IRA PCI only


STEMI with multi-vessel disease
Culprit lesion amendable to percutaneous revascularization
No
Thrombolysis (Class I Level A) or Emergency CABG (Class IIa, Level C)
Yes
Culprit lesion PCI (Class I, Level A)
Cardiogenic shock, haemodynamic instability or ongoing ischaemia
Yes
Ad-hoc complete revascularization (Class IIa, Level B)
No
Non-culprit lesion > 90%, SYNTAX score <22, normal kidney function and LV-EF > 40 % (local policy)
Yes
Ad-hoc complete revascularization (Class IIb, Level B, for selected patients) (Supported by PRAMI and CvLPRIT for unselected patients)
No
FFR or non-invasive ischaemia test
Positive FFR or significant ischaemia in non-invasive imaging
Yes
Staged revascularization of non-culprit lesion (Class IIa, Level B) (FFR supported by DANAMI3-PRIMULTI)
No
Best medical management of asymptomatic non-culprit lesions
Class I
Class IIa
Class IIb

COMPARE-ACUTE

ACC.17

Randomised trial of FFR-guided complete revascularization *versus* infarct artery only treatment in multivessel STEMI patients

On behalf of all COMPARE-ACUTE investigators

Pieter Smits

Maasstad Hospital

Rotterdam, The Netherlands

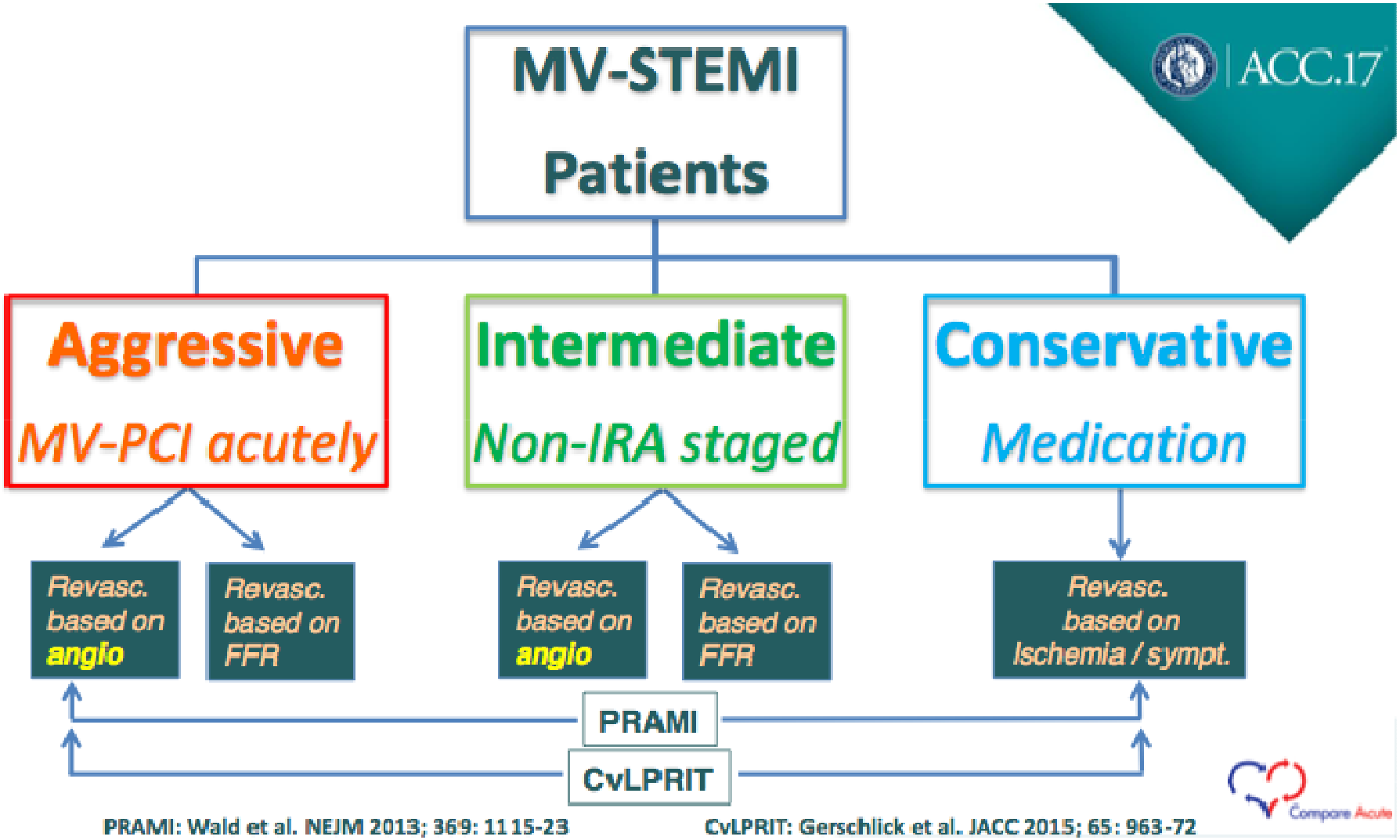
Compare Acute

MAASSTAD ZIEKENHUIS

Introduction

- Approximately 50% of the STEMI patients have multivessel disease at presentation; meaning 50% or more diameter stenosis in one or more non-infarct-related arteries (non-IRAs)

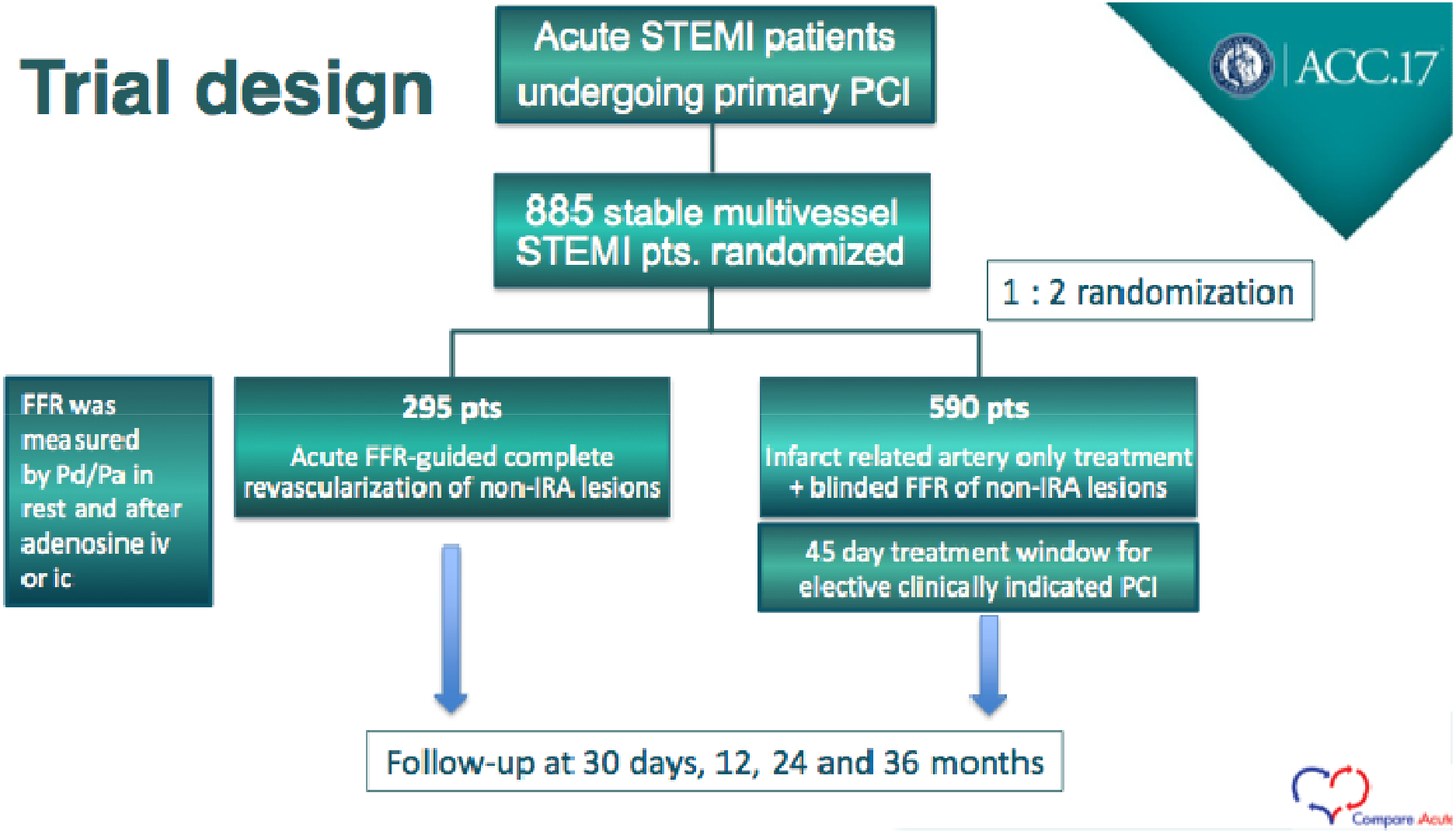
- What and when to do with these non-infarct-related artery (non-IRA) lesions remains a unresolved clinical dilemma



PRAMI: Wald et al. NEJM 2013; 369: 1115-23

CvLPRIT: Gerschlick et al. JACC 2015; 65: 963-72

Trial design



Key In- and Exclusion Criteria

Inclusion Criteria

- Pts. between18-85 years old
- Presenting with STEMI within 12 hours of onset of complaints with an indication for primary PCI
- And of which the non-IRAs - or their major side branches of ≥2.0 mm in diameter - demonstrated lesions with ≥50% stenosis by quantitative coronary angiography (QCA) or visual assessment and were judged feasible for PCI by the operator

Exclusion Criteria

- Left main disease
- Chronic total occlusion or severe stenosis with TIMI flow ≤ II of the non-IRA lesion
- Suboptimal result or complications after treatment of IRA
- Severe valve dysfunction
- Killip Class III or IV

Endpoints

Primary endpoint:

The composite of all-cause death, recurrent myocardial infarction, recurrent revascularization and cerebrovascular event (MACCE) at 12 months follow-up

Secondary endpoints:

- The primary endoint (MACCE) at 24 and 36 months
- The components of the primary endpoint at 12, 24 and 36 months
- The composite of all-cause death and myocardial infarction at 12, 24 and 36 months
- The composite of cardiac death, myocardial infarction, revascularization, cerebrovascular event and major bleeding (NACE) at 12, 24 and 36 months
- Major bleeding at 48 hours and 12 months
- Stent thrombosis at 12, 24 and 36 months
- Treatment costs at 12, 24 and 26 months

Procedural data

	FFR guided complete Revascularization (295 pts.)	Infarct Artery Only Revascularization (590 pts.)	p-value
Pts. with treated (FFR guided) non-IRA lesions – no.(%)	163 (55.3%)¶	NA	
during index PCI procedure delayed during index hospitalization	136 (83.4%) 27 (16.6%)§		
Mean index procedure time – min	65 ± 31	59 ± 28	0.001
Mean contrast volume during index PCI procedure – ml	224 ± 104	202 ± 75	0.007
Median (range) hospital stay - days	4 (1 – 35)	4 (1 -71)	0.36
Pre-discharge non-invasive stress tests – no.(%)	21 (7.1%)	71 (12.0%)	0.03

¶ 158 pts. FFR guided + 5 pts without FFR guidance underwent non-IRA treatment

§ mean delay of 2.1 ± 1.0 days

FFR outcome

	FFR-guided Complete n=295 pts (450 lesions)	IRA-only n=590 pts (856 lesions)	P value
FFR measurements	292 (99.0%)	575 (97.5%)	0.13
Min. FFR (mean ± SD)	0.78 ± 0.12	0.79 ± 0.12	0.42
Positive FFR value (≤ 0.80)	158/292 (54.1%)	275/575 (47.9%)	0.08
Negative FFR value (>0.80)	134/292 (45.9 %)	300/575 (52.1%)	

Primary outcome and its components

* MACCE = the composite of all-cause mortality, non-fatal myocardial infarction, any revascularization and cerebrovascular events.

	FFR guided Complete Revascularization (n=295)	Infarct Artery Only treatment (n=590)	HR	95% CI	P value
Primary endpoint	Number of events (%)				
MACCE* (any first event)	23 (7.8%)	121 (20.5%)	0.35	0.22 – 0.55	<0.001
Death, all cause	4 (1.3%)	10 (1.7%)	0.80	0.25 – 2.56	0.70
Cardiac	3 (1.0%)	6 (1.0%)			
Myocardial infarction (MI)	7 (2.4%)	28 (4.7%)	0.50	0.22 - 1.13	0.10
Spontaneous	5 (1.6%)	17 (2.9%)	0.59	0.22 – 1.59	0.29
Peri-procedural	2 (0.6%)	11 (1.9%)	0.36	0.08 – 1.64	0.19
Revascularization	18 (6.1%)	103 (17.5%)	0.32	0.20 – 0.54	<0.001
PCI	15 (5.1%)	98 (16.6%)	0.37	0.24 – 0.57	<0.001
CABG	3 (1.0%)	5 (0.8%)	1.20	0.29 – 5.02	0.80
Cerebrovascular event	0 (0.0%)	4 (0.7%)	NA	NA	NA

Secondary endpoints

** NACE = Net Adverse Clinical Events; the composite of cardiac death, myocardial Infarction, any revascularization, stroke and major bleeding.

	FFR guided Complete Revascularization (n=295)	Infarct Artery Only treatment (n=590)	HR	95% CI	P value
Secondary endpoints	Number of events (%)				
NACE (any first event)**	25 (8.5%)	174 (29.5%)	0.25	0.16– 0.38	**<0.001**
Death (all cause) or MI	11 (3.7%)	38 (6.4%)	0.57	0.29 – 1.12	0.10
Major bleeding	3 (1.0%)	8 (1.4%)	0.75	0.20 – 2.84	0.67
Any bleeding at 12months	9 (3.1%)	28 (4.7%)	0.64	0.30 – 1.36	0.25
Any bleeding at 48h	5 (1.7%)	8 (1.4%)	1.25	0.41 – 3.83	0.69
Hospitalization for heart failure, unstable angina and chest pain	13 (4.4%)	47 (8.0%)	0.54	0.29 – 0.99	**0.04**
Any revascularization	19 (6.4%)	161 (27.3%)	0.47	0.29 – 0.76	**0.002**
Stent thrombosis	2 (0.7%)	1 (0.2%)	0.58	0.12 – 2.80	0.50

Conclusions

- In multivessel STEMI patients, FFR-guided complete revascularization of non-infarct-related lesions in the acute phase of primary PCI significantly reduced the risk of the composite MACCE outcome as compared with a strategy of treatment of the infarct-related artery only

- This reduction was mainly driven by the decreased need for subsequent revascularization

Conclusão - Mensagens para casa

- Estudos mais recentes sobre este tema sugerem ser benéfico, de maneira geral, tratar as lesões não culpadas pelo infarto

- Estes estudos tem aspectos que dificultam a validação externa dos resultados e a aplicação deste conceito em uma boa parte dos casos na prática diária

- Pacientes hemodinamicamente estáveis e com anatomia coronariana simples

- O momento de abordagem da lesão não culpada foi: no mesmo procedimento índice no estudo PRAMI e em um segundo momento, mas na mesma internação, nos estudos Cvlprit e DANAMI-3

Conclusões - mensagem para casa

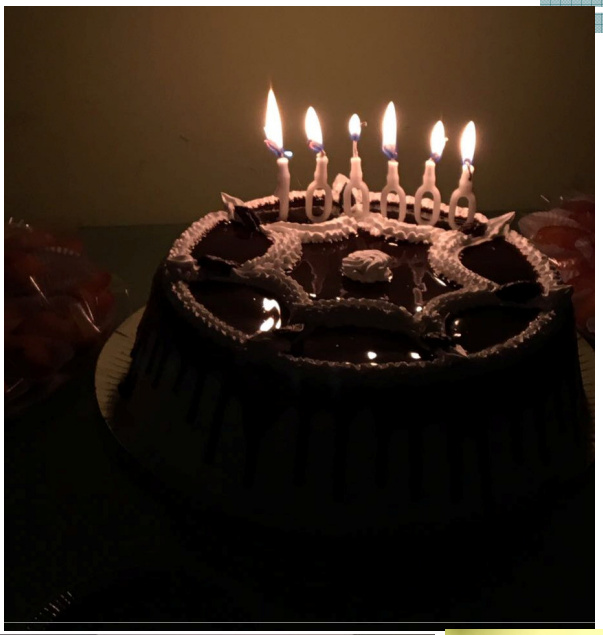
- O tratamento de lesões não culpadas, parece ser benéfico. Há evidências de estudos randomizados tanto para a abordagem imediata quanto para o estadiamento para um segundo procedimento na mesma internação - não há redução de desfechos duros

- Utilização da FFR para selecionar qual lesão residual tratar parece evitar o tratamento desnecessário induzido apenas pela angiografia

- É fundamental levar em consideração na tomada de decisão a complexidade anatômica da lesão residual, bem como o tempo de procedimento e o volume de contraste utilizados até aquele momento

- Na maioria dos casos deve-se apenas tratar a lesão culpada pelo IAM no procedimento inicial

Obrigado!



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