Complete vs incomplete revascularisation

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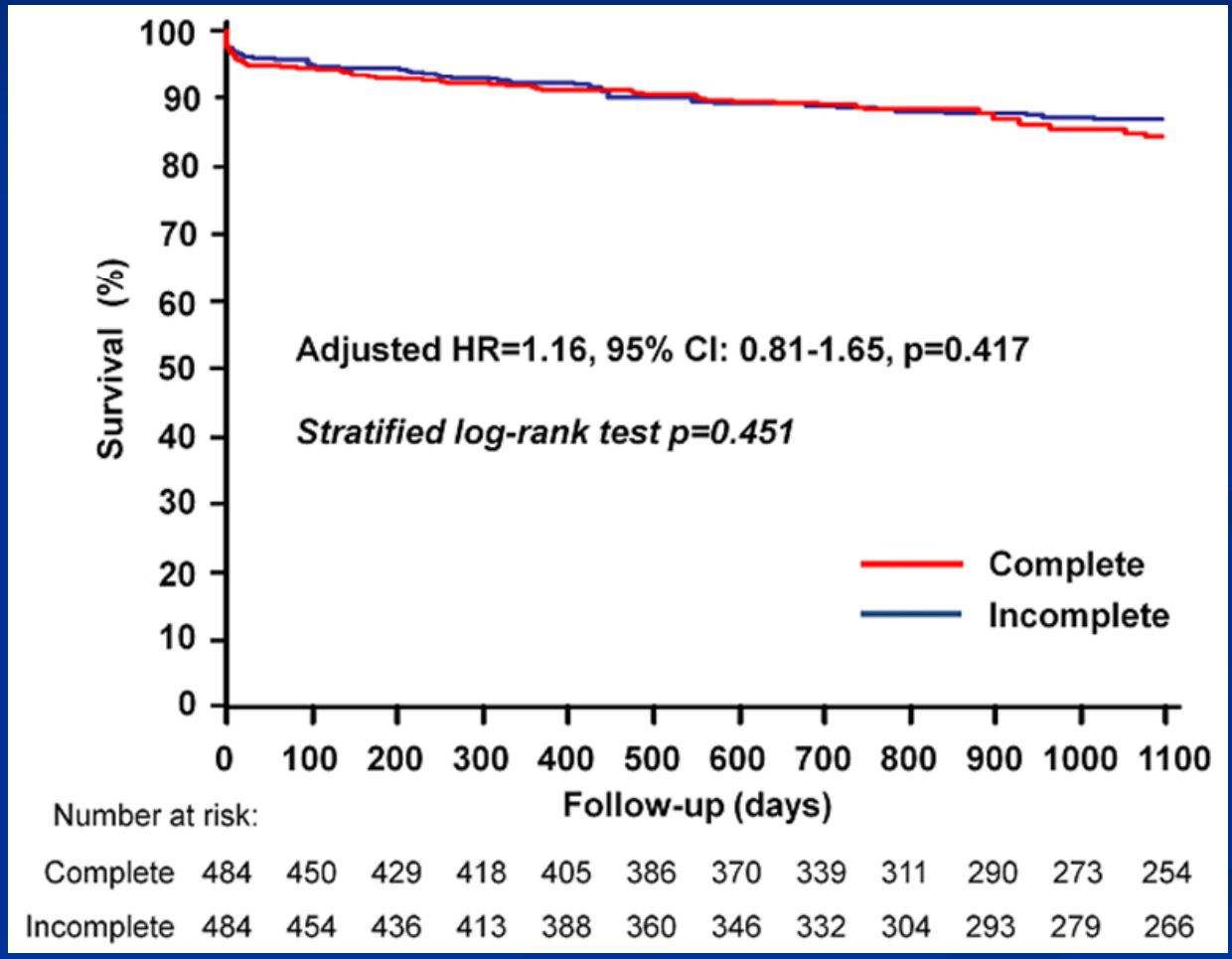
Best Strategies for Multivessel CAD

- Efficacy of Alternative Therapies
  - *PCI vs CABG vs Medical Rx*
- Completeness of Revascularization
- Improving Techniques
  - *Drug eluting stents vs arterial CABG*
  - *FFR-guided intervention*
  - *Radial access*
- Long-term treatment
  - *Active risk factor modification*

Complete vs incomplete revascularisation

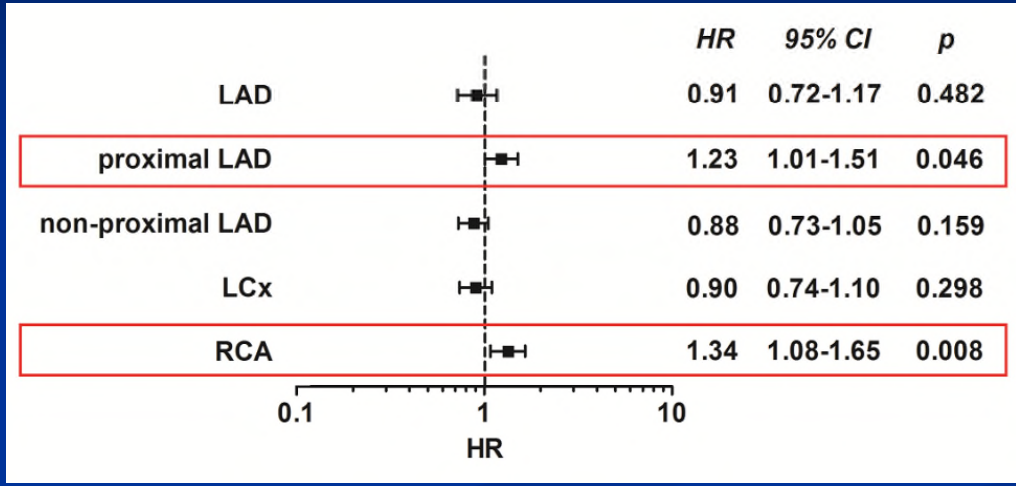
- Treatment bias favouring younger patients?
- Assessing coronary anatomy “easy” but….
  - Small vessel disease
  - Bystander CTO
  - Diffuse disease
  - LV function vs myocardium at risk
  - Myocardial viabilty
  - Adverse coronary anatomy (calcification etc)

Complete vs incomplete revascularisation (propensity matched)

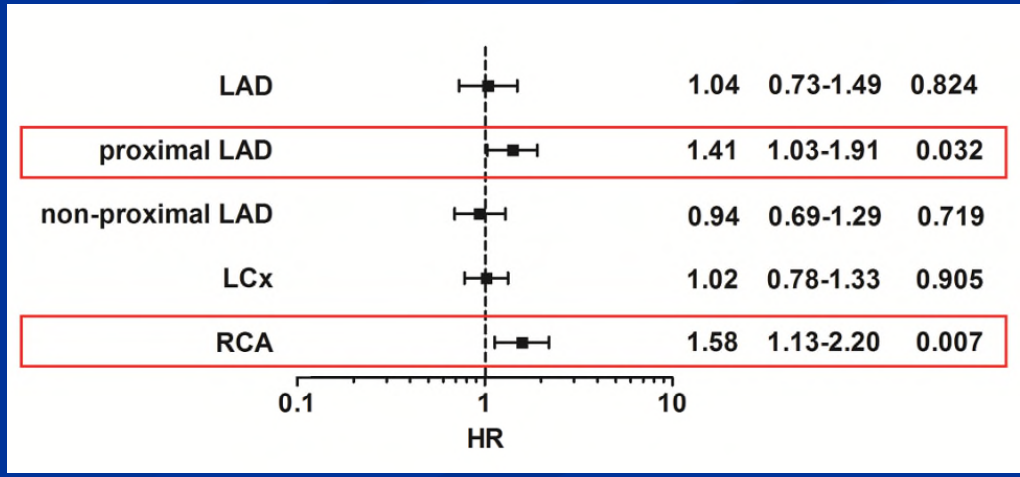


Complete vs incomplete revascularisation

Total study cohort (n=6,755)

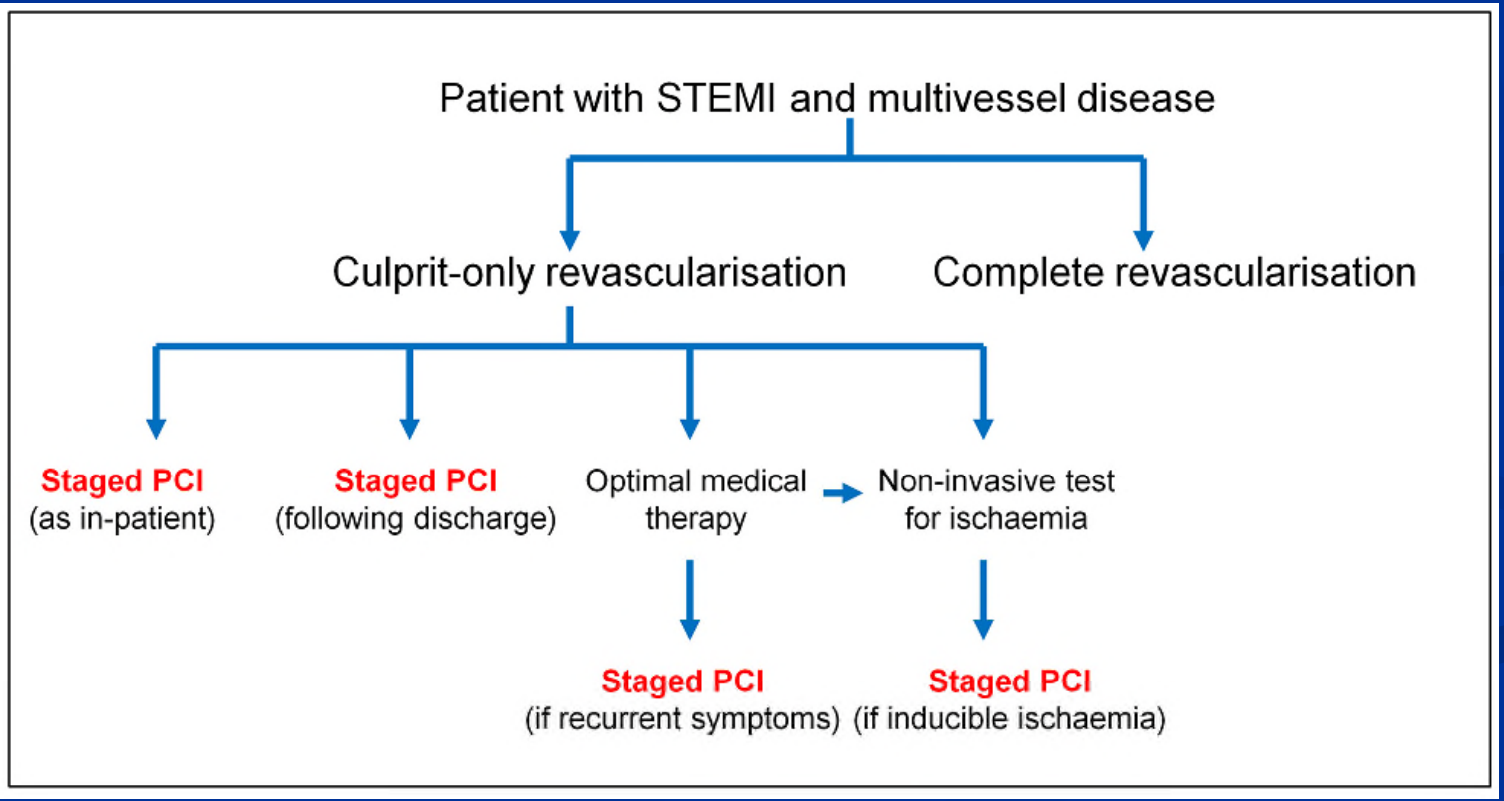


STEACS cohort (n=2,336)



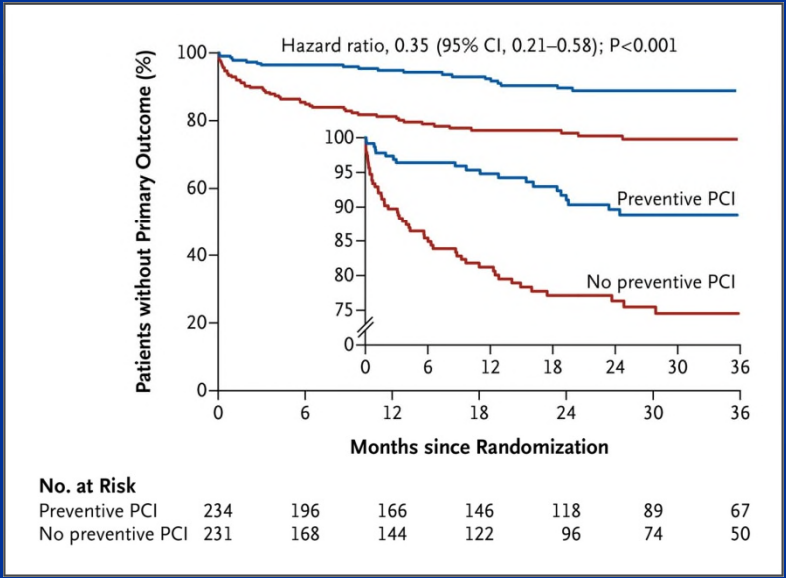
Current strategies

- Current AHA/ACC/ESC guidelines culprit-only intervention at the time of PPCI except for patients in cardiogenic shock or in those with ongoing ischaemia



PRAMI trial

- Randomised trial with 465 patients: complete (preventative) vs. culprit vessel PCI at time of index PPCI procedure
- Primary end point: a *composite* of cardiac death, non-fatal MI and refractory angina at a median follow-up of 23 months
- Preventative PCI was associated with a significant reduction in primary end-point (HR=0.35, 95% CI: 0.21-0.58, p<0.001)
- However this was driven by non-fatal MI and refractory angina, with no difference in mortality (HR=0.34, 95% CI: 0.11-1.08, p=0.070)



Wald DS et al. N Engl J Med 2013;369:1115-1123.

CVLPRIT trial

- Randomised trial with 296 patients: culprit vessel PCI at index procedure vs. complete revascularisation prior to discharge.
- Primary end point: a *composite* of all-cause death, recurrent MI, heart failure and repeat PCI and refractory angina at 30 days
- Complete revascularisation prior to discharge was associated with a significant reduction in primary end-point (HR=0.45, 95% CI: 0.24-0.84, p=0.009)
- No difference in each individual components of primary end-point.
- Only 57% of pts had complete revascularisation at index procedure

An important question stemming from CVLPRIT: " Is complete revascularisation at the time of PPCI or prior to hospital discharge associated with better outcomes?"

Gershlick A. European Society of Cardiology Congress. 2014

Meta-analysis

Interventional Cardiology

Culprit Vessel Only Versus Multivessel and Staged Percutaneous Coronary Intervention for Multivessel Disease in Patients Presenting With ST-Segment Elevation Myocardial Infarction

A Pairwise and Network Meta-Analysis

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Gert van Valkenhoef, MS,‡ Hans L. Hillege, MD, PhD,*‡ Iwan C. C. van der Horst, MD, PhD,*
Felix Zijlstra, MD, PhD,§ Bart J. G. L. de Smet, MD, PhD*
Groningen and Rotterdam, the Netherlands; and Rochester, Minnesota

JACC 2011;58(7):692-703

Table 3 Quality of Retrospective Studies

Primary Author, Year Published (Ref. #)	Control for Confounders	Blinded Assessment of Angiography Data	Preferred PCI Strategy	Definition of Culprit PCI Regarding Staged Procedures	Completeness of Survival Data
Cavender, 2009 (9)	+ (subanalysis of prospective registry)	—	N/A	No staged procedures allowed	N/A
Corpus, 2004 (10)	—	—	Operator decision	No staged procedures allowed	100%
Dziewierz, 2010 (11)	+ (subanalysis of prospective registry)	—	N/A	No staged procedures allowed	100%
Han, 2008 (12)	—	—	Operator decision	No staged procedures allowed	99.5%
Hannan, 2010 (13)	+ (subanalysis of prospective registry)	—	N/A	No staged procedures allowed	N/A
Kong, 2006 (14)	+ (subanalysis of prospective registry)	—	Operator decision	N/A	N/A
Mohamad, 2010 (15)	—	—	N/A	No staged procedures allowed	N/A
Poyen, 2003 (16)	—	—	Multivessel PCI	Staged procedures allowed	98.8%
Qarawani, 2008 (17)	—	—	Operator decision	Staged procedures allowed	N/A
Rigattieri, 2007 (18)	—	—	Operator decision	No staged procedures allowed	95.5%
Roe, 2001 (19)	—	—	Operator decision	Staged procedures allowed	100%
van der Schaaf, 2010 (20)	—	—	N/A	N/A	N/A
Torna, 2010 (21)	+ (subanalysis of prospective study)	—	N/A	N/A	99.7%

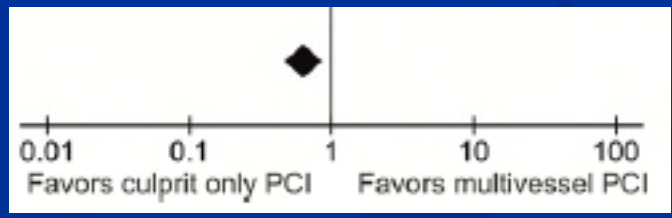
Table 2 Quality of Prospective Studies

Primary Author, Year Published (Ref. #)	RCT	Power Calculation	Blinded Assessment of Angiographic Data	Adjudication of Adverse Events	ITT Analysis	Definition of Culprit PCI Regarding Staged Procedures	Completeness of Survival Data
Di Mario, 2004 (5)	Yes	Yes	Yes	No	N/A	Staged procedures allowed	100%
Ochala, 2004 (6)	Yes	No	Yes	No	N/A	No staged procedures allowed	100%
Politi, 2010 (7)	Yes	Yes	No	No	Yes	No staged procedures allowed	Mean follow-up used
Khattab, 2008 (8)	No	No	No	No	N/A	Staged procedures allowed 1–3 months after primary PCI	93%

Short-term Mortality (n=17)

OR = 0.70 (0.46-1.14)

Long-term Mortality (n=17)



OR = 0.63 (0.46-0.86)

In a genuinely High-Risk Group?

CLINICAL RESEARCH

CME

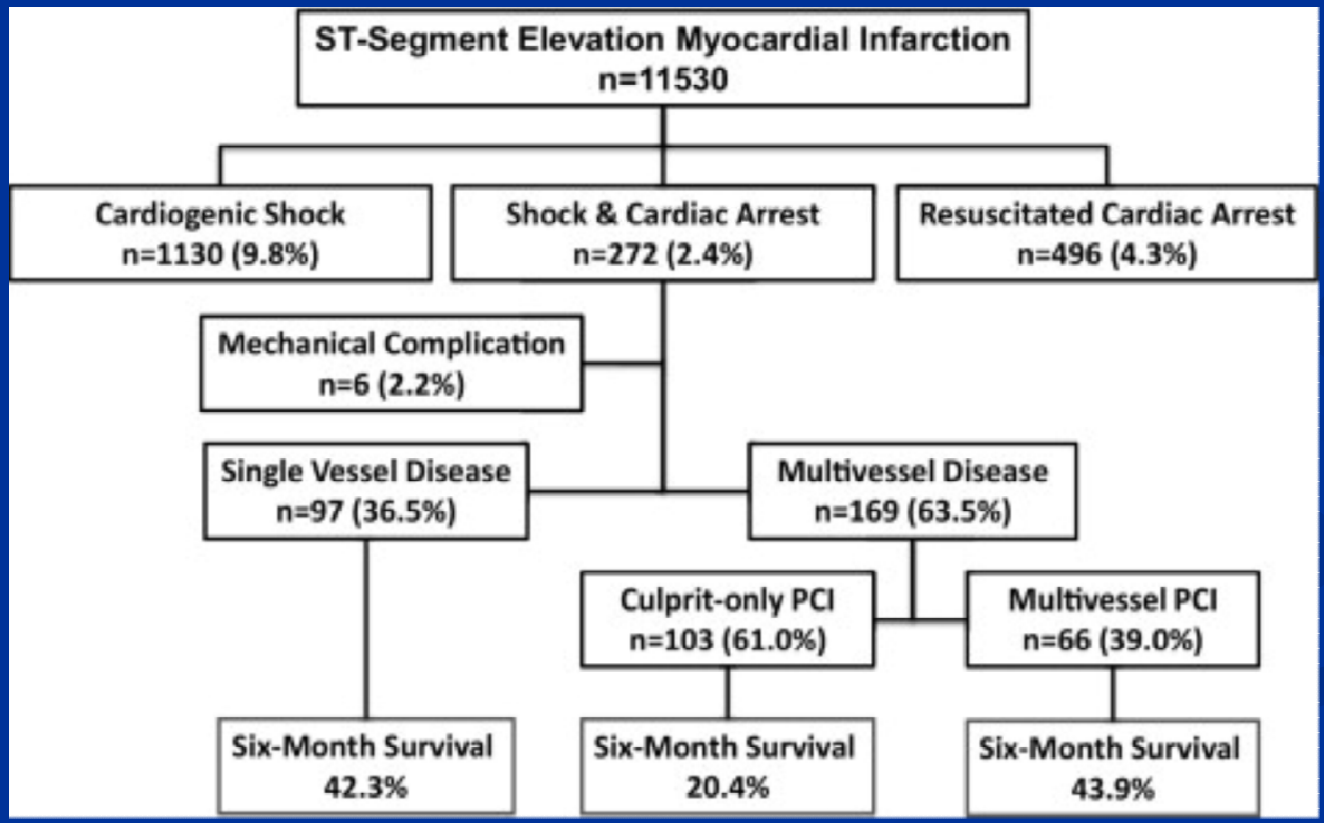
Primary Percutaneous Coronary Intervention in Patients With Acute Myocardial Infarction, Resuscitated Cardiac Arrest, and Cardiogenic Shock

The Role of Primary Multivessel Revascularization

Darren Mylotte, MD,* Marie-Claude Morice, MD,* Hélène Eltchaninoff, MD, PhD,†
Jérôme Garot, MD, PhD,* Yves Louvard, MD,* Thierry Lefèvre, MD,* Philippe Garot, MD*

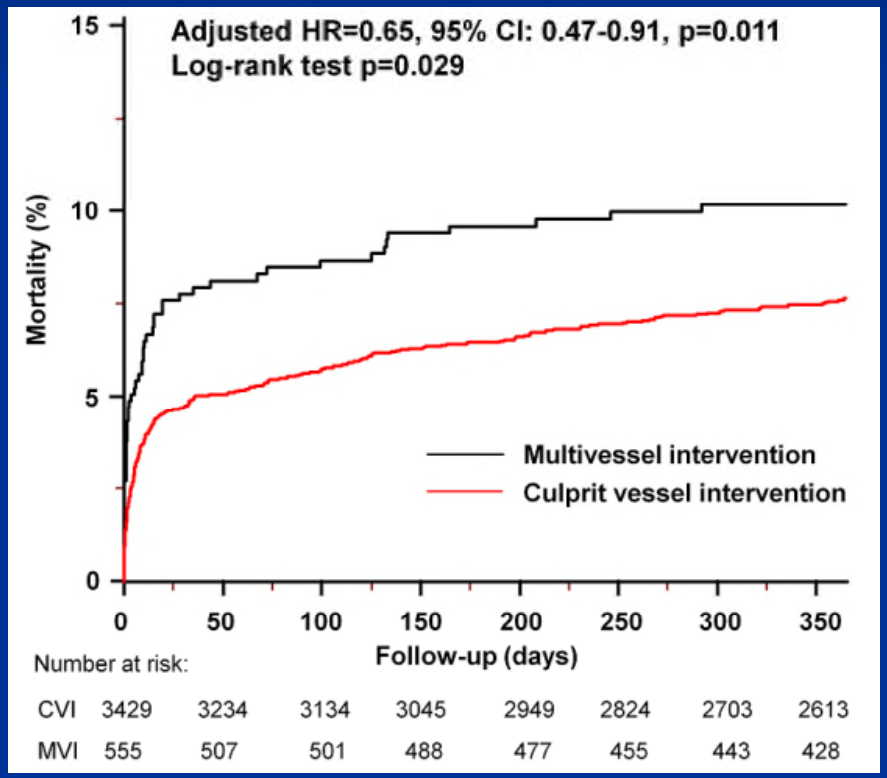
Massy, Quincy, and Rouen, France

JACC Cardiov Interv 2013;6(2):115-125

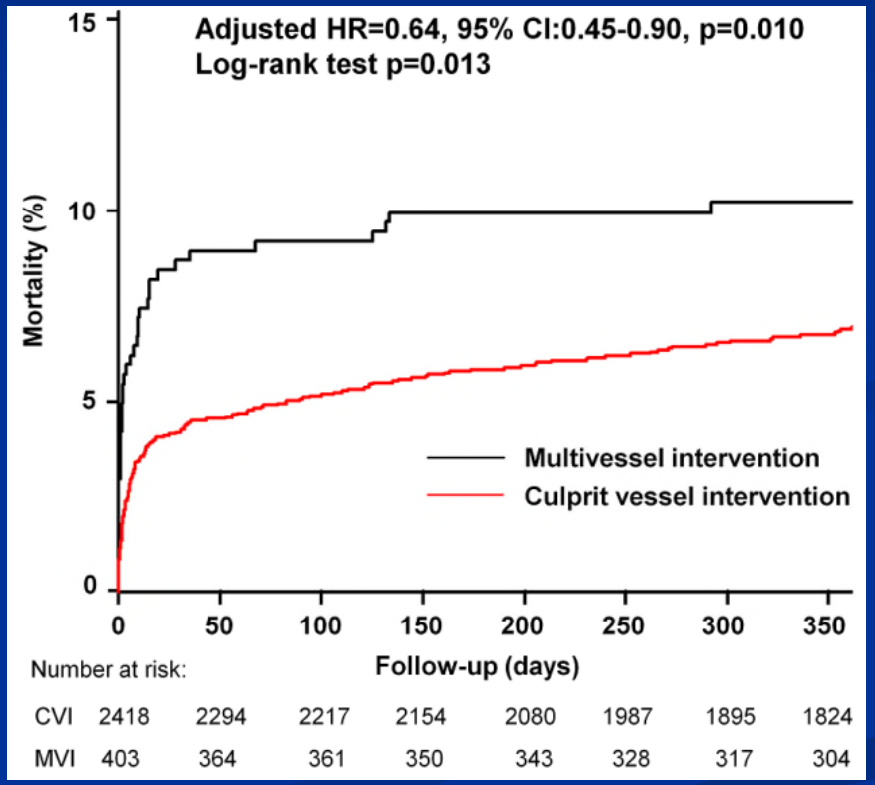


Survival curves

Total study population (n=3,984):

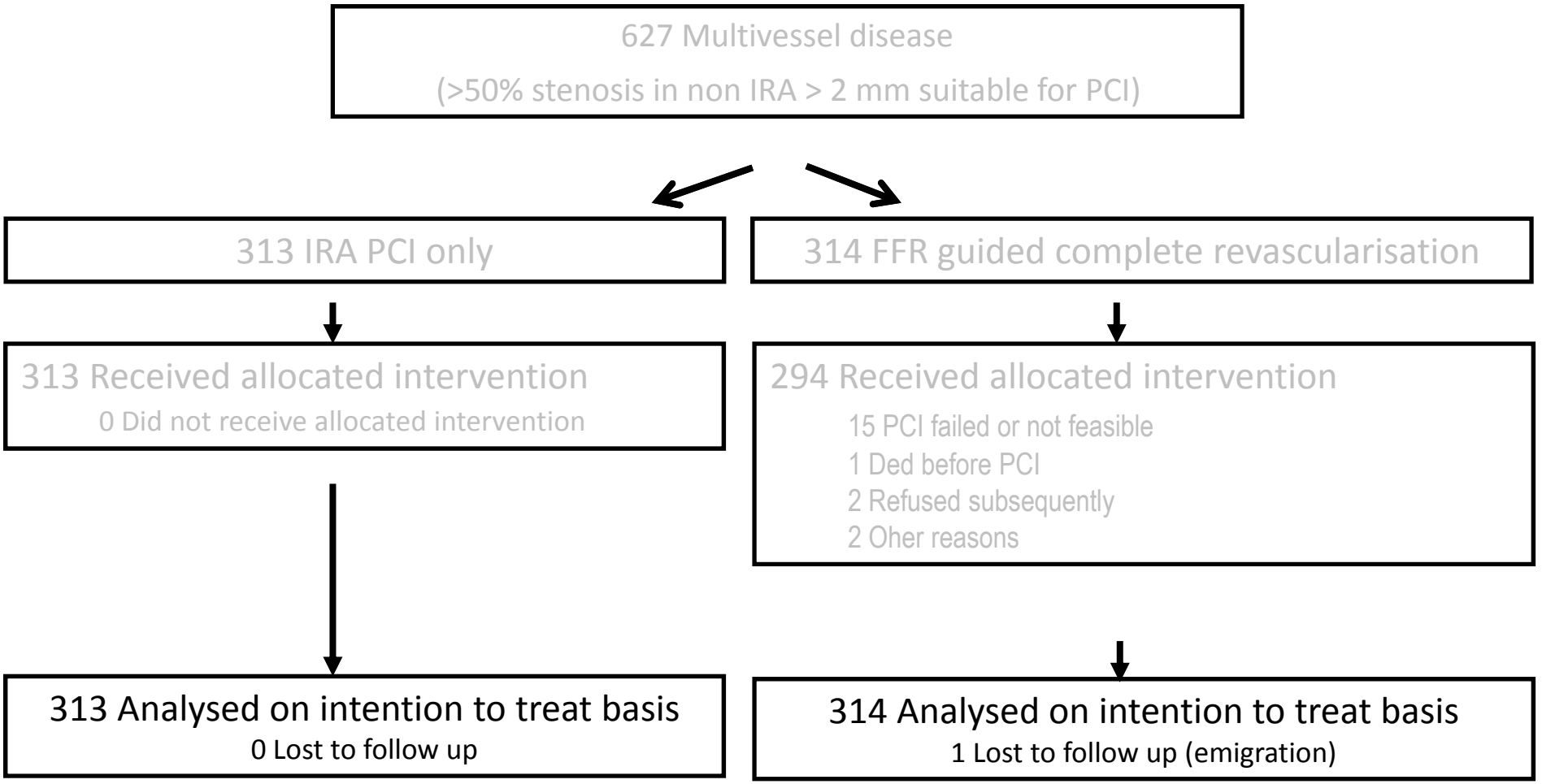


Propensity-matched cohort (n=2,821):

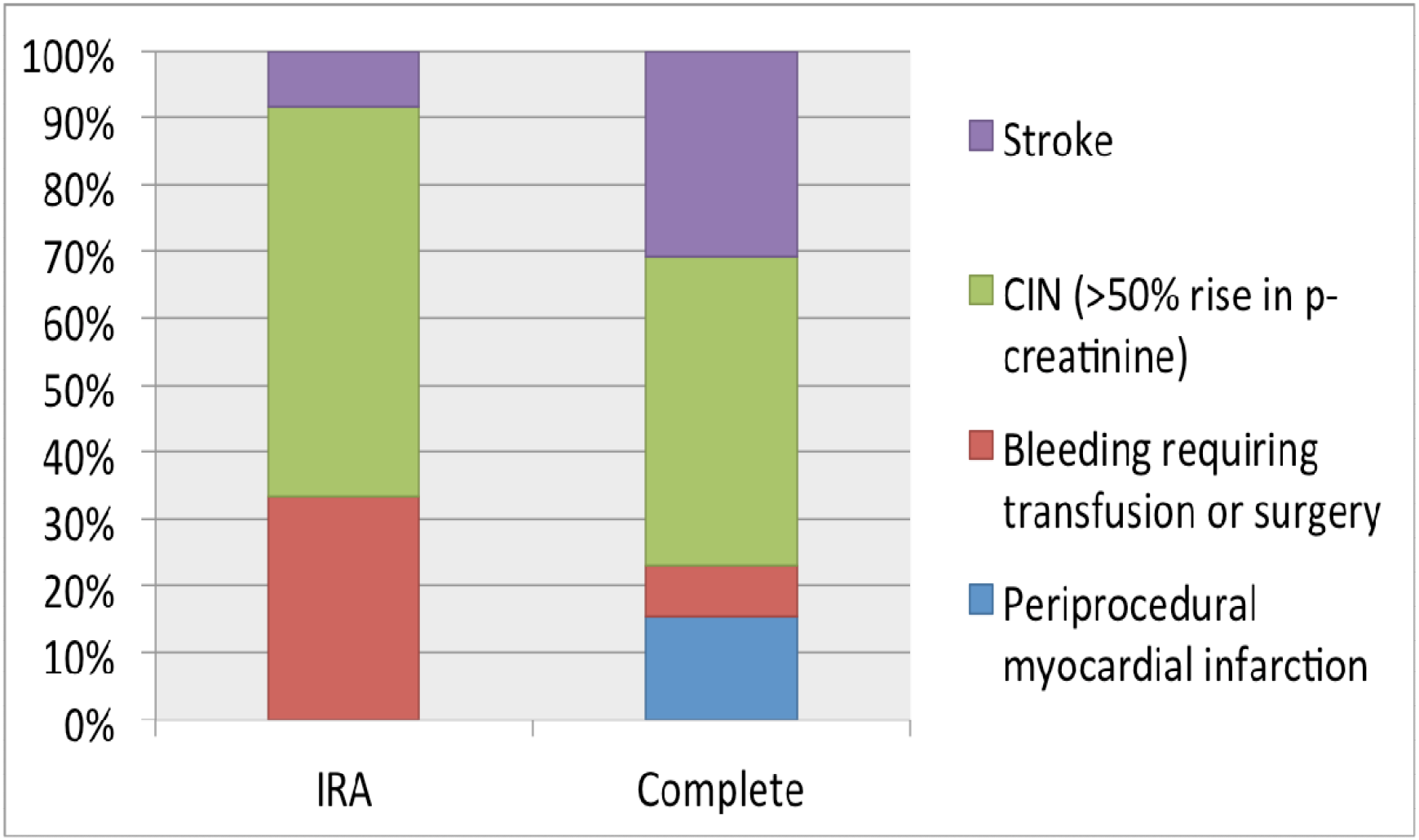


Iqbal, Ilsley, Kabir et al. Circ Cardivasc Qual Outcomes 2014 (1941-7713)

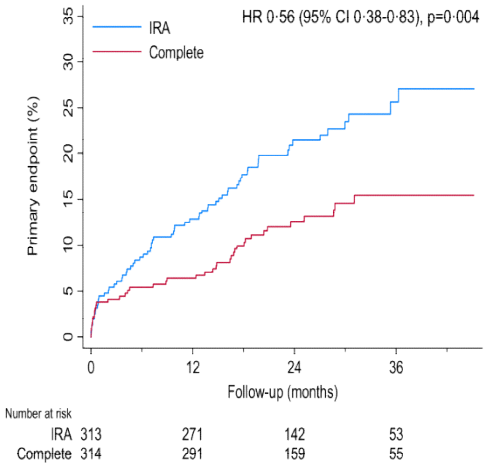
DANAMI3-TRIAL PROGRAM



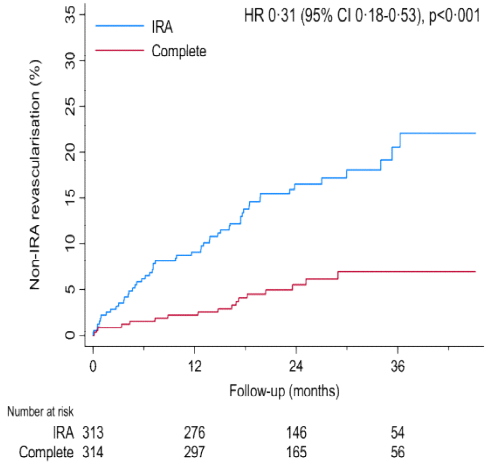
Complications



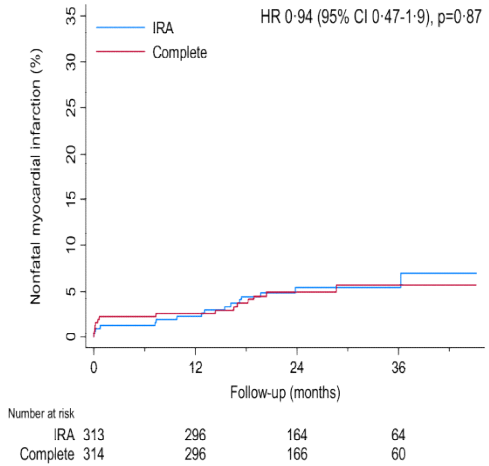
Individual components of primary endpoint



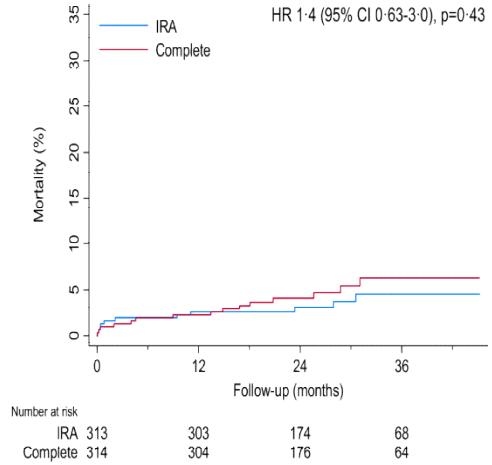
Composite



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

Complete vs incomplete revascularisation

- Question –

  Could the PRAMI and CVLPRIT studies drive an increased risk in the real world?

Total vs target in PPCI

- ***Favour complete revascularisation***
  - Reduce incidence of recurrent ischaemia
  - Reduce overall ischaemic burden
  - Reduce need for future revascularisation
- ***Favour culprit-only revascularisation***
  - Assessing bystander disease is difficult
  - ↑ coronary emoblisation
  - ↑ iatrogenic myocardial infarction
  - ↑ contrast nephropathy

Dealing with bystander disease after PPCI

2104 audit of 149 consecutive patients

- 39 (20%) of 198 lesions treated electively

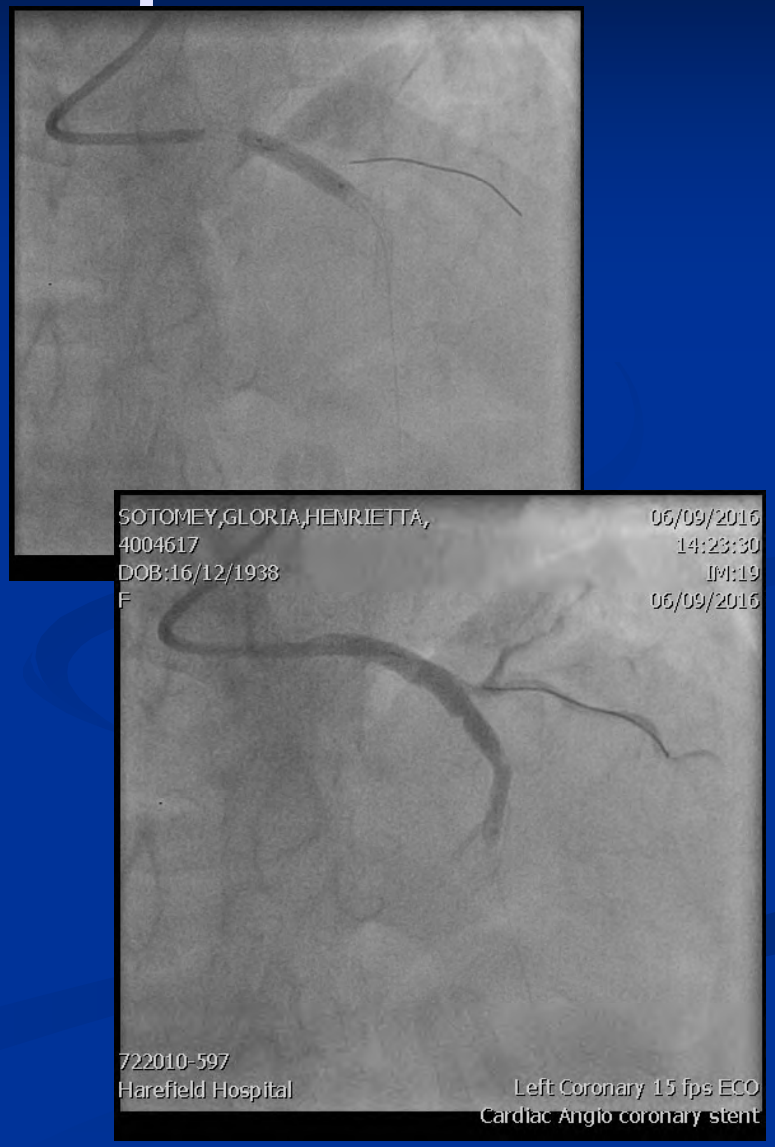
  Intervention usually driven by symptoms or myoview scan

  NO DEATHS, No complications

- 159 (80%) managed medically
  - 89 with no ischaemia study – ***1 death AMI***
  - 50 negative test (MPS or FFR) – ***1 non fatal MI***
  - 7 no PCI despite +ve myoview
  - 13 staged PCI without MPS or symptoms

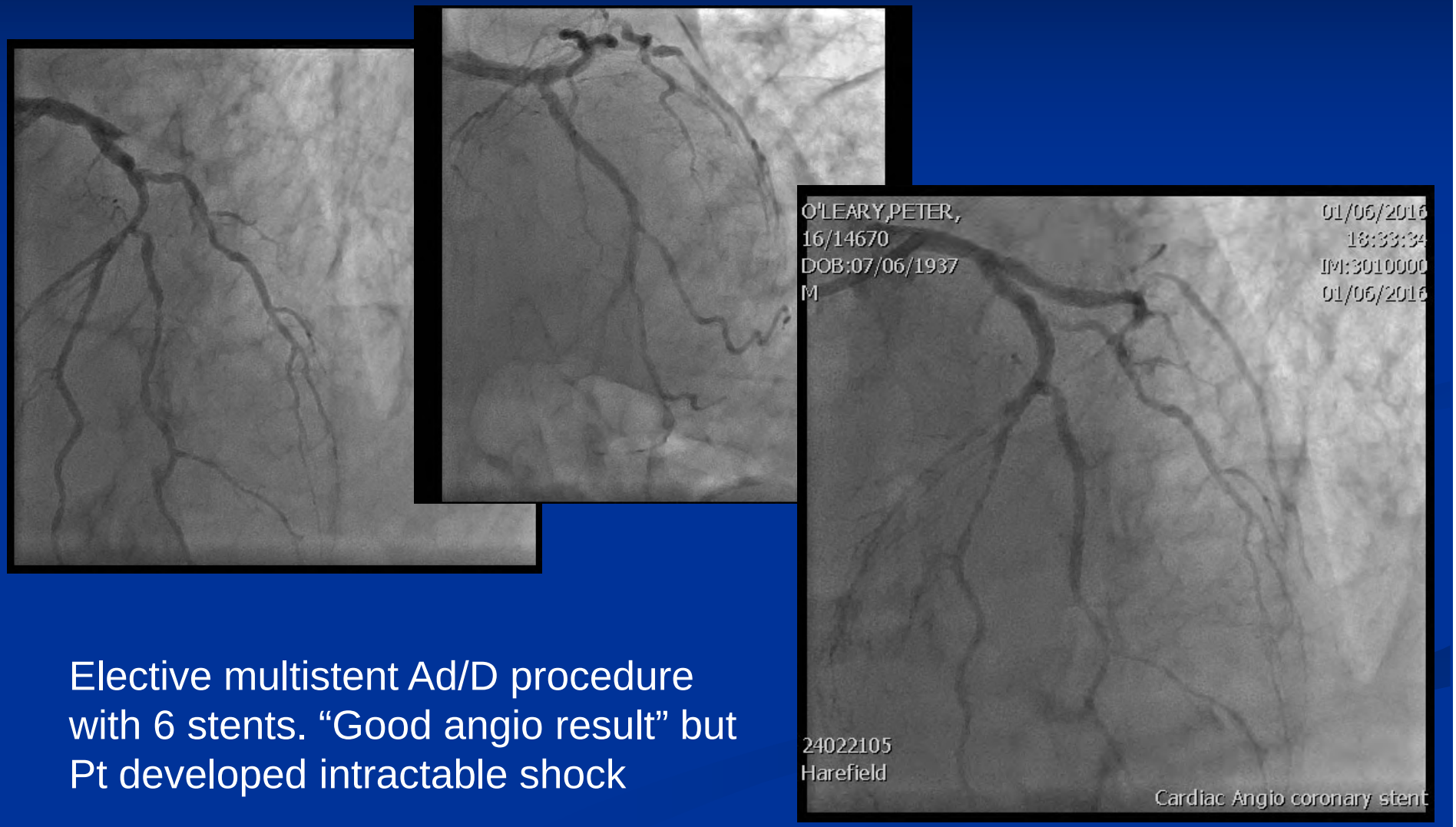
GS – 58 y female RC PPCI

GS – 58 y female 2d post PPCI



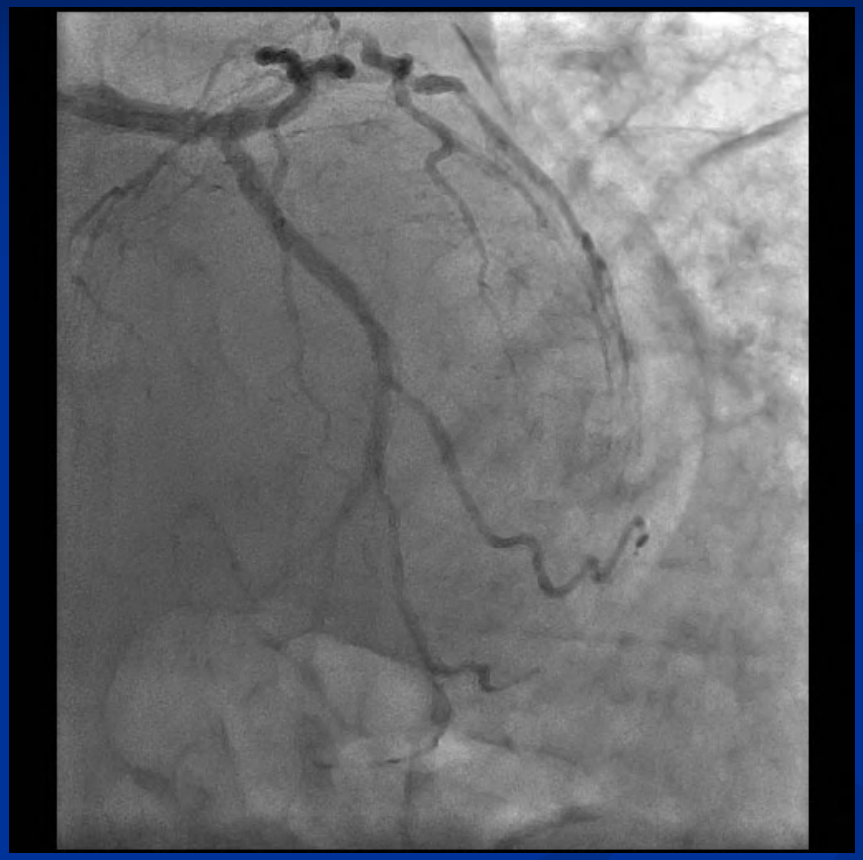
Discretion not the better part of valour?

PO – 78 y male 2d post PPCI Cx



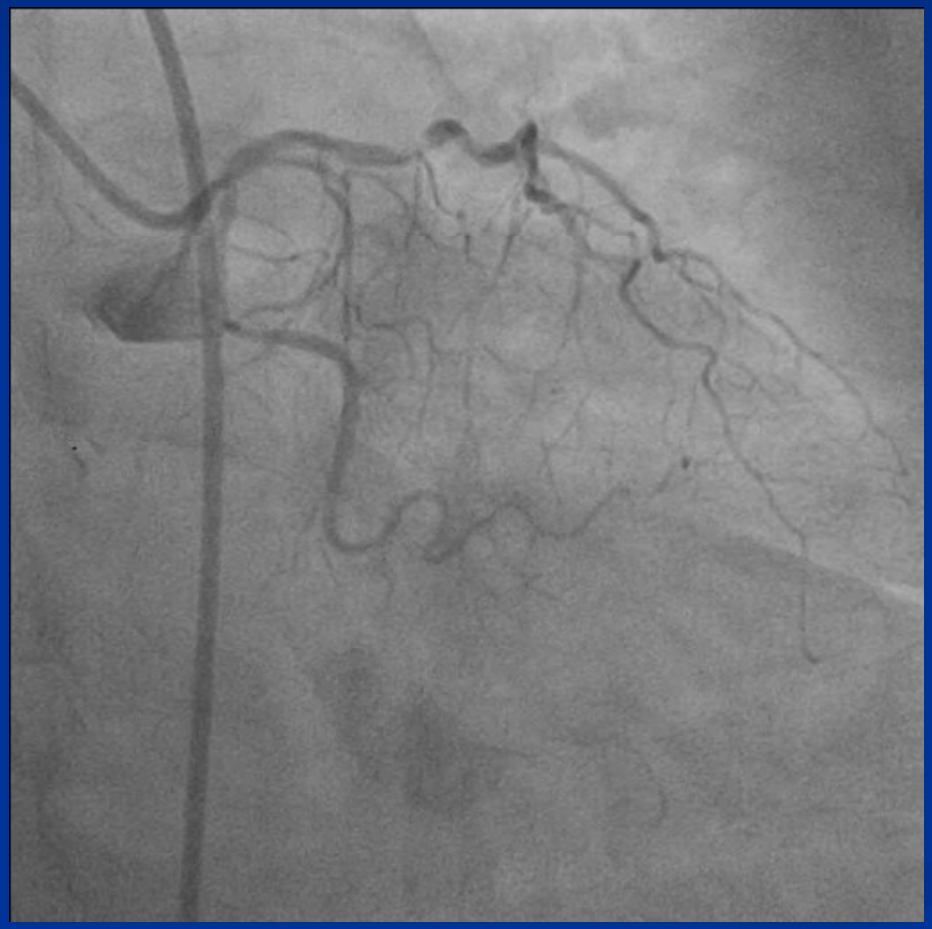
Elective multistent Ad/D procedure with 6 stents. “Good angio result” but Pt developed intractable shock

JN – 86 y male complex AD/Cx



Pulmonary oedema, severe LV dysfunction, ST depression – 2 hour procedure With 3 vessels (AD, Cx, OM) and 5 stents.

RR – 70 y male CABG after RC PPCI



Successful RC PPCI. No post PCI symptoms. Left main led to CABG at 5 days

Died after CABG

Complete vs incomplete revascularisation

Conclusions

Complete revascularisation should still be regarded as gold standard, however

- PRAMI and CVLPRIT doesn't support early multi-vessel multi-stent intervention
- Incomplete revascularisation, properly assessed, is not invariably high risk
- Proximal AD and dominant RC are important but have good reason for multi-vessel intervention in the setting of PPCI (or PCI)

Isolated left main – PCI vs CABG

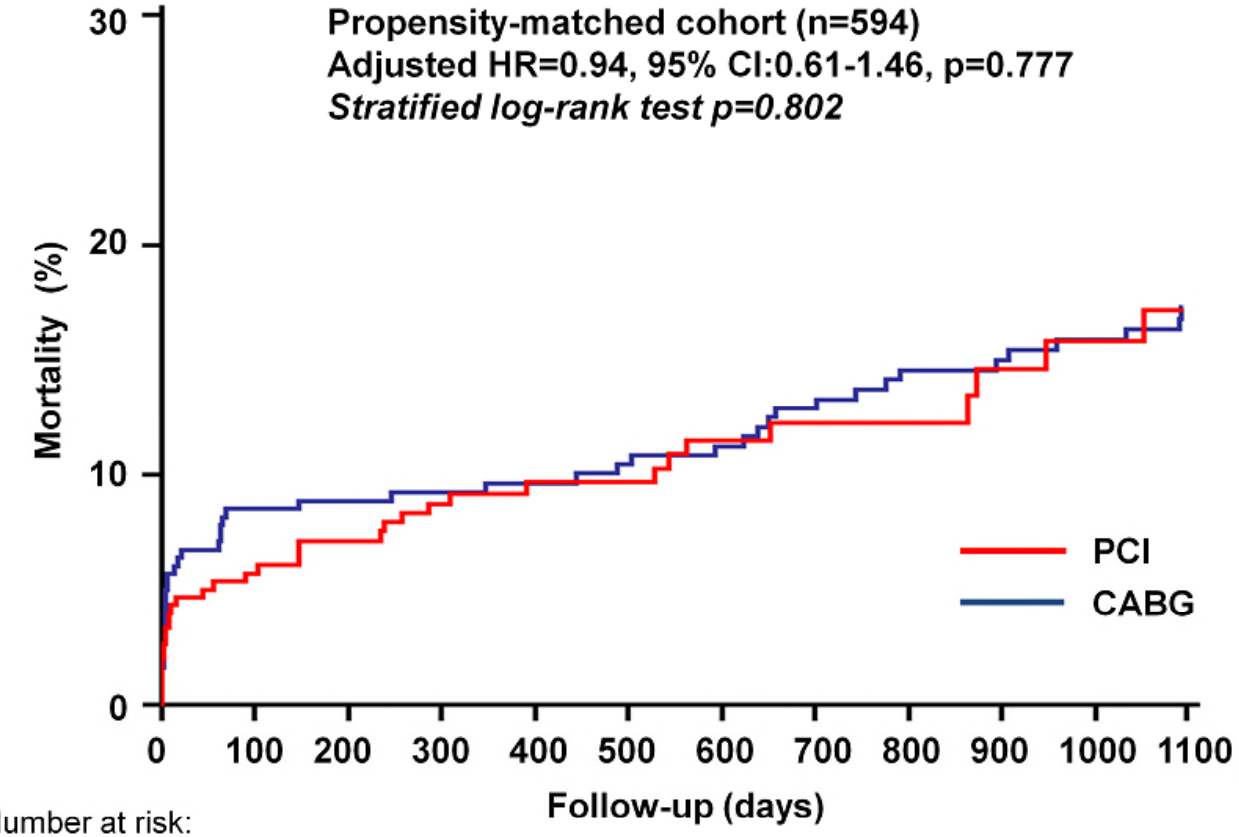
- LMS stenosis (>50%) is seen in 4-6% of all patients undergoing coronary angiography.
- It occurs in isolation in 6-9% of patients and in 70-80% of patients with MVD.
- CABG has been considered the standard treatment for LMS disease, particularly in the setting of MVD.
- For PCI, current ESC guidelines give ostial/body LMS disease a IIa recommendation and bifurcation LMS disease (with a SYNTAX score of <33) a IIb recommendation
- There are limited data comparing CABG and PCI in the modern contemporary DES era.

Methods

- We compared PCI and CABG in an all-comer patient population with isolated LMS disease at Harefield Hospital, UK.
- A total of 20,984 patients had coronary revascularization at Harefield Hospital between 2004-2015 (14,931 patients had PCI and 6054 patients had CABG).
- Of these patients, a total of 2,662 patients underwent revascularization for isolated LMS disease (1,012 patients had PCI and 1,450 patients had CABG)
- We analyzed all-cause mortality at 3 years
- We adjusted for measured and unmeasured confounding using Cox regression analysis, propensity score and instrumental variable methods.

KM Curves

PS-matched cohort (n=594):



Number at risk:

PCI	297	271	246	217	180	166	132	108	83	72	66	63
CABG	297	254	246	240	231	225	219	210	200	196	187	176