PCI in Left Main Disease: Do the Guidelines in the US Reflect the Current State of Knowledge?

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Disclosure Statement of Financial Interest

- I, (Issam Moussa) DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation

US Guidelines 2011

2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention

A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions

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Heart Team Approach to UPLM or Complex CAD

Anatomic Setting	COR	LOE
UPLM or Complex CAD	I – Heart Team Approach	C
UPLM or Complex CAD	IIa – Calculation of the STS and SYNTAX scores	B

UPLM PCI to Improve Survival (SIHD)

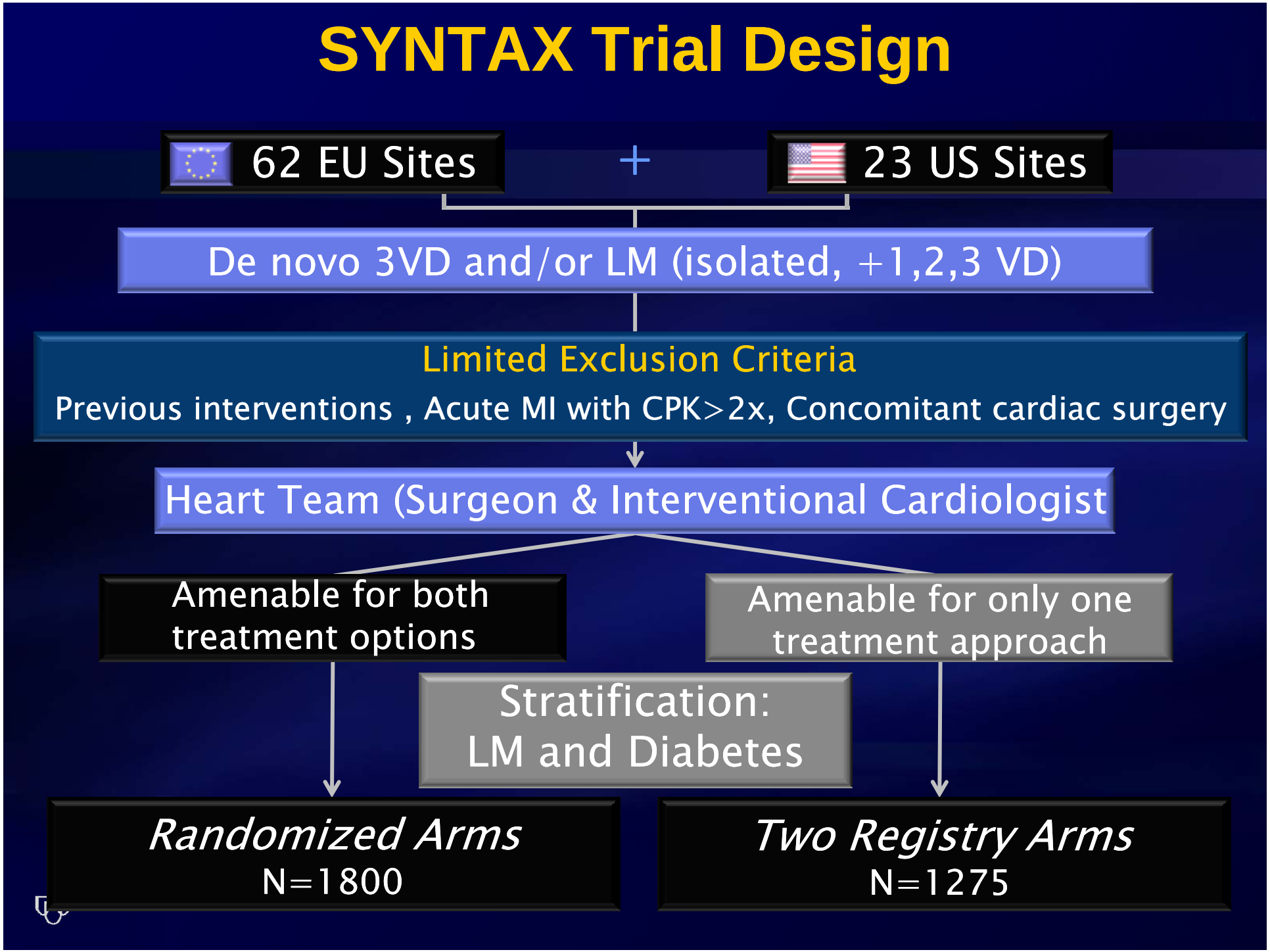
COR	LOE
IIa—For SIHD when *low* risk of PCI complications and *high* likelihood of good long-term outcome (e.g., SYNTAX score of ≤22, ostial or trunk left main CAD), **and** a *signficantly increased* CABG risk (e.g., STS-predicted risk of operative mortality ≥5%)	B
IIb—For SIHD when *low to intermediate* risk of PCI complications and *intermediate to high* likelihood of good long-term outcome (e.g., SYNTAX score of <33, bifurcation left main CAD) **and** *increased* CABG risk (e.g., moderate-severe COPD, disability from prior stroke, prior cardiac surgery, STS-predicted operative mortality >2%)	B
III: Harm—For SIHD in patients (versus performing CABG) with *unfavorable* anatomy for PCI and who are *good* candidates for CABG	B

UPLM PCI to Improve Survival (ACS)

COR	LOE
IIa—For UA/NSTEMI if not a CABG candidate	**B**
IIa—For STEMI when distal coronary flow is <TIMI grade 3 and PCI can be performed more rapidly and safely than CABG	**C**

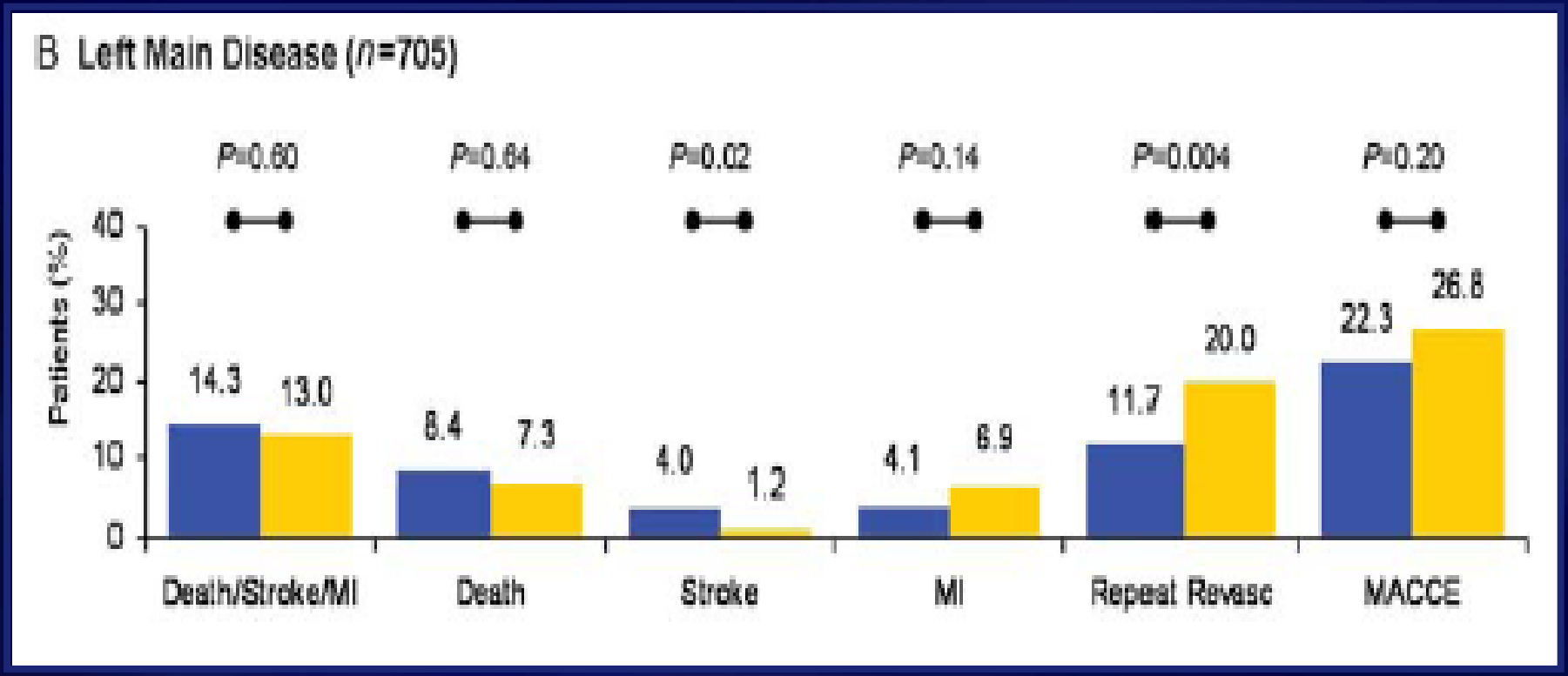
The Evidence

SYNTAX Trial Design



MACCE to 3 Years in Patients with UPLMCA Disease

(All Syntax Patients)



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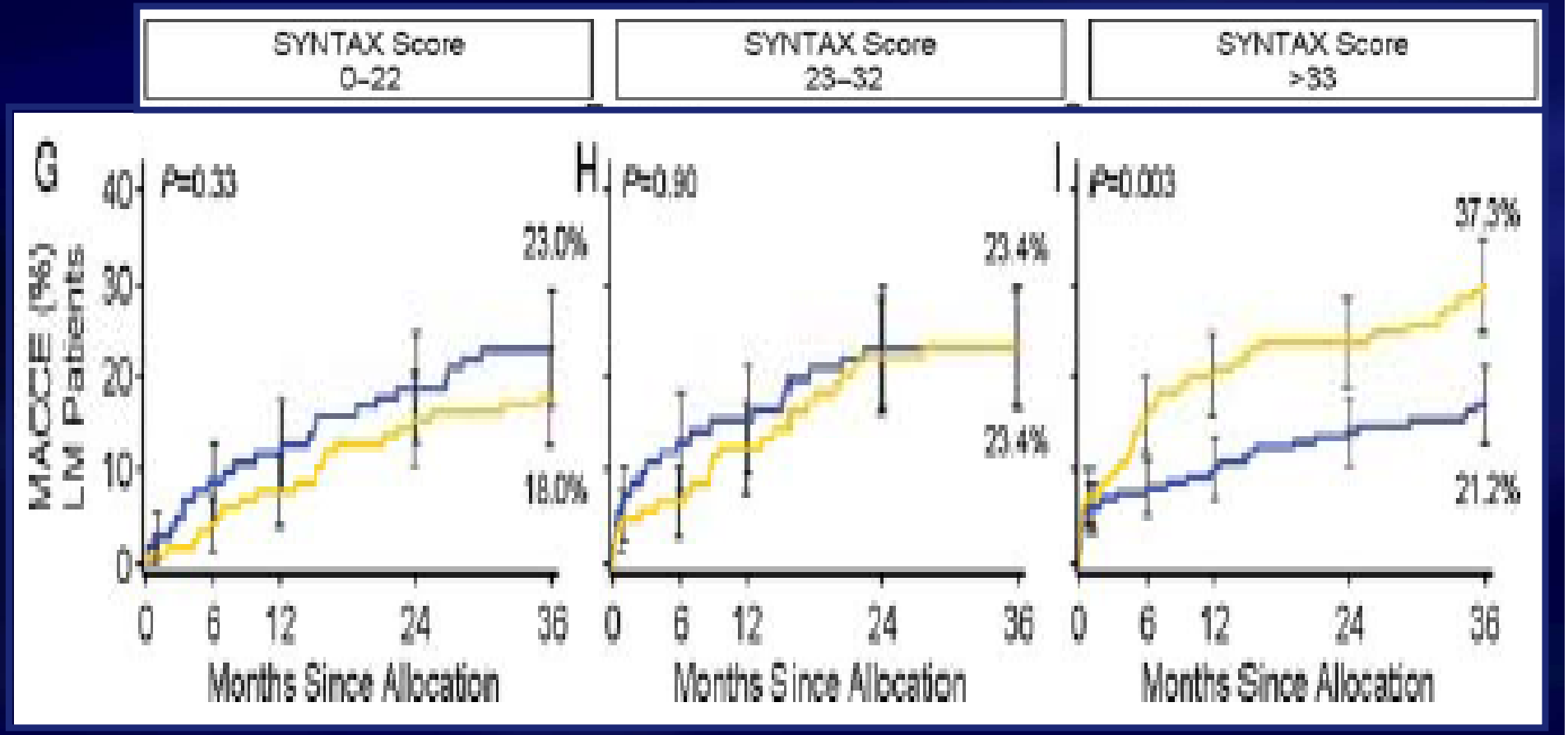
Kappetein AP et al. European Heart Journal (2011) 32, 2125–2134

MACCE to 3 Years in Patients with UPLMCA Disease

According to SYNTAX Score



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PCI vs. CABG for UPLMCA Disease

A Meta-Analysis of Randomized Clinical Data

Table 1 Studies Included in the Meta-Analysis

Study/First Author (Ref. #)	Year	Design	N	PCI, n	DES, %	CABG, n	LIMA to LAD, %	Primary Outcome
LEMANS (4)	2008	RCT	105	52	35	53	81	Cardiac death, MI, CVA, repeat revascularization, and/or acute/subacute in-stent thrombosis
SYNTAX Left Main (5)	2009	Pre-specified subanalysis from RCT	705	357	100	348	97	All-cause death, CVA, MI, and repeat revascularization
Boudriot et al. (8)	2010	RCT	201	100	100	101	99	All-cause death, MI, and repeat revascularization
PRECOMBAT (9)	2011	RCT	600	300	100	300	94	All-cause death, CVA, MI, and repeat revascularization

Cappodanno D et al. J Am Coll Cardiol 2011;58:1426–32

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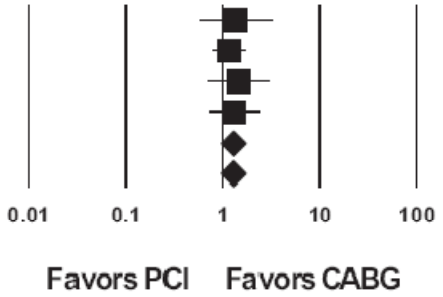
Major Adverse Cardiac and Cerebrovascular Events

Model	Study name	Odds ratio	Lower limit	Upper limit	p-Value	Events / Total PCI	Events / Total CABG
	LEMANS	1.368	0.579	3.229	0.475	16 / 52	13 / 53
	SYNTAXleft main	1.181	0.774	1.801	0.440	56 / 355	46 / 336
	Boudriot et al.	1.458	0.686	3.098	0.327	19 / 100	14 / 101
	PRECOMBAT	1.328	0.725	2.436	0.359	26 / 300	20 / 300
Fixed	Pooled estimate	1.276	0.950	1.715	0.106		
Random	Pooled estimate	1.276	0.950	1.715	0.106		
	I^2 = 0%						



Death, Myocardial Infarction or Stroke

Model	Study name	Odds ratio	Lower limit	Upper limit	p-Value	Events / Total PCI	Events / Total CABG
	SYNTAXleft main	0.745	0.430	1.291	0.294	25 / 355	31 / 336
	PRECOMBAT	0.828	0.352	1.946	0.664	10 / 300	12 / 300
Fixed	Pooled estimate	0.769	0.484	1.220	0.264		
Random	Pooled estimate	0.769	0.484	1.220	0.264		
	I^2 = 0%						

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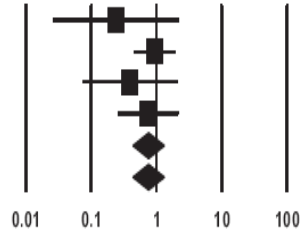
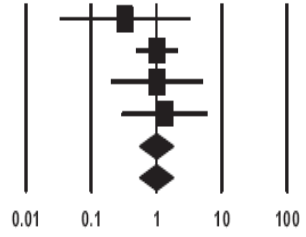
Death

Model	Study name	Odds ratio	Lower limit	Upper limit	p-Value	Events / Total PCI	Events / Total CABG
	LEMANS	0.240	0.026	2.225	0.209	1 / 52	4 / 53
	SYNTAX left main	0.944	0.454	1.963	0.878	15 / 355	15 / 336
	Boudrict et al.	0.392	0.074	2.069	0.270	2 / 100	5 / 101
	PRECOMBAT	0.745	0.255	2.173	0.590	6 / 300	8 / 300
Fixed	Pooled estimate	0.741	0.427	1.284	0.285		
Random	Pooled estimate	0.741	0.427	1.284	0.285		
	$I^2 = 0\%$						



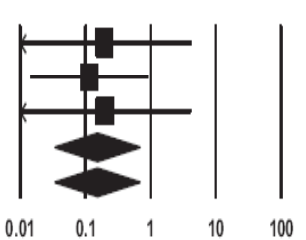
Myocardial Infarction

Model	Study name	Odds ratio	Lower limit	Upper limit	p-Value	Events / Total PCI	Events / Total CABG
	LEMANS	0.327	0.033	3.248	0.340	1 / 52	3 / 53
	SYNTAX left main	1.015	0.482	2.136	0.969	15 / 355	14 / 336
	Boudrict et al.	1.010	0.199	5.129	0.990	3 / 100	3 / 101
	PRECOMBAT	1.338	0.297	6.029	0.705	4 / 300	3 / 300
Fixed	Pooled estimate	0.981	0.541	1.781	0.950		
Random	Pooled estimate	0.981	0.541	1.781	0.950		
	$I^2 = 0\%$						



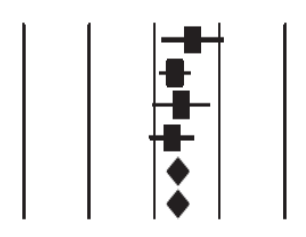
Stroke

Model	Study name	Odds ratio	Lower limit	Upper limit	p-Value	Events / Total PCI	Events / Total CABG
	LEMANS	0.196	0.009	4.187	0.297	0 / 52	2 / 53
	SYNTAX left main	0.116	0.014	0.931	0.043	1 / 355	8 / 336
	PRECOMBAT	0.199	0.009	4.156	0.298	0 / 300	2 / 300
Fixed	Pooled estimate	0.150	0.033	0.671	0.013		
Random	Pooled estimate	0.150	0.033	0.671	0.013		
	$I^2 = 0\%$						



Repeat Revascularization

Model	Study name	Odds ratio	Lower limit	Upper limit	p-Value	Events / Total PCI	Events / Total CABG
	LEMANS	3.892	1.297	11.683	0.015	15 / 52	5 / 53
	SYNTAX left main	2.072	1.215	3.532	0.007	45 / 355	22 / 336
	Boudrict et al.	2.578	0.948	7.006	0.063	14 / 100	6 / 101
	PRECOMBAT	1.851	0.840	4.079	0.127	18 / 300	10 / 300
Fixed	Pooled estimate	2.246	1.537	3.282	0.000		
Random	Pooled estimate	2.246	1.537	3.282	0.000		
	$I^2 = 0\%$						



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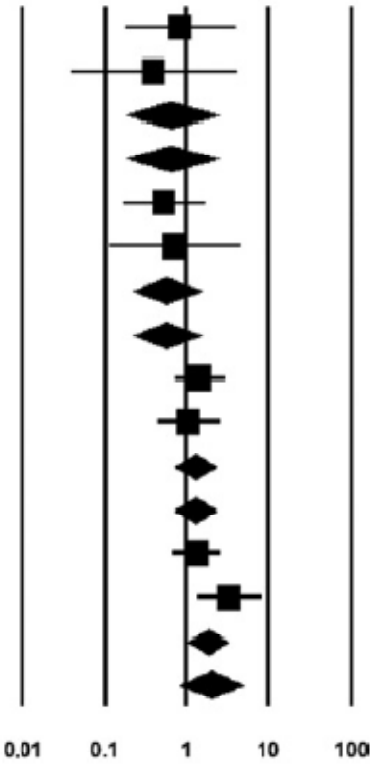
A Meta-Analysis of Randomized Clinical Data

Major Adverse Cardiac and Cerebrovascular Events

Model	Group by Subgroup within study	Study name	Subgroup within study	Odds ratio	Lower limit	Upper limit	p-Value	Events / Total PCI	Events / Total CABG
	Isolated LMCA	SYNTAX LM	Isolated LMCA	0.83	0.17	3.93	0.81	3 / 42	4 / 47
	Isolated LMCA	PRECOMBAT	Isolated LMCA	0.40	0.04	4.05	0.44	1 / 27	3 / 34
Fixed	Isolated LMCA			0.66	0.18	2.40	0.53	4 / 69	7 / 81
Random	Isolated LMCA			0.66	0.18	2.40	0.53	4 / 69	7 / 81
	LMCA + 1 vessel	SYNTAX LM	LMCA + 1 vessel	0.53	0.17	1.67	0.28	5 / 67	9 / 68
	LMCA + 1 vessel	PRECOMBAT	LMCA + 1 vessel	0.69	0.11	4.34	0.70	2 / 50	3 / 53
Fixed	LMCA + 1 vessel			0.57	0.22	1.51	0.26	7 / 117	12 / 121
Random	LMCA + 1 vessel			0.57	0.22	1.51	0.26	7 / 117	12 / 121
	LMCA + 2 vessels	SYNTAX LM	LMCA + 2 vessels	1.47	0.71	3.01	0.30	22 / 111	15 / 104
	LMCA + 2 vessels	PRECOMBAT	LMCA + 2 vessels	1.06	0.45	2.50	0.89	13 / 101	11 / 90
Fixed	LMCA + 2 vessels			1.28	0.74	2.23	0.38	35 / 212	26 / 194
Random	LMCA + 2 vessels			1.28	0.74	2.23	0.38	35 / 212	26 / 194
	LMCA + 3 vessels	SYNTAX LM	LMCA + 3 vessels	1.31	0.68	2.54	0.42	26 / 135	18 / 117
	LMCA + 3 vessels	PRECOMBAT	LMCA + 3 vessels	3.25	1.32	8.00	0.01	20 / 122	7 / 123
Fixed	LMCA + 3 vessels			1.80	1.06	3.07	0.03	46 / 257	25 / 240
Random	LMCA + 3 vessels			1.96	0.81	4.73	0.14	46 / 257	25 / 240



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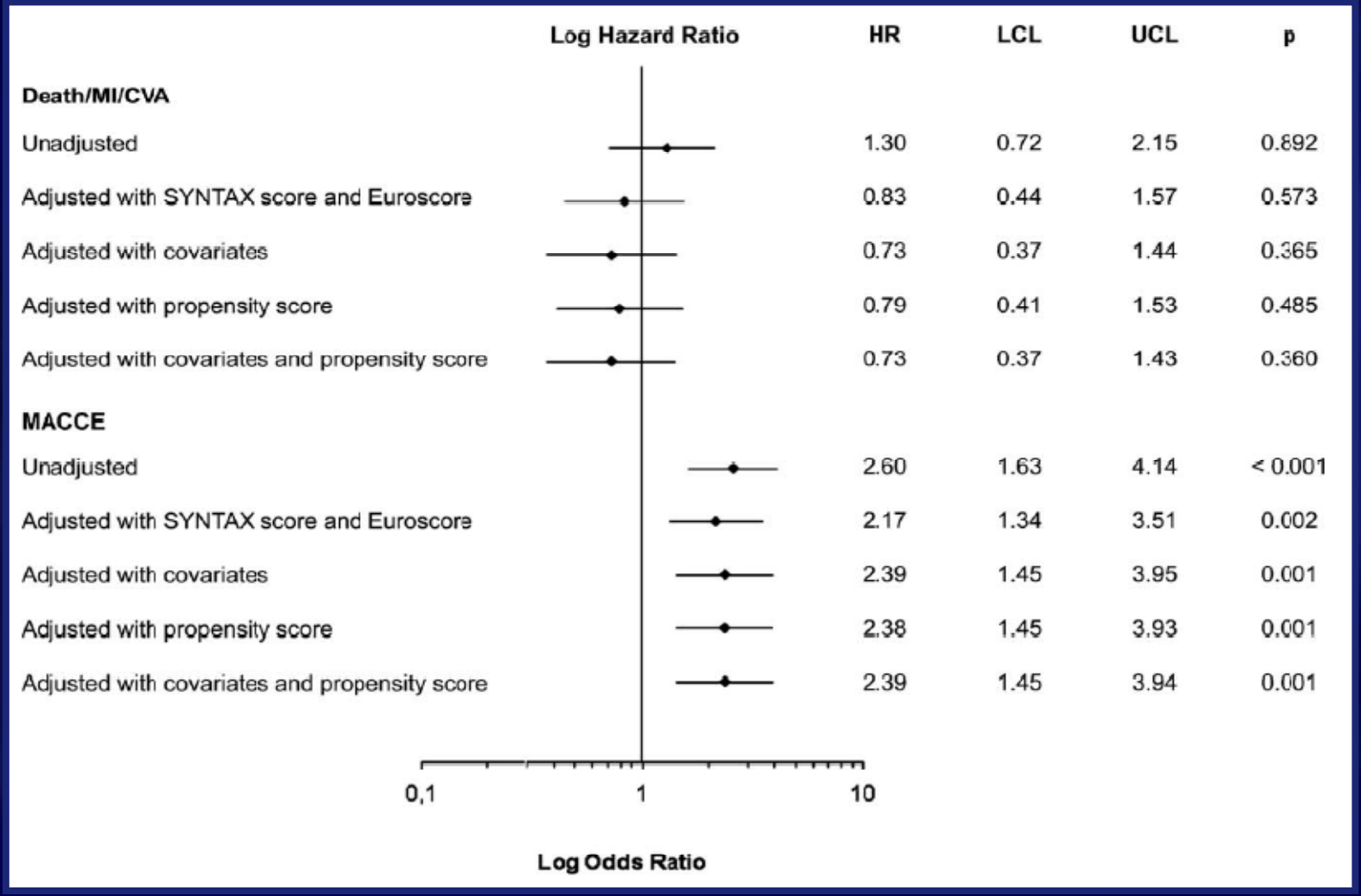
PCI vs. CABG for UPLMCA Disease with SYNTAX Score <32

A Propensity Score Matched 3-Year Comparison



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Capodanno D et al. CCI. 2011;77:936–943.

Do the Guidelines in the US Reflect the Current State of Knowledge?

NO

Remaining Questions

- What is the cause of the higher mortality after PCI in patients with LMCA and SYNTAX >32?
  - CABG benefit? (CABG did not reduce mortality in STITCH and BARI 2D compared to medical therapy)
  - TAXUS stents harm? (too many stents, high thrombosis and restenosis rate)

- What the impact of increasing co-morbidities on SYNTAX outcome? Can we apply the results to patients with STS score >5?

- Can new PCI strategies and 2nd generation devices change the outcome?
  - Use of FFR guided PCI in MVD improve outcome
  - 2nd generation stents have lower rates of thrombosis and restenosis