



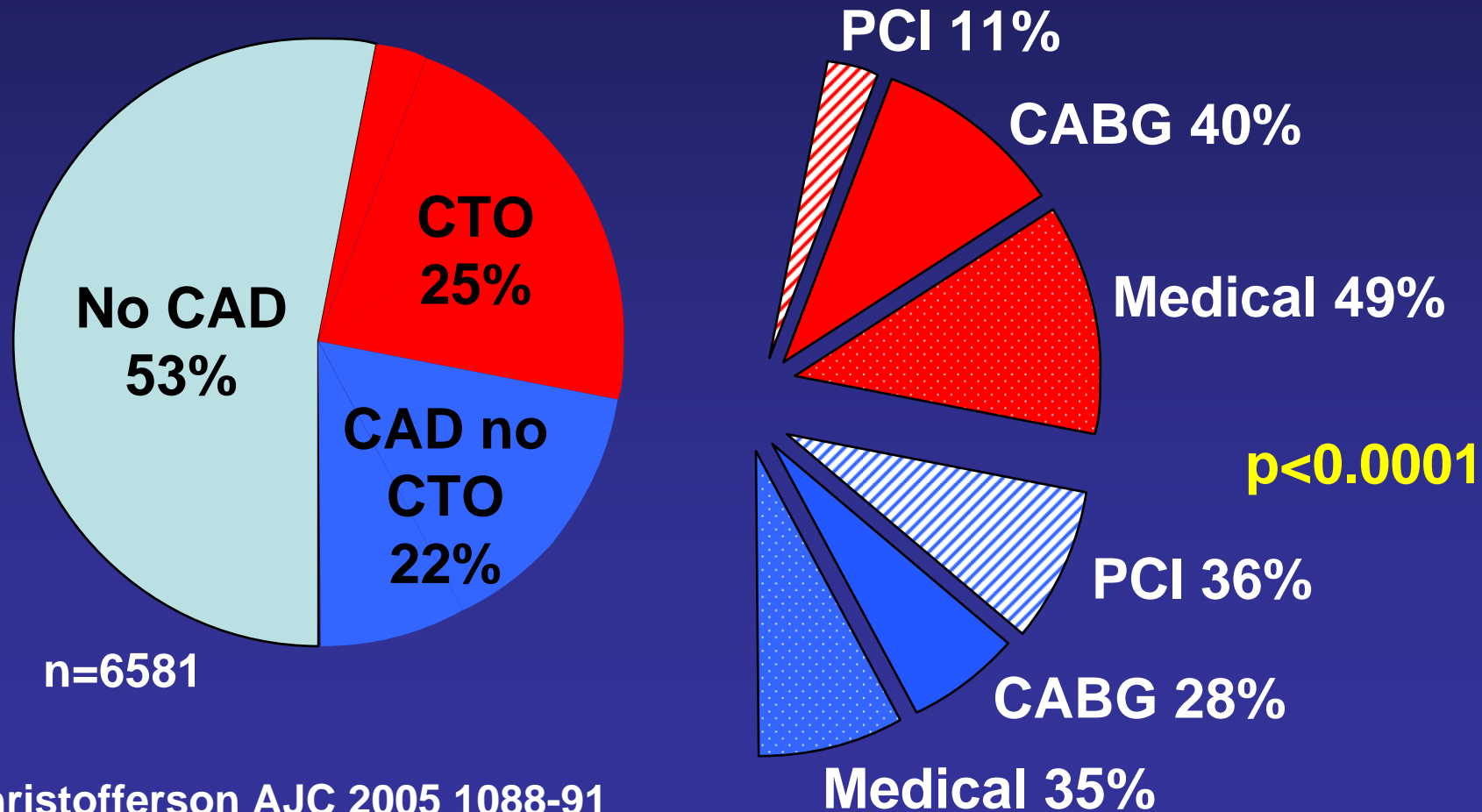
The rationale behind why it is important to open CTOs

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CTOs are common:

- Analysis of consecutive patients undergoing angiography between 1990-2000, CTO was found in 52% patients with significant ($\geq 70\%$ DS) coronary disease



Why is it important to revascularise CTO's?

- Improved symptoms
- Improved exercise capacity
- Improved LV function
- Reduced need for CABG
- ?Improved survival in those with a successful recanalization

Symptom relief:

Study	FU months	No. with successful PCI (POBA)	No. with symptom relief at FU (%)
Holmes et al JACC 1984	7	13	10 (77)
Keriakes et al JACC 1985	7	40	30 (75)
Serruys et al EHJ 1985	7	28	18 (64)
DiSciascio et al AHJ 1986	8	29	16 (55)
Melchior et al AJC 1987	8	49	40 (82)
Finci et al AJC 1990	24	100	57 (57)
Warren et al AHJ 1990	31	20	16 (80)
Bell et al Circulation 1992	32	234	178 (76)
Ruocco et al AJC 1992	24	160	110 (69)
Ivanhoe et al Circulation 1992	48	286	196 (69)
Stewart et al JACC 1993	14	45	31 (69)
Total		1004	702 (70%)

Symptom relief: stents vs POBA

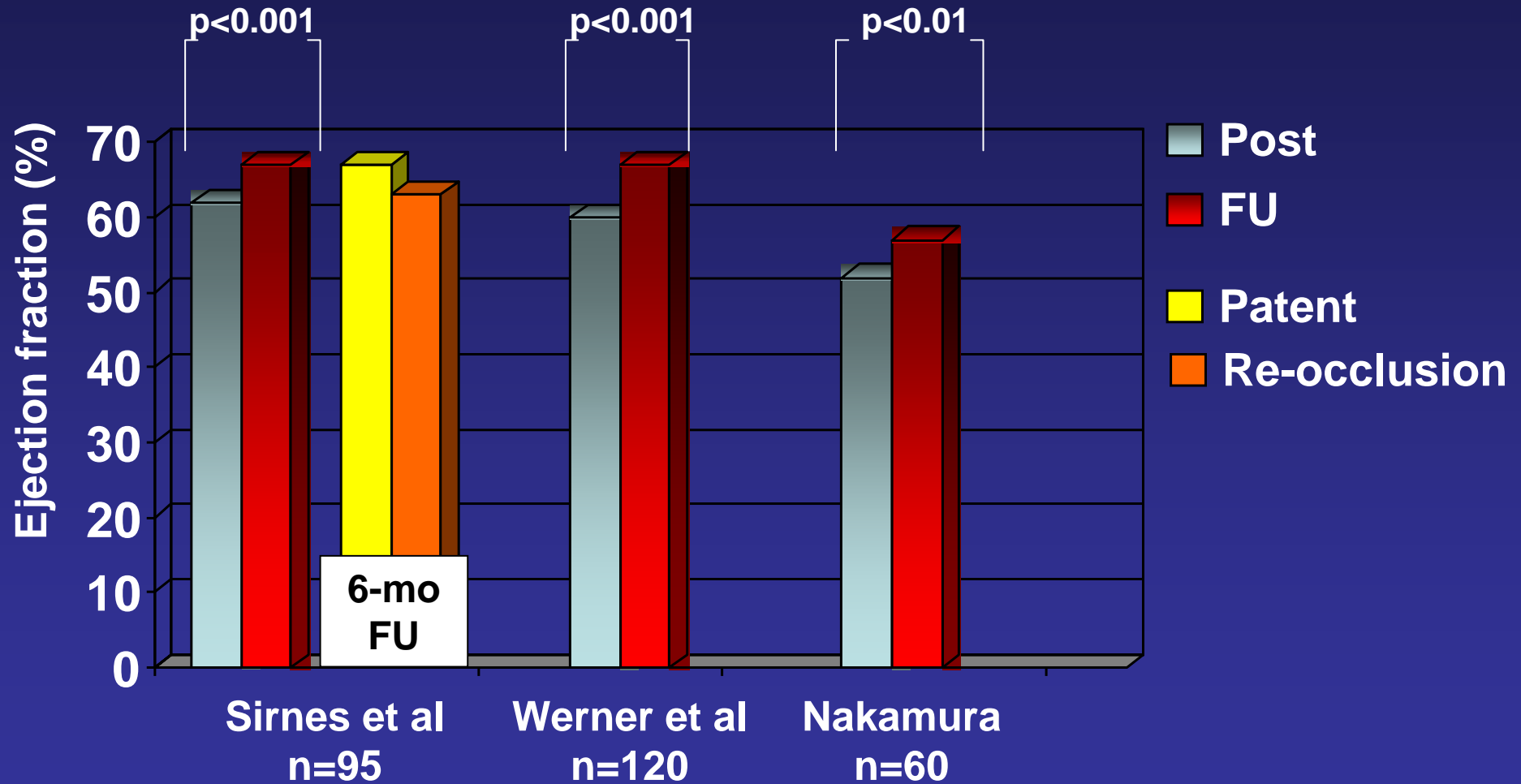
Study	FU (months)	POBA, n (% angina-free)	Stent, n (% angina-free)	p value
SICCO	6	59 (24%)	58 (57%)	<0.001
GISSOC	9	54 (54%)	56 (86%)	<0.05

Symptom relief: objective evidence

Study	FU (months)		Successful	Failed	p value
Finci et al	24	Positive ETT	27/82 (33%)	49/85 (58%)	<0.001
Oliviari et al	12	Negative ETT	181/248 (73%)	28/60 (47%)	<0.001

Sirnes et al JACC 1996; Rubartelli et al JACC 1998; Finci et al AJC 1990; Oliviari et al JACC 2003

Improvement in LV function



Sirnes et al EHJ 1998;19(2); Werner et al Heart 2004;90; Nakamura et al AJC 2005;95

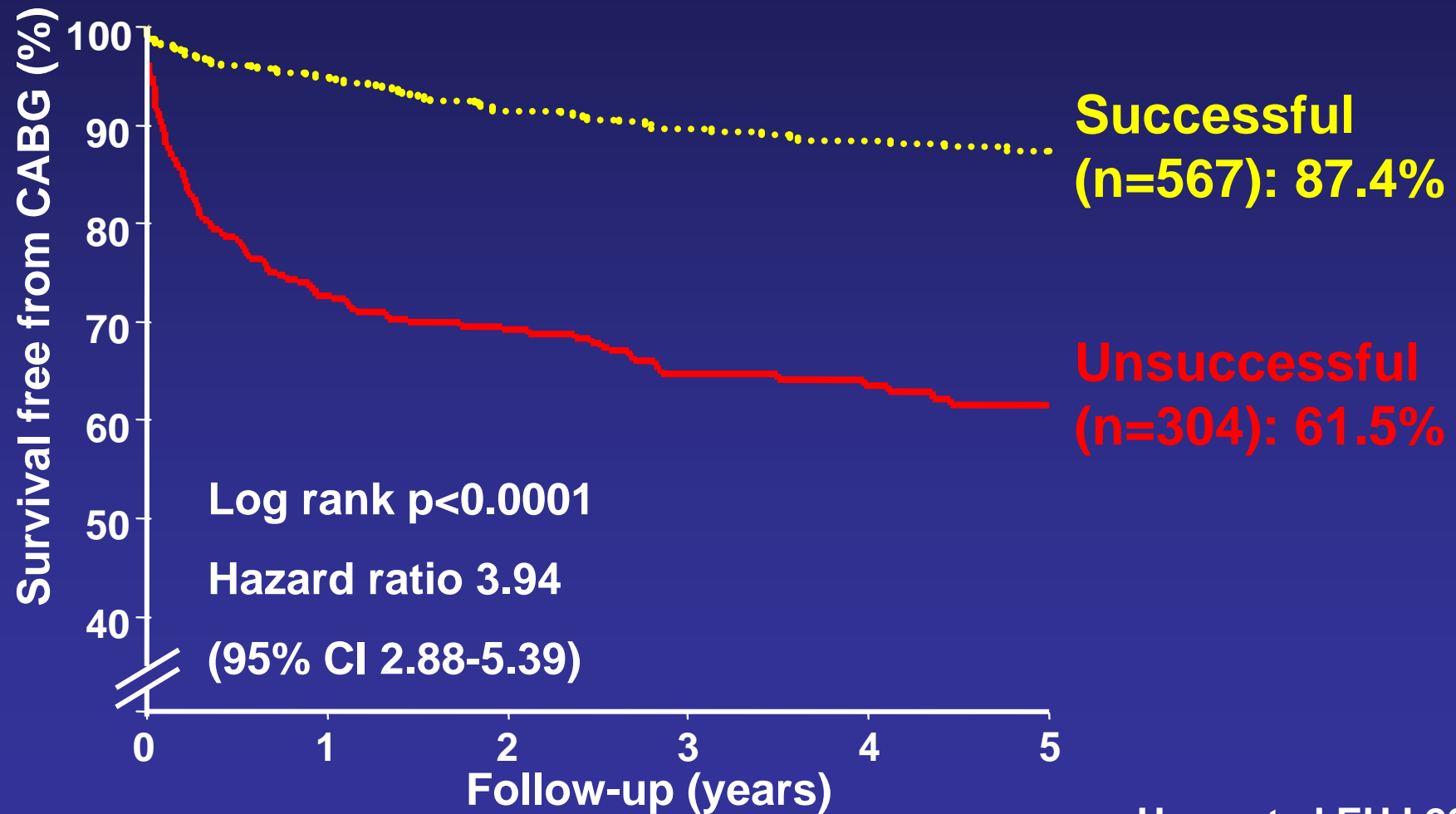
Freedom from CABG

Study	FU (months)	CTO success, n (% had CABG)	CTO failure, n (% had CABG)	p value
Bell et al 1992	32	234 (18%)	120 (58%)	<0.001
Ivanhoe et al 1992	36	317 (13%)	163 (36%)	<0.0001
Noguchi et al 2000	52	134 (7%)	92 (28%)	<0.001
Oliviari et al 2002	12	286 (2.5%)	83 (16%)	<0.0001

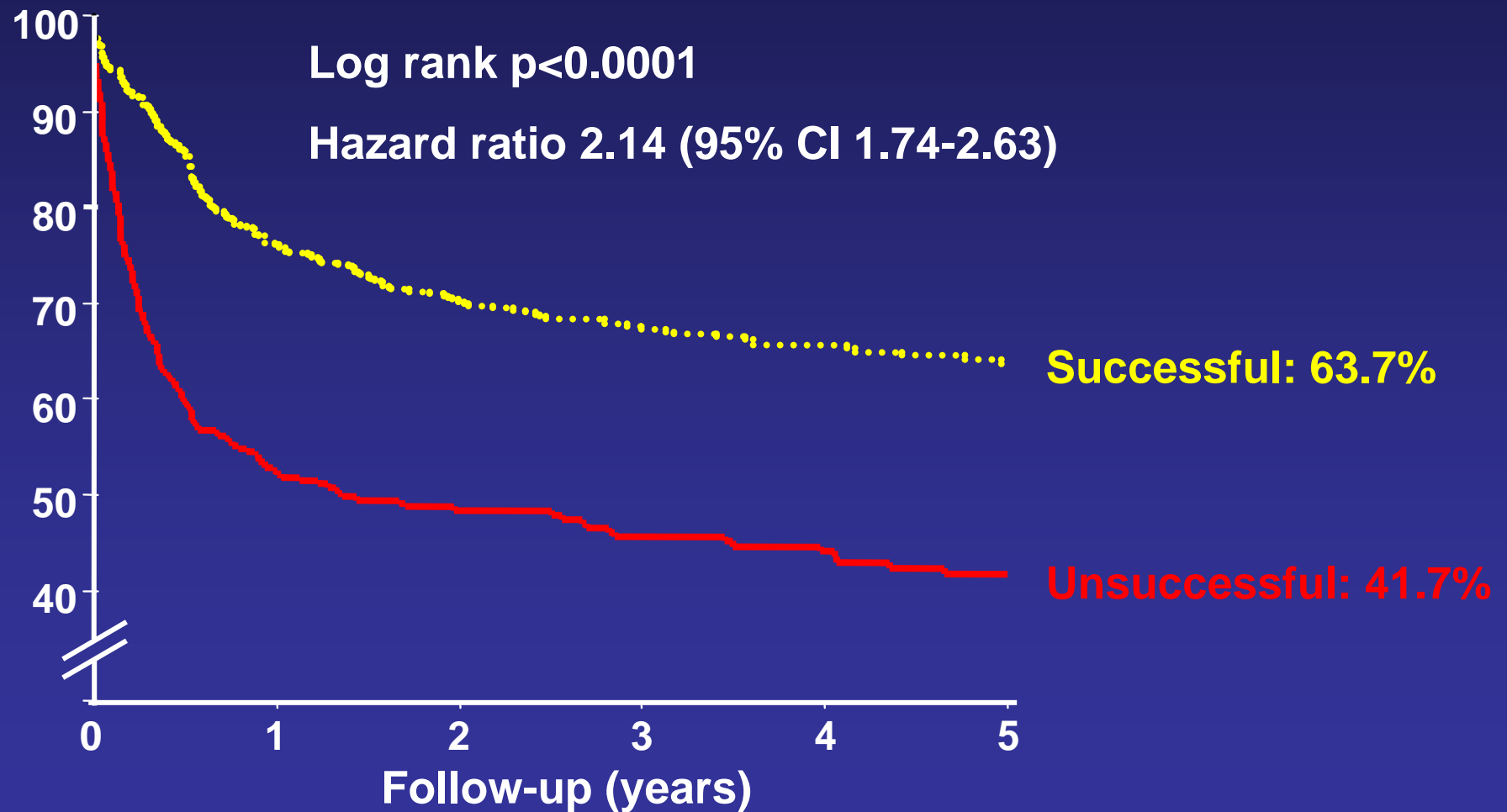
The Thoraxcenter Experience 1992-2002

- Patients were included who had PCI of an occlusion ≥ 1 months duration
- Stents were utilised in the majority (81%)
- Consecutive series of 874 patients (885 CTOs)
- Mean follow-up period was 4.47 ± 2.69 years (median 4.10 years)

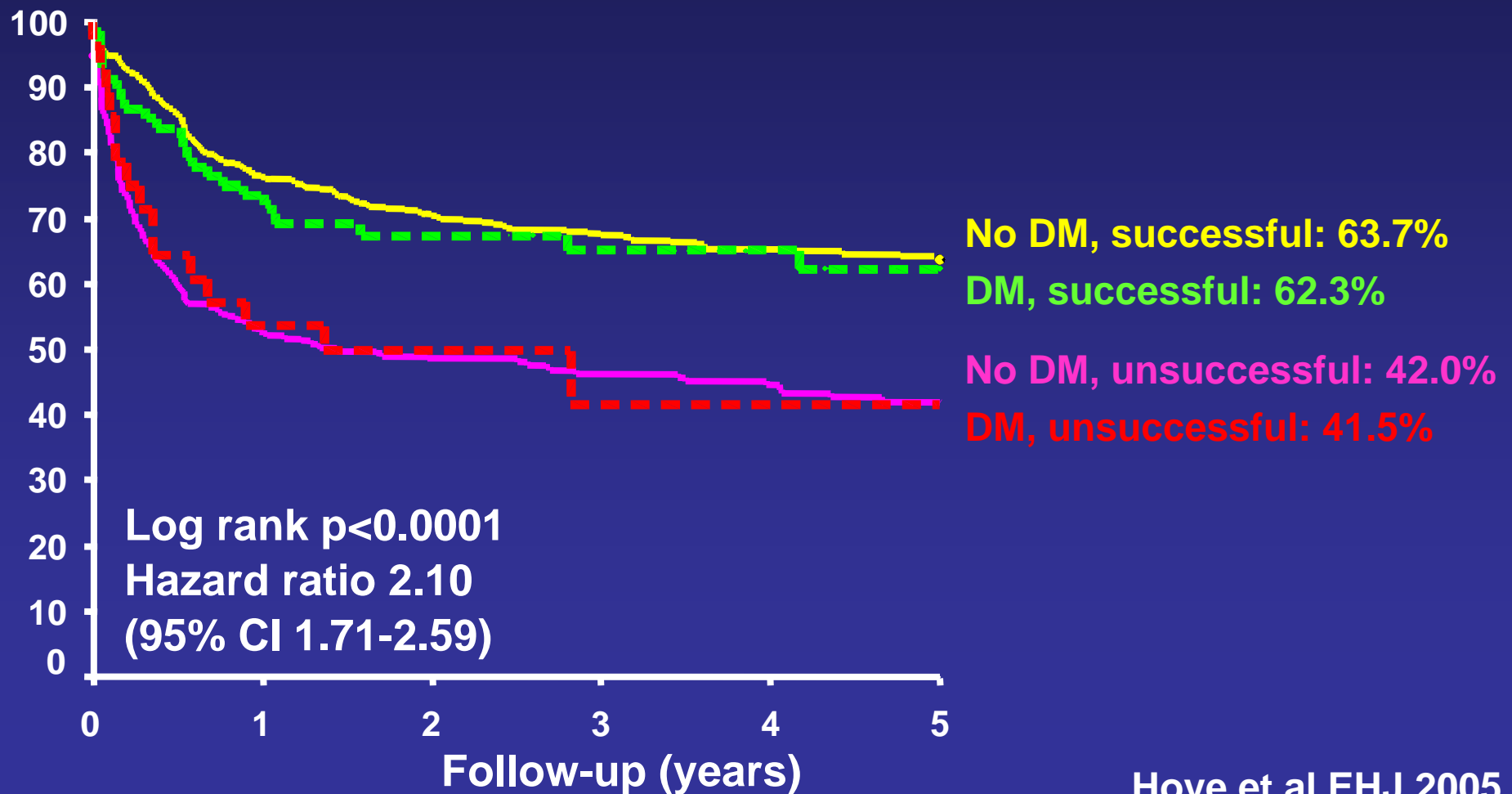
Freedom from CABG



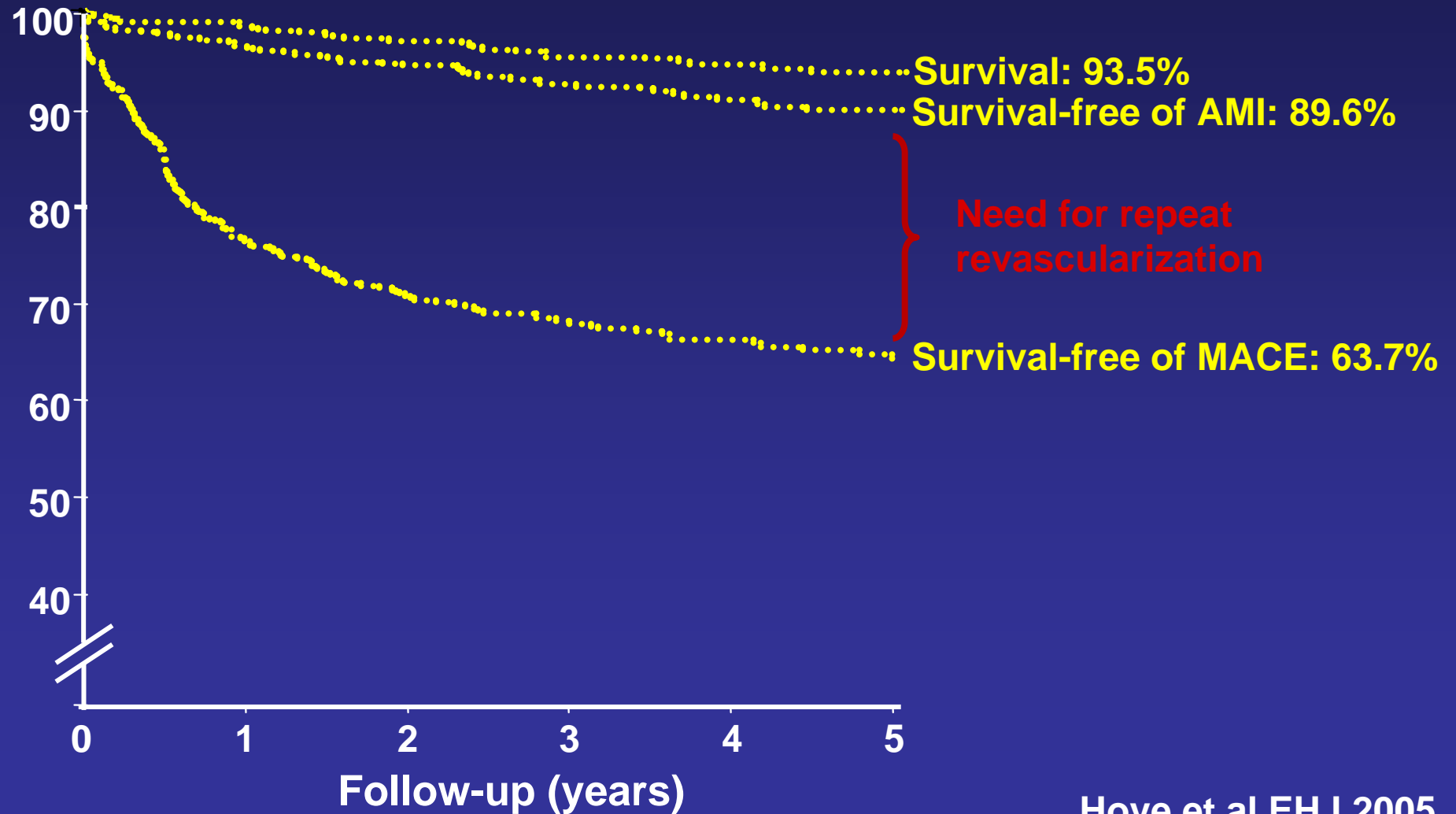
Cumulative survival-free of MACE (death, AMI, or repeat reintervention (PCI or CABG))



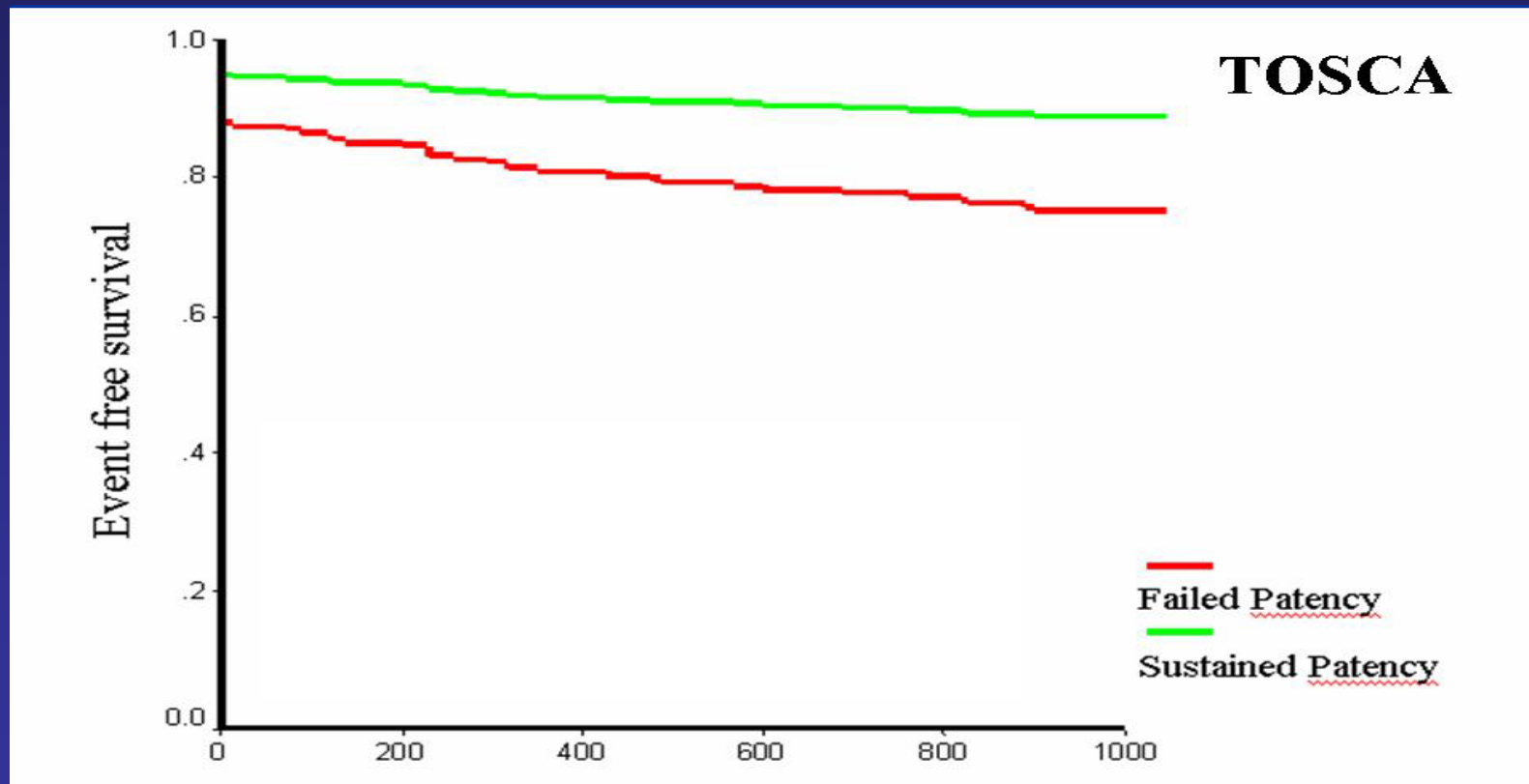
Cumulative survival-free of MACE (death, AMI, or repeat reintervention with respect to diabetic status)



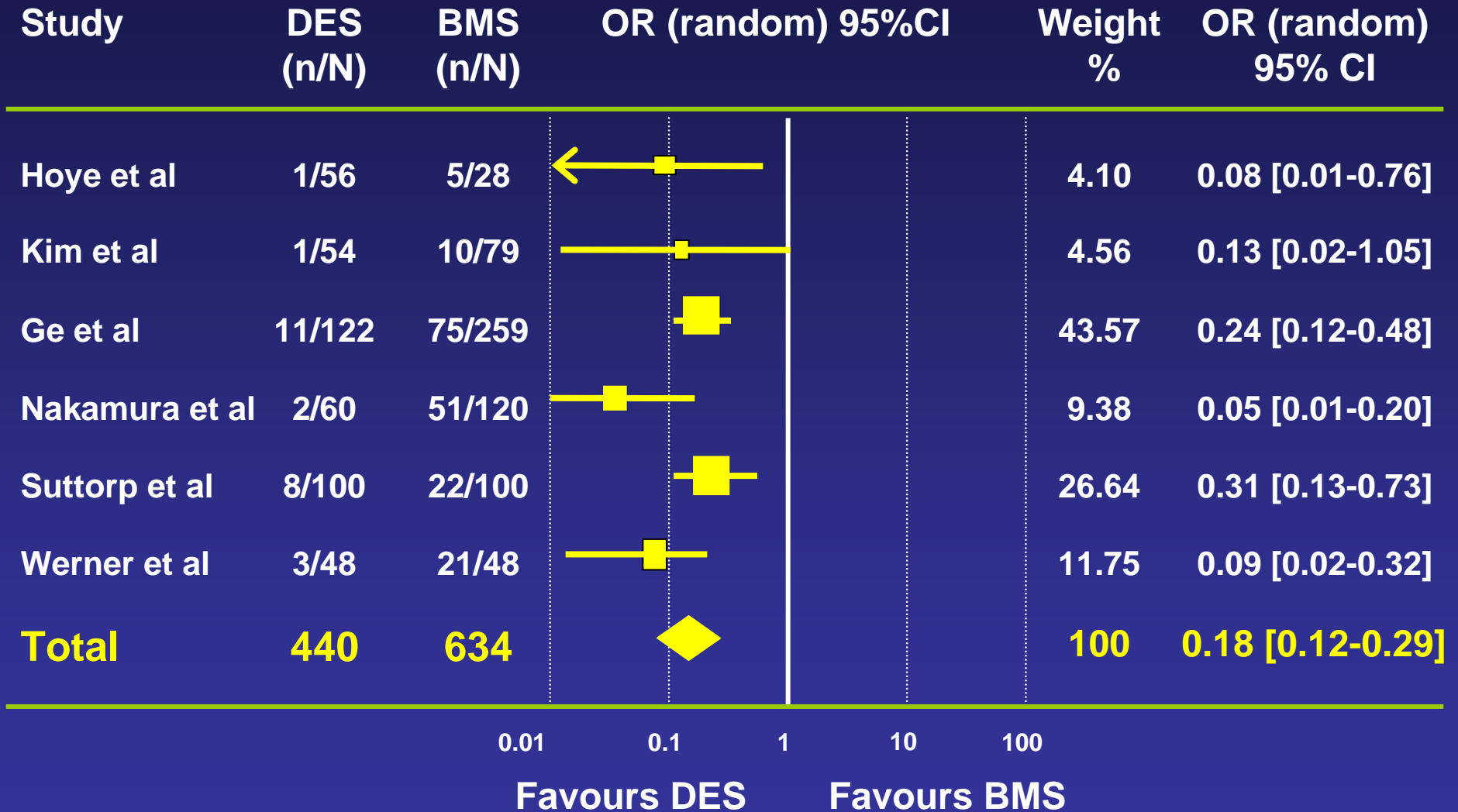
Cumulative survival-free of adverse events following successful CTO recanalization:



Event-free survival (death, MI, or CABG) with respect to vessel patency at 6-months



Efficacy of DES



Quality of Life

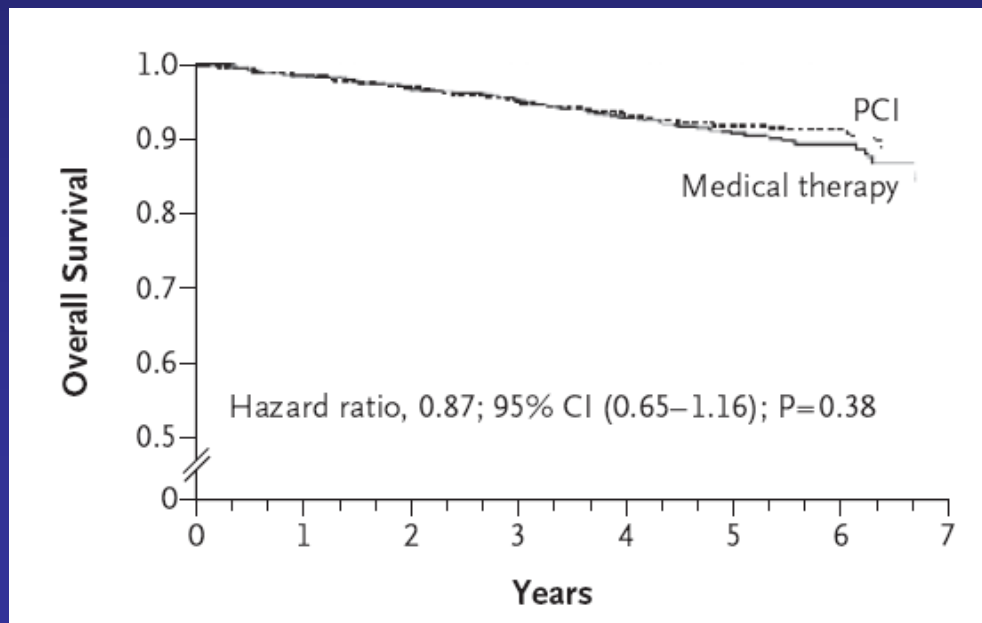


Conclusion.....

- Successful percutaneous CTO recanalisation is associated with an improvement in quality of life
- Optimal efficacy is achieved with DES implantation

What about mortality?

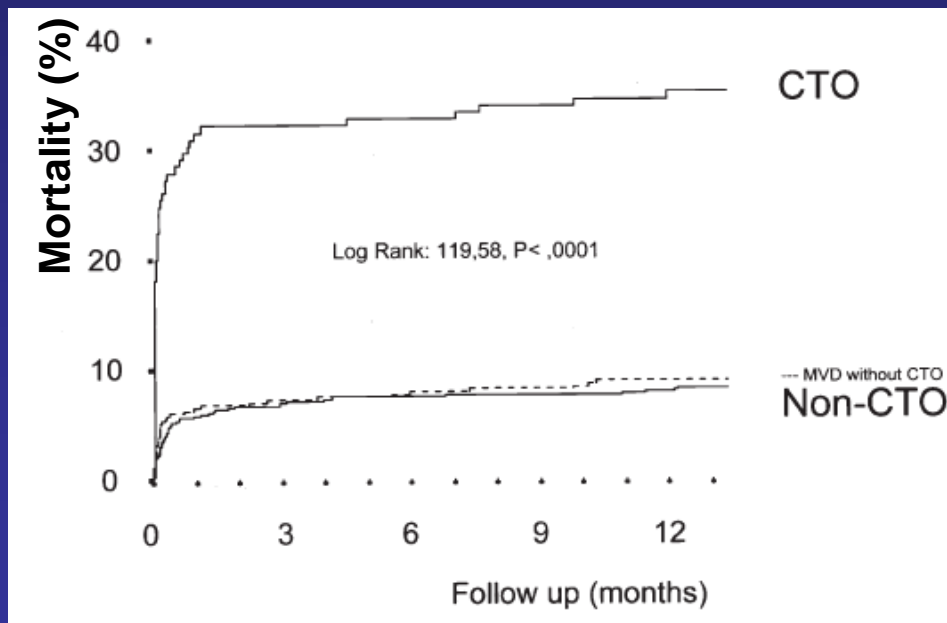
- COURAGE study of 2287 patients with stable angina randomised to PCI versus optimal medical therapy
- Multivessel disease in 69%



- Patients with lesions “unsuitable for PCI” were excluded
- There is no randomised data that specifically looks at patients with CTO

In AMI, CTOs are associated with a worse prognosis

- 1,417 patients with STEMI treated with primary angioplasty
- 165 patients (12%) had a CTO at presentation



CTO was an independent predictor of 1-year mortality (OR 3.8; 95% CI: 2.5-5.8, p<0.001)

Improved long-term survival

4014 patients treated
between 1980-1999

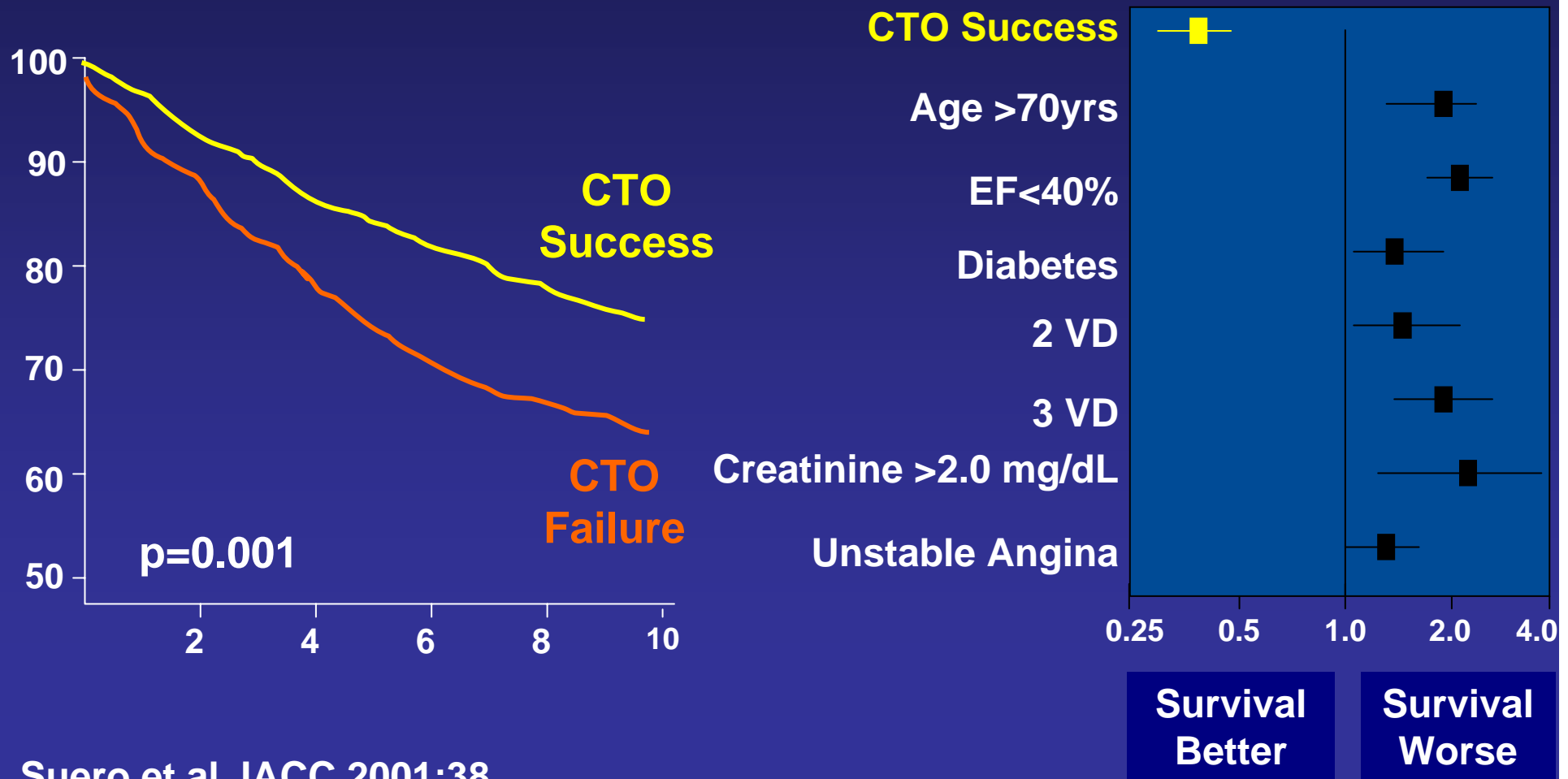
2007 PCI Patients with
Total Occlusions

2007 PCI Patients with Non-
occluded stenoses

10 year survival – 73.5% for
successful procedures versus 65.1%
for unsuccessful procedures $p=0.001$

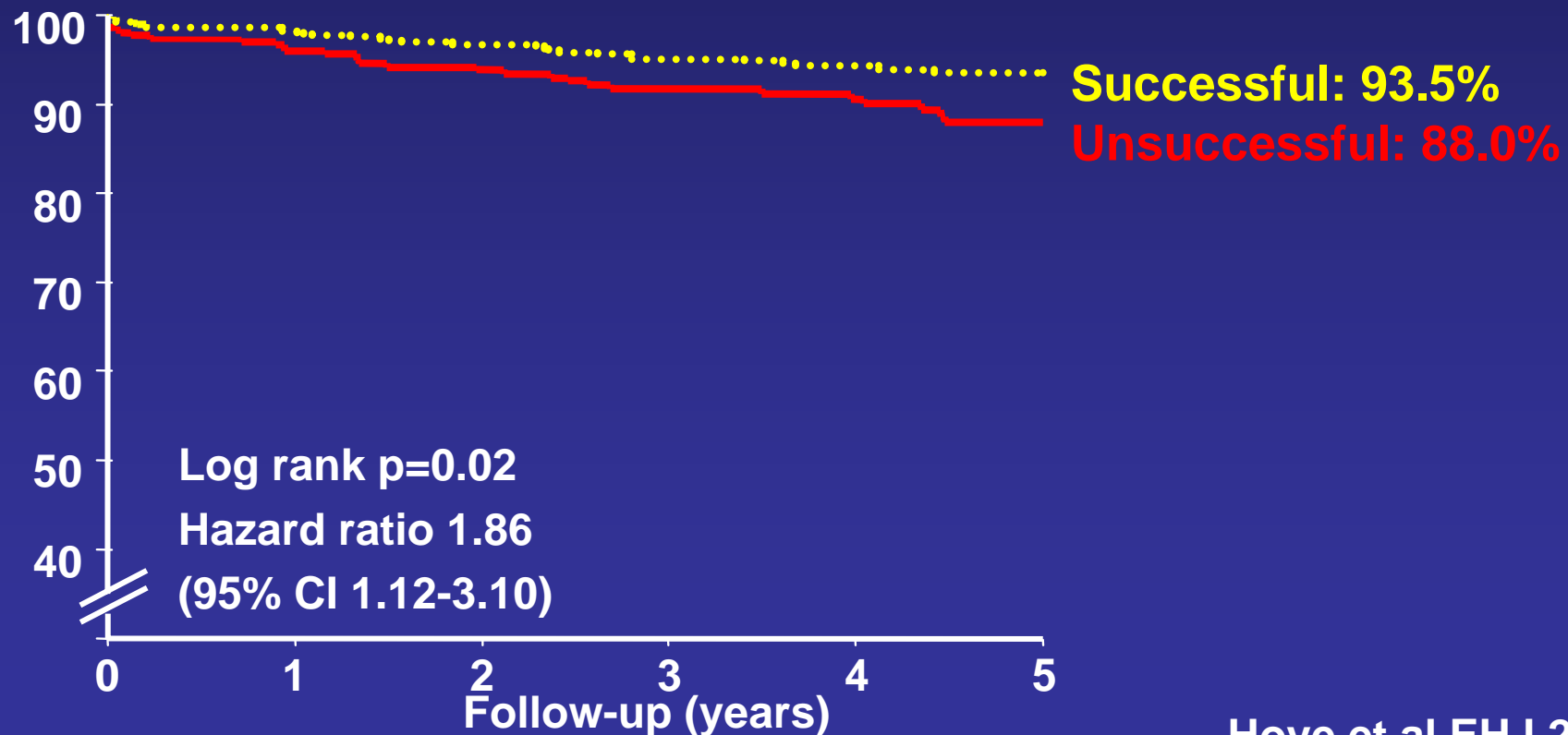
10 year survival – 71.9% for
successful procedures

Successful CTO PCI improves long-term survival rates



Successful CTO PCI improves long-term survival rates

- 874 consecutive patients with undergoing PCI for a CTO (defined as >1 months duration)



Conclusion.....

- Successful percutaneous CTO recanalisation is associated with an improvement in quality of life
- Optimal efficacy is achieved with DES implantation
- There is no mortality benefit incurred with a successful CTO angioplasty
- there are at present no randomised studies specifically comparing PCI of CTOs with “best medical therapy”

However...



An unsuccessful CTO procedure is not risk-free

Incidence of in-hospital MACE	Hoye et al			Suero et al		
	Success n=567	Failure n=304	p value	Success n=1491	Failure n=514	p value
Death, n(%)	2 (0.4)	3 (1.0)	0.2	15 (1.0)	12 (2.3)	0.02

Percutaneous CTO strategies must focus on a SAFE approach to CTO recanalization