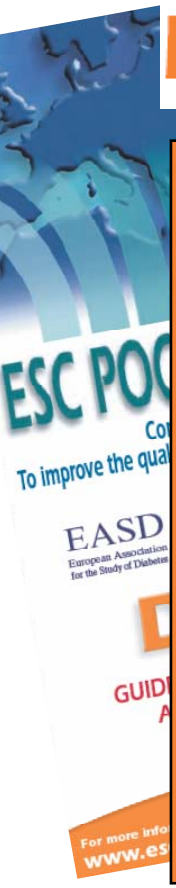
Management of cardiovascular disease



Diabetes and coronary revascularization

Recommendation	Class	Level
Treatment decisions regarding revascularization in patients with diabetes should favour coronary artery bypass surgery over percutaneous intervention.	IIa	A
Glycoprotein IIb/IIIa inhibitors are indicated in elective PCI in a diabetic patient.	I	B
When PCI with stent implantation is performed in a diabetic patient, drug-eluting stents (DES) should be used.	IIa	B
Mechanical reperfusion by means of primary PCI is the revascularization mode of choice in a diabetic patient with acute MI.	I	A

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Management of diabetes and glucose control before, during and after PCI and CABG

Diabetes and coronary revascularization

By pass surgery versus PCI

Adjunctive therapy

Revascularization in acute coronary syndromes

Glucose control

Unresolved issues

L Rydén MD, FRCP, FESC

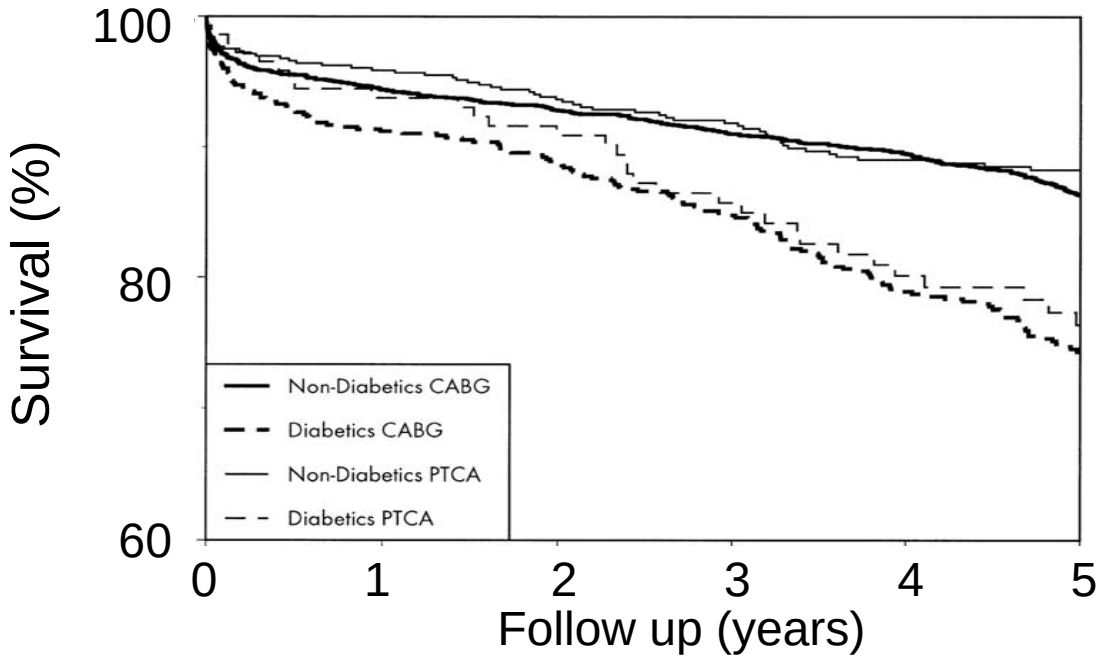
Management of diabetes and glucose control before, during and after PCI and CABG

Diabetes and coronary revascularization

L Rydén MD, FRCP, FESC

Diabetes and coronary revascularization

Registry study - Duke University data base
n= 3 220 (diabetes 24%) with 2-3 VD. Interventions: 1984 - 1990



Patients with Diabetes			
CABG	626	506	358
PTCA	144	113	79
Patients without Diabetes			
CABG	1890	1635	1287
PTCA	560	444	323

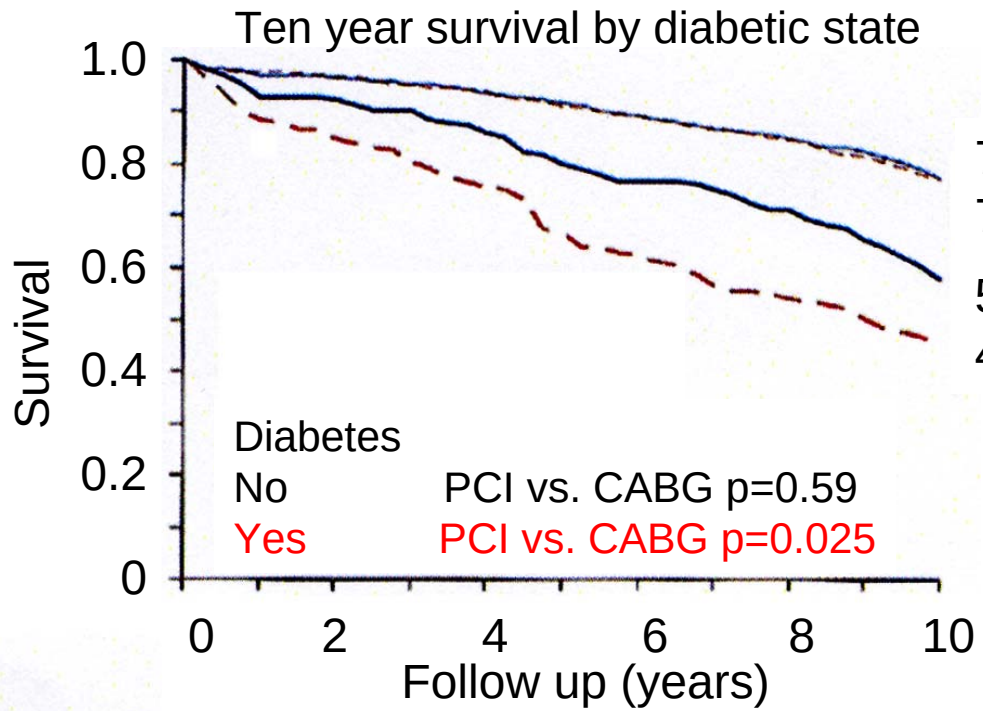
88 PCI – no diabetes
86 CABG – no diabetes

76 PCI – diabetes
74 CABG – diabetes

(Barness et al Circulation 1997;96:2551)

Diabetes and coronary revascularization

The BARI randomized trial comparing CABG and PCI
Patients n = 1829; Diabetes n=353 (19%)



No. of Patients					
ND CABG	734	698	669	613	473
ND PTCA	742	703	675	621	477
D CABG	180	161	143	124	80
D PTCA	173	139	115	93	63

77 % CABG No diabetes
77% PCI No diabetes

58 % CABG Diabetes
45% PCI Diabetes

(The BARI investigators JACC 2007; 49:1600)

Diabetes and coronary revascularization

Coronary interventions in patients with vs. without diabetes

- Coronary Bypass Surgery
  - Higher mortality
  - More frequent complications
    - infections, delayed wound healing…
- Percutanous coronary angioplasty
  - Higher mortality
  - High restenosis rate
  - Increased rate of stent thrombosis
  - More frequent repeat revascularizations

Management of diabetes and glucose control before, during and after PCI and CABG

Diabetes and coronary revascularization

By pass surgery versus PCI

L Rydén MD, FRCP, FESC

By pass surgery by diabetic state

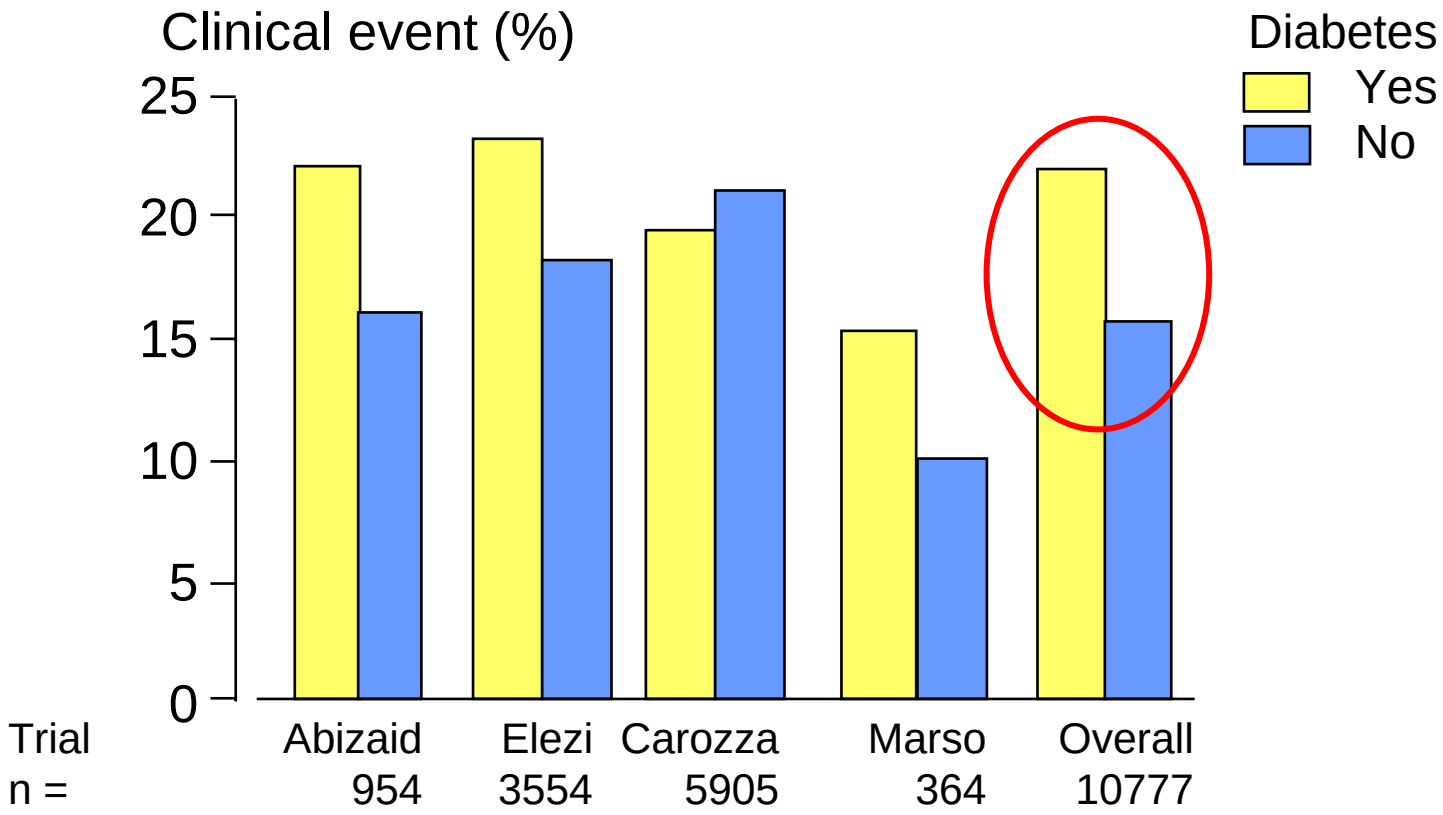
North American retrospective cohort study
30 day mortality and morbidity in CABG
No diabetes n = 105 123 Diabetes n = 41663 (28%)

Variable	Diabetes		
	No	Yes	Adjusted OR
Mortality	2.7	3.7	1.23 (1.15-1.32)
Morbidity MI, Stroke, Organ failure	9.1	13.9	1.38 (1.33-1.44)
Infection Pneumonia, Urinary tract, Sternal	5.2	7.9	1.36 (1.30-1.40)
Septicemia	0.9	1.4	
Mortality or morbidity	10.4	15.5	

(Carson et al JACC 2002; 40:202)

PCI by diabetic state

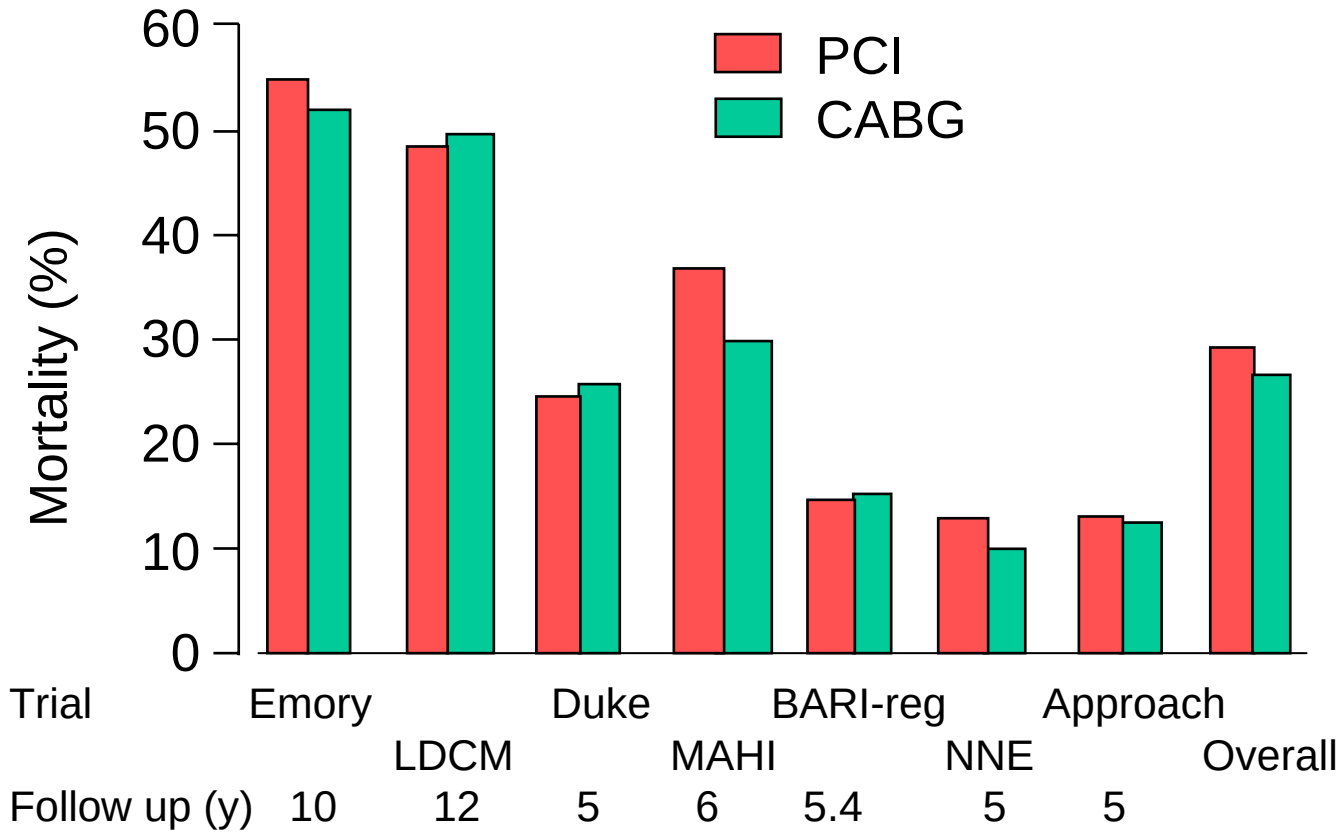
Subgroup analysis – pooled data (n= 10 777)
Endpoint: death, MI or repeat revascularisation



(After Mak & Faxon Europ Heart J 2003; 24:1087)

By pass surgery versus PCI

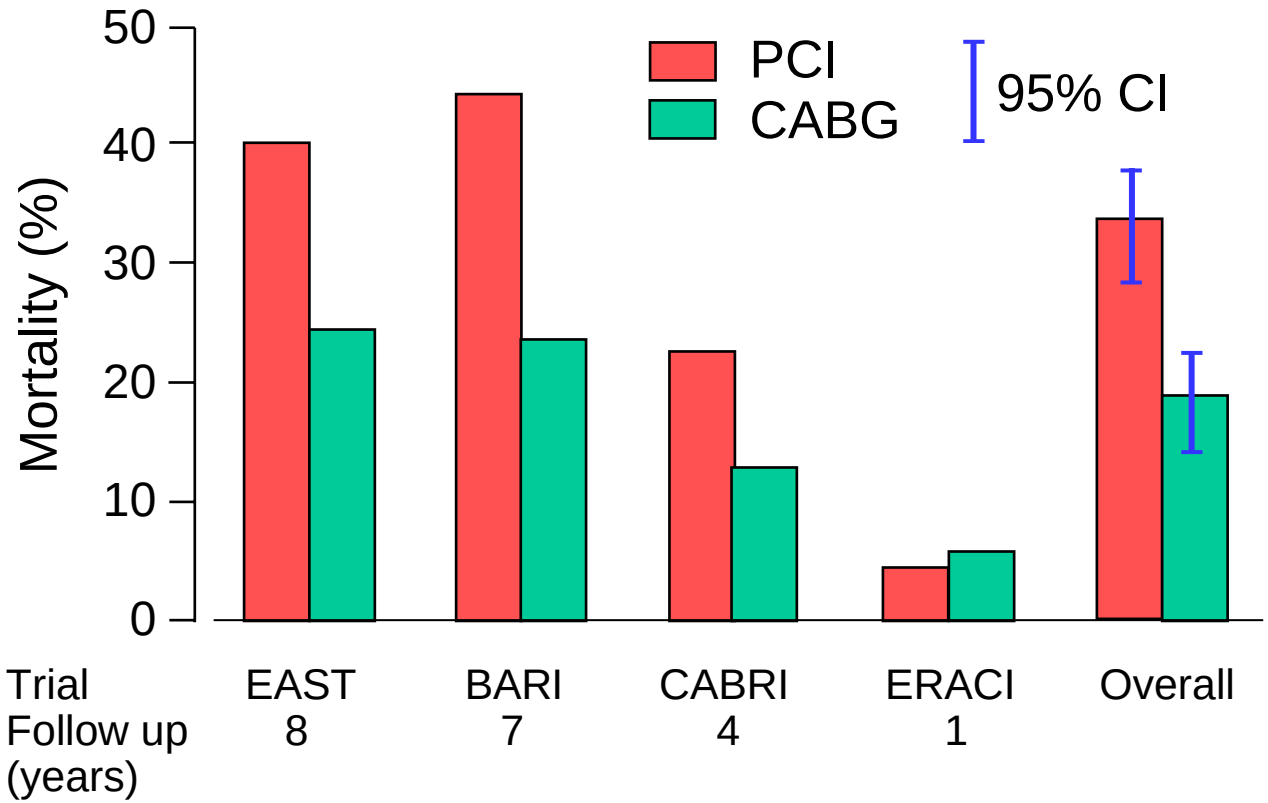
Subgroup analysis - registry studies comparing CABG and PCI
Survival in patients with diabetes (n= 8 817)



(After Mak & Faxon Europ Heart J 2003; 24:1087)

By pass surgery versus PCI

Subgroup analysis - RCT comparing CABG and PCI
Survival in patients with diabetes (n= 627)

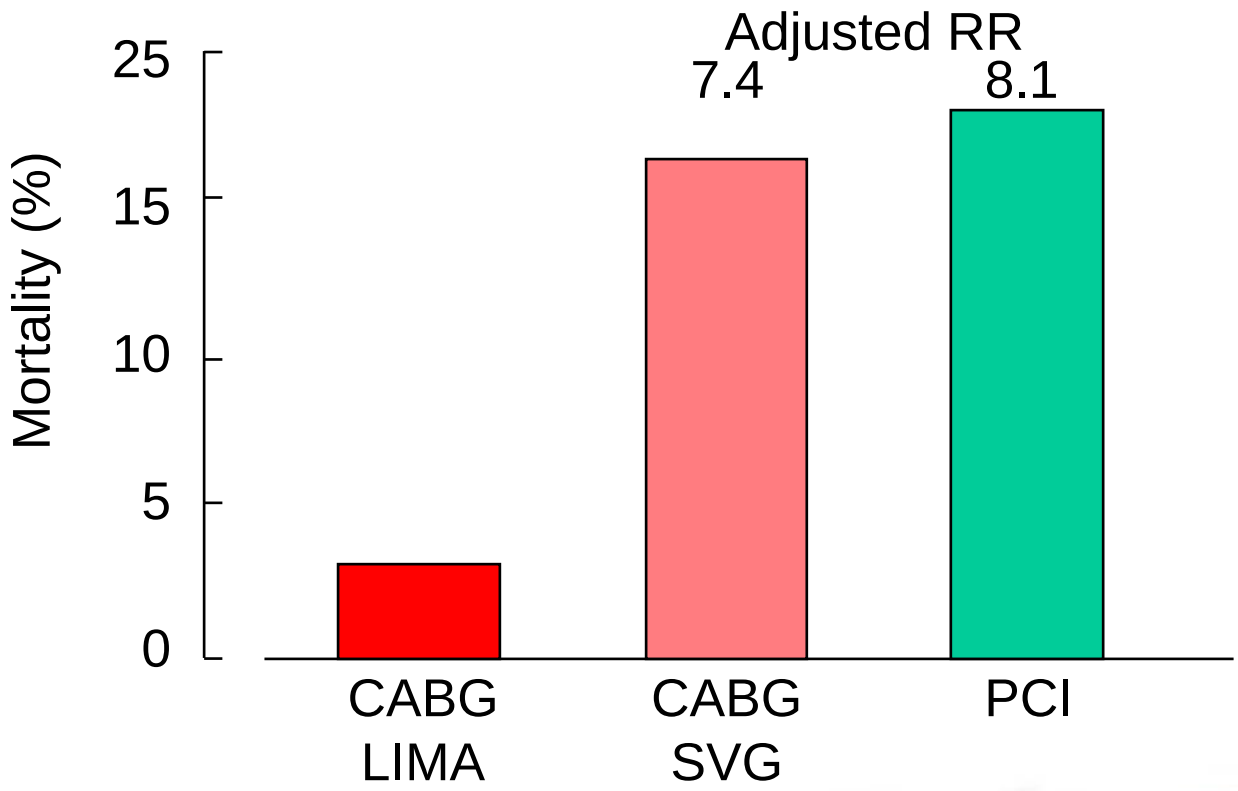


(After Mak & Faxon Europ Heart J 2003; 24:1087)

By pass surgery versus PCI

The BARI randomized trial comparing CABG and PCI
Patients with diabetes (n=353)

Five year mortality by type of intervention

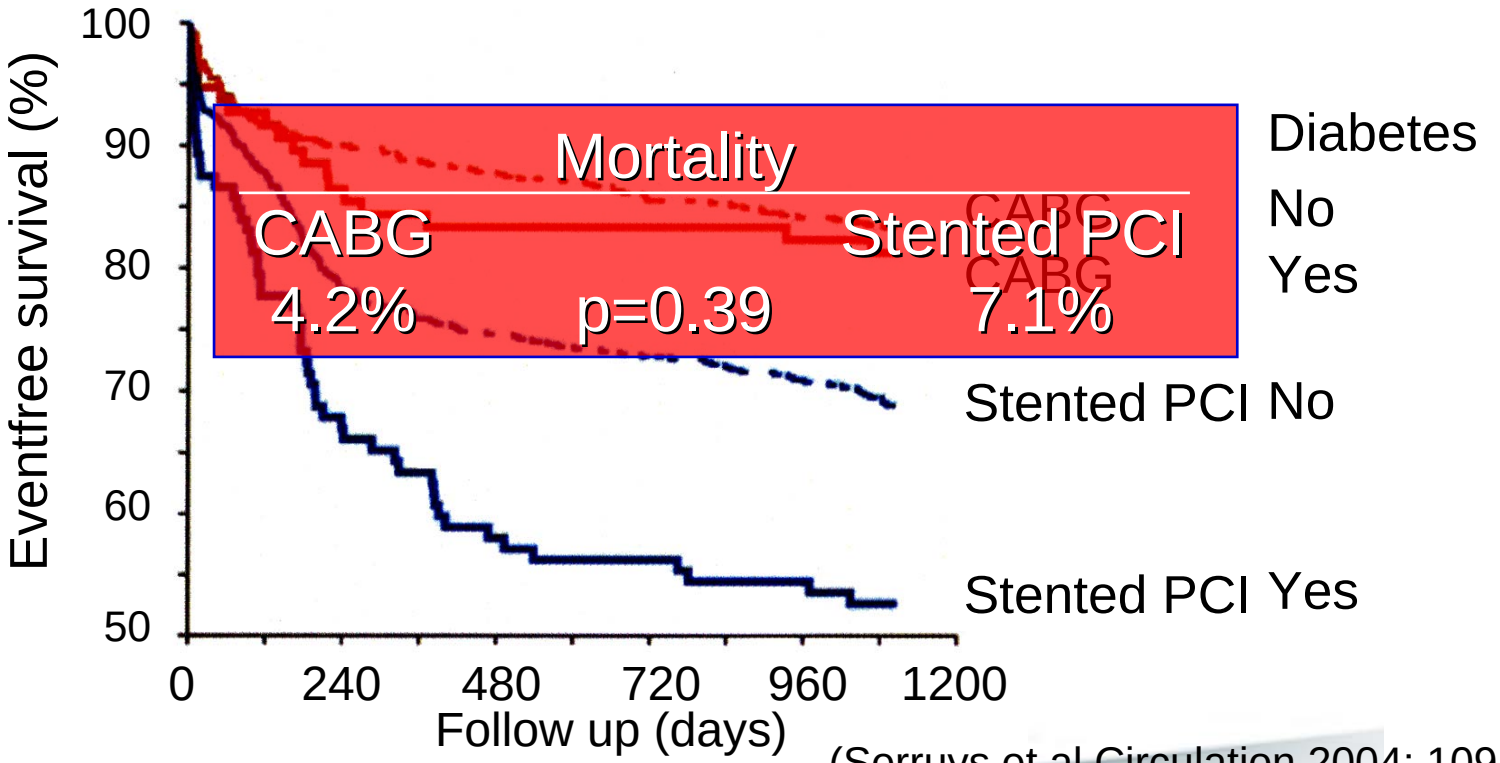


(The Bari Investigators Circulation 1997; 96:1761)

By pass surgery versus PCI

Stenting vs. CABG in multivessel disease
Subgroup analysis from ARTS
Mutlivessel disease n = 1 205 Diabetes n = 208 (17%)

Three year survival free from stroke, MI and revascularization



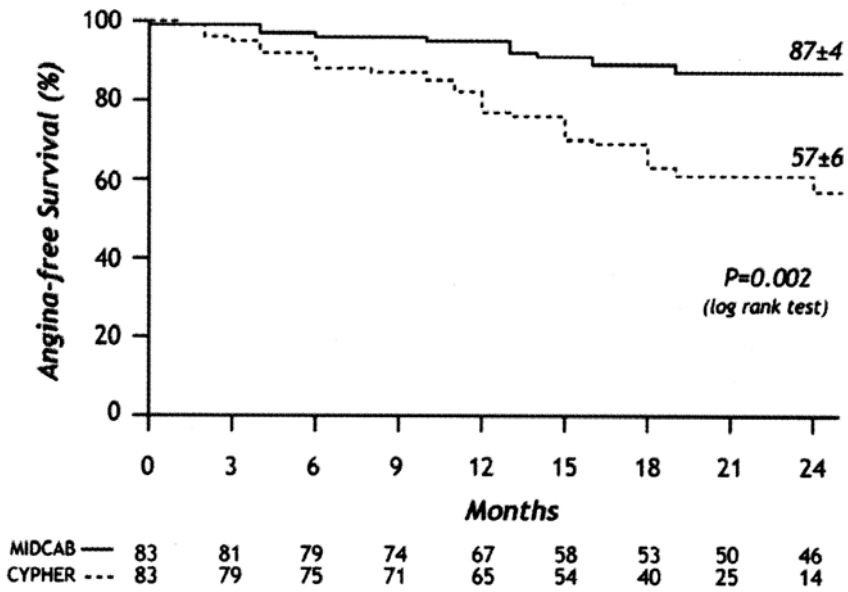
(Serruys et al Circulation 2004; 109:1114)

By pass surgery versus PCI

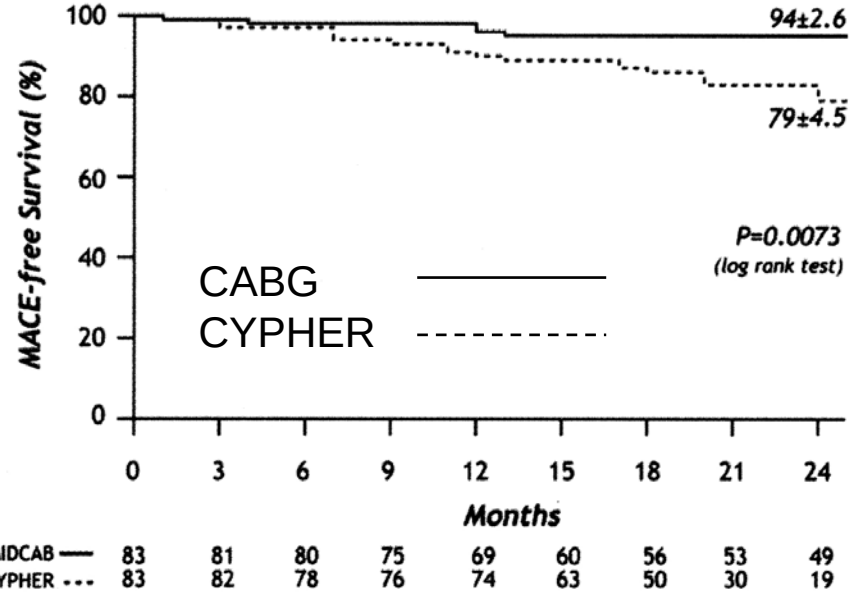
CABG and PCI in the era of drug eluting stents (Cypher)
Patients with diabetes (n = 518)
Matched pairs CABG (n = 86) PCI (n = 86)

Survival free from

Angina



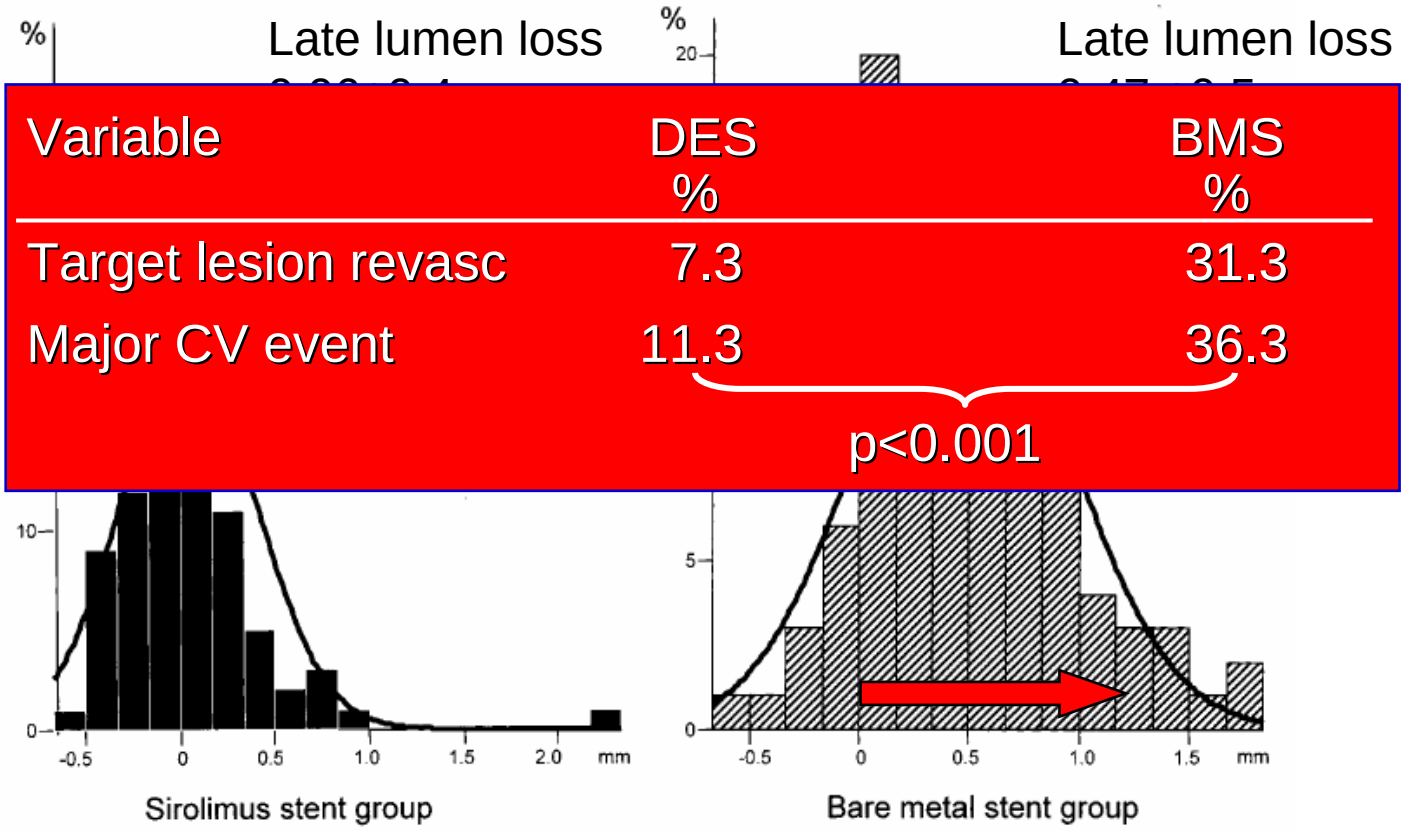
New interventions



(Ben-Gal et al. Ann Thorac Surg 2006; 82:2006)

Bare metal vs. drug eluting stents

RCT in patients with diabetes
Sirolimus (n = 80; 111 lesions) Bare metal (n = 80; 110 lesions)
End-point: in segment late lumen loss by QCA after 9 months



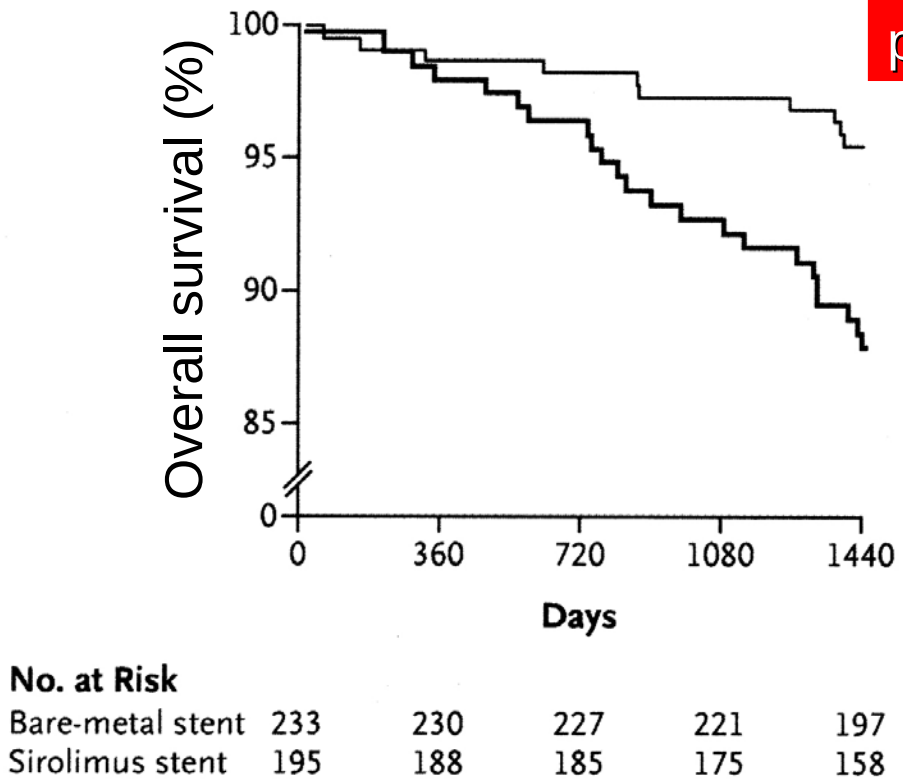
Variable	DES %	BMS %
Target lesion revasc	7.3	31.3
Major CV event	11.3	36.3

p<0.001

(Sabaté et al. Circulation 2005; 112:2175)

By pass surgery versus PCI

Drug eluting stents (sirolimus)
Four years survival in patients with diabetes (n = 428)



HR 2.90 (95% CI 1.38-6.10)
p=0.008

Bare Metal Stents
96%

Drug eluting stents
SIROLIMUS
88%

(Spaulding et al New Engl J Med 2007; 356:989)

Management of diabetes and glucose control before, during and after PCI and CABG

Diabetes and coronary revascularization

Recommendation	Class	Level
Treatment decisions regarding revascularization in patients with diabetes should favour coronary artery bypass surgery over percutaneous intervention.	IIa	A
Whenever possible, patients with diabetes should be offered at least one and often mutliple arterial grafts	I	C

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Management of diabetes and glucose control before, during and after PCI and CABG

Diabetes and coronary revascularization

By pass surgery versus PCI

Adjunctive therapy

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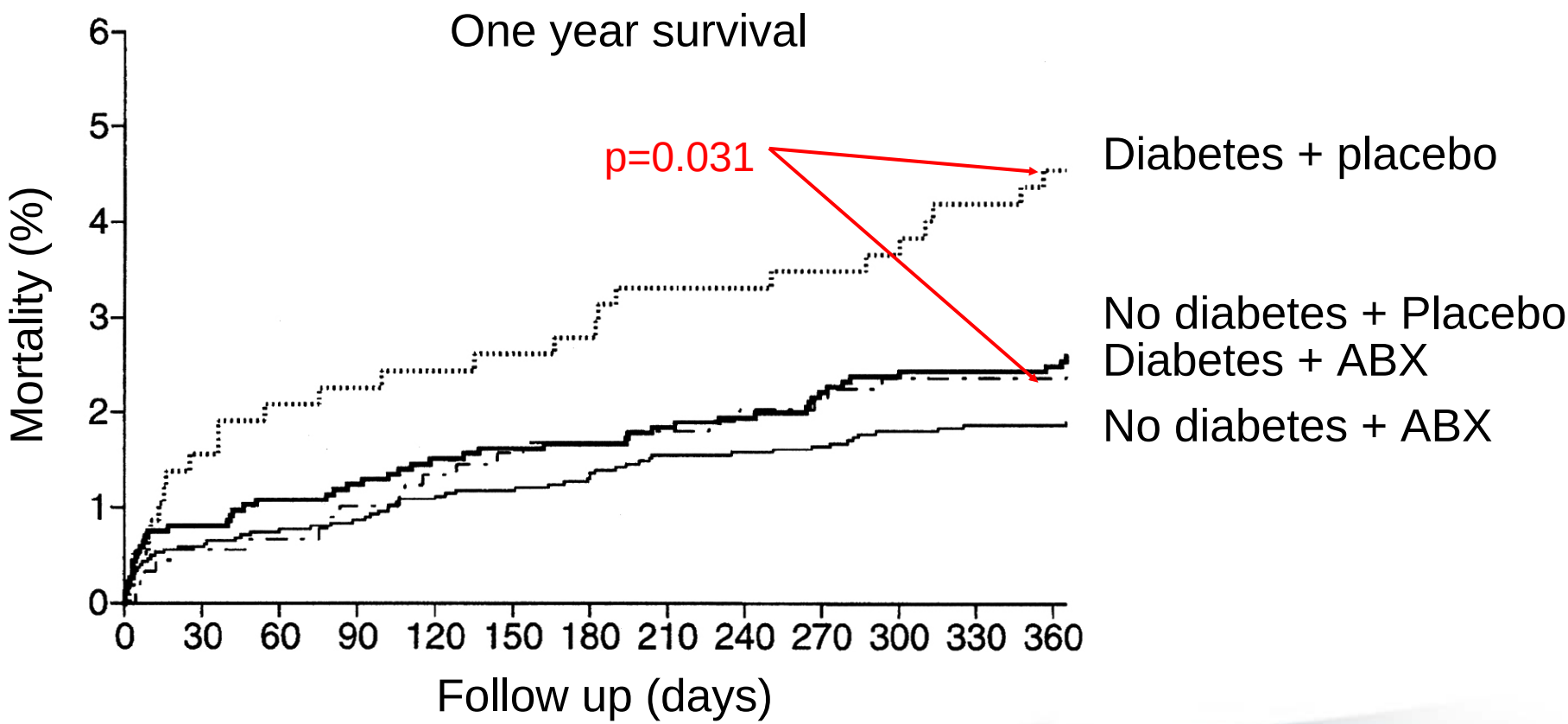
Adjunctive therapy - Abciximab

Subgroup analysis of three RCT (EPIC, EPILOG, EPISTENT)
Pooled patients with (n= 1 462) vs. without diabetes (n= 5 072)



(Bhatt et al. JACC 2000; 35:922)

Management of diabetes and glucose control before, during and after PCI and CABG

Diabetes and coronary revascularization

Glycoprotein IIb/IIIa inhibitors are indicated in elective PCI in a diabetic patient.	I	B

Management of diabetes and glucose control before, during and after PCI and CABG

Diabetes and coronary revascularization

By pass surgery versus PCI

Adjunctive therapy

Revascularization in acute coronary syndromes

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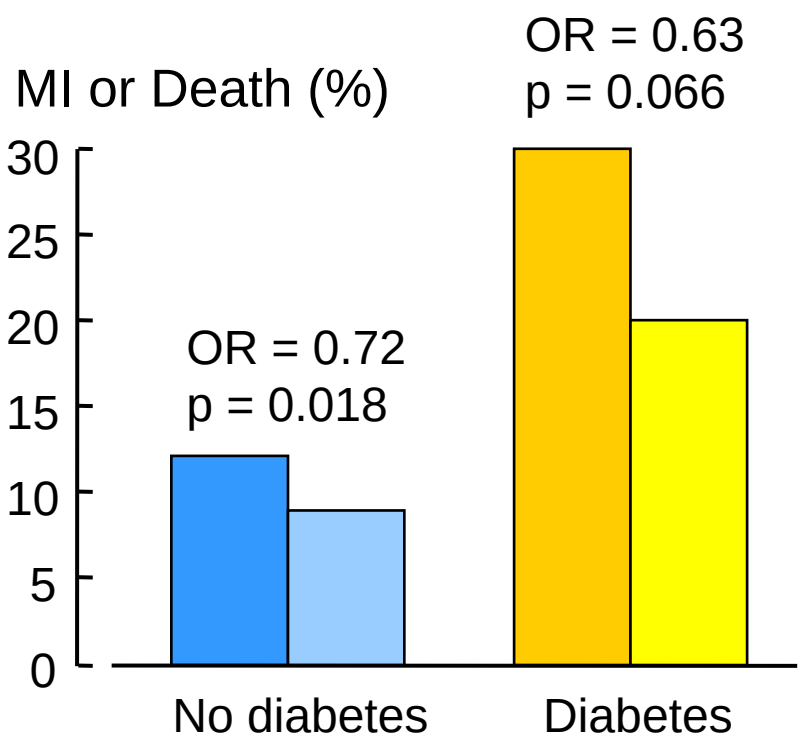
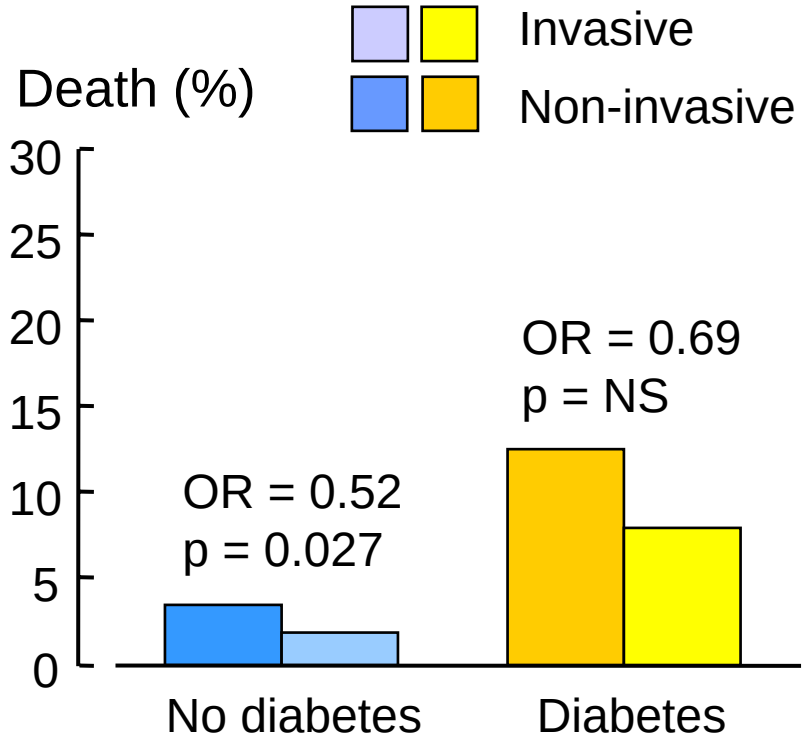
Revascularization in acute coronary syndromes

Early revascularization in ACS comparing patients with (n=155) and without diabetes (n=1 067)
One year event rate in FRISC II

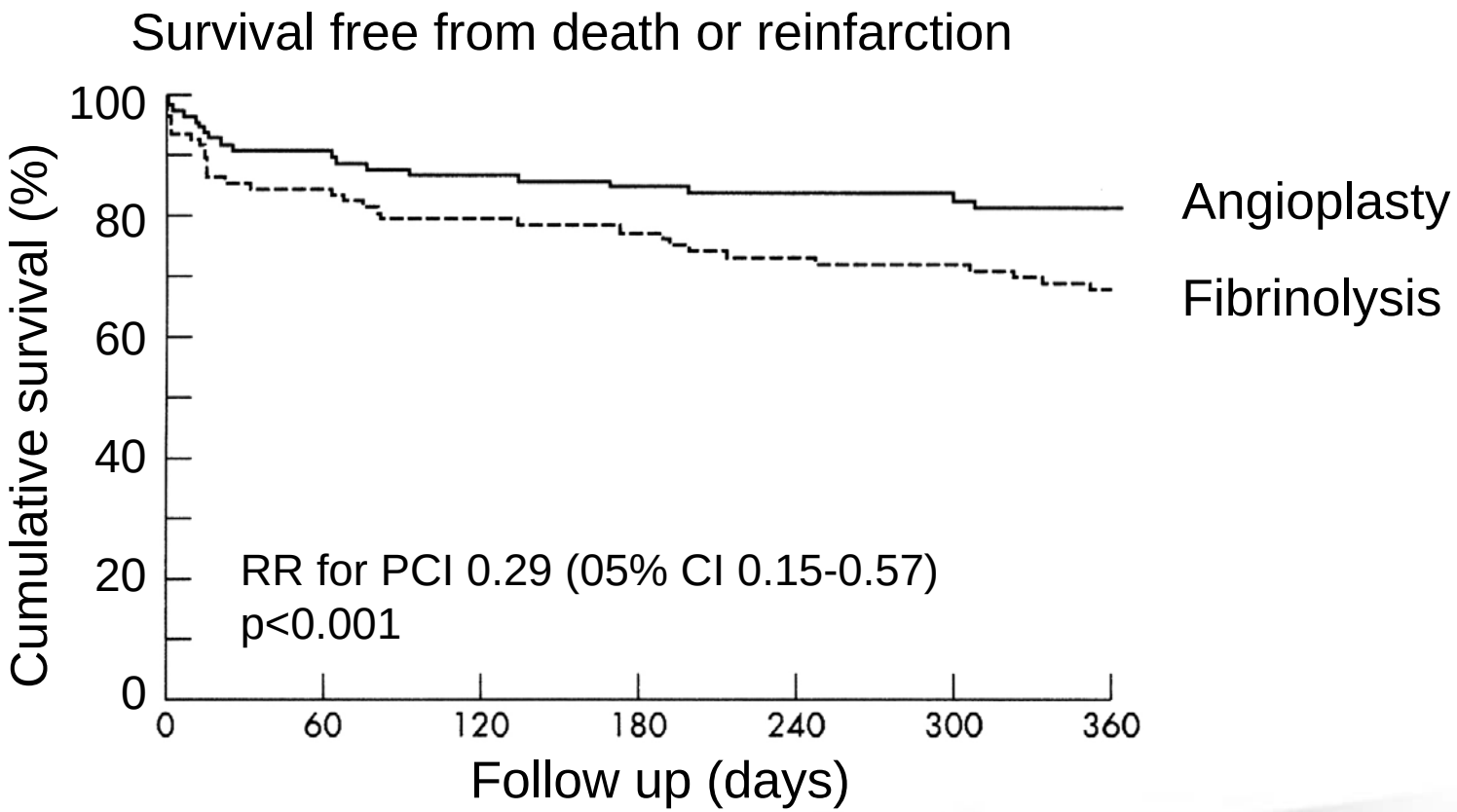




(Norhammar et al J Am Coll Card 2004; 43; 585)

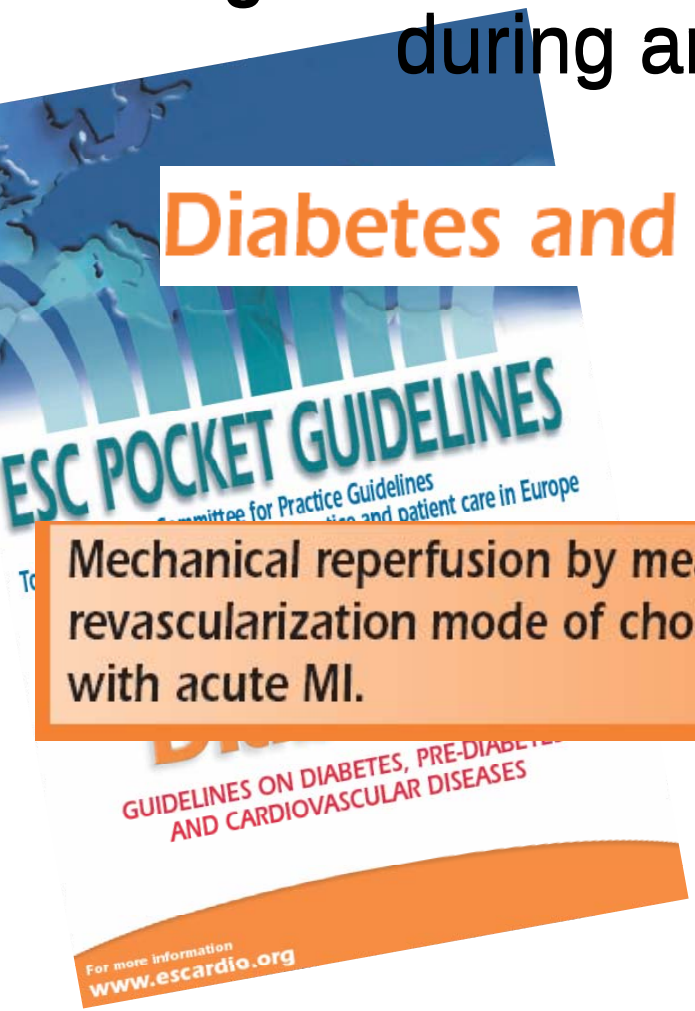
Revascularization in acute coronary syndromes

Early PCI vs. thrombolysis in diabetic patients with AMI
Fibrinolysis (n = 99) or Primary PCI (n = 103)



(Hsu et al Heart 2002:88: 268)

Management of diabetes and glucose control before, during and after PCI and CABG



Diabetes and coronary revascularization

Mechanical reperfusion by means of primary PCI is the revascularization mode of choice in a diabetic patient with acute MI.	I	A

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Management of diabetes and glucose control before, during and after PCI and CABG

Diabetes and coronary revascularization

By pass surgery versus PCI

Adjunctive therapy

Revascularization in acute coronary syndromes

Glucose control

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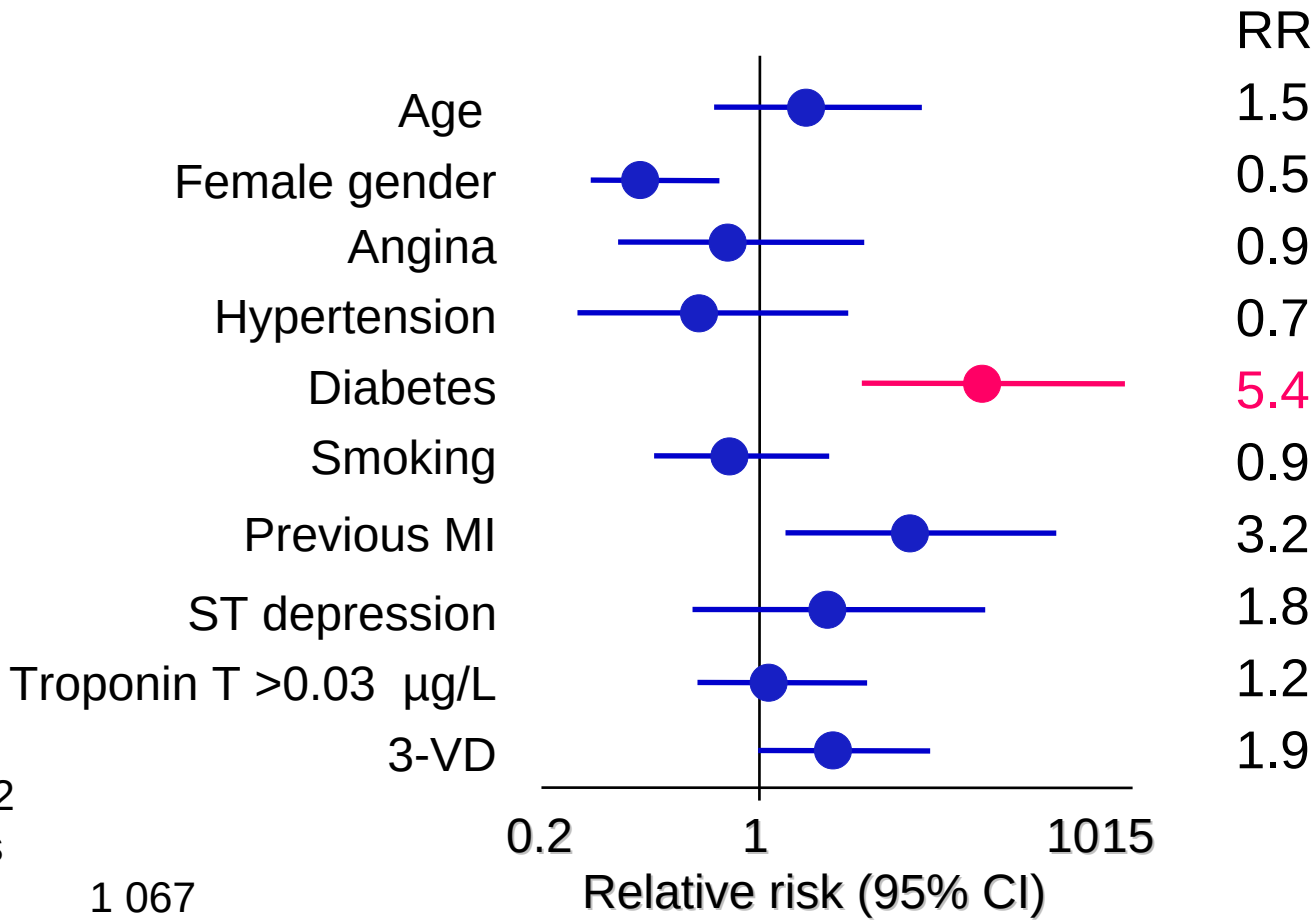
Revascularization in acute coronary syndromes

Mortality predictors in invasively managed patients with ACS



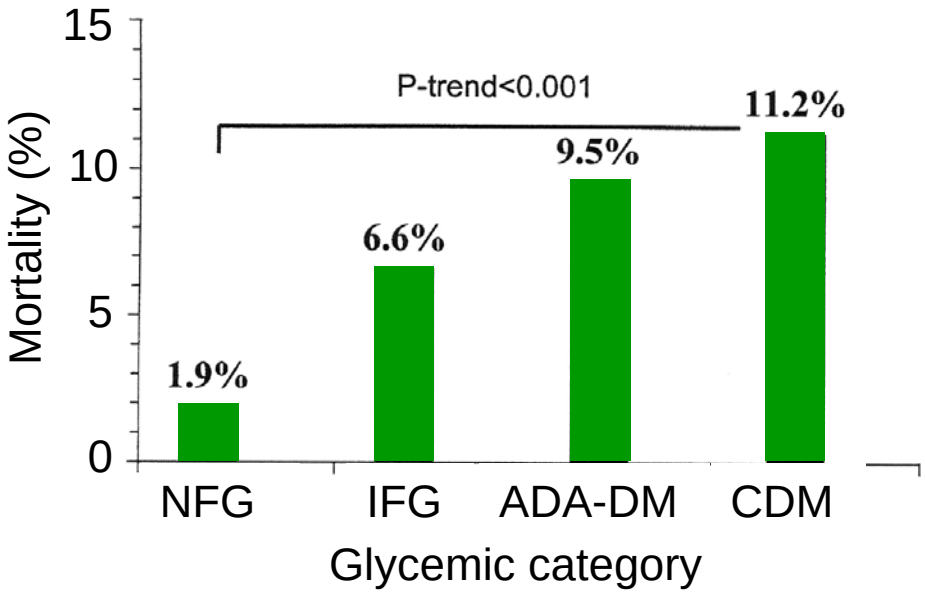
n = 1 222

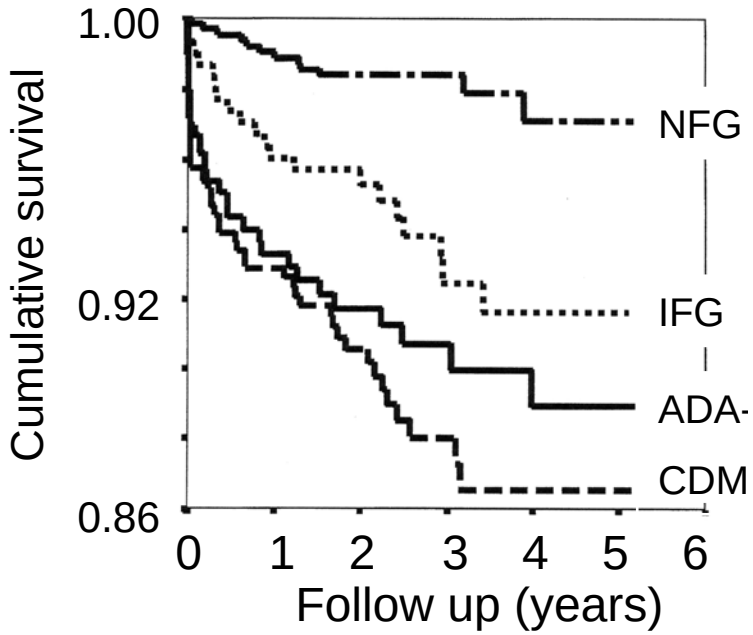
Diabetes	
No	1 067
Yes	155

(Norhammar et al J Am Coll Card 2004; 43; 585)

The importance of glucose control

Glycemia and mortality following PCI
(n=1 612)
Glucometabolic classification via fasting glucose

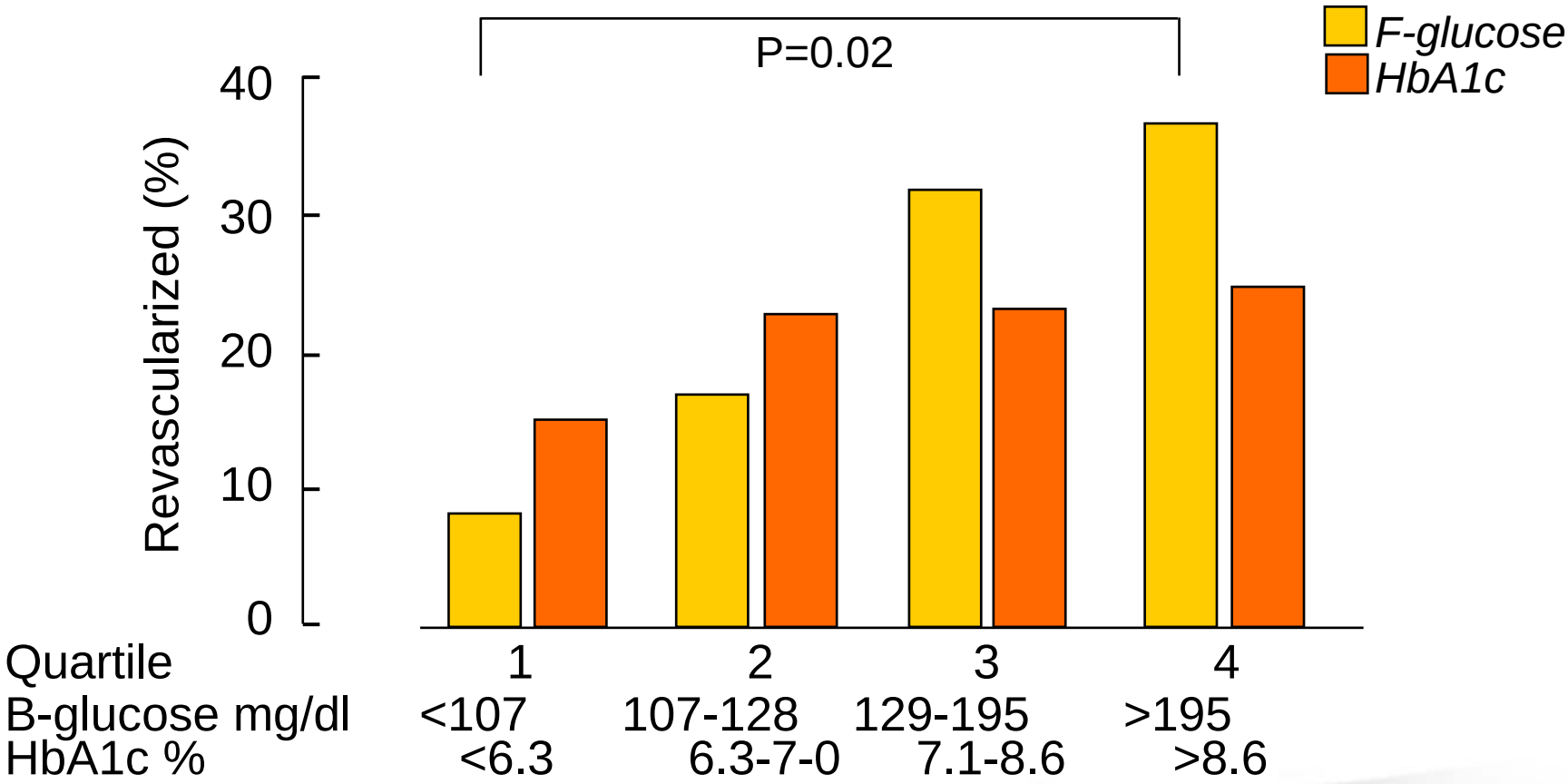




(Muhlestein et al. Am Heart J, 2003:146: 351)

The importance of glucose control

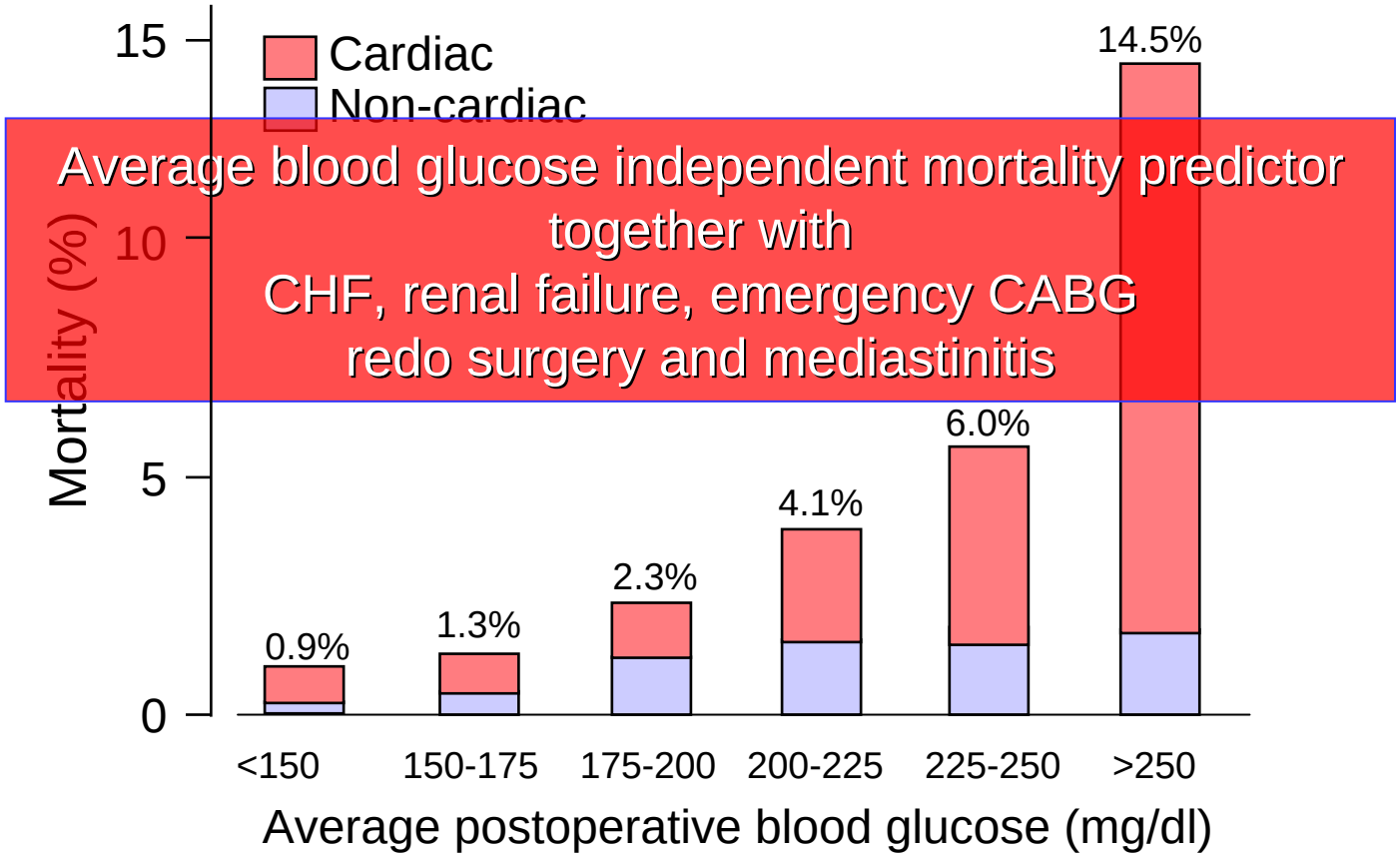
Target vessel revascularization and pre-procedural glycemia
Patients with diabetes (n=162); Follow up = 9 months



(Lindsay et al. Cardiovasc Revasc Med, 2007; 8:15)

The importance of glucose control

Glycemia and mortality after CABG
Effect of the institution of continous insulin infusion

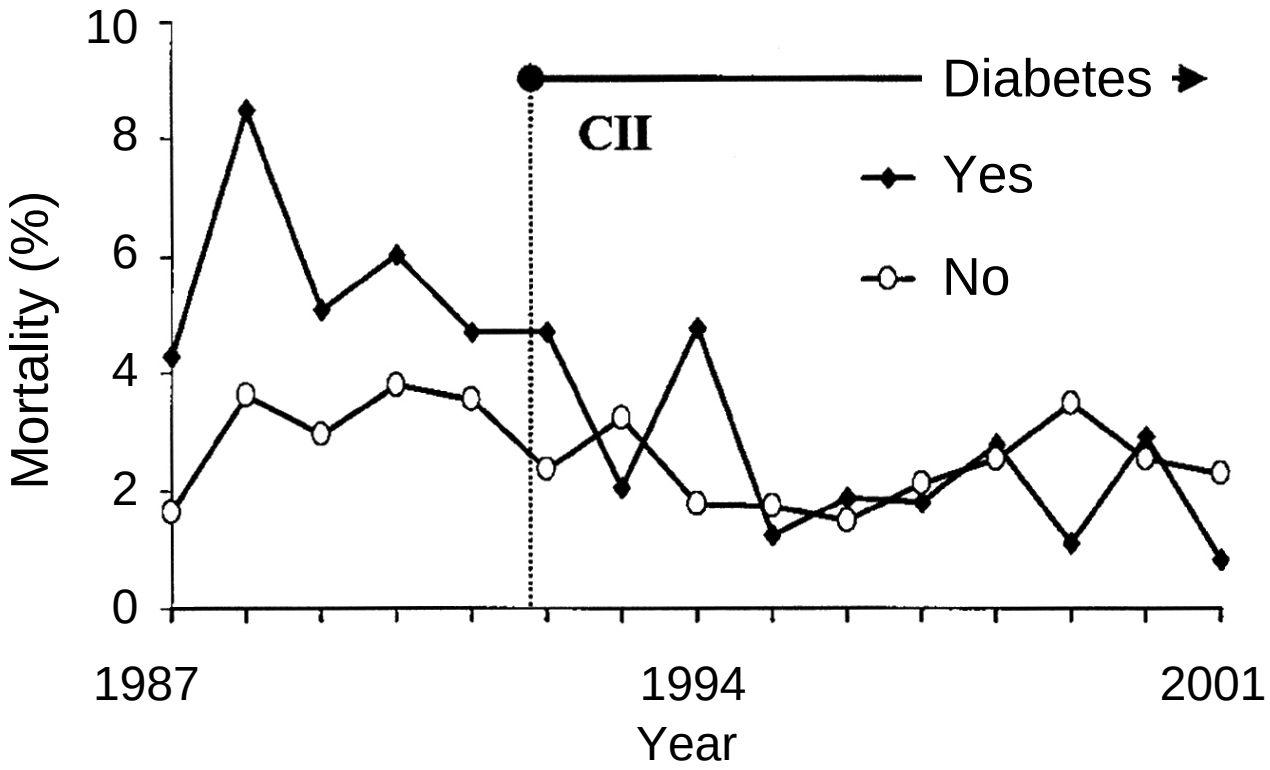


Average blood glucose independent mortality predictor
together with
CHF, renal failure, emergency CABG
redo surgery and mediastinitis

(Furnary et al. J Thorac Cardiovasc Surg, 2003;146:1007)

The importance of glucose control

Annualized mortality in all CABG with/without diabetes following a glucose control programme



(Furnary et al. J Thorac Cardiovasc Surg, 2003;146:1007)

Management of diabetes and glucose control before, during and after PCI and CABG

Diabetes and coronary revascularization

By pass surgery versus PCI

Adjunctive therapy

Revascularization in acute coronary syndromes

Glucose control

Unresolved issues

L Rydén MD, FRCP, FESC

Unresolved issues

On the amount and quality of presently available information

- Limited
- Retrospective
- Therapy not updated
- Mostly subgroup-based
- Diabetes poorly described
- Glucose lowering therapy undefined

Unresolved issues

On urgently needed information

- Trials dedicated to diabetic patients
  - Accurately characterised patients
  - Well defined concomitant therapy
  - Carefully described glucose lowering drugs
- Mode of revascularization
  - single vs. multivessel disease
  - optimised technique
- The impact of tight glycemic control

Unresolved issues

Important ongoing trials

FREEDOM
- Diabetes mellitus type 2
- Randomised to CABG or PCI (+DES)
- Death, MI or repeat revascularization
- Follow up 5 years

BARI IID
- Diabetes mellitus type 2
- Revascularization or optimal medical therapy
- Glucose lowering randomised
- Follow up 6 years

CARDia
- Diabetes mellitus type 2
- CABG or PCI – modern techniques

Management of cardiovascular disease

Diabetes and coronary revascularization

Recommendation	Class	Level
Treatment decisions regarding revascularization in patients with diabetes should favour coronary artery bypass su… over percutaneous intervention.		
Glycoprotein IIb/IIIa inhibit… in a diabetic pat…	I	B
When P… …performed in a diabetic p… …ng stents (DES) should be used.	IIa	B
Mechanical reperfusion by means of primary PCI is the revascularization mode of choice in a diabetic patient with acute MI.	I	A

Time for questions!!

L Rydén MD, FRCP, FESC