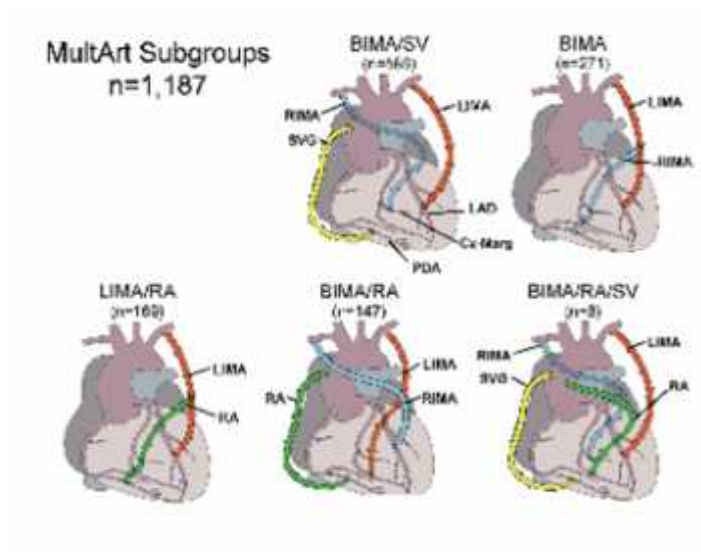
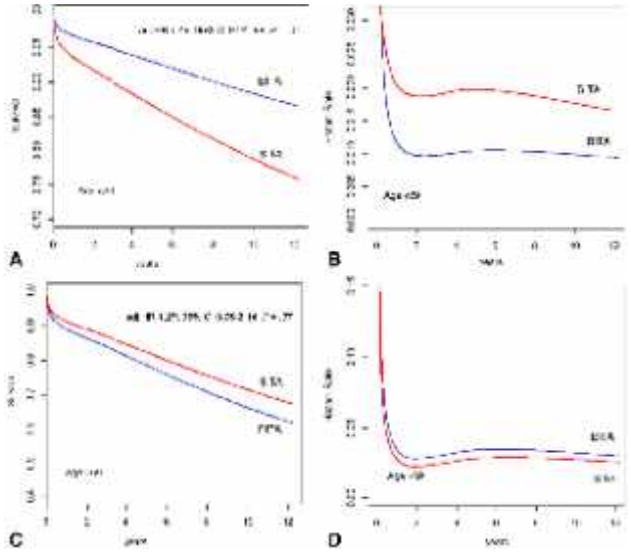
Incertidumbres en cirugía de revascularización coronaria





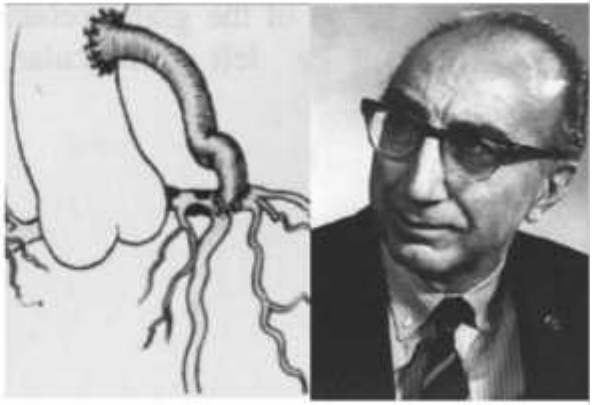
J.A.MONTERO ARGUDO
Cirugía Cardiaca
Hospital Universitari i Politècnic La Fe

Coronary artery bypass grafting: Part 1—the evolution over the first 50 years

Stuart J. Head[1], Teresa M. Kieser[2], Volkmar Falk[3], Hans A. Huysmans[4], and A. Pieter Kappetein[1]*

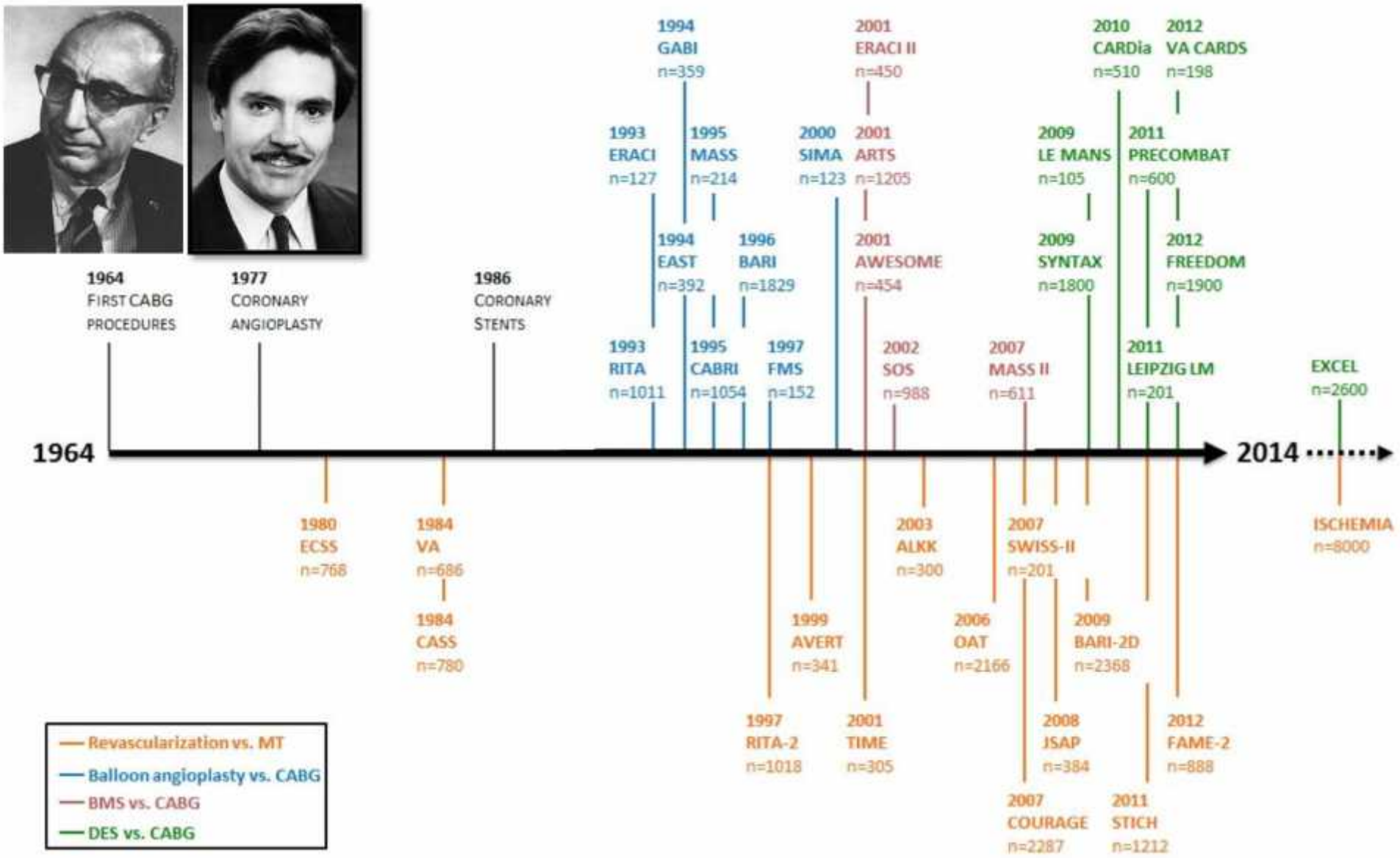
Vasilii I Kolesov (1904 –1992)
Military surgeon in St. Peterburg
→ **LITA to marginal branch of LCX on 25 February 1964**

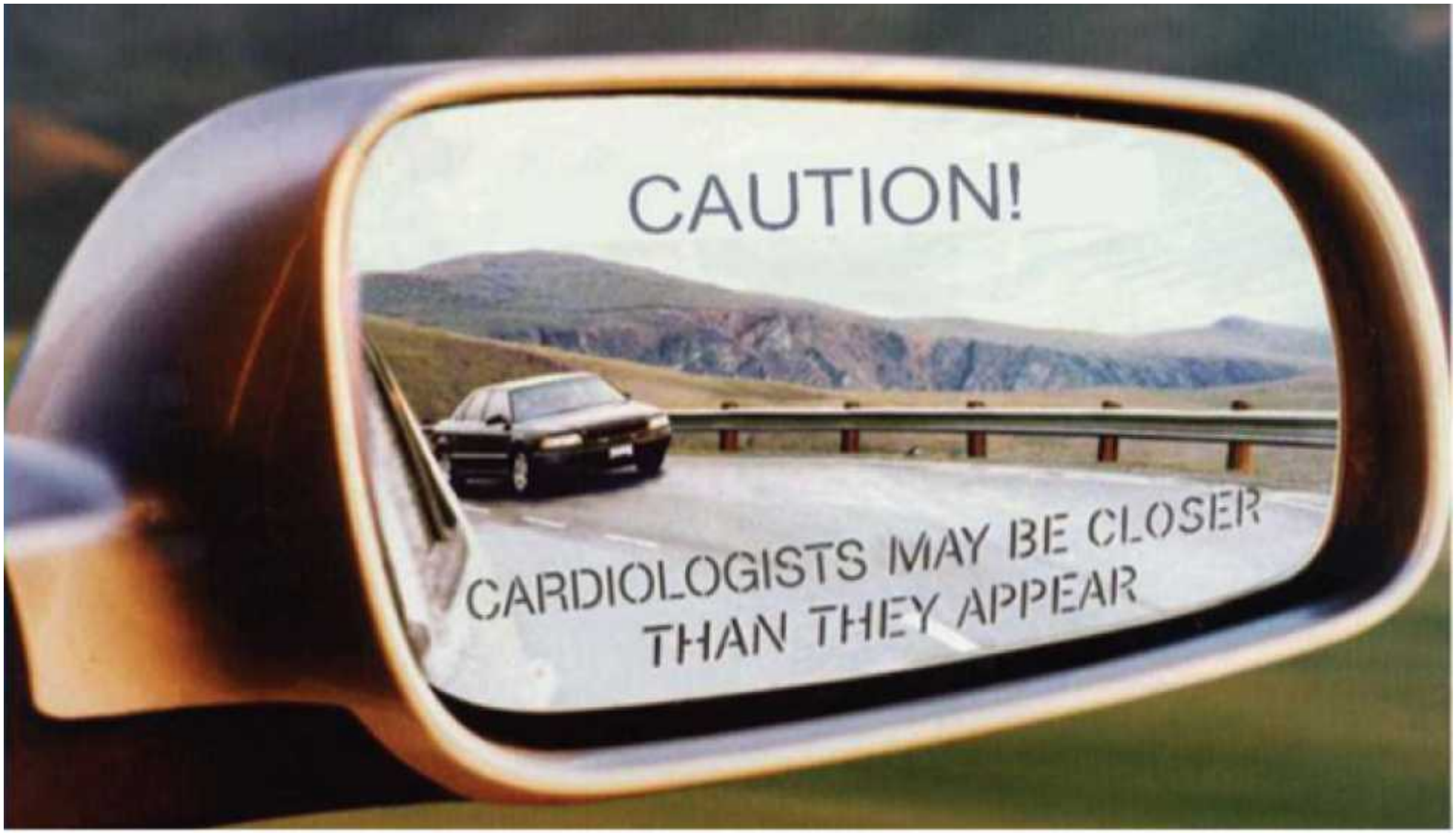
Michael E DeBakey (1908-2008), Baylor Houston, TX
→ **SVG to the LAD on 23 November 1964**
Garrett HE et al. JAMA 1973;223:792-4



René G Favaloro (1923-2000), Cleveland Clinic, OH
→ **SVG to the RCA on 9 May 1967**
J Thorac Cardiovasc Surg 1969;58:178-85

EC revascularización coronaria




CAUTION!
CARDIOLOGISTS MAY BE CLOSER
THAN THEY APPEAR

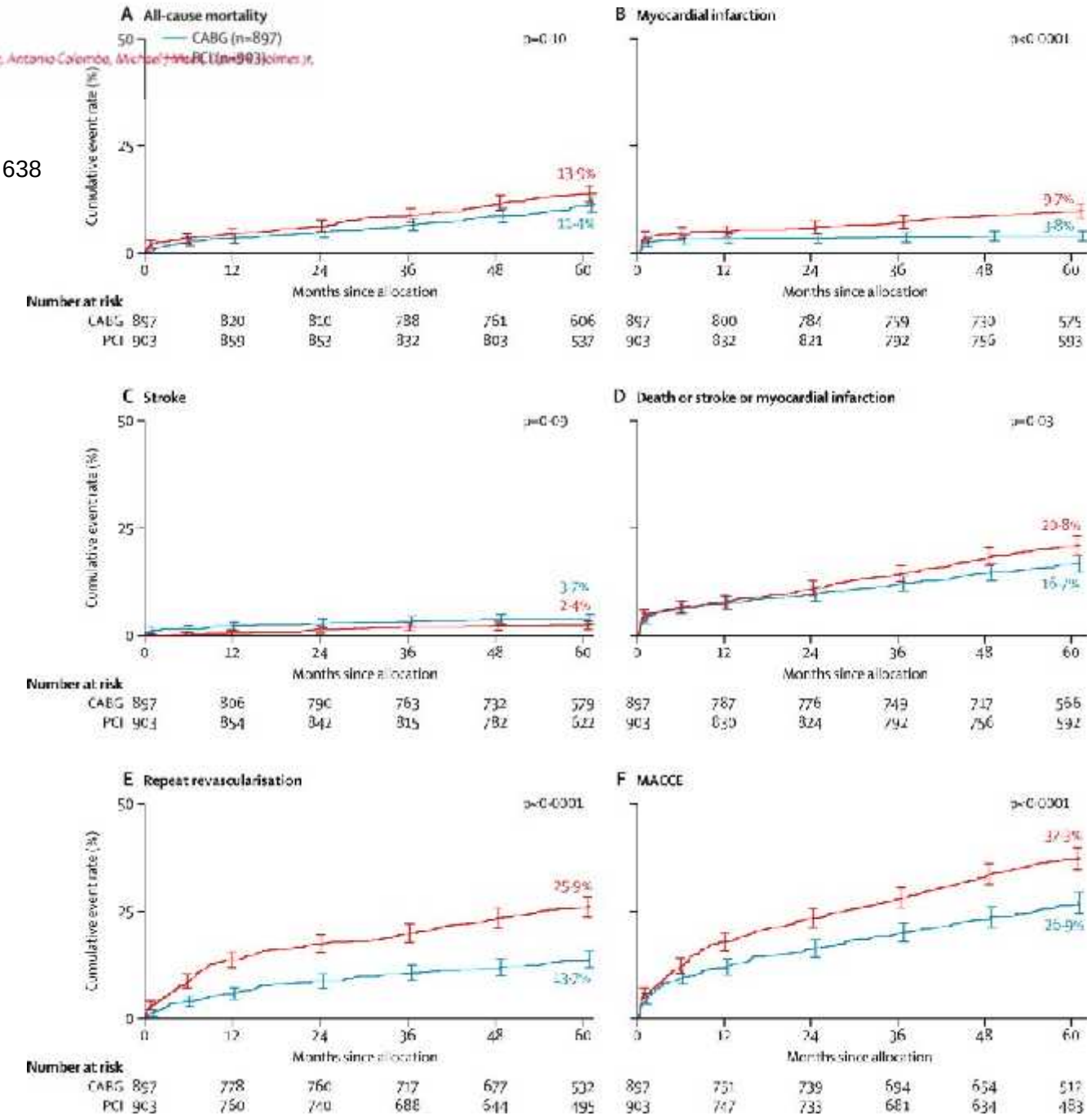
#1

“El tronco es de los cirujanos”

Coronary artery bypass graft surgery versus percutaneous coronary intervention in patients with three-vessel disease and left main coronary disease: 5-year follow-up of the randomised, clinical SYNTAX trial

Friedrich W Mohr, Marie-Claude Morice, A Pieter Kappetein, Ted E Feldman, Elisabeth Stähle, Antonio Colombo, Michael J Mack, David R Holmes Jr, Marie-angèle Morel, Nic Van Dyck, Vicki M Houle, Keith D Dawkins, Patrick W Serruys

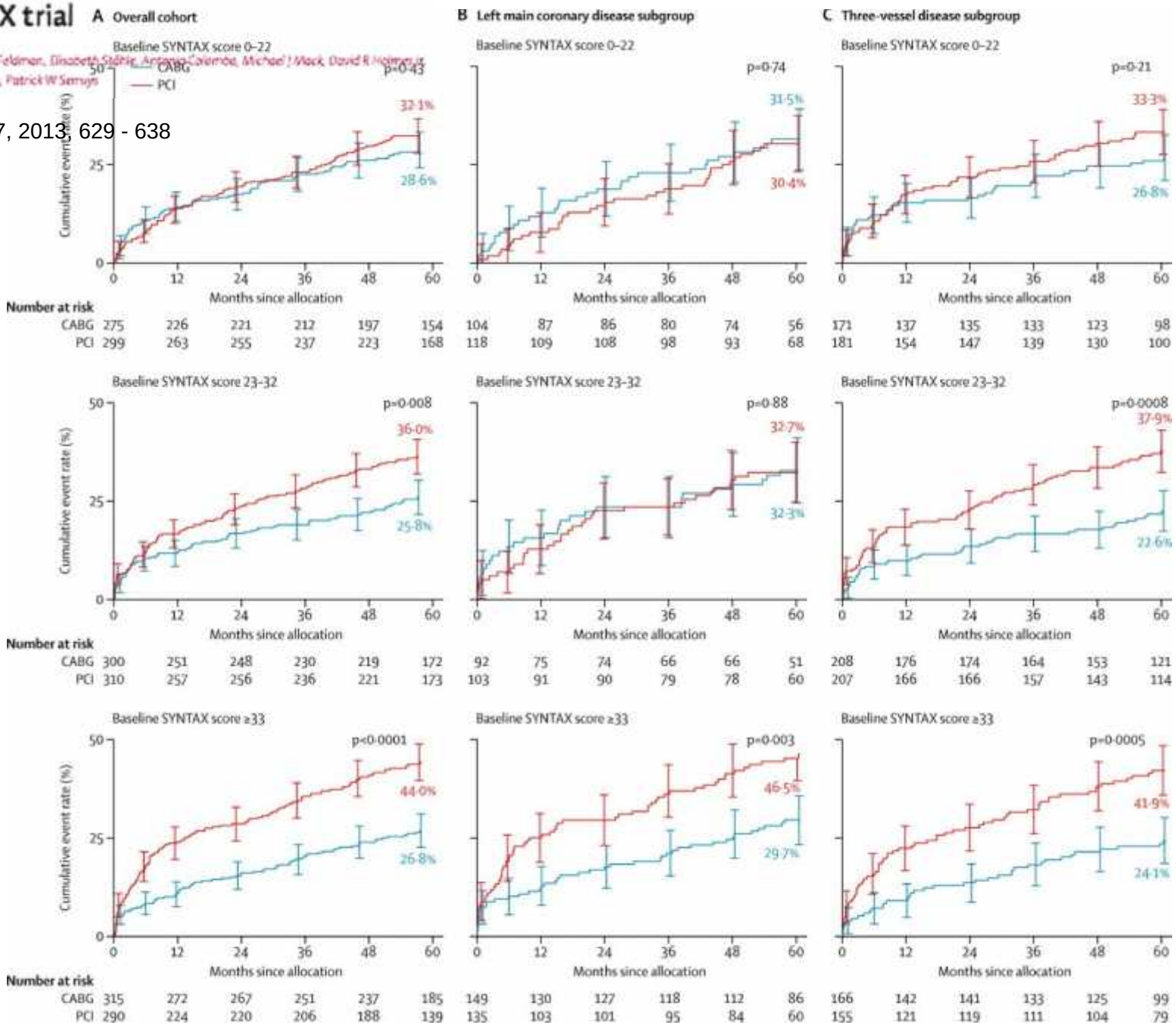
The Lancet, Volume 381, Issue 9867, 2013, 629 - 638



Coronary artery bypass graft surgery versus percutaneous coronary intervention in patients with three-vessel disease and left main coronary disease: 5-year follow-up of the randomised, clinical SYNTAX trial

Friedrich W Mohr, Marie-Claude Morice, A Pieter Kappetein, Ted E Feldman, Elisabeth Stähle, Arnoldus Colombo, Michael J Mack, David R Holmes Jr, Marie-angèle Morel, Nic Van Dyck, Vicki M Houle, Keith D Dawkins, Patrick W Serruys

The Lancet, Volume 381, Issue 9867, 2013, 629 - 638



MACCE 5a

JACC Journals

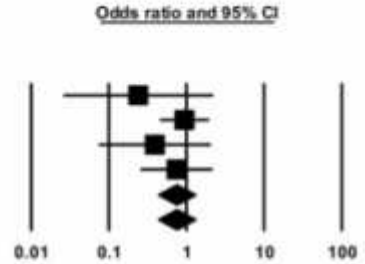
Percutaneous Coronary Intervention Versus Coronary Artery Bypass Graft Surgery in Left Main Coronary Artery Disease: A Meta-Analysis of Randomized Clinical Data

J Am Coll Cardiol. 2011;58(14):1426-1432. doi:10.1016/j.jacc.2011.07.005

Death

Model	Study name	Odds ratio	Lower limit	Upper limit	p-Value	PCI	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
	Boudriot 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		

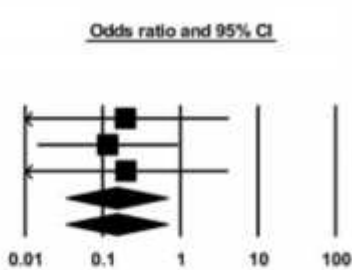
$I^2 = 0\%$



Stroke

Model	Study name	Odds ratio	Lower limit	Upper limit	p-Value	PCI	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		

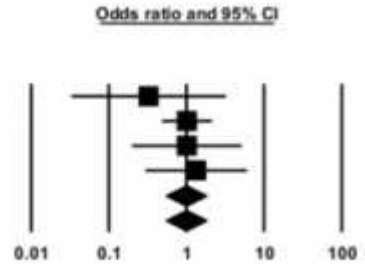
$I^2 = 0\%$



Myocardial Infarction

Model	Study name	Odds ratio	Lower limit	Upper limit	p-Value	PCI	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
	Boudriot 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		

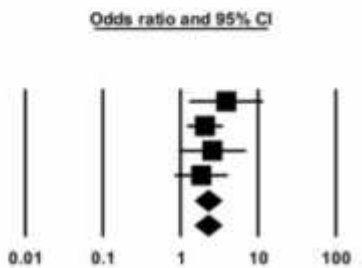
$I^2 = 0\%$



Repeat Revascularization

Model	Study name	Odds ratio	Lower limit	Upper limit	p-Value	PCI	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
	Boudriot 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		

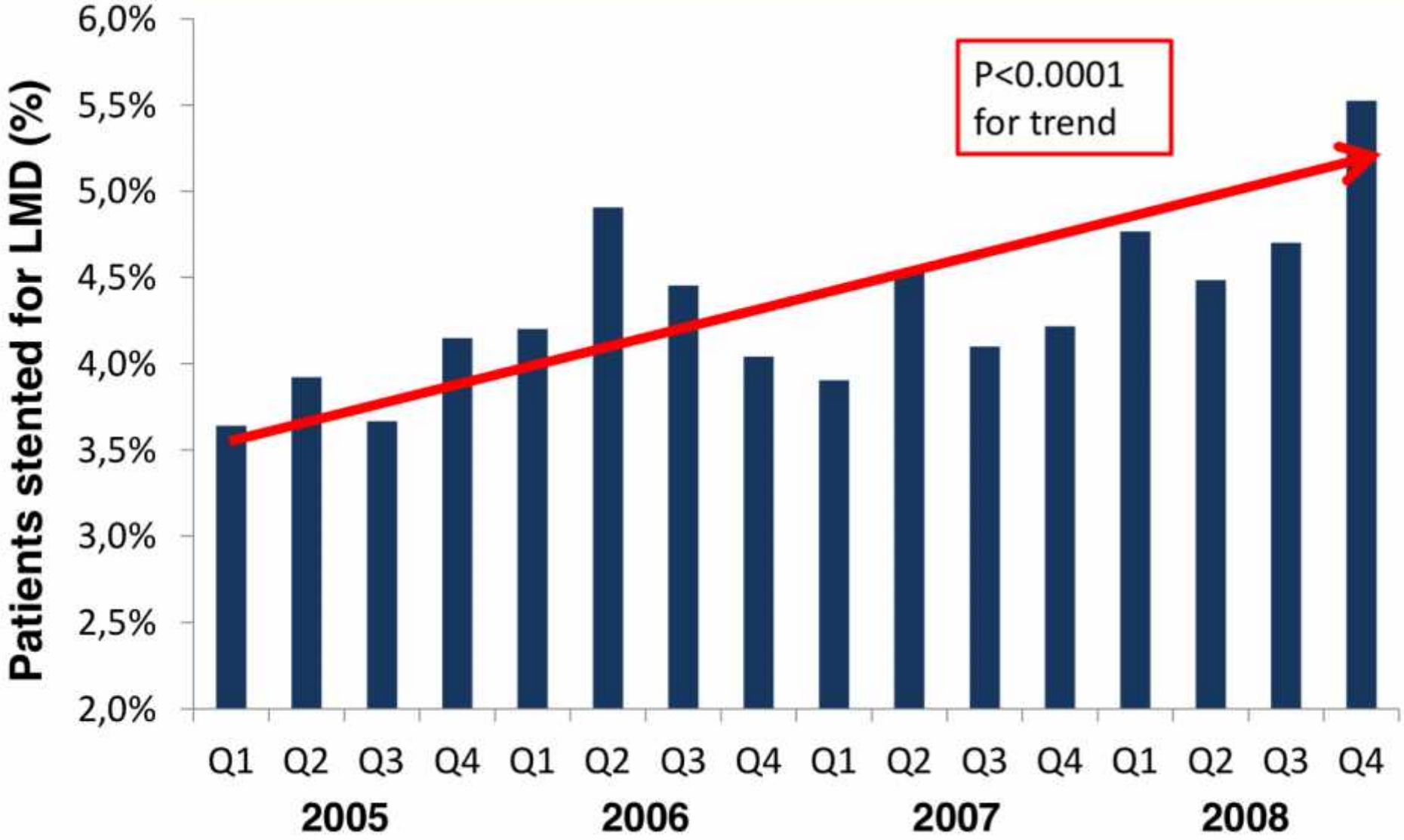
$I^2 = 0\%$



Characteristics and Long-Term Outcomes of Percutaneous Revascularization of Unprotected Left Main Coronary Artery Stenosis in the United States

A Report From the National Cardiovascular Data Registry, 2004 to 2008

J. Matthew Brennan, MD, MPH,* David Dai, PHD,* Manesh R. Patel, MD,* Sunil V. Rao, MD,*



Brennan JM et al. *JACC* 2012;59:648-54

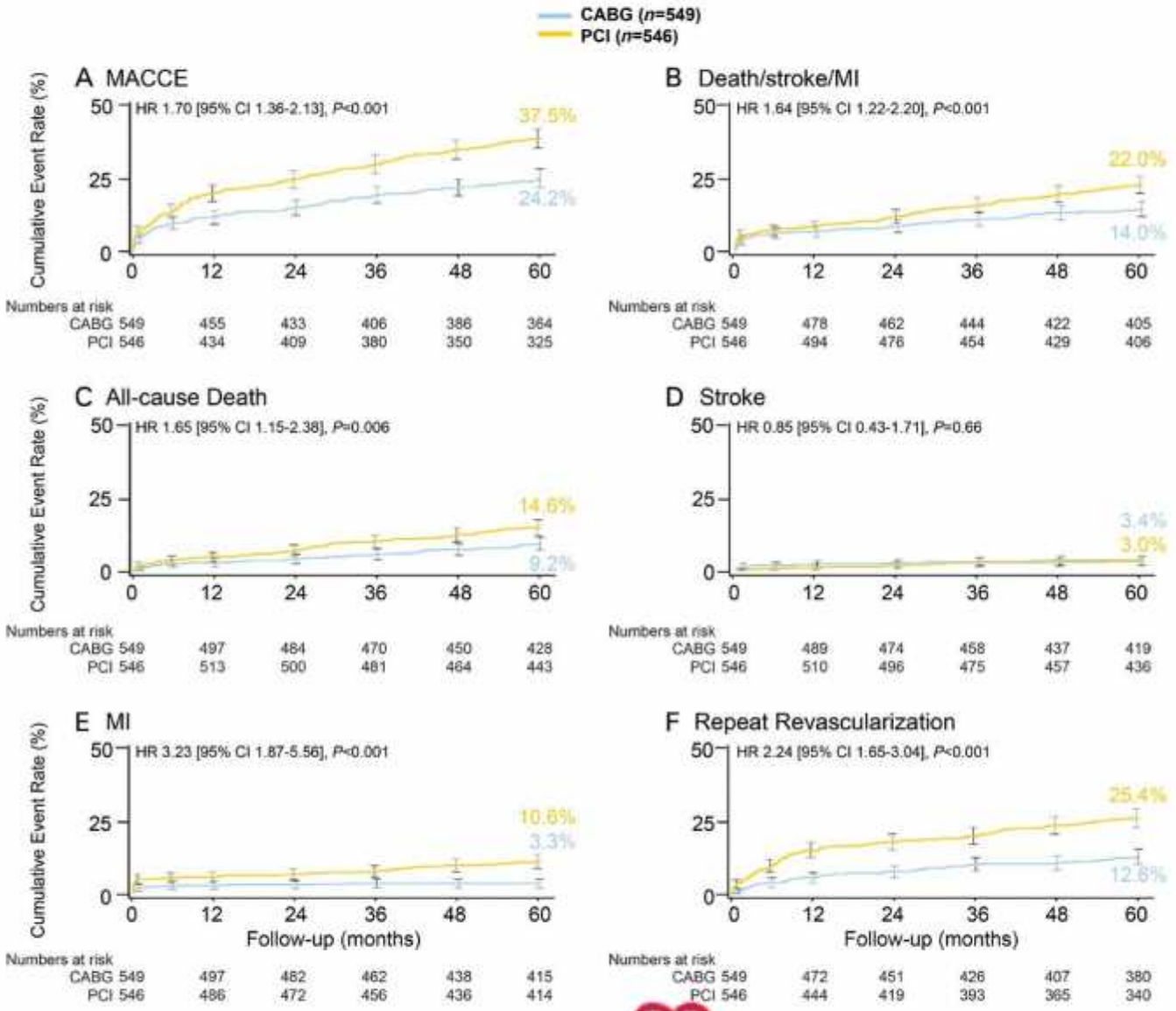
#2

“Nunca nos ‘quitaran’ la enfermedad de 3 vasos”

Coronary artery bypass grafting vs. percutaneous coronary intervention for patients with three-vessel disease: final five-year follow-up of the SYNTAX trial

Five-year estimates of adverse events

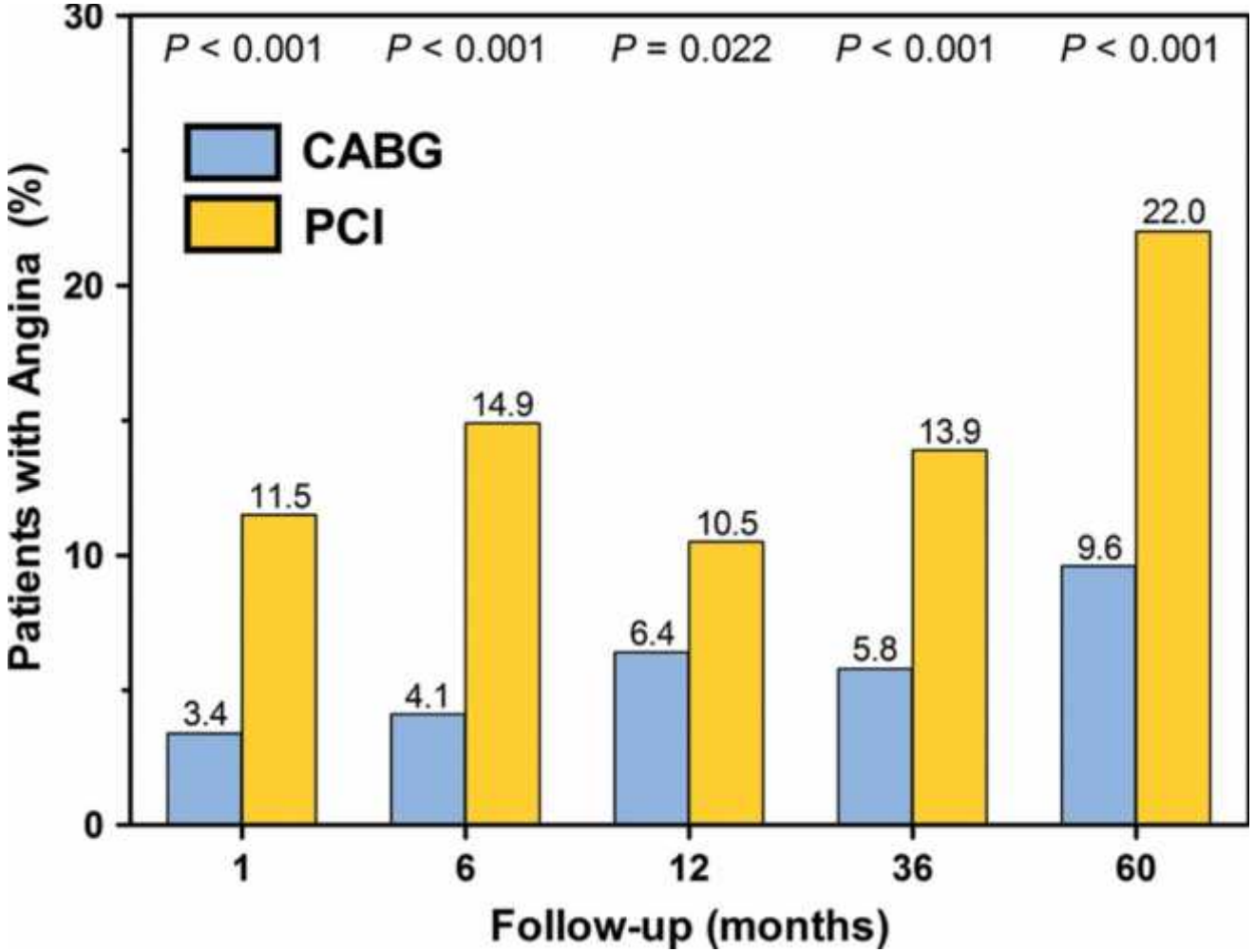
3 vessel disease



European Heart Journal (2014) 35, 2821–2830
doi:10.1093/eurheartj/ehu213

Coronary artery bypass grafting vs. percutaneous coronary intervention for patients with three-vessel disease: final five-year follow-up of the SYNTAX trial

Presence of angina during follow-up.

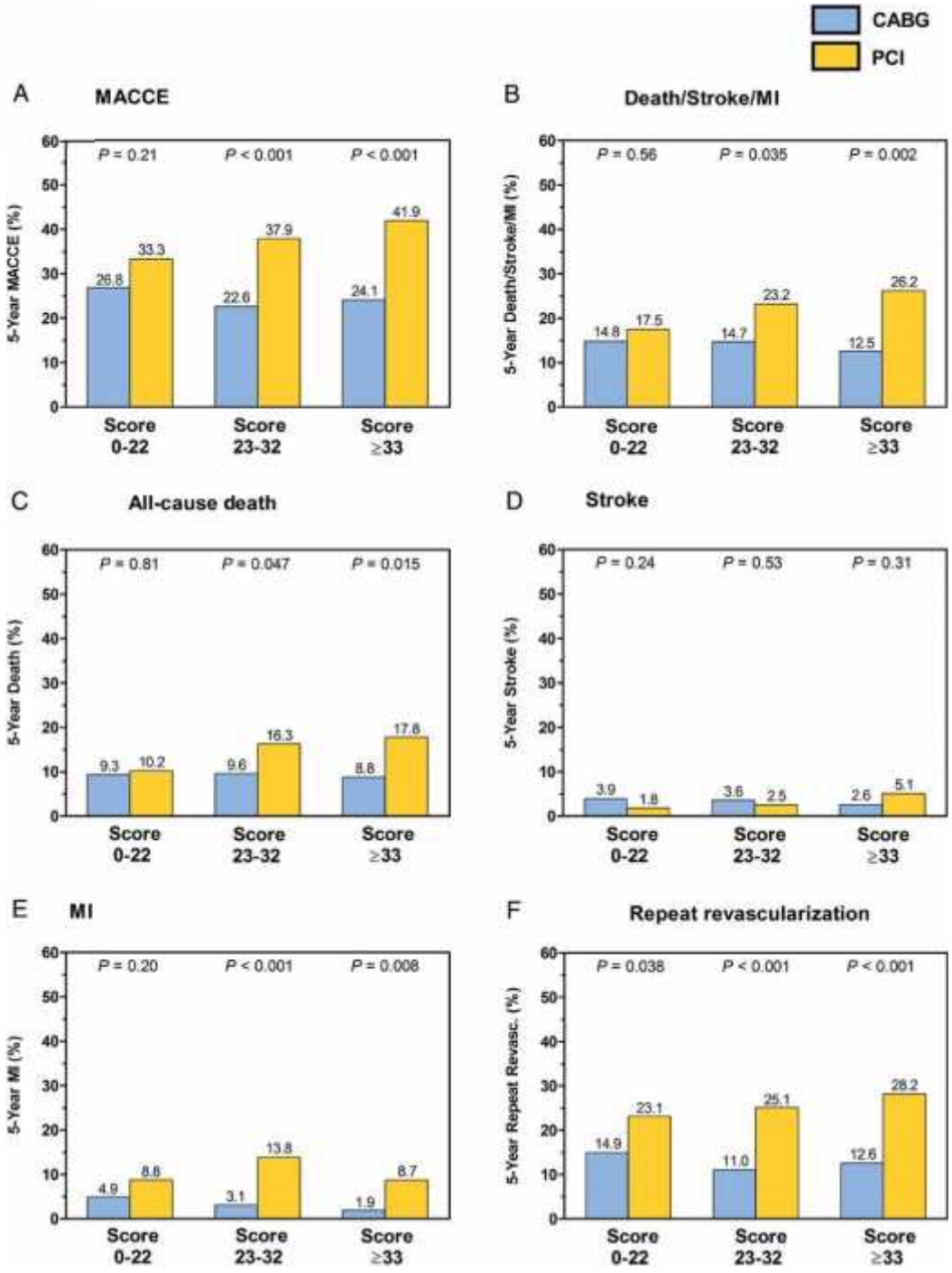


Stuart J. Head et al. Eur Heart J 2014;35:2821-2830

European Heart Journal

Coronary artery bypass grafting vs. percutaneous coronary intervention for patients with three-vessel disease: final five-year follow-up of the SYNTAX trial

Five-year estimates of adverse events according to the SYNTAX score.



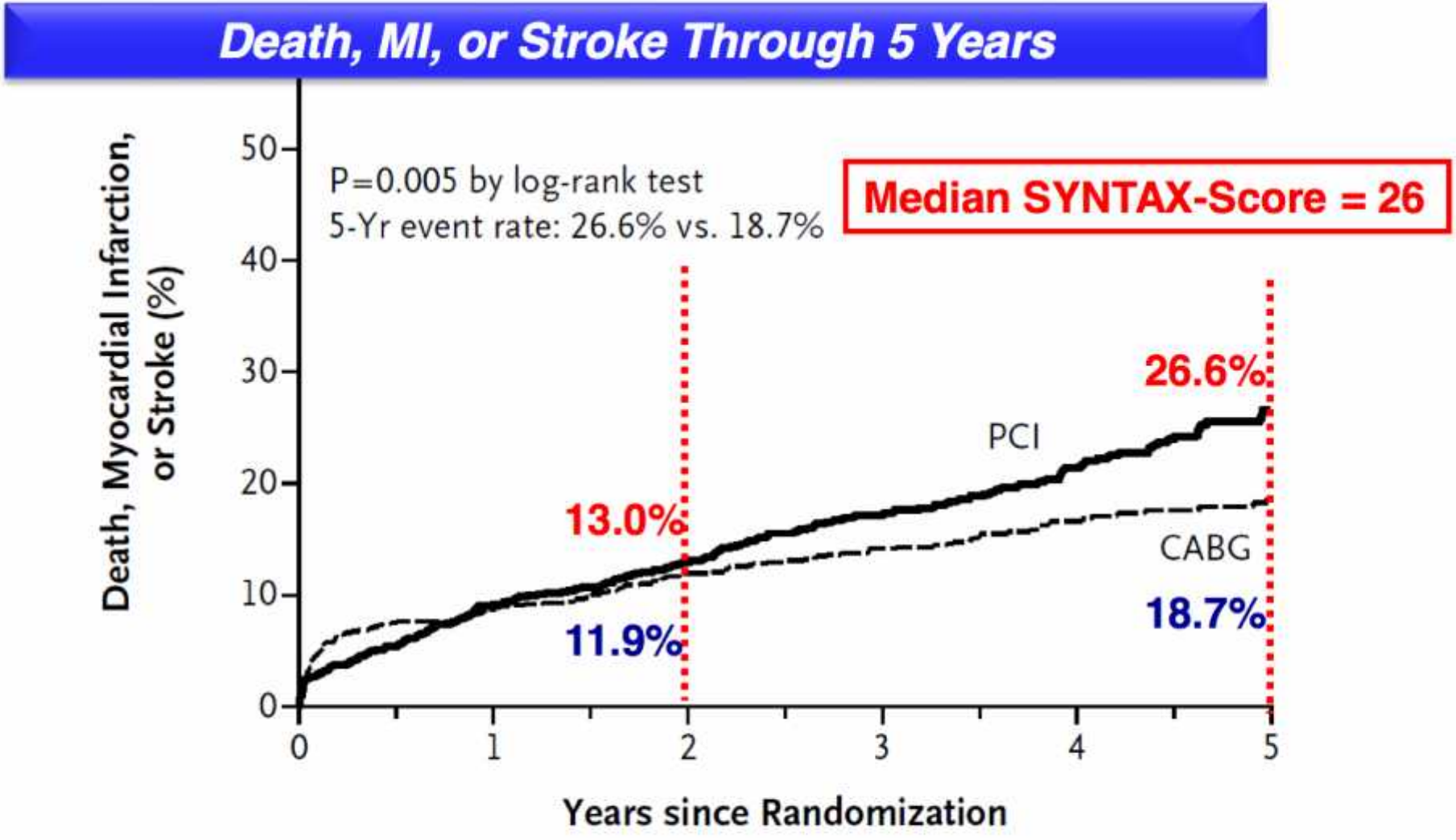
Stuart J. Head et al. Eur Heart J 2014;35:2821-2830

#3

“¡Los diabéticos sí que son nuestros!”

Strategies for Multivessel Revascularization in Patients with Diabetes – the FREEDOM Trial

Farkouh ME et al. *N Engl J Med* 2012; 367:2375-84



No. at Risk						
PCI	953	848	788	625	416	219
CABG	947	814	758	613	422	221

META-ANALYSIS: DES VS CABG IN DIABETIC PATIENTS

Hakeem A et al. *J Am Heart Assoc* 2013

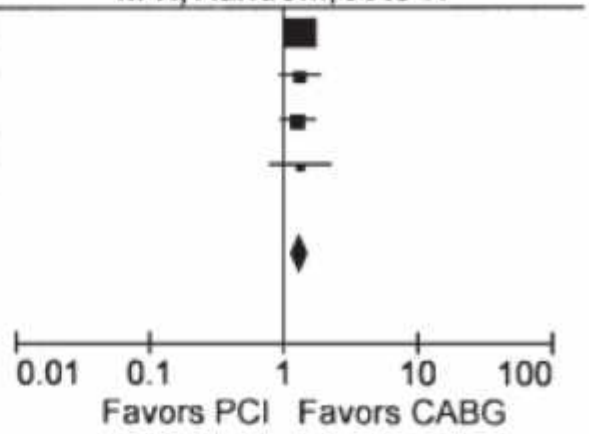
1° EP MACE: Death, MI, or Stroke @ 4 Years

(A)

Study or Subgroup	PCI Events	PCI Total	CABG Events	CABG Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
FREEDOM trial	200	953	146	947	56.2%	1.36 [1.12, 1.65]	2012
SYNTAX TRIAL	54	231	39	221	15.5%	1.32 [0.92, 1.91]	2012
CARDIA Study	68	254	52	248	21.1%	1.28 [0.93, 1.75]	2013
VA CARDS	25	101	18	97	7.3%	1.33 [0.78, 2.28]	2013
Total (95% CI)		**1539**		**1513**	**100.0%**	**1.34 [1.16, 1.54]**	
Total events	**347**		**255**				

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 0.12$, df = 3 (P = 0.99); $I^2 = 0\%$

Test for overall effect: Z = 3.91 (P < 0.0001)

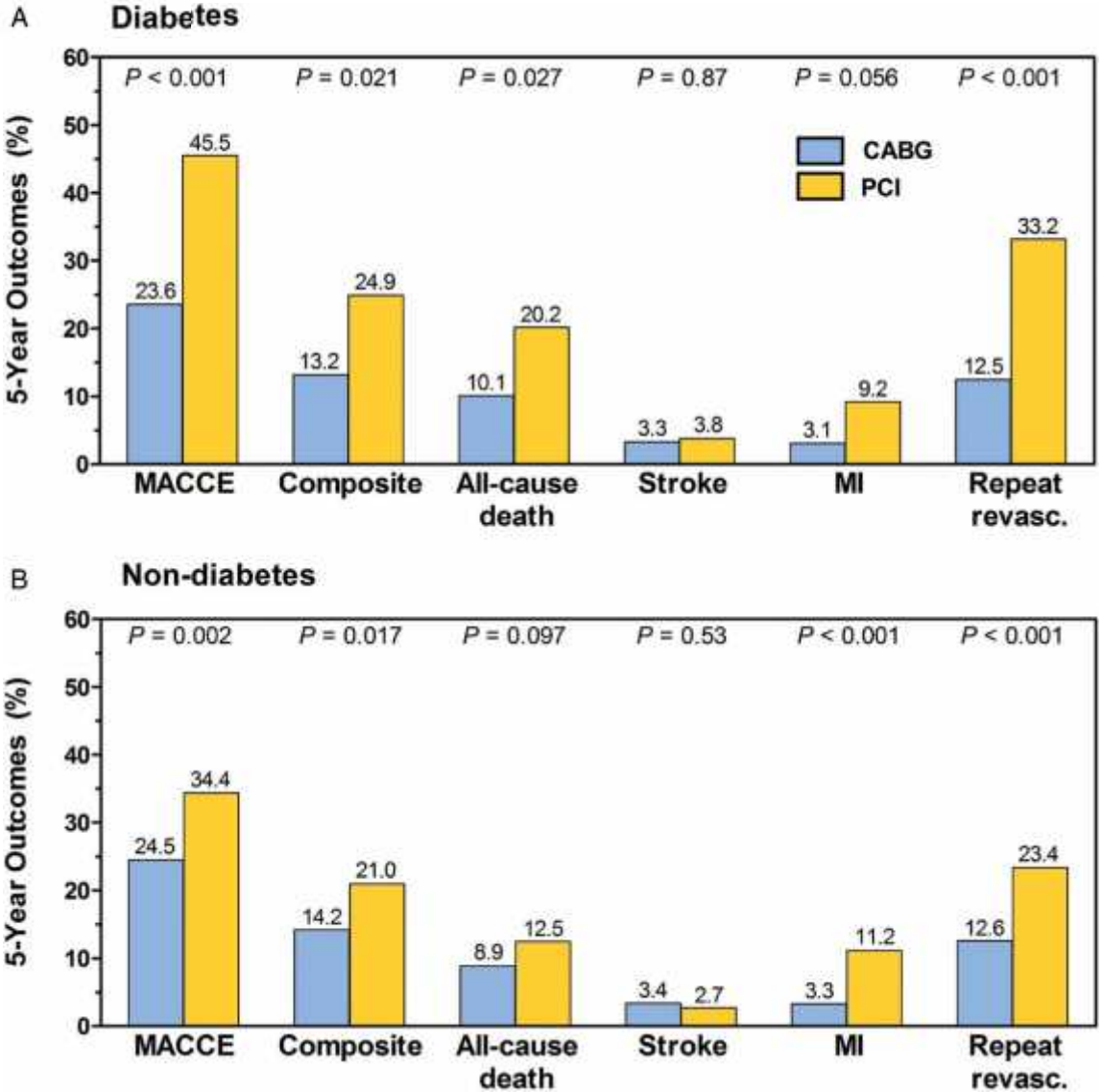


Sensitivity Analysis According to SYNTAX score

Variable		PCI	CABG	RR	*P* Value	Heterogeneity
MACE based on SYNTAX Score*	<22 (n=805)	22.2%	17.5%	1.27 (0.96 to 1.68)	0.09	0%; *P*=0.32
	23 to 32 (n=992)	26.1%	18.3%	1.32 (0.86 to 2.02)	0.21	48%; *P*=0.16
	>33 (n=541)	24.7%	14.4%	1.73 (1.21 to 2.46)	0.003	0%; *P*=0.81

Coronary artery bypass grafting vs. percutaneous coronary intervention for patients with three-vessel disease: final five-year follow-up of the SYNTAX trial

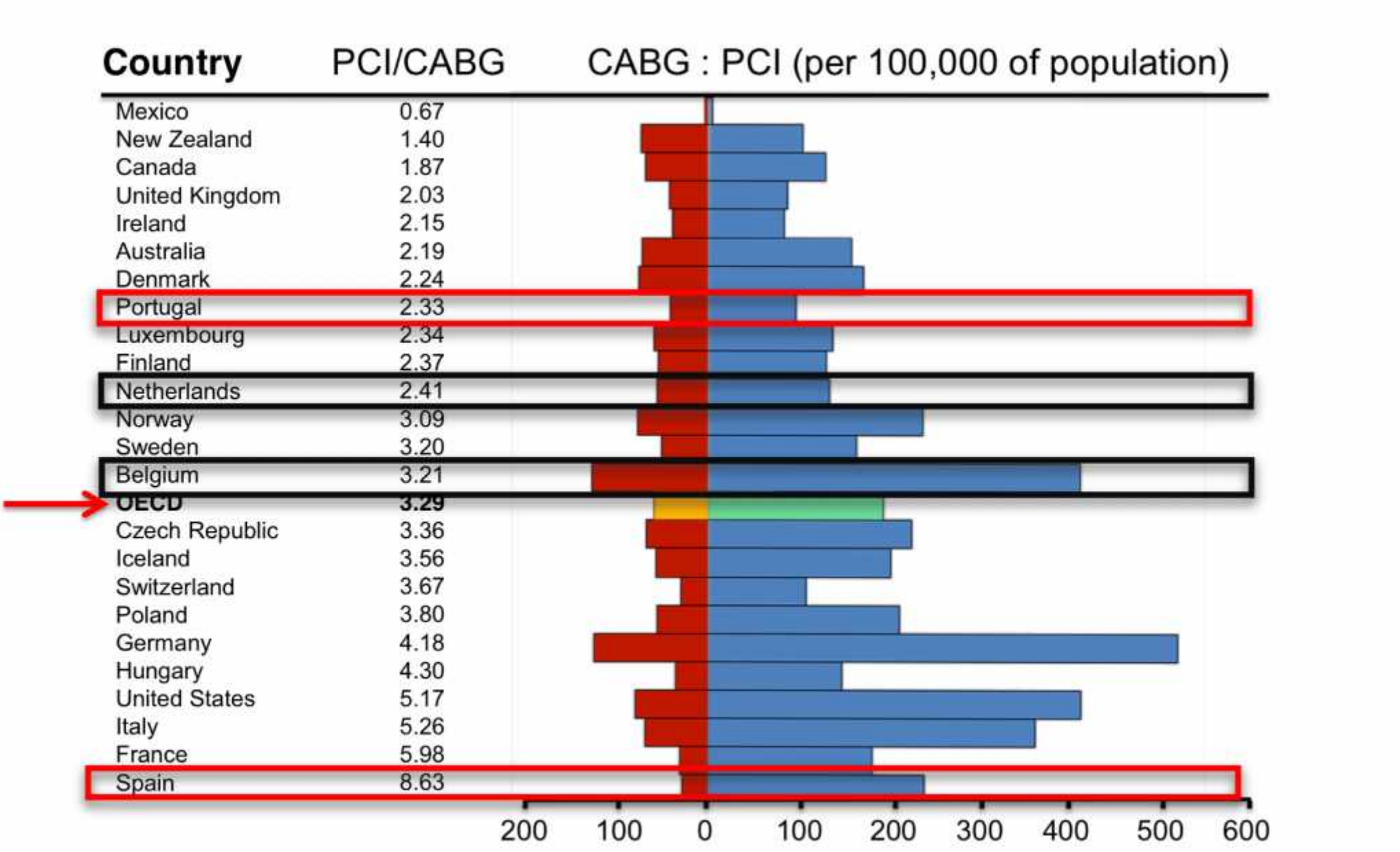
Five-year estimates of adverse events in patients with diabetes (A) and without diabetes (B).



Stuart J. Head et al. Eur Heart J 2014;35:2821-2830

European Heart Journal

Variabilidad en tasas angioplastia / cirugía



Head SJ et al. *Eur Heart J* 2013;94:1954-60

EUROPEAN SOCIETY OF CARDIOLOGY®

2014 ESC/EACTS Guidelines

Recommendations for the type of revascularization (CABG or PCI) in patients with SCAD with suitable coronary anatomy for both procedures and low predicted surgical mortality

Recommendations according to extent of CAD	CABG		PCI	
	Class[a]	Level[b]	Class[a]	Level[b]
One- or two-vessel disease without proximal LAD stenosis.	IIb	C	I	C
One-vessel disease with proximal LAD stenosis.	I	A	I	A
Two-vessel disease with proximal LAD stenosis.	I	B	I	C
Left main disease with SYNTAX score ≤22.	I	B	I	B
Left main disease with SYNTAX score 23–32.	I	B	IIa	B
Left main disease with SYNTAX score >32.	I	B	III	B
Three-vessel disease with SYNTAX score ≤22.	I	A	I	B
Three-vessel disease with SYNTAX score 23–32.	I	A	III	B
Three-vessel disease with SYNTAX score >32.	I	A	III	B

#4

“Los cirujanos solo sirven
para coser venas”

Evolución de la cirugía coronaria

Three Phases in the evolution of contemporary coronary artery bypass surgery

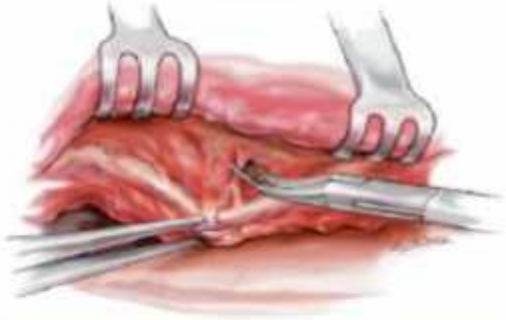
1. Venous Grafting

Saphenous Vein

2. Mixed Arterial and venous grafting

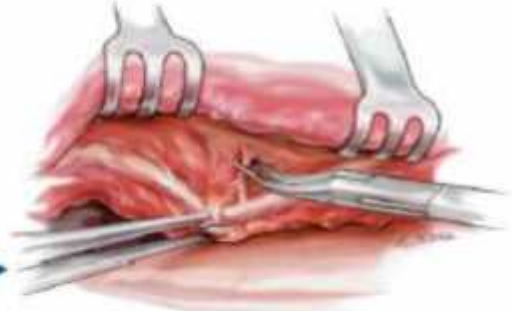
Saphenous Vein

ITA

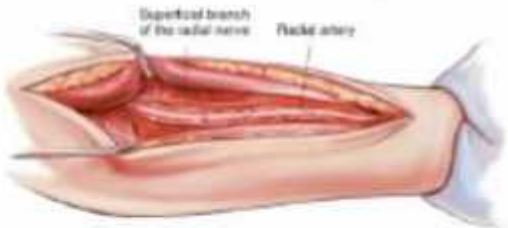


3. Total Arterial Grafting

One or both ITA

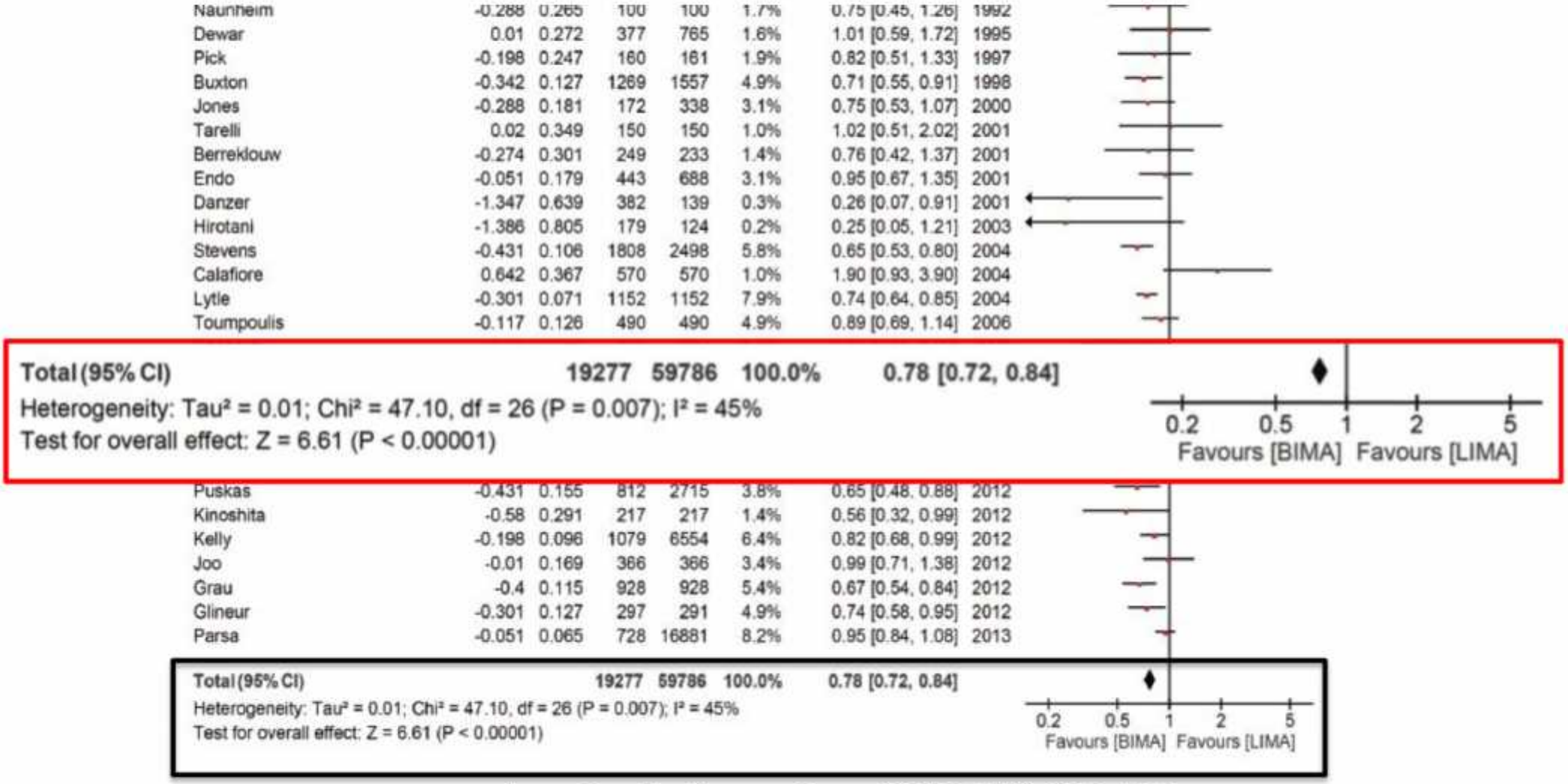


Radial Artery



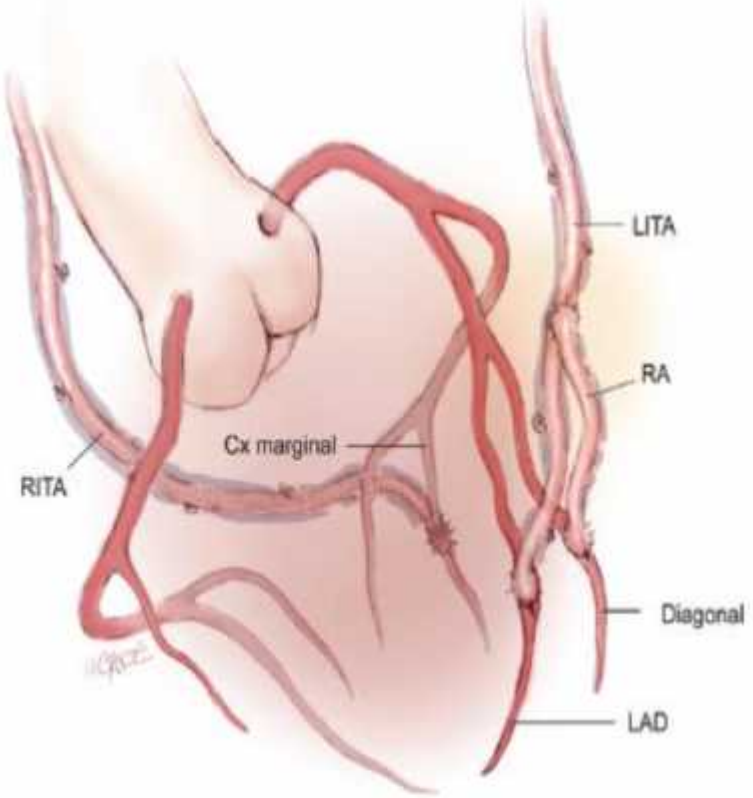
A meta-analysis comparing bilateral internal mammary artery with left internal mammary artery for coronary artery bypass grafting

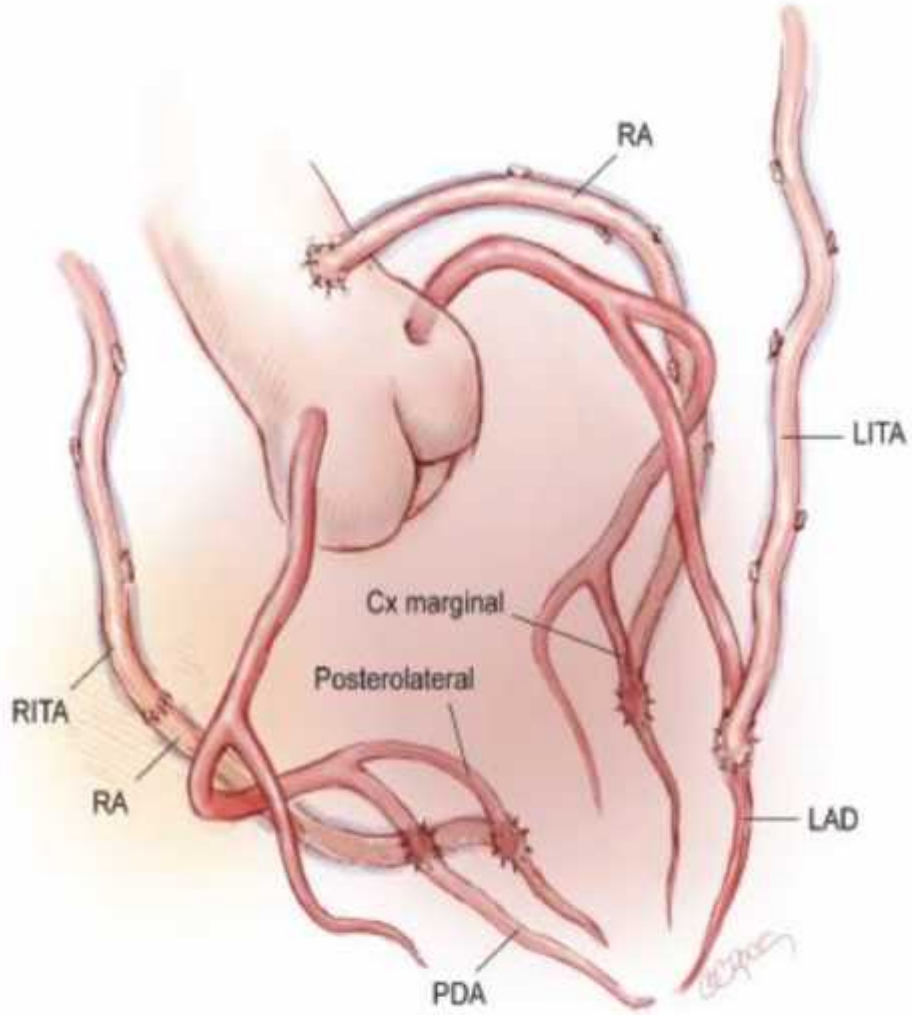
Aaron J. Weiss[1,2], Shan Zhao[3], David H. Tian[2], David P. Taggart[4], Tristan D. Yan[2,5]



Ann Cardiothorac Surg 2013;2(4):390-400

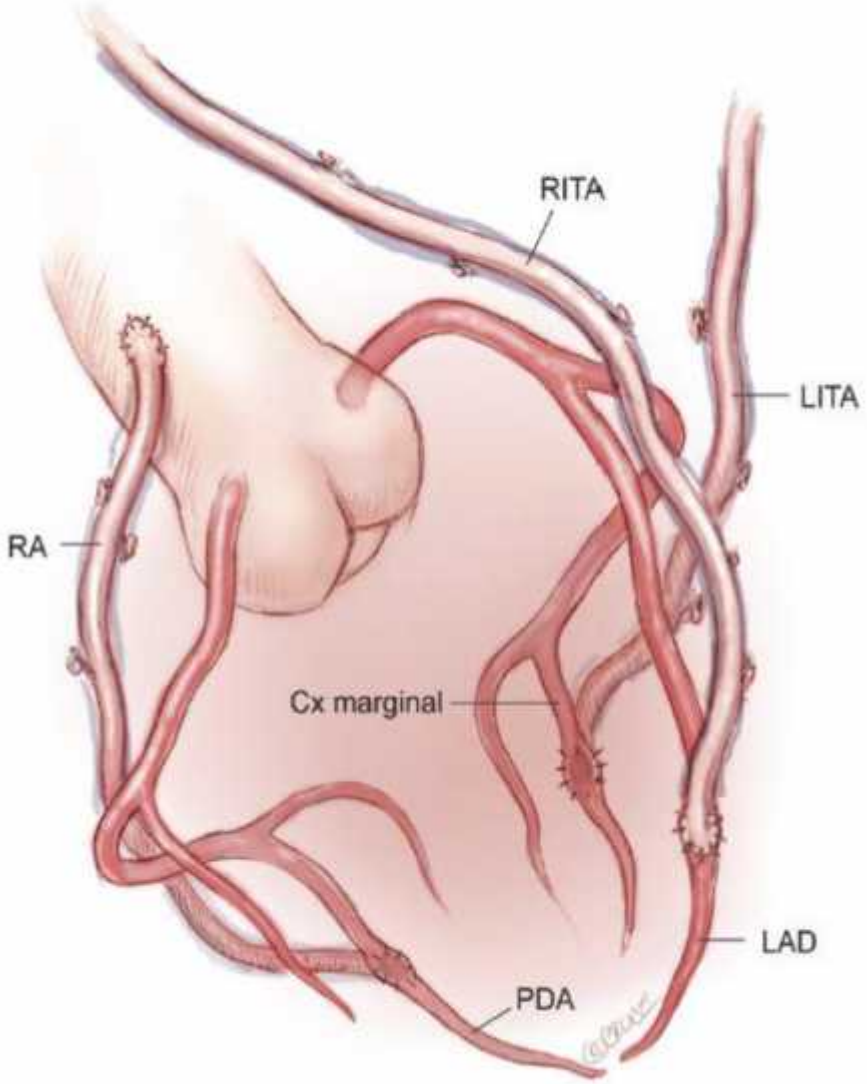
Revascularización con injertos arteriales múltiples

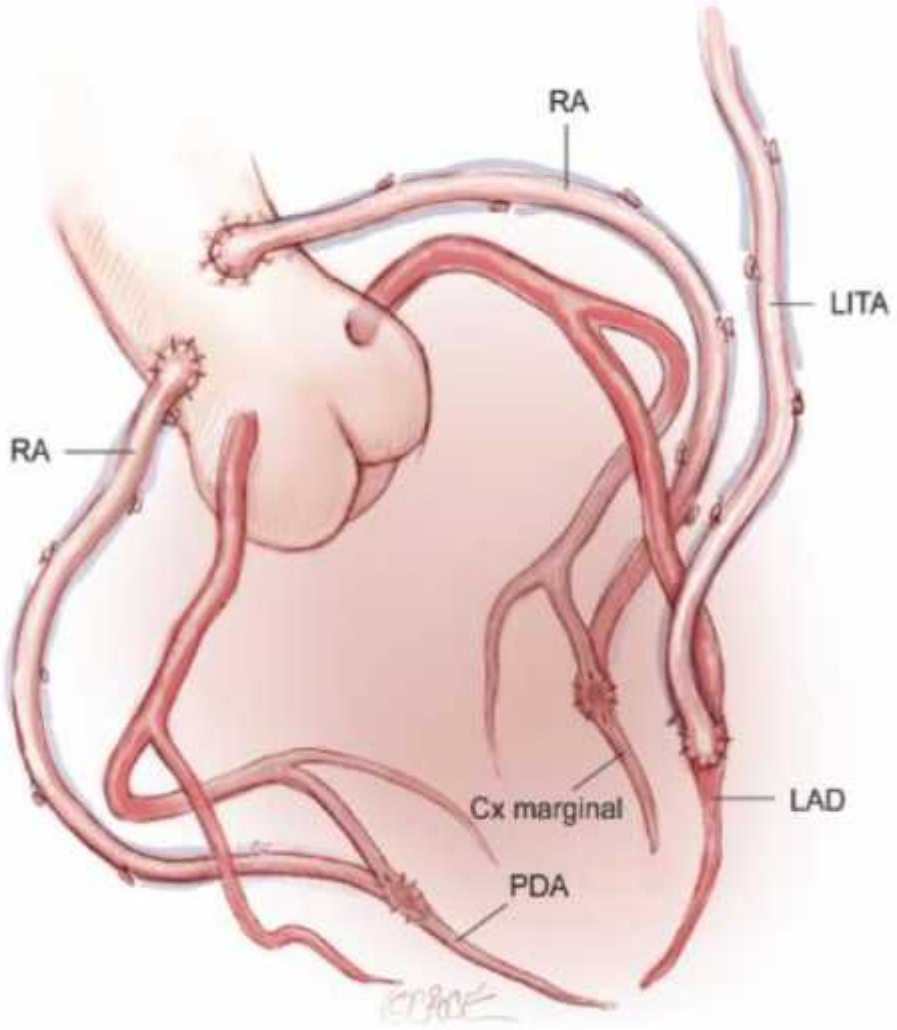




Radial arteries used as a composite grafts with the left or right ITAs

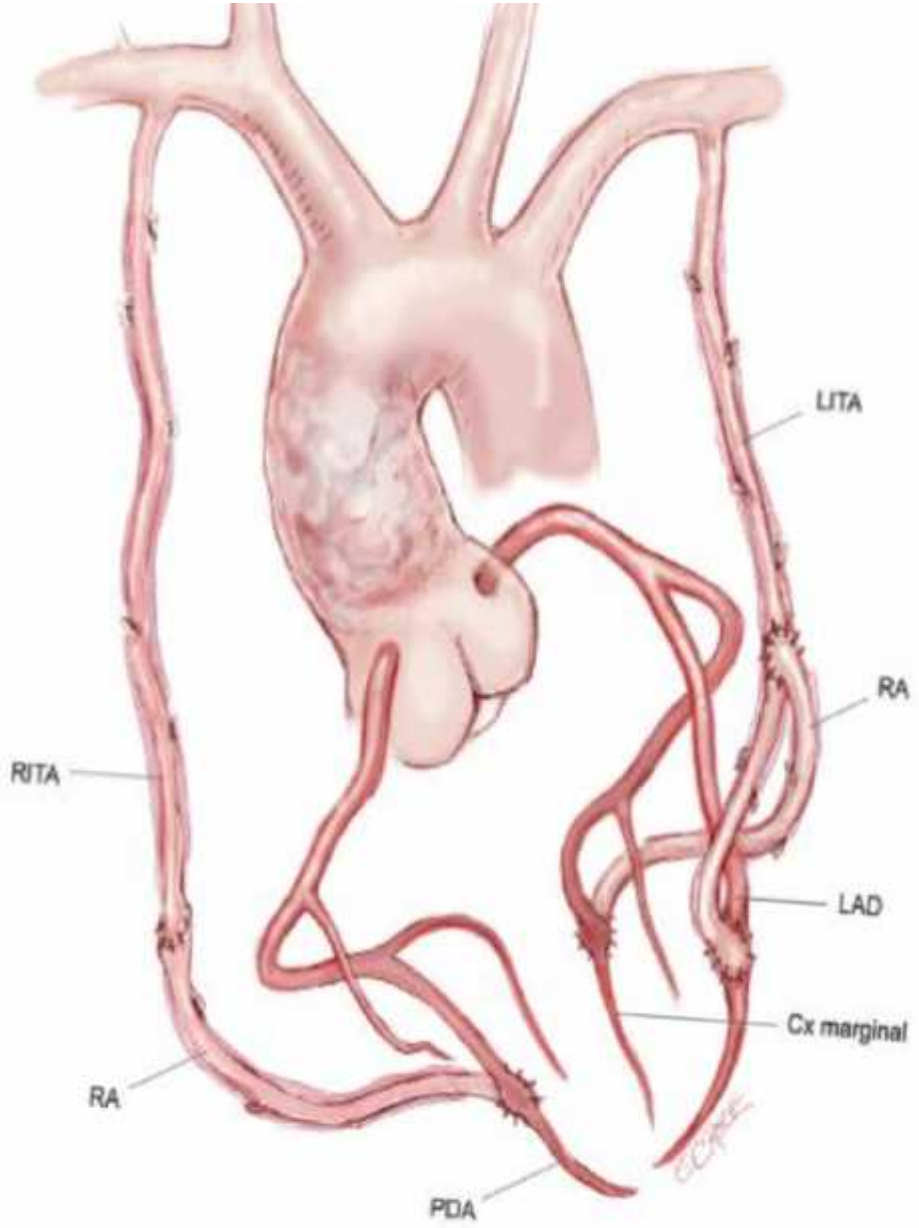
Revascularización con injertos arteriales múltiples





Aorta “de porcelana”

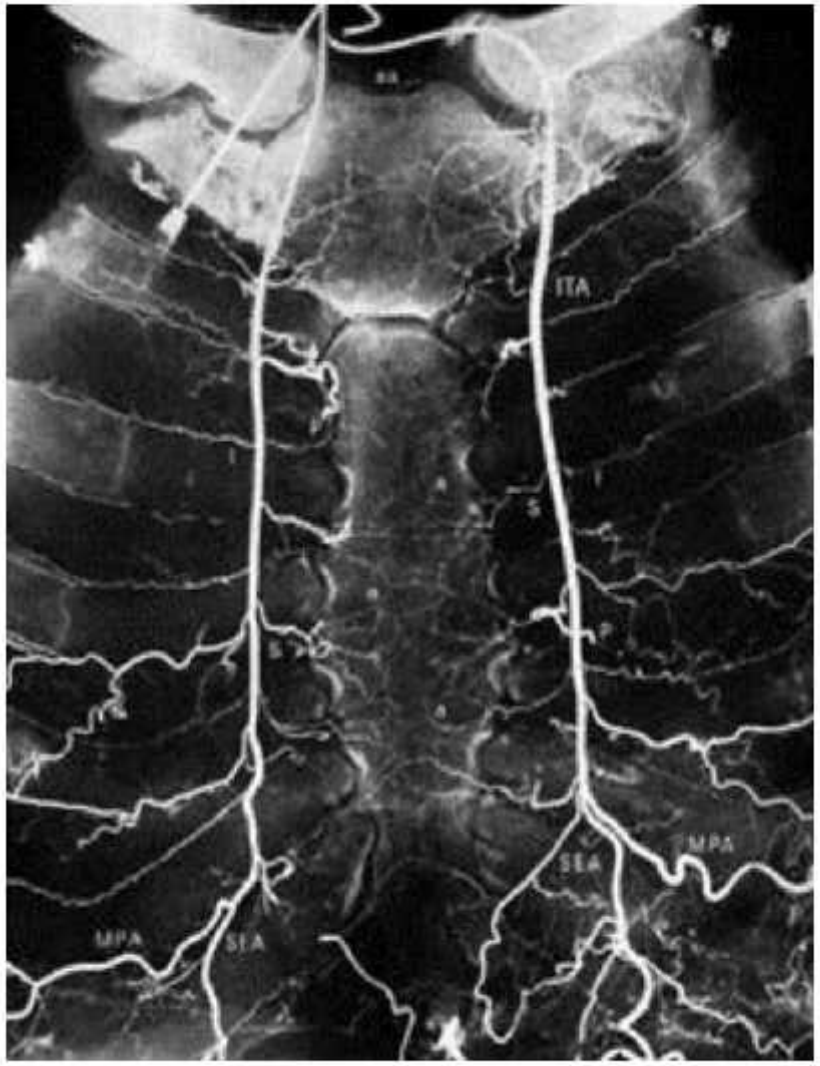
Complete revascularisation based on composite internal thoracic and radial artery conduits in a patient with extensive aortic calcification



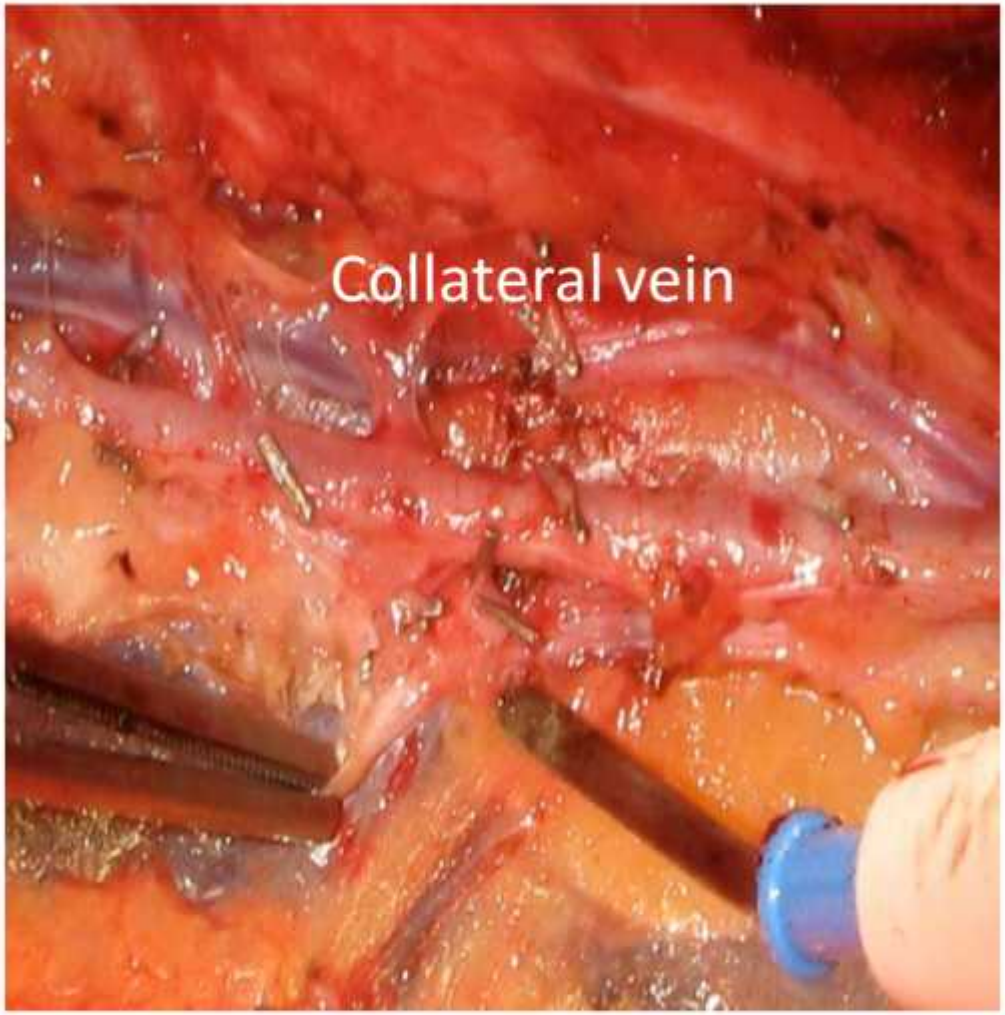
Vallely MP, Edelman JJ, Wilson MK. Bilateral internal mammary arteries: evidence and technical considerations. Ann Cardiothorac Surg 2013;2(4):570-577

Infección esternal profunda (“talón de Aquiles”)

- “Esqueletización” de art mamaria
- Minimizar manipulación fascia endotorácica
- Preservación circulación venosa
- Preferencia por bisturí harmónico
- Mejorar control glucémico
- Evitar obesidades mórbidas,
- vasculopatías severas, etc



Esqueletización art. mamarias



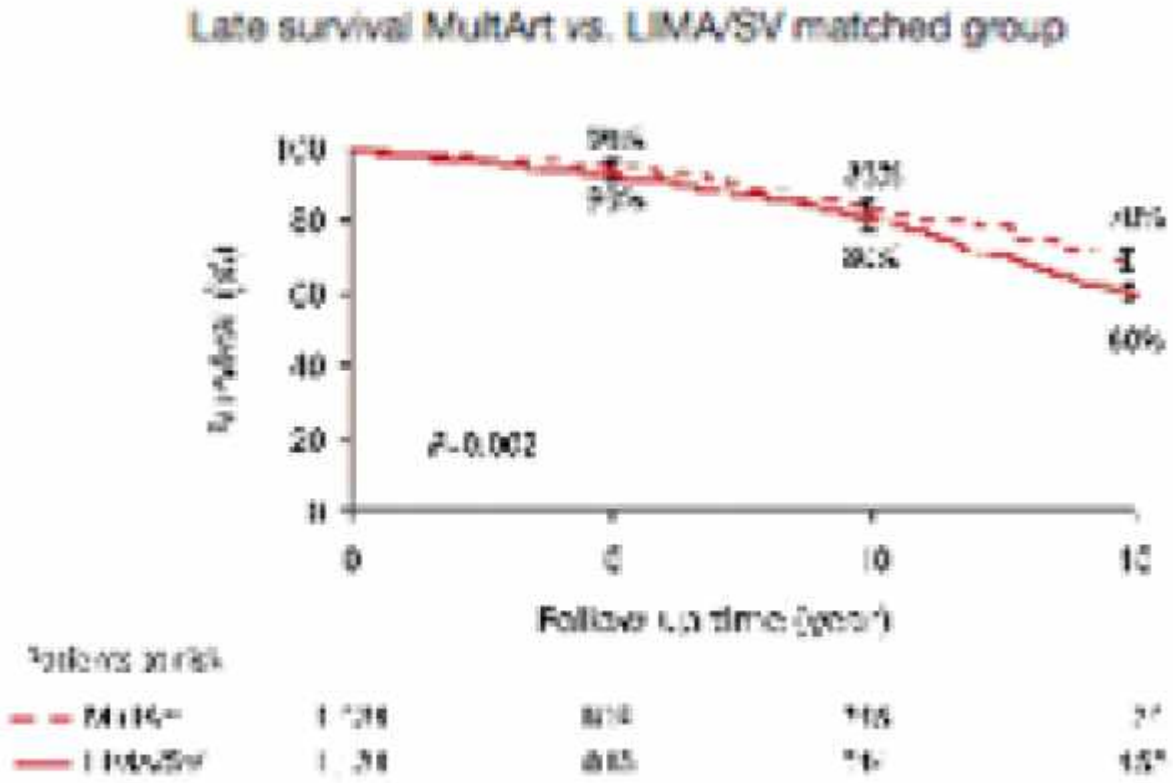
#5

“Hay que poner
dos mamarias a todo el mundo”

Improved late survival with arterial revascularization

Chaim Locker, Hartzell V. Schaff, Joseph A. Dearani, Richard C. Daly

Division of Cardiovascular Surgery, Mayo Clinic, Rochester, Minnesota, USA



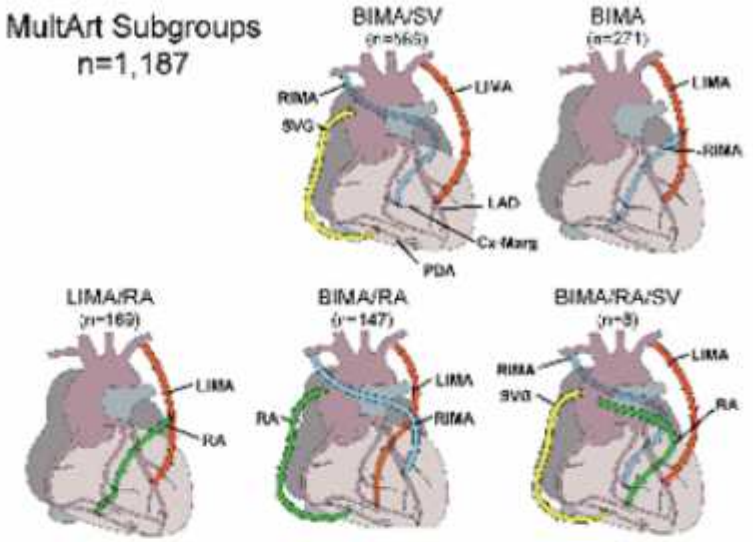


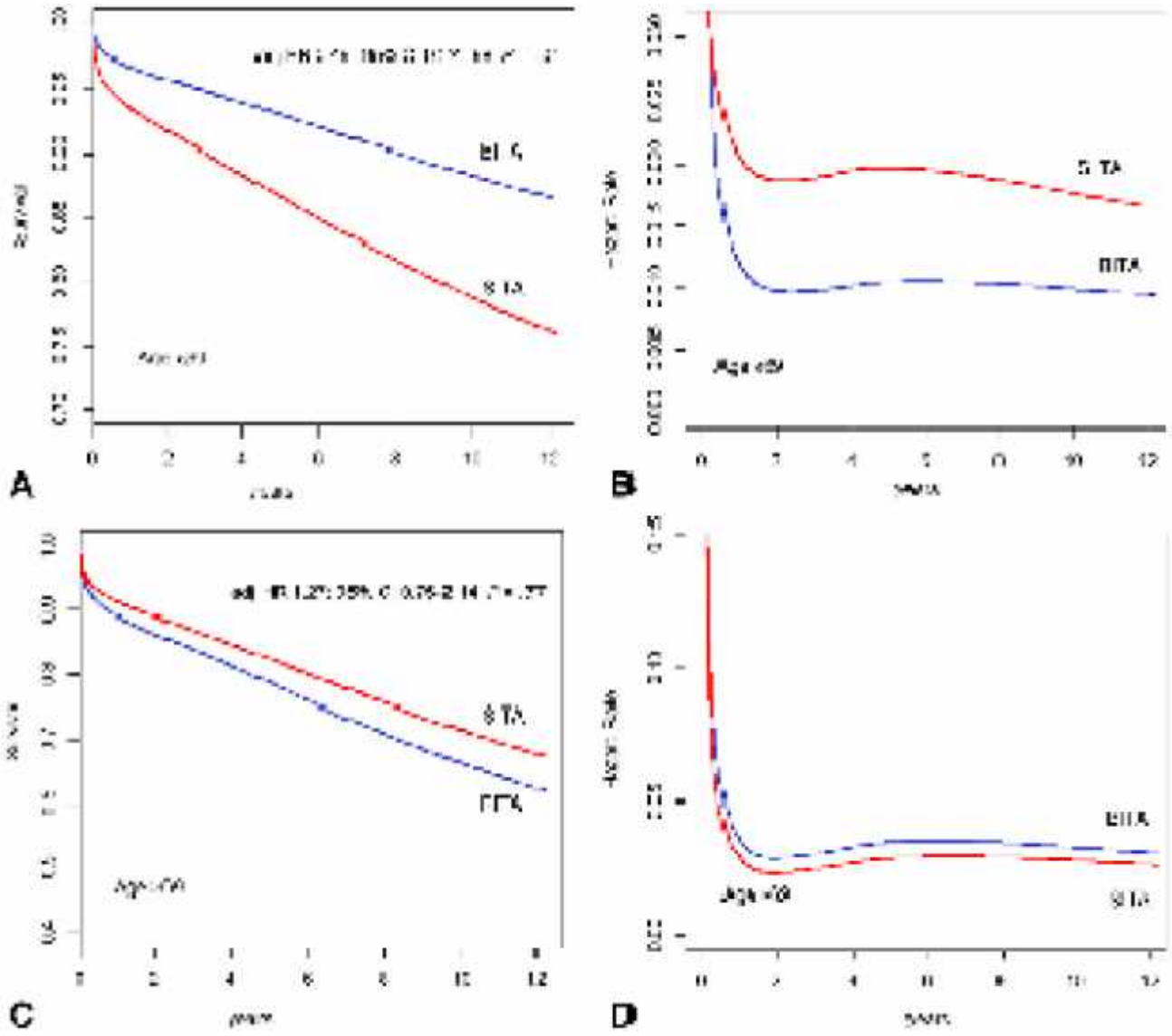
Table 4 Late death in MultArt vs. LIMA/SV: multivariate regression model

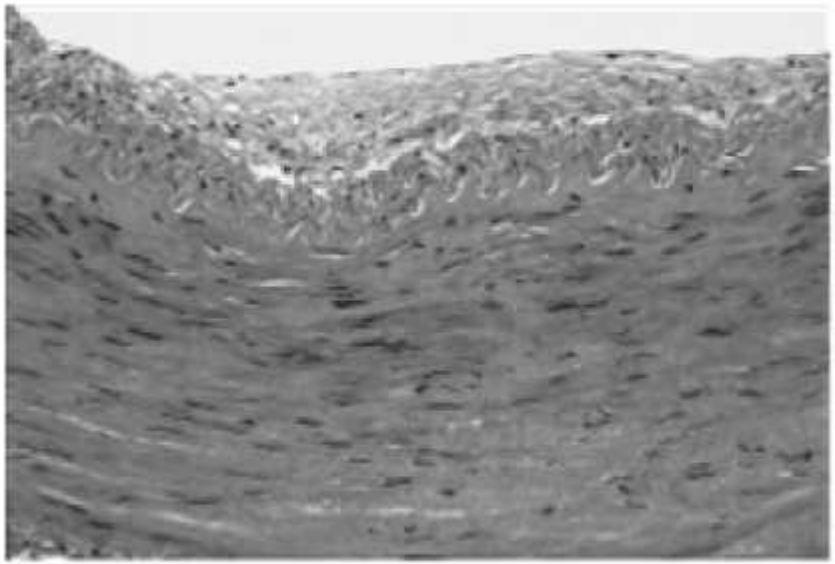
Variable	HR (95% CI)	P value
MultArt vs. LIMA/SV	0.79 (0.66-0.94)	0.007
Older age (per 1 y)	1.07 (1.06-1.07)	<0.001
Lower EF (per 1%)	1.02 (1.02-1.03)	<0.001
Hypertension	1.14 (1.04-1.24)	0.004
Diabetes mellitus	1.55 (1.43-1.67)	<0.001
Chronic lung disease	1.64 (1.49-1.82)	<0.001
Renal failure	2.26 (1.99-2.60)	<0.001
PVD	1.45 (1.34-1.57)	<0.001
S/P MI	1.10 (1.02-1.19)	0.013
S/P CVA	1.56 (1.38-1.77)	<0.001
LM disease >50%	1.17 (1.08-1.26)	<0.001
Urgent/Emergent	1.11 (1.01-1.22)	0.030
OPCAB	1.32 (1.12-1.54)	<0.001

Chaim Locker et al. Circulation. 2012;126:1023-1030

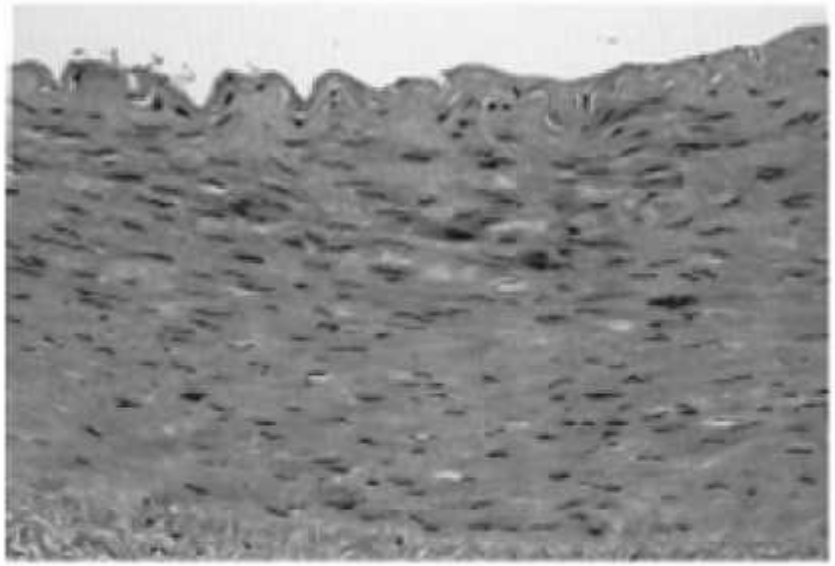
Guidance for the use of bilateral internal thoracic arteries according to survival benefit across age groups

Umberto Benedetto, MD, PhD, Mohamed Amrani, MD, PhD, FETCS, FRCS, and
Shahzad G. Raja, MRCS, FRCS(C-Th), on behalf of the Harefield Cardiac Outcomes Research Group





A



B

Fig 3. Photographic examples of cross-section of the radial artery (×100) from groups 1 (A) and 2 (B). Intimal hyperplasia was observed only in group 2.

Use of the Radial Artery Graft After Transradial Catheterization: Is It Suitable as a Bypass Conduit?

Hiroyuki Kamiya, MD, Teruaki Ushijima, MD, Taro Kanamori, MD, Chikako Ikeda, MD, Chiemi Nakagaki, Keishi Ueyama, MD, and Go Watanabe, MD

Department of Cardiovascular Surgery, Maizuru Mutual Hospital, Maizuru, and Department of General and Cardiothoracic Surgery, Kanazawa University Graduate School of Medical Sciences, Kanazawa, Japan

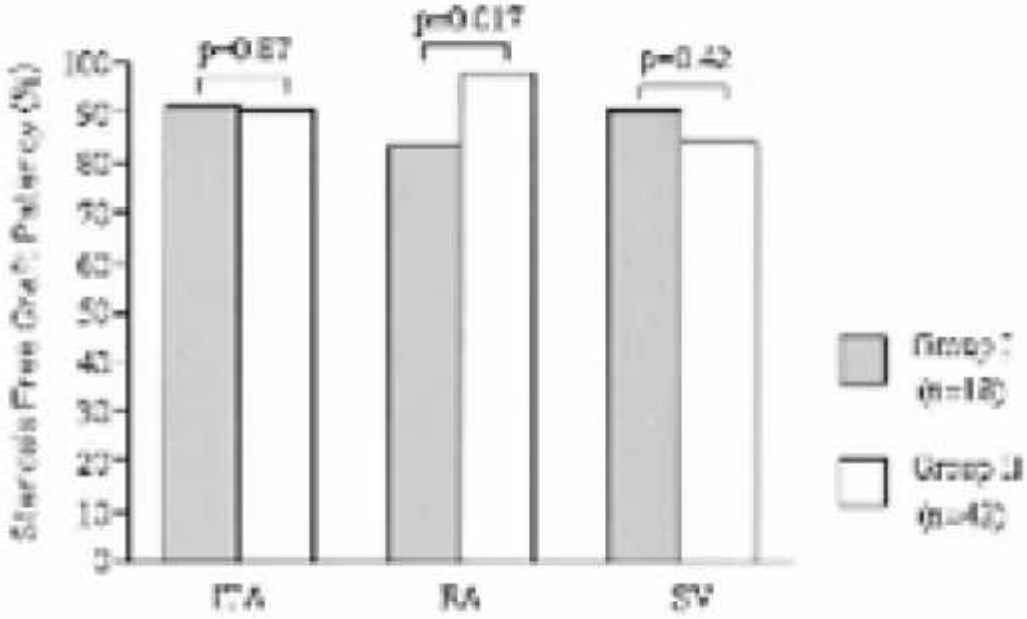
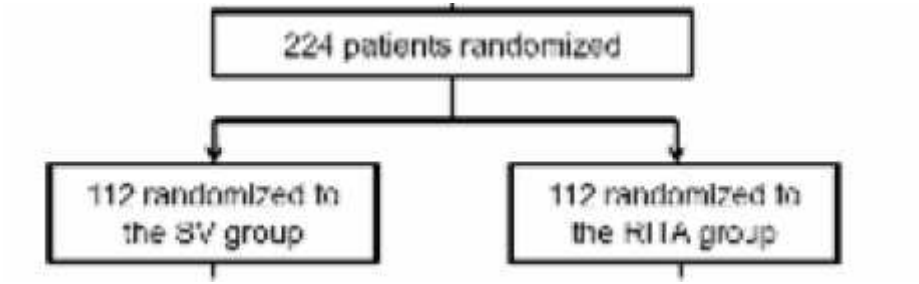
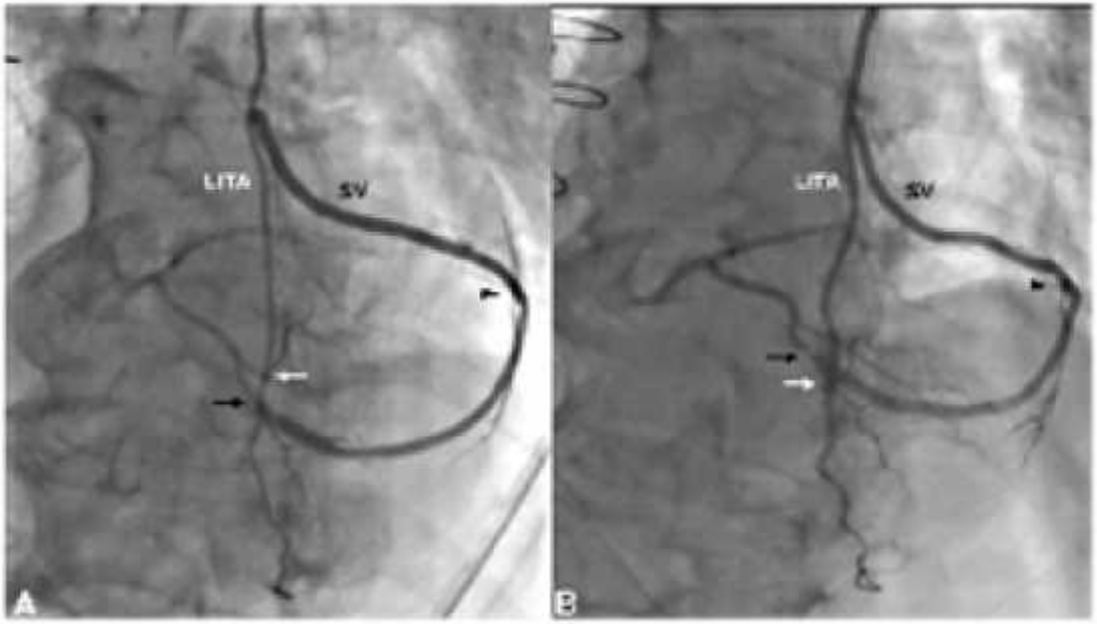


Fig 1. Early stenosis-free graft patency rates of the groups. (ITA = internal thoracic artery; RA = radial artery; SV = saphenous vein.)

(Ann Thorac Surg 2003;76:1505–9)

A randomized comparison of the Saphenous Vein Versus Right Internal Thoracic Artery as a Y-Composite Graft (SAVE RITA) trial: One-year angiographic results and mid-term clinical outcomes





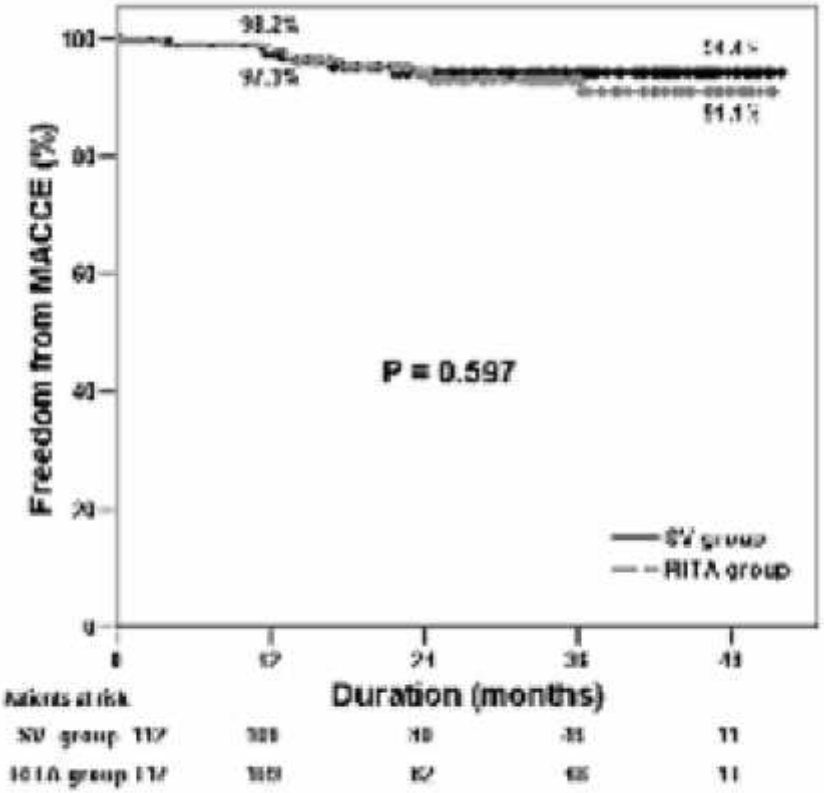


FIGURE 3. Comparison of freedom from major adverse cardiac and cerebrovascular events (*MACCE*) between the saphenous vein (*SV*) and right internal thoracic artery (*RITA*) groups.

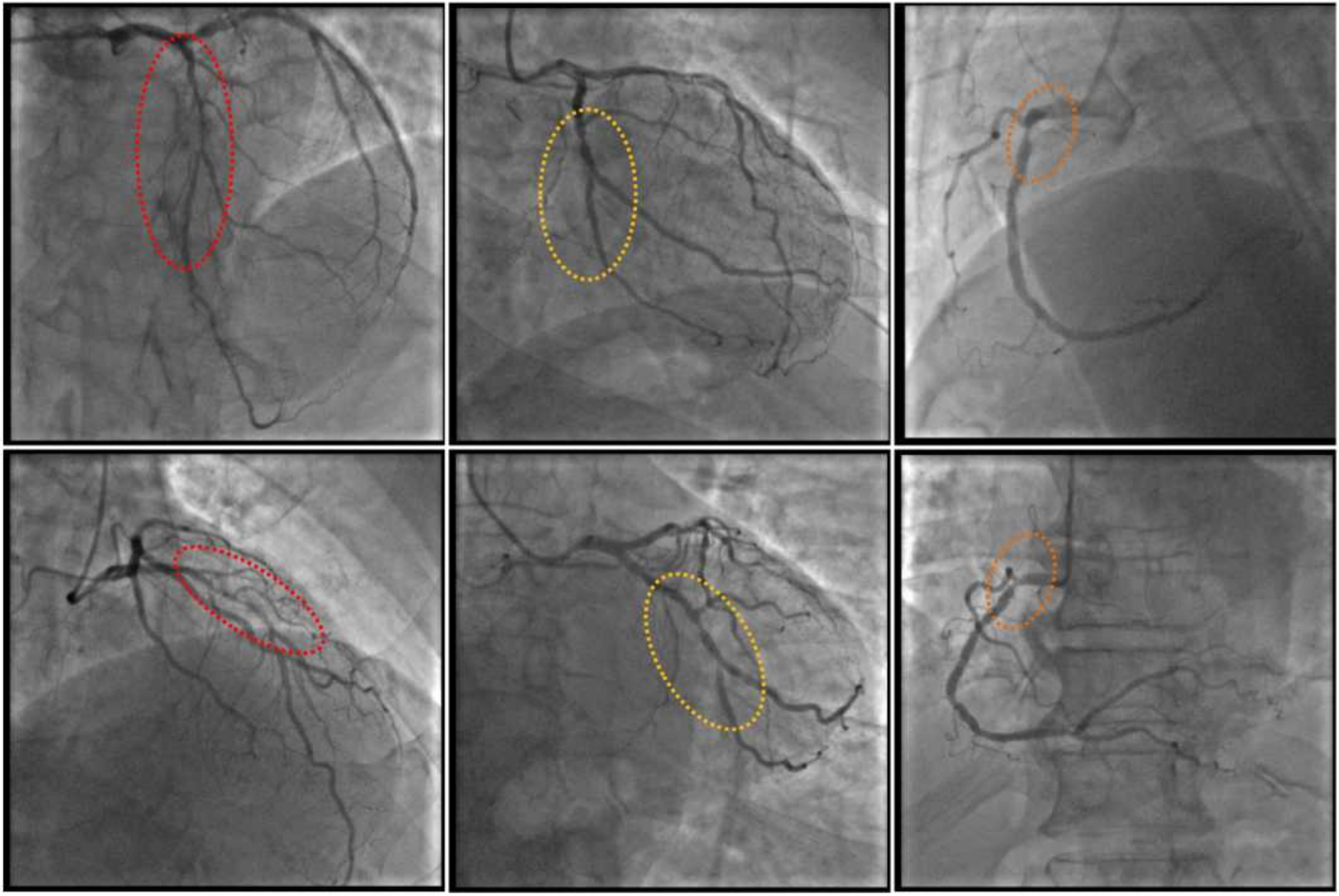
Estrategias de revascularización actuales

- Maximizar injertos arteriales
- Uso de doble arteria mamaria (stt. < 70-75a)
- AMI /AMD permeabilidad / fisiología similares
- Radial de manera suplementaria en estenosis severas
- Minimizar manipulación aorta
- Injertos venosos estenosis moderadas / mal calibre

#6

“Cuantos más injertos mejor”

Angiografías “clásicas”

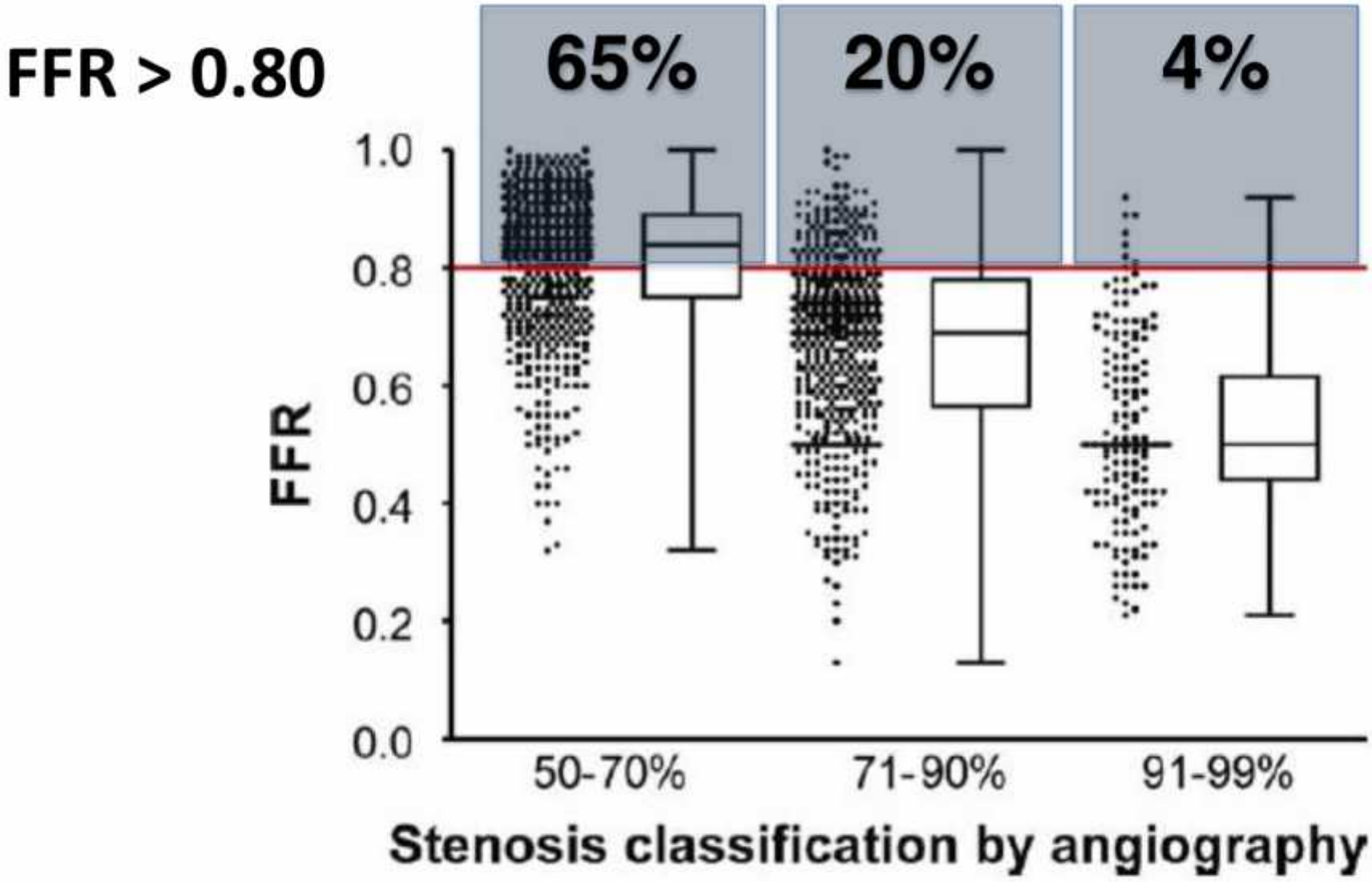


Valoración grado de estenosis coronaria

- VISUAL : “a ojo”
- PIXELIZACIÓN: diámetro luminal mínimo
- FUNCIONAL: Reserva fraccional de flujo (FFR)

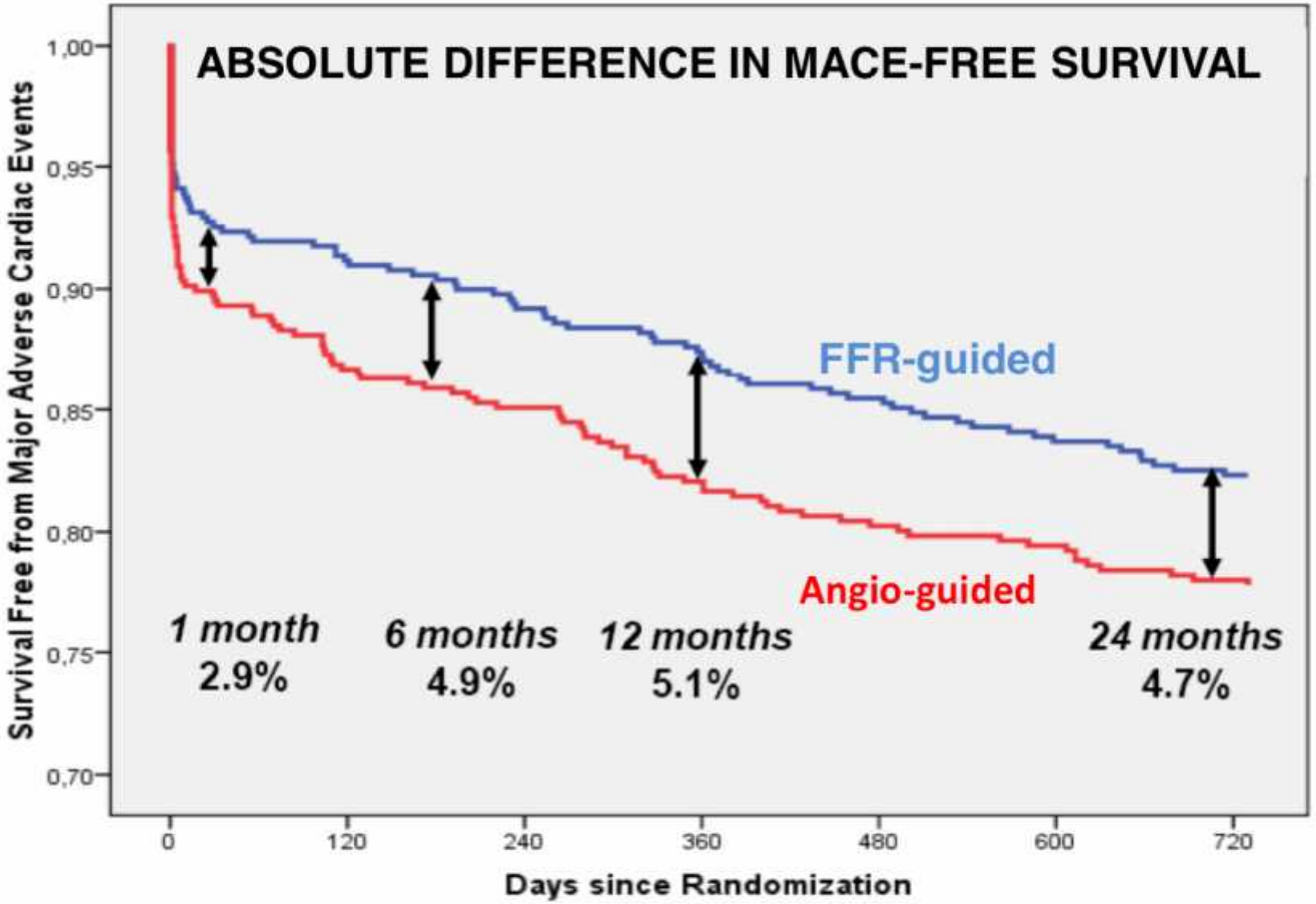
$$FFR = \frac{\text{Max flow in the stenosed vessel}}{\text{Max flow in the normal vessel}}$$

Pobre correlación entre estenosis angiográficas y “funcionales”



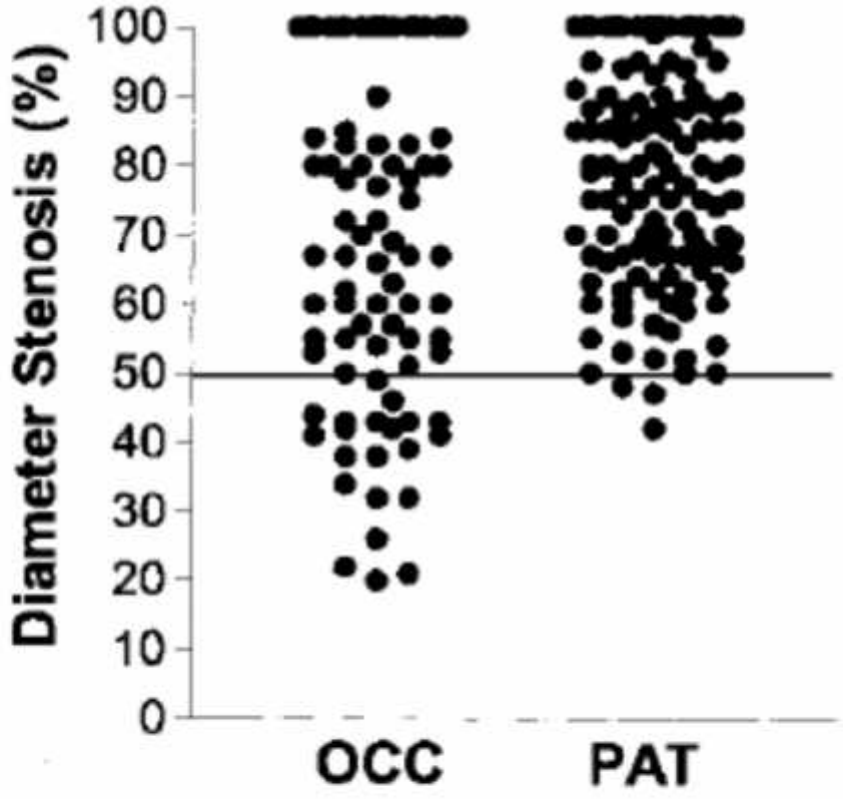
Tonino P et al. JACC 2010

FAME trial



P Tonino et al NEJM 2009

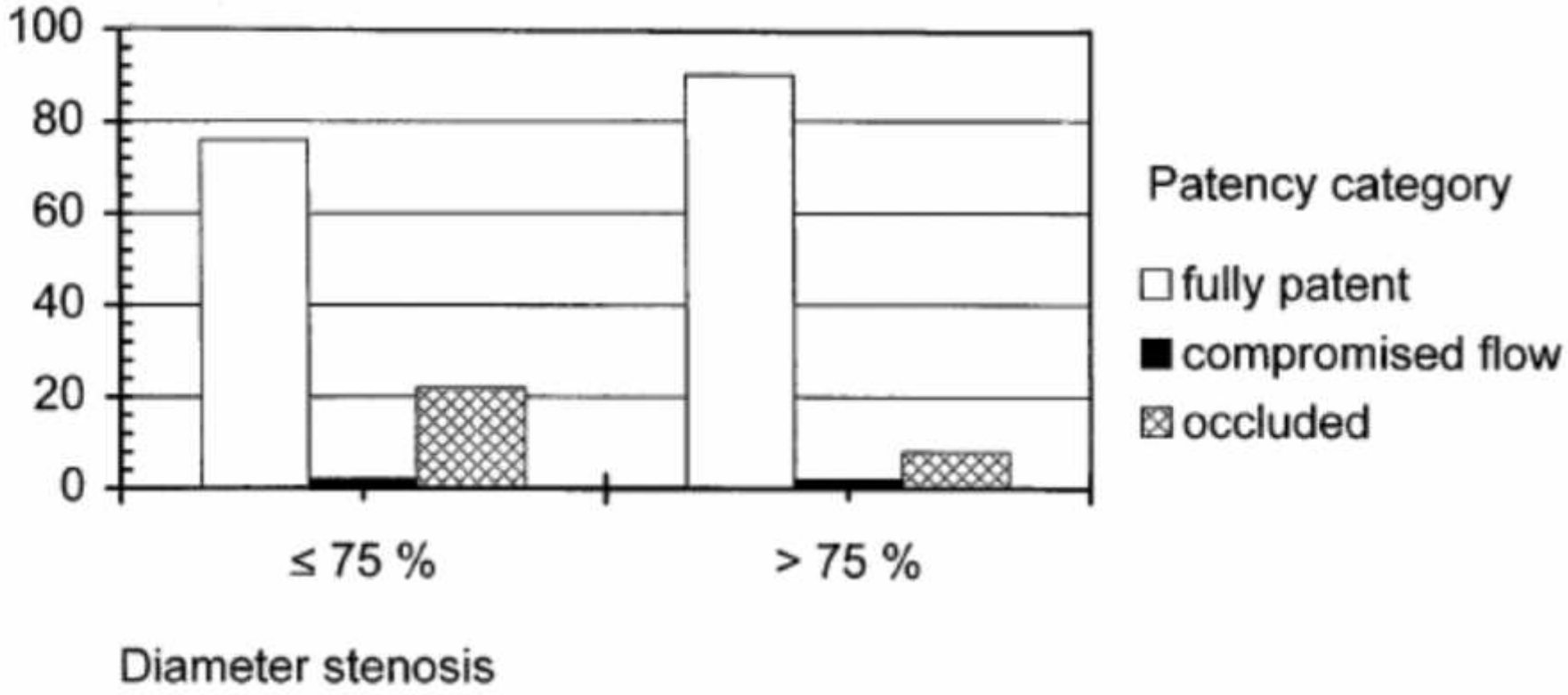
Permeabilidad art. mamaria y grado de estenosis del vaso nativo



Estenosis nativa < 50% predictor de oclusión OR 21.5 (5.2-64.4)

Berger A et al, Circulation 2004

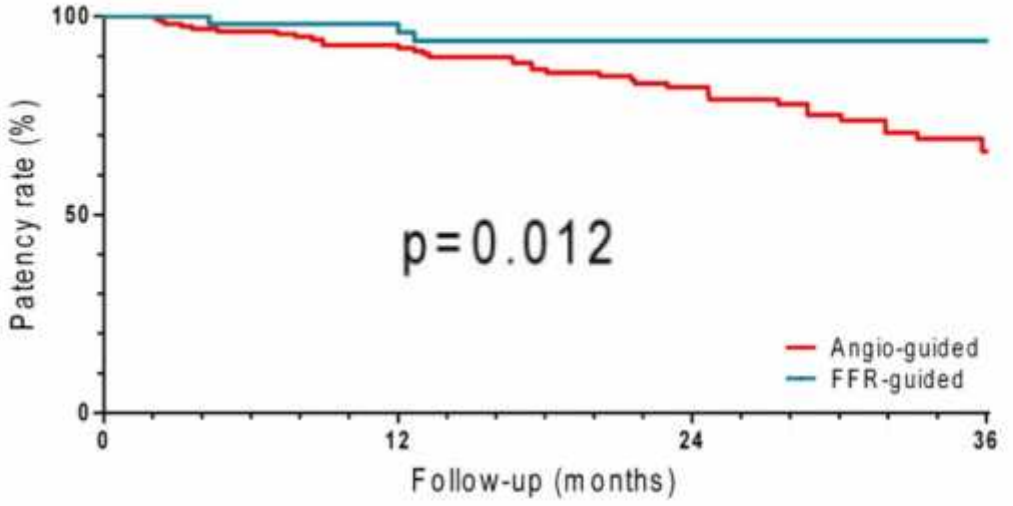
Permeabilidad injertos venosos y estenosis vaso nativo



Manninen HI et al. Ann Thorac Surg 1998

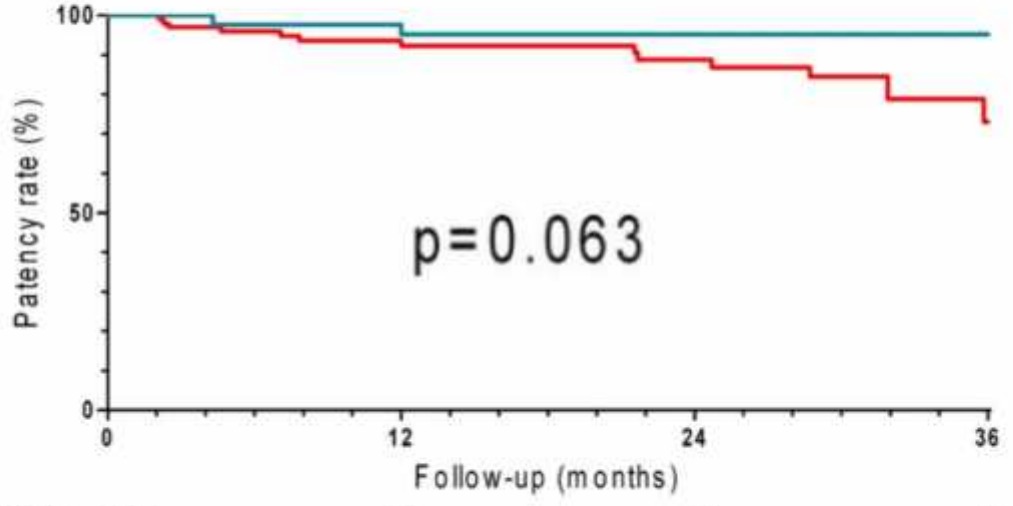
CABG y FFR: Permeabilidad a 36 meses

All grafts



Angio-guided:	174	128	83	39
FFR-guided:	60	47	26	16

Arterial grafts



Angio-guided:	110	75	49	24
FFR-guided:	51	39	22	15

Toth et al. Circulation 2013

CABG guiado por FFR

1. Menor número de injertos
2. Mejor clase funcional
3. Sin exceso de eventos postquirúrgicos (MACCE)

Toth et al. Circulation 2013

#7

“¿Con bomba o sin bomba?”

Cir Coronaria SIN CEC

	+	-
CON CEC	Facilidad técnica Mayor tasa revascularización completa	Isquemia miocárdica Respuesta inflamatoria
SIN CEC	Evita isquemia miocárdica Menor manipulación aórtica Ventaja en comorbilidades (renal, neurológica) Menor sangrado	Mayor dificultad técnica Mayor tasa de revascularización incompleta

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association.

No Major Differences in 30-Day Outcomes in High-Risk Patients Randomized to Off-Pump Versus On-Pump Coronary Bypass Surgery: The Best Bypass Surgery Trial

Christian H. Møller, Mario J. Perko, Jens T. Lund, Lars W. Andersen, Henning Kelbæk, Jan K. Madsen, Per Winkel, Christian Gluud and Daniel A. Steinbrüchel

Table 1. Preoperative Data*

Variable	Off-Pump (n=176)	On-Pump (n=163)
Age, mean (SD), y	76.1 (5.2)	75.6 (4.9)
Age >65 y	172 (98)	162 (99)

Table 4. Primary Outcome After 30 Days

Variable	Off-Pump (n=176)	On-Pump (n=163)	RR	95% CI	*P*
Composite primary outcome*	27 (15)	30 (18)	0.83	0.52–1.34	0.47
All-cause mortality	6 (3.4)	11 (6.7)	0.51	0.19–1.34	0.21
Myocardial infarction	9 (5.1)	15 (9.2)	0.56	0.25–1.24	0.20
Cardiac arrest with successful resuscitation	2 (1.1)	3 (1.8)	0.62	0.10–3.65	0.67
Low cardiac output syndrome	7 (4.0)	10 (6.1)	0.65	0.25–1.66	0.46
Stroke	7 (4.0)	6 (3.7)	1.08	0.37–3.15	1.00
Coronary reintervention†	1 (0.6)	3 (1.8)	0.31	0.03–2.94	0.36

Values are numbers (percentages). RR indicates relative risk; CI, confidence interval.

*All-cause mortality, acute myocardial infarction, cardiac arrest with successful resuscitation, low cardiac output syndrome/cardiogenic shock, stroke, and coronary reintervention.

†Coronary artery bypass grafting or percutaneous coronary intervention.

Conclusions—Both off- and on-pump coronary artery bypass grafting can be performed in high-risk patients with low short-term complications.

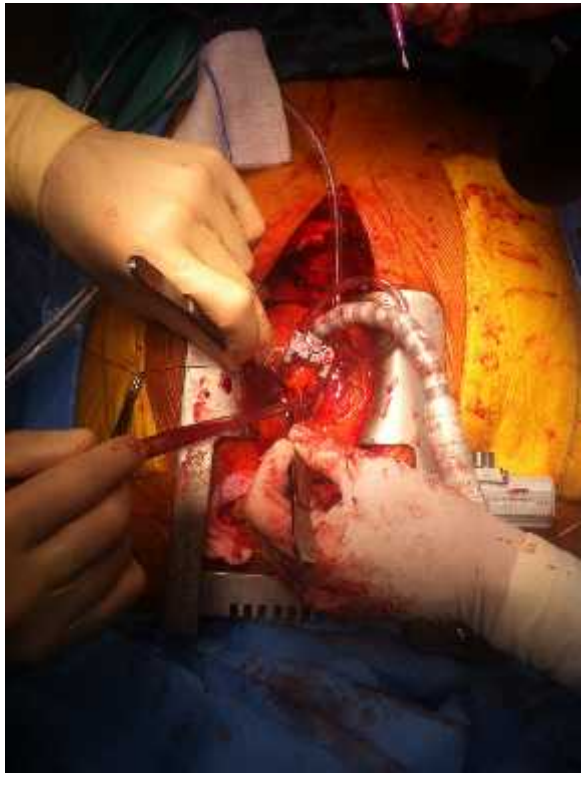
ORIGINAL ARTICLE

Off-Pump versus On-Pump Coronary-Artery Bypass Grafting in Elderly Patients

Table 3. Trial End Points (Modified Intention-to-Treat Analysis).*

End Point	Off-Pump CABG	On-Pump CABG	Odds Ratio or Hazard Ratio (95% CI)†	P Value
	no./total no. (%)			
At 30 days‡				
Primary composite end point§	93/1187 (7.8)	99/1207 (8.2)	0.95 (0.71–1.28)	0.74
Individual components				
Death	31/1187 (2.6)	34/1207 (2.8)	0.92 (0.57–1.51)	0.75
Myocardial infarction	18/1187 (1.5)	20/1207 (1.7)	0.92 (0.51–1.66)	0.79
Stroke	26/1187 (2.2)	32/1207 (2.7)	0.83 (0.50–1.38)	0.47
Repeat revascularization	15/1187 (1.3)	5/1207 (0.4)	2.42 (1.03–5.72)	0.04
New renal-replacement therapy	29/1187 (2.4)	37/1207 (3.1)	0.80 (0.49–1.29)	0.36
At 12 mo¶				
Primary composite end point§	154/1179 (13.1)	167/1191 (14.0)	0.93 (0.76–1.16)	0.48
Individual components				
Death	83/1179 (7.0)	95/1191 (8.0)	0.88 (0.65–1.18)	0.38
Myocardial infarction	25/1179 (2.1)	28/1191 (2.4)	0.90 (0.53–1.54)	0.70
Stroke	41/1179 (3.5)	52/1191 (4.4)	0.79 (0.53–1.19)	0.26
Repeat revascularization	36/1179 (3.1)	24/1191 (2.0)	1.52 (0.90–2.54)	0.11
New renal-replacement therapy	34/1179 (2.9)	42/1191 (3.5)	0.82 (0.52–1.28)	0.37

* CI denotes confidence interval.
† Odds ratios are reported for end points at 30 days after surgery, and hazard ratios are reported for end points at 12 months after surgery.
‡ Comparison of end points at 30 days was performed with the chi-square test.
§ The primary composite end point was death, myocardial infarction, stroke, repeat revascularization, or new renal-replacement therapy at 30 days and at 12 months after surgery.
¶ Comparison of end points at 12 months was performed with the log-rank test.



Off-pump surgery in preventing perioperative stroke after coronary artery bypass grafting: a retrospective multicentre study†

Fernando Hornero[1,*], Elio Martín[a], Rafael Rodríguez[b], Manel Castellà[c], Carlos Porras[c], Bernat Romero[c], Luis Maroto[i] and Enrique Pérez de la Sota[e] on behalf of the Working Group on Arrhythmia Surgery and Cardiac Pacing of the Spanish Society for Cardiovascular and Thoracic Surgery (SECTCV)

Table 2: Multivariate analysis and impact of ON/OPCAB technique in perioperative stroke rate

	P	OR (95% CI)	Perioperative stroke rate		
			ONCAB group	OPCAB group	*P*
Diabetes mellitus	0.08	1.21 (0.98–1.51)			
Arterial hypertension	0.43	1.09 (0.87–1.39)			
Prior stroke	0.01	1.57 (1.10–2.25)	22/683 (3.22%)	16/599 (2.67%)	<0.0001
Preoperative cardiac failure	<0.0001	2.98 (2.39–3.70)	99/2073 (4.78%)	48/927 (2.49%)	<0.0001
Non-elective surgery	<0.0001	2.37 (1.87–2.99)	62/1761 (3.52%)	47/1700 (2.76%)	<0.0001
Peripheral arteriopathy	<0.0001	1.62 (1.28–2.05)	71/2137 (3.32%)	50/2011 (2.48%)	<0.0001
Chronic renal failure	<0.0001	6.16 (4.92–7.71)	9 271 247 (7.38%)	56/1030 (5.43%)	<0.0001

Multivariate logistic regression analysis and comparison of perioperative stroke rate in ONCAB and OPCAB groups.
OR: odds ratio; CI: confidence interval; ONCAB: on-pump coronary bypass surgery; OPCAB: off-pump coronary bypass surgery.

Table 4: Impact of ON/OPCAB technique regarding number of independent risk factors

Number of risk factors	Perioperative stroke rate			*P*
	Global group	ONCAB group	OPCAB group	
0	73/15 198 (0.48%)	43/9872 (0.44%)	30/5326 (0.56%)	0.23
1	112/7909 (1.42%)	66/4185 (1.58%)	46/3724 (1.23%)	0.22
2	106/2564 (4.13%)	68/1307 (5.20%)	38/1257 (3.02%)	0.007
3	56/580 (10%)	33/299 (11.04%)	25/281 (8.89%)	0.03
4	15/89 (16.85%)	10/45 (22.22%)	5/44 (11.36%)	0.26
5	1/7 (14.29%)	1/5 (20%)	0/2 (0%)	0.99

Perioperative stoke incidence regarding the number of preoperative independent risk factors present simultaneously in global, ONCAB and OPCAB groups.
ONCAB: on-pump coronary bypass surgery; OPCAB: off-pump coronary bypass surgery.

Stroke after coronary artery bypass grafting: Preoperative predictive accuracies of $CHADS_2$ and CHA_2DS_2VASc stroke risk stratification schemes

Fernando Hornero, MD, PhD, Elio Martin, MD, Federico Paredes, MD, Oscar Gil, MD, Sergio Cánovas, MD, PhD, Rafael García, MD, PhD, and Juan Martínez, MD, PhD

TABLE 4. Mean score values of the stroke stratification schemes and optimum score thresholds

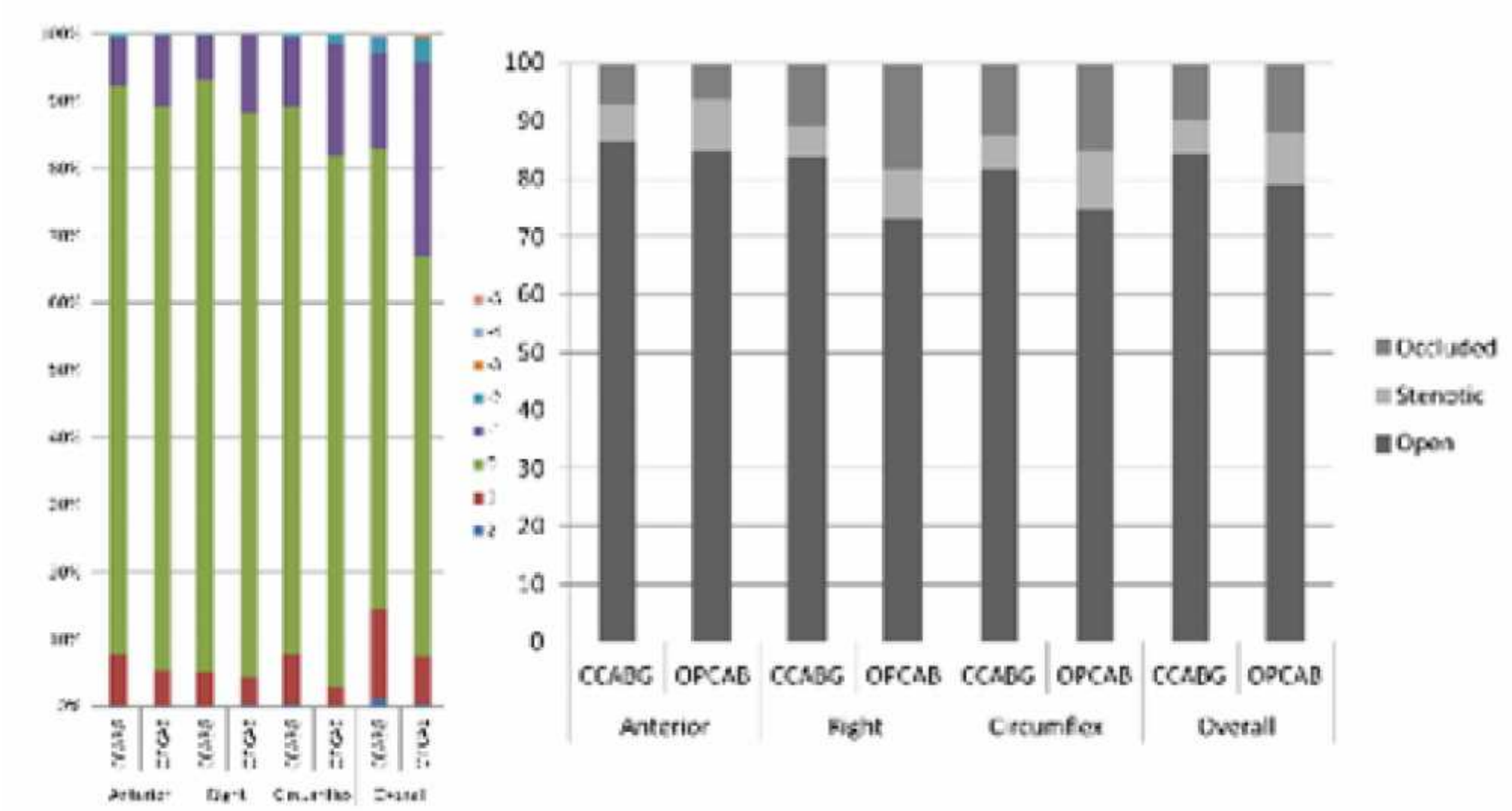
	With stroke	Without stroke	AUC	Optimum score threshold	Sensitivity	Specificity
$CHADS_2$[6]	2.37 ± 1.33	1.40 ± 1.06	0.716	1.50	73.8%	58.1%
CHA_2DS_2VASc[7]	3.68 ± 1.74	2.40 ± 1.52	0.725	2.50	74.2%	55.9%
NNECDSG[4]	6.18 ± 2.54	4.52 ± 2.38	0.697	5.25	70.5%	62.4%
McSPI[5]	89.69 ± 22.53	72.50 ± 22.05	0.736	76.85	78.7%	59.3%

TABLE 5. Stroke events in relation to stroke risk stratification models and predictive ability of each stroke risk scheme

	Low	Intermediate or moderate	High	AUC	95% CI	SE
$CHADS_2$[6]				0.704	0.633-0.775	0.036
In risk category (%)	57.6%	27.6%	14.6%			
Stroke events (no.)	15 (24.2%)	17 (27.4%)	30 (48.3%)			
Mean rate of stroke (%)	0.89%	2.11%	7.04%			
CHA_2DS_2VASc[7]				0.696	0.626-0.766	0.036
In risk category (%)	30.3%	47.0%	22.5%			
Stroke events (no.)	7 (11.3%)	18 (29%)	37 (59.6%)			
Mean rate of stroke (%)	0.79%	1.31%	5.63%			
NNECDSG[4]				0.671	0.604-0.738	0.034
In risk category (%)	22.8%	47.0%	30.0%			
Stroke events (no.)	5 (8%)	19 (30.6%)	38 (61.2%)			
Mean rate of stroke (%)	0.75%	1.38%	4.34%			
McSPI[5]				0.704	0.637-0.770	0.033
In risk category (%)	48.1%	41.6%	10.1%			
Stroke events (no.)	10 (16.1%)	31 (50.0%)	21 (33.8%)			
Mean rate of stroke (%)	0.71%	2.55%	7.09%			

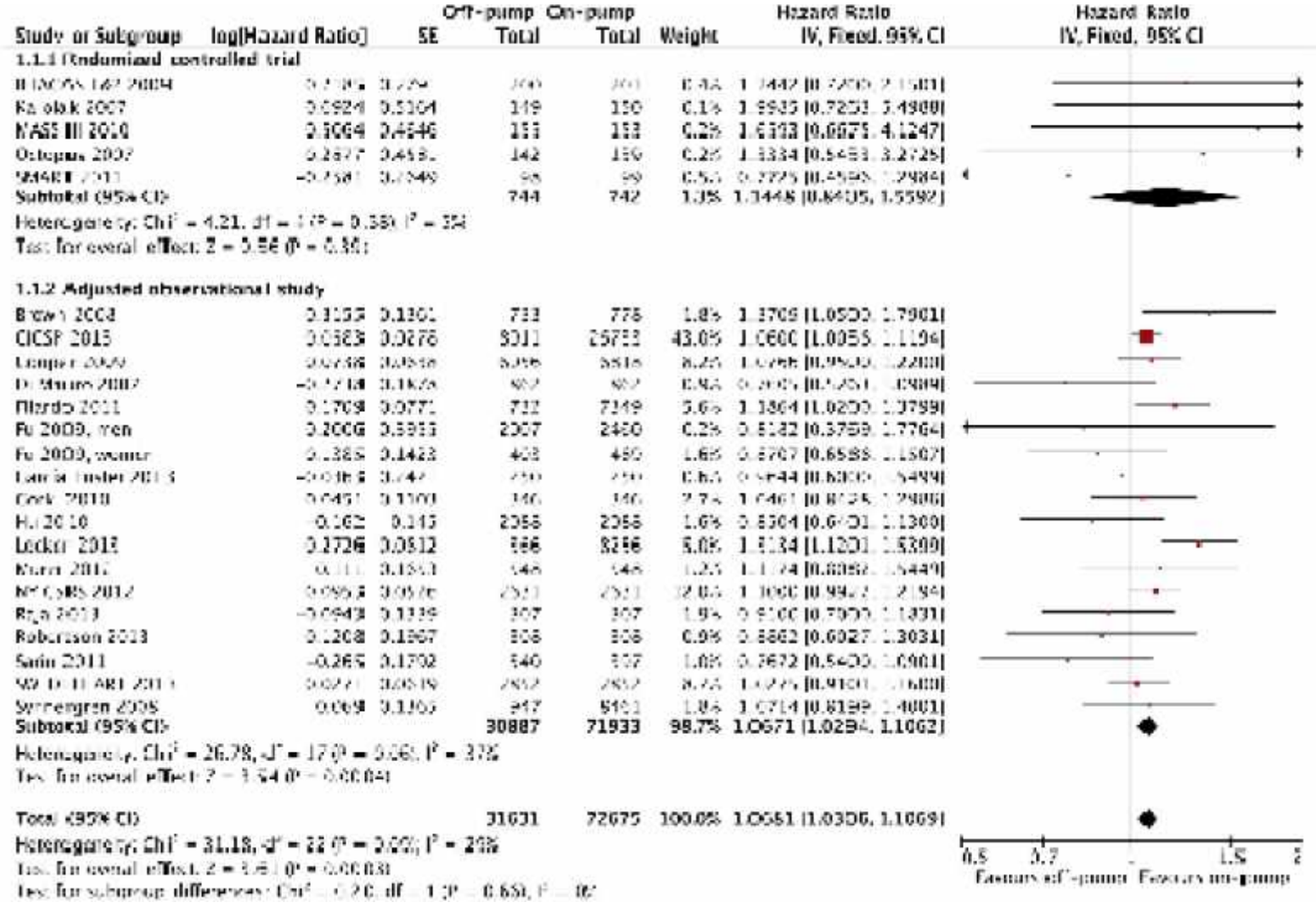
Scores were categorized into 3 representative risk levels: low (<1.5), moderate or intermediate (1.5–3.5), and high risk (>3.5). $P < .0001$ for all schemes. AUC, Area under

Graft patency after off-pump coronary artery bypass surgery is inferior even with identical heparinization protocols: Results from the Danish On-pump Versus Off-pump Randomization Study (DOORS)



Worse long-term survival after off-pump than on-pump coronary artery bypass grafting

Hisato Takagi, MD, PhD, and Takuya Umemoto, MD, PhD, for the All-Literature Investigation of Cardiovascular Evidence (ALICE) Group



En resumen…

Recommendations	Class[a]	Level[b]
It is recommended to perform procedures in a hospital structure and by a team specialized in cardiac surgery, using written protocols.	I	B
Endoscopic vein harvesting should be considered to reduce the incidence of leg wound complications.	IIa	A
Routine skeletonized IMA dissection should be considered.	IIa	B
Skeletonized IMA dissection is recommended in patients with diabetes or when bilateral IMAs are harvested.	I	B
Complete myocardial revascularization is recommended.	I	B
Arterial grafting with IMA to the LAD system is recommended.	I	B
Bilateral IMA grafting should be considered in patients <70 years of age.	IIa	B
Use of the radial artery is recommended only for target vessels with high-degree stenosis.	I	B
Total arterial revascularization is recommended in patients with poor vein quality independently of age.	I	C
Total arterial revascularization should be considered in patients with reasonable life expectancy.	IIa	B
Minimization of aortic manipulation is recommended.	I	B
Off-pump CABG should be considered for subgroups of high-risk patients in high-volume off-pump centres.	IIa	B
Off-pump CABG and/or no-touch on-pump techniques on the ascending aorta are recommended in patients with significant atherosclerotic disease of the ascending aorta in order to prevent perioperative stroke.	I	B
Minimally invasive CABG should be considered in patients with isolated LAD lesions.	IIa	C
Electrocardiogram-triggered CT scans or epiaortic scanning of the ascending aorta should be considered in patients over 70 years of age and/or with signs of extensive generalized atherosclerosis.	IIa	C
Routine intraoperative graft flow measurement should be considered.	IIa	C

Hybrid Coronary Revascularization

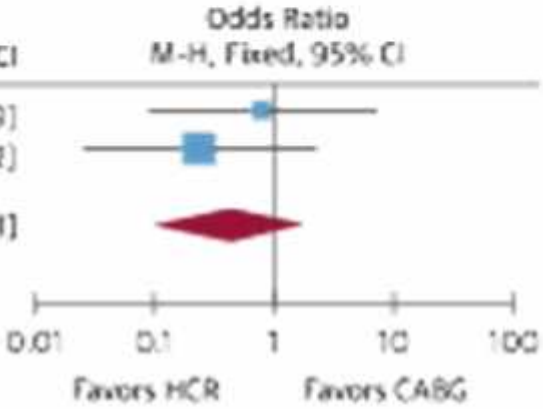
Promising, But Yet to Take Off

Vasileios F. Panoulas, MD, PhD,*† Antonio Colombo, MD,*‡ Alberto Margonato, MD,* Francesco Maisano, MD§

A All-cause mortality (3-5 years)

Study or Subgroup	HCR Events	HCR Total	CABG Events	CABG Total	weight	Odds Ratio M-H, Fixed, 95% CI
Halkos M et al. 2011	1	147	5	588	33.3%	0.80 [0.09, 6.89]
Shen L et al. 2013	1	141	4	141	66.7%	0.24 [0.03, 2.22]
Total (95% CI)		288		729	100.0%	0.43 [0.09, 2.01]
Total events	2		9			

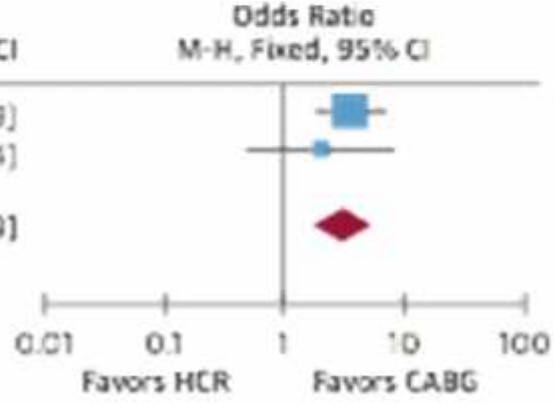
Heterogeneity: Chi² = 0.57, df = 1 (P = 0.45); I² = 0%
Test for overall effect: Z = 1.07 (P = 0.28)



B Any revascularization (3 years)

Study or Subgroup	HCR Events	HCR Total	CABG Events	CABG Total	weight	Odds Ratio M-H, Fixed, 95% CI
Halkos M et al. 2011	18	147	22	588	72.9%	3.59 [1.87, 6.89]
Shen L et al. 2013	6	141	3	141	27.1%	2.04 [0.50, 8.34]
Total (95% CI)		288		729	100.0%	3.17 [1.74, 5.79]
Total events	24		25			

Heterogeneity: Chi² = 0.51, df = 1 (P = 0.47); I² = 0%
Test for overall effect: Z = 3.76 (P = 0.0002)



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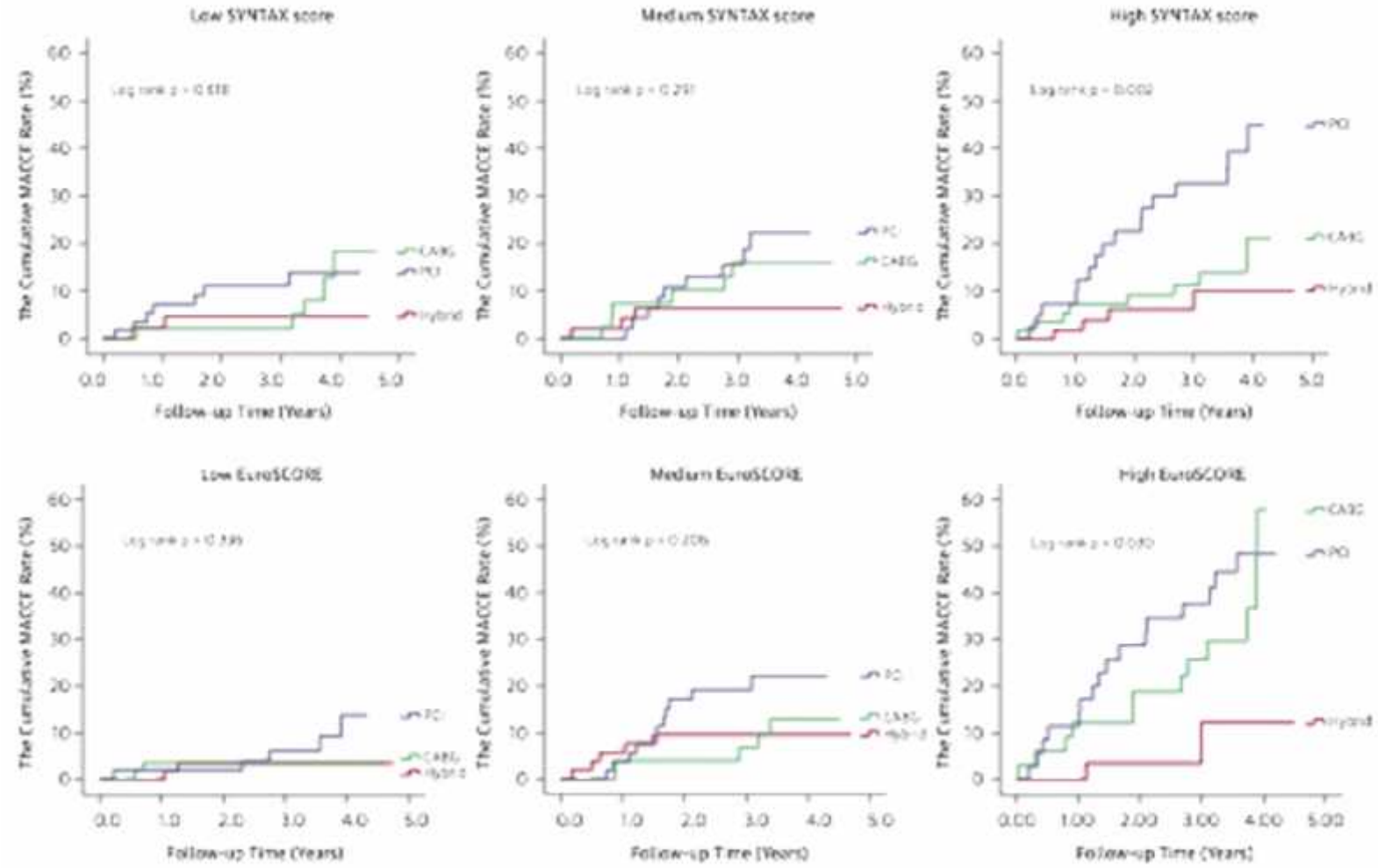
Hybrid Coronary Revascularization

Promising, But Yet to Take Off

Vasileios F. Panoulas, MB, PhD,*† Antonio Colombo, MD,*‡ Alberto Margonato, MD,* Francesco Maisano, MD§



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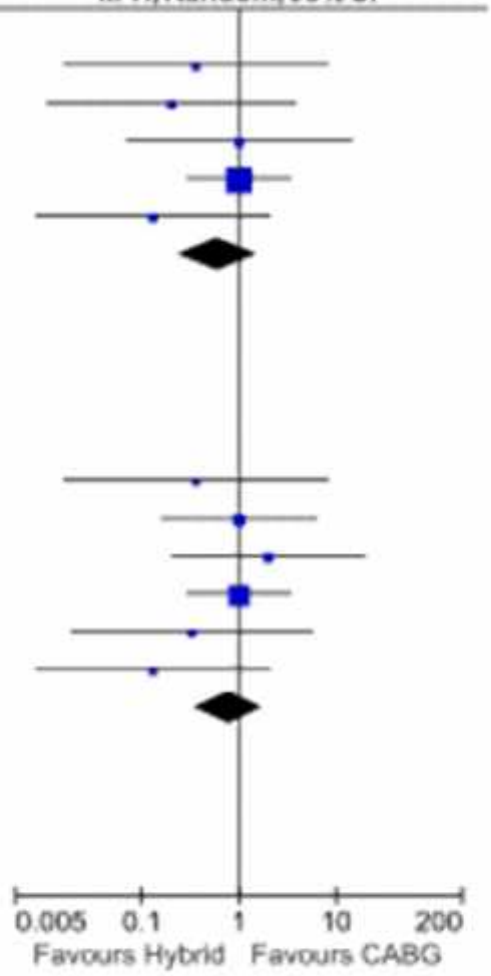
Hybrid coronary revascularization versus coronary artery bypass surgery: Systematic review and meta-analysis ☆

Kevin Phan [a,b], Sophia Wong [c], Nelson Wang [a], Steven Phan [a], Tristan D. Yan [a,b,*]

[a] The Collaborative Research (CORE) Group, Macquarie University, Sydney, Australia
[b] Sydney Medical School, University of Sydney, Sydney, Australia
[c] Cosford Hospital, Cosford, Australia

Study or Subgroup	Hybrid Events	Hybrid Total	CABG Events	CABG Total	Weight	Risk Ratio M-H, Random, 95% CI
(a) In-hospital MACCE						
Bachinsky	0	25	1	27	9.0%	0.36 [0.02, 8.43]
de Canniere	0	20	2	20	10.1%	0.20 [0.01, 3.92]
Delhaye	1	18	1	18	12.3%	1.00 [0.07, 14.79]
Halkos	3	147	12	588	57.1%	1.00 [0.29, 3.50]
Kon	0	15	7	30	11.4%	0.13 [0.01, 2.12]
Subtotal (95% CI)		**225**		**683**	**100.0%**	**0.61 [0.24, 1.58]**
Total events	4		23			
Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 2.72$, df = 4 (P = 0.60); $I^2 = 0\%$						
Test for overall effect: Z = 1.01 (P = 0.31)						
(b) Postoperative MACCE						
Bachinsky	0	25	1	27	6.9%	0.36 [0.02, 8.43]
de Canniere	2	20	2	20	19.8%	1.00 [0.16, 6.42]
Delhaye	2	18	1	18	12.8%	2.00 [0.20, 20.15]
Halkos	3	147	12	588	43.6%	1.00 [0.29, 3.50]
Halkos2	0	27	4	81	8.2%	0.33 [0.02, 5.86]
Kon	0	15	7	30	8.7%	0.13 [0.01, 2.12]
Subtotal (95% CI)		**252**		**764**	**100.0%**	**0.78 [0.34, 1.78]**
Total events	7		27			
Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 3.23$, df = 5 (P = 0.67); $I^2 = 0\%$						
Test for overall effect: Z = 0.60 (P = 0.55)						

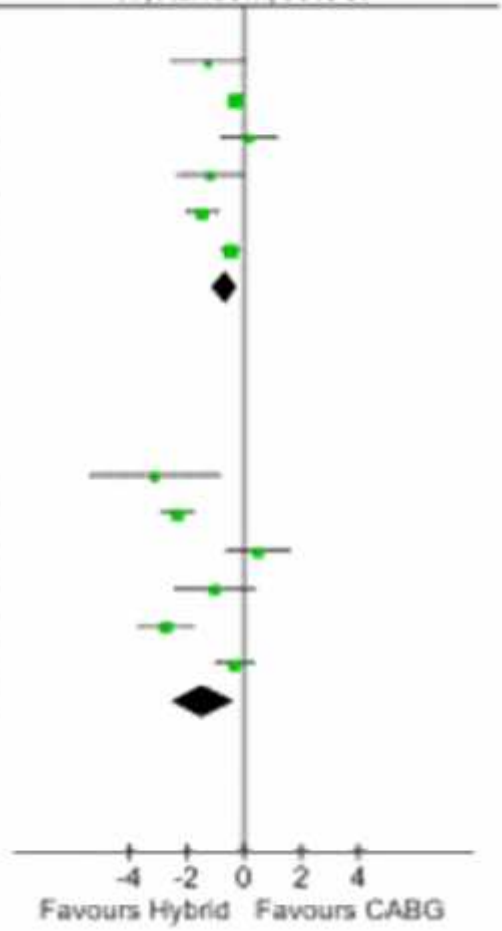


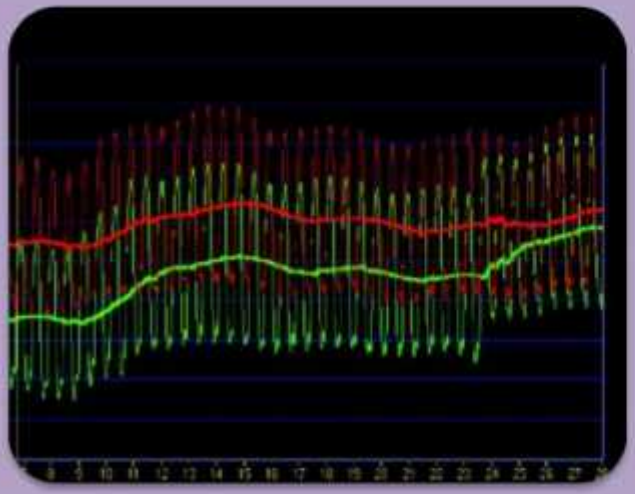
Hybrid coronary revascularization versus coronary artery bypass surgery: Systematic review and meta-analysis ☆

Kevin Phan [a,b], Sophia Wong [c], Nelson Wang [a], Steven Phan [a], Tristan D. Yan [a,b,*]

[a] The Collaborative Research (CORE) Group, Macquarie University, Sydney, Australia
[b] Sydney Medical School, University of Sydney, Sydney, Australia
[c] Canford Hospital, Canford, Australia

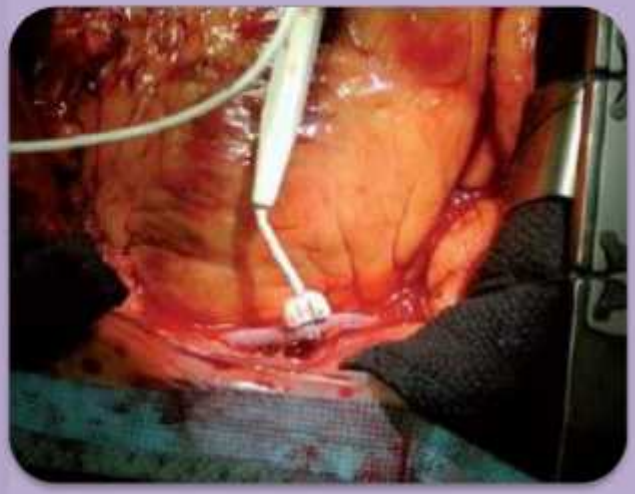
Study or Subgroup	Hybrid Mean	Hybrid SD	Hybrid Total	CABG Mean	CABG SD	CABG Total	Weight	Mean Difference IV, Random, 95% CI
(a) ICU stay								
Bachinsky	1.19	0.58	25	2.41	3.53	27	7.6%	-1.22 [-2.57, 0.13]
de Canniere	0.84	0.075	20	1.11	0.47	20	28.0%	-0.27 [-0.48, -0.06]
Halkos	2.39	6.04	147	2.2	3.66	588	11.2%	0.19 [-0.83, 1.21]
Halkos2	1.52	1.24	27	2.68	5.01	81	9.2%	-1.16 [-2.35, 0.03]
Kon	0.98	0.42	15	2.42	1.57	30	18.9%	-1.44 [-2.04, -0.84]
Zhou	1.45	1.38	141	1.9	1.55	141	25.2%	-0.45 [-0.79, -0.11]
Subtotal (95% CI)			375			887	100.0%	**-0.64 [-1.07, -0.21]**
Heterogeneity: $Tau^2 = 0.16$; $Chi^2 = 17.31$, df = 5 (P = 0.004); $I^2 = 71\%$								
Test for overall effect: Z = 2.90 (P = 0.004)								
(b) Hospital stay								
Bachinsky	5.1	2.8	25	8.19	5.4	27	11.0%	-3.09 [-5.40, -0.78]
de Canniere	6.7	0.7	20	9	1.2	20	19.6%	-2.30 [-2.91, -1.69]
Halkos	6.6	6.7	147	6.1	4.7	588	17.0%	0.50 [-0.65, 1.65]
Halkos2	5.6	2	27	6.6	5.6	81	15.5%	-1.00 [-2.43, 0.43]
Kon	3.7	1.4	15	6.4	2	30	17.8%	-2.70 [-3.71, -1.69]
Zhou	8.19	2.54	141	8.49	3.53	141	19.1%	-0.30 [-1.02, 0.42]
Subtotal (95% CI)			375			887	100.0%	**-1.40 [-2.52, -0.28]**
Heterogeneity: $Tau^2 = 1.57$; $Chi^2 = 36.66$, df = 5 (P < 0.00001); $I^2 = 86\%$								
Test for overall effect: Z = 2.44 (P = 0.01)								





IMPACTO DE FFR EN VALORACION PREOPERATORIA PRACTICA CLINCA DIARIA

TC AORTA US EPIAÓRTICO VALORACIÓN ATEROMATOSIS MINIMIZAR RIESGO ICTUS

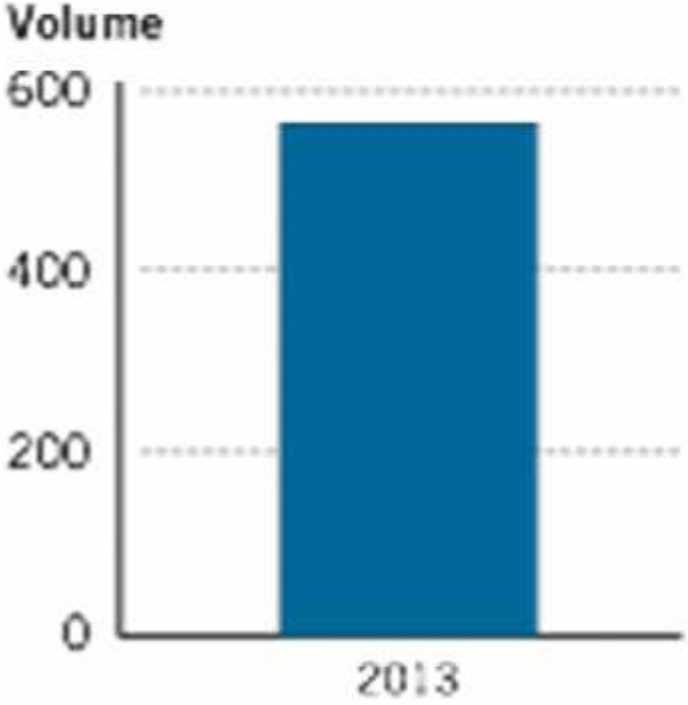


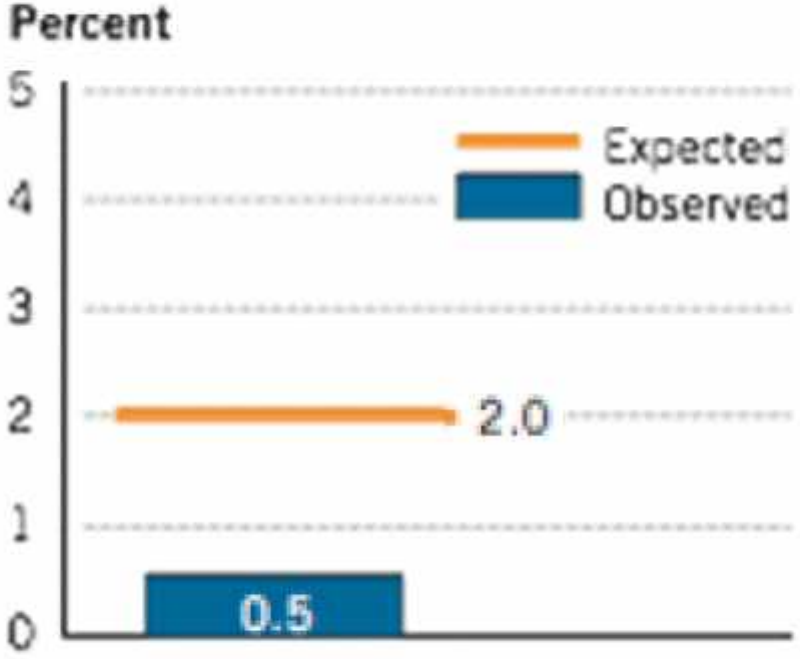
VERIFICACIÓN DE INJERTOS POR DOPPLER OPTIMIZAR PERMEABILIDAD Y DURABILIDAD

Cleveland Clinic

Isolated CABG Procedures, Inpatient Hospital Mortality (N = 567)

Cleveland Clinic surgeons performed 567 isolated CABG procedures in 2013. The inpatient hospital mortality rate was 0.5% (N = 3), which was lower than the expected rate of 2.0%.





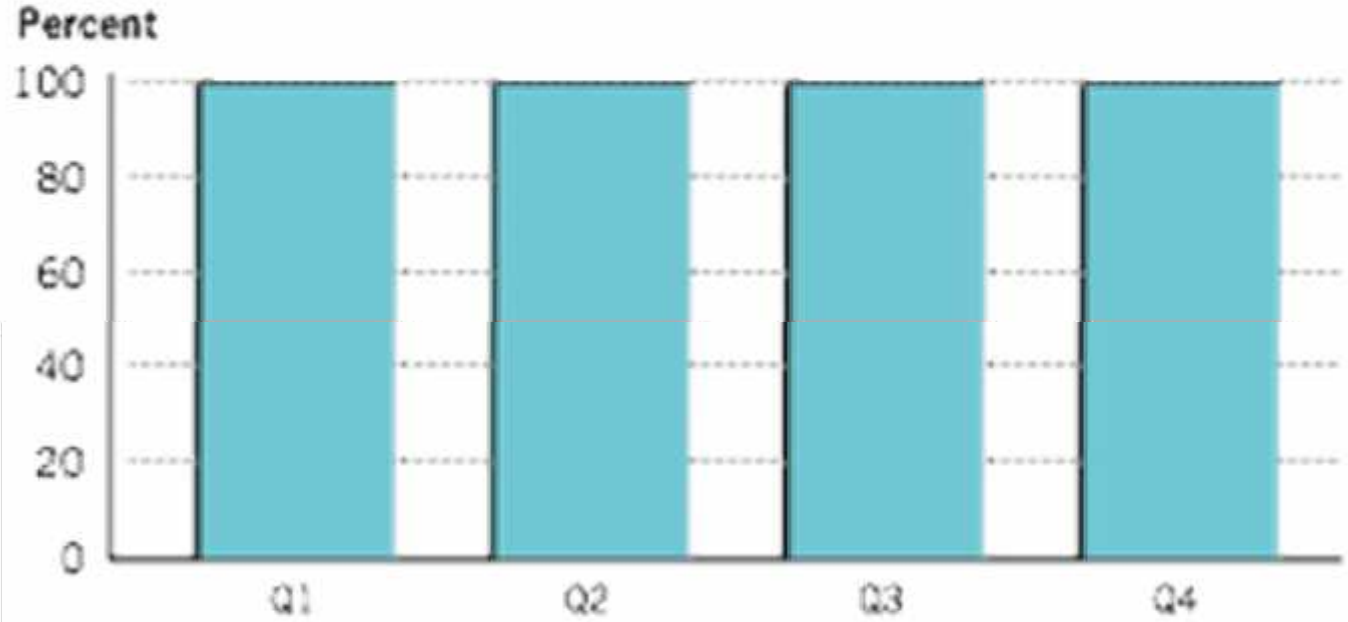
Cleveland Clinic

Process Measures

2013

Cleveland Clinic was 100% compliant in 2013 with all Society of Thoracic Surgeons process measures. The process measures include the use of a perioperative beta blocker; beta blocker, statin, and aspirin at discharge; and use of an internal mammary artery during isolated CABG surgery.

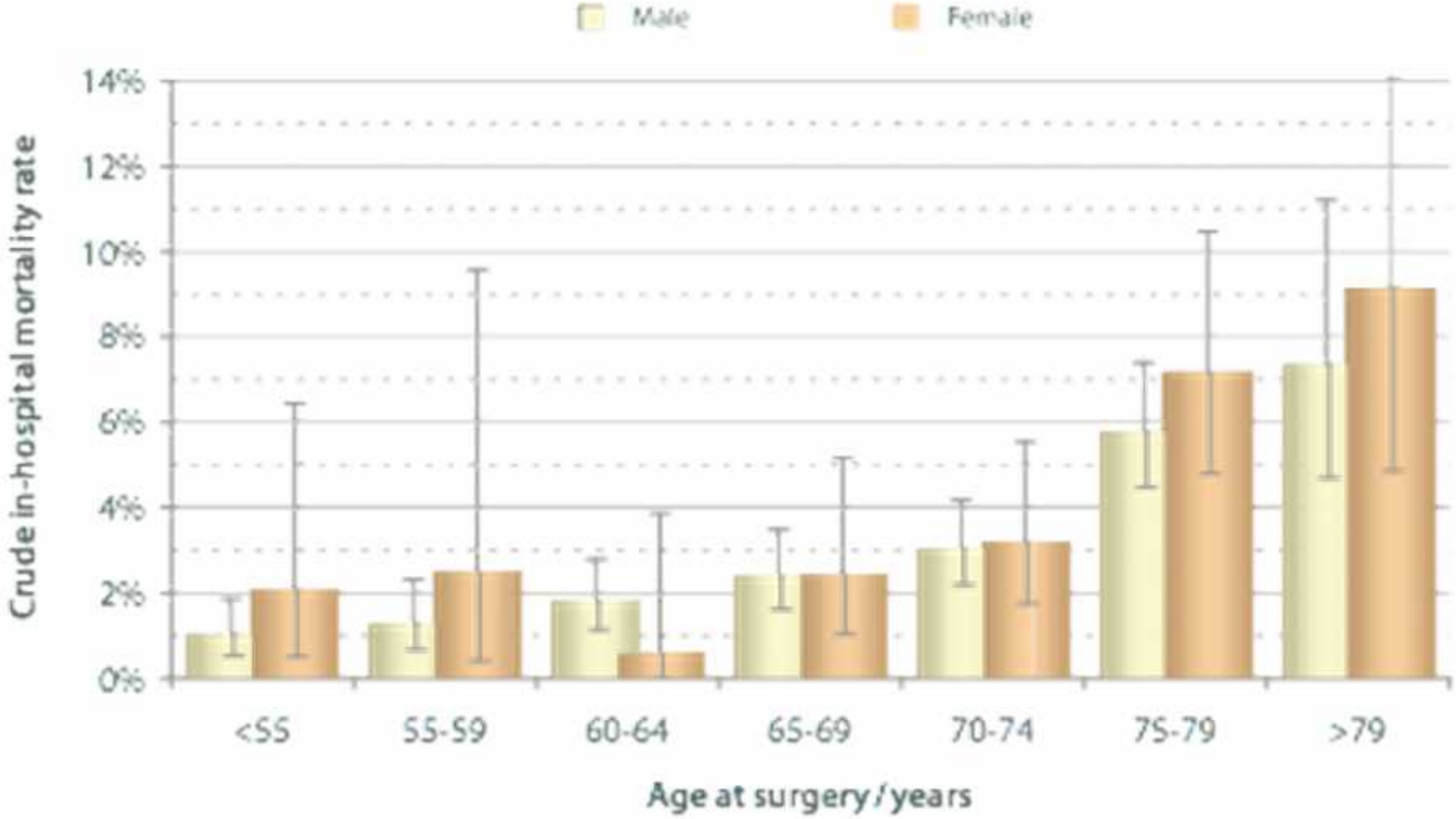
Source: Society of Thoracic Surgeons (STS) National Adult Cardiac Surgery Database, 2013.



Sociedad Española de Cirugía
Torácica - Cardiovascular

Primer Informe del Proyecto Español de Calidad de Cirugía Cardiovascular del Adulto 2013

Cirugía coronaria aislada: Mortalidad hospitalaria cruda, edad y sexo (n=8,749)



How Physicians Can Change the Future of Health Care

Michael E. Porter, PhD, MBA

Elizabeth Olmsted Teisberg, PhD, MEngr, MS

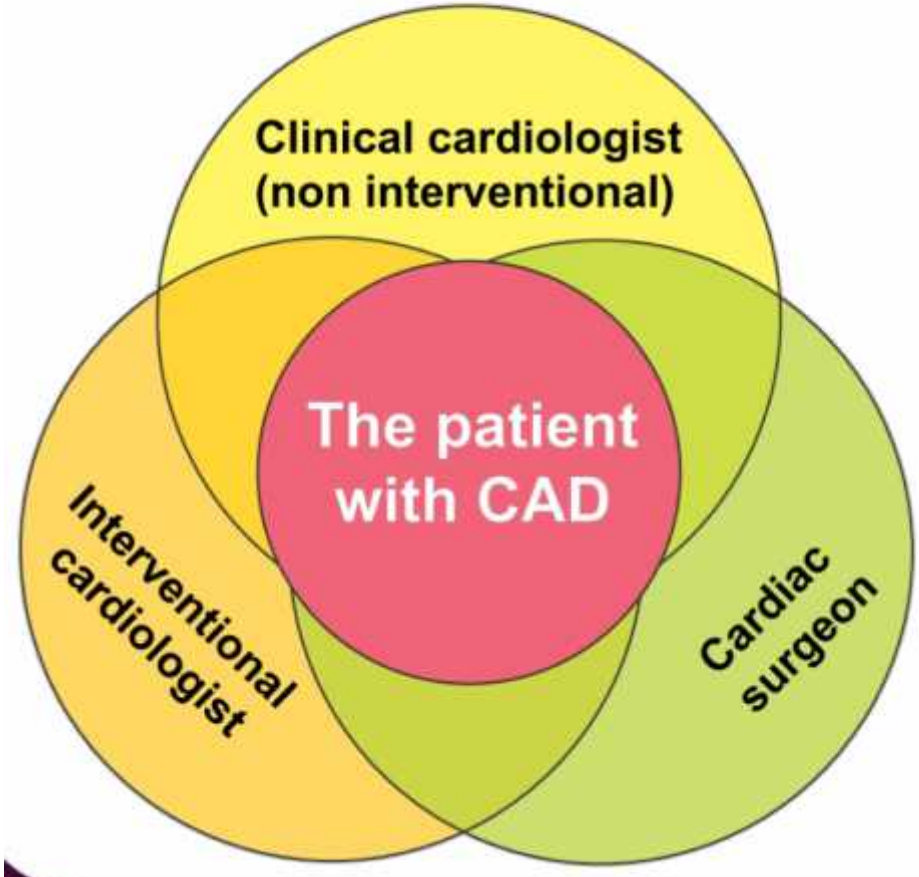
Today's preoccupation with cost shifting and cost reduction undermines physicians and patients. Instead, health care reform must focus on improving health and health care value for patients. We propose a strategy for reform that is market based but physician led. Physician leadership is essential. Improving the value of health care is something only medical teams can do. The right kind of competition—competition to improve results—will drive dramatic improvement. With such positive-sum competition, patients will receive better care, physicians will be rewarded for excellence, and costs will be contained. Physicians can lead this change and return the practice of medicine to its appropriate focus: enabling health and effective care. Three principles should guide this change: (1) the goal is value for patients, (2) medical practice should be organized around medical conditions and care cycles, and (3) results—risk-adjusted outcomes and costs—must be measured. Following these principles, professional satisfaction will increase and current pressures on physicians will decrease. If physicians fail to lead these changes, they will inevitably face ever-increasing administrative control of medicine. Improving health and health care value for patients is the only real solution. Value-based competition on results provides a path for reform that recognizes the role of health professionals at the heart of the system.

JAMA. 2007;297:1103-1111 www.jama.com

THE HEALTH CARE POLICY DEbate is stuck in a place that undermines physicians and the nation's health. Although reform proposals differ, they have this in common: each examines today's system and asks what incremental change, imposed from the outside, can effectively rein in costs that are both high and increasing. That approach will fail because it starts with a flawed premise. The purpose of the health care system is not to minimize costs but to deliver value to patients, that is, better health per dollar spent.

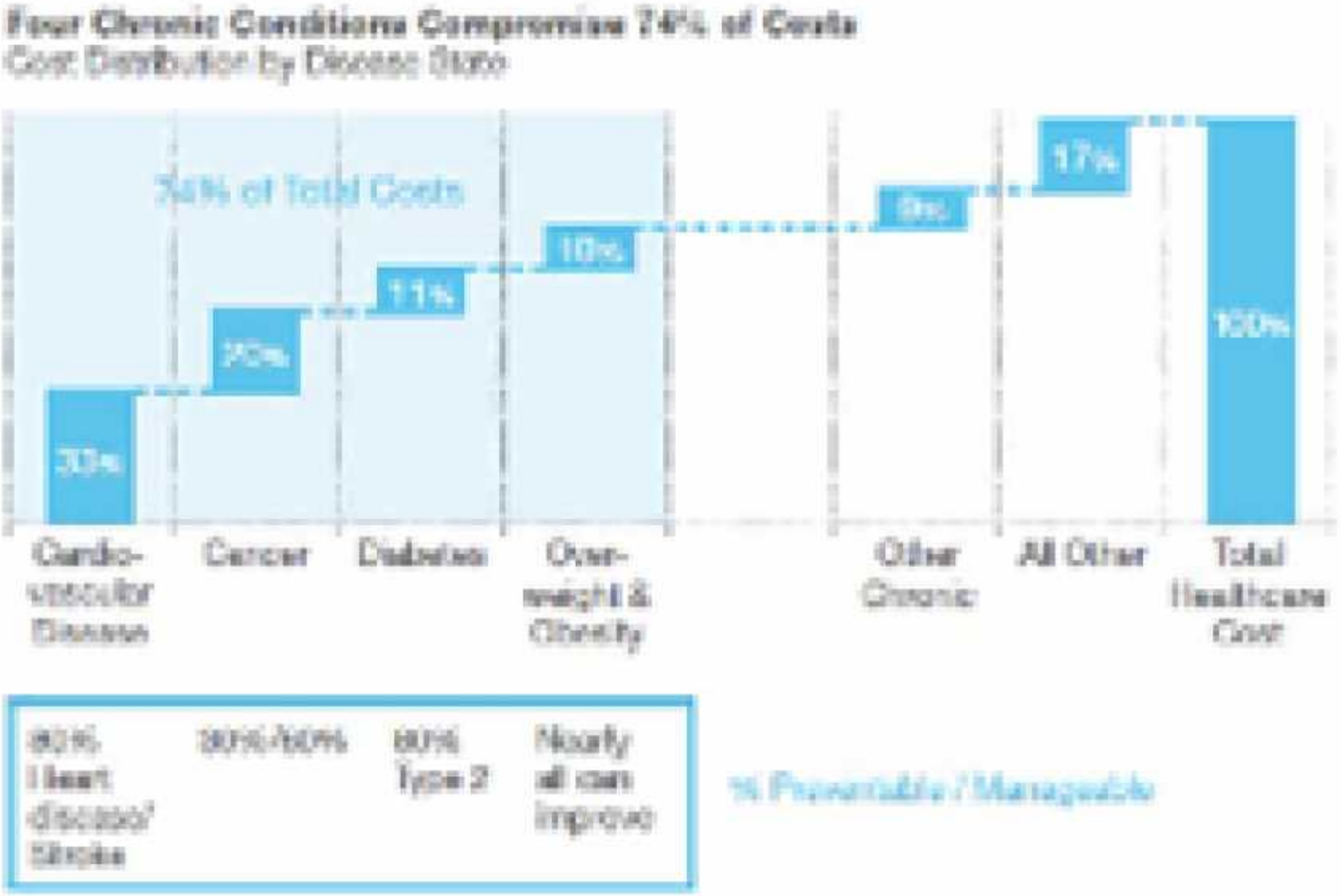
We offer a different approach. If one were to design a system focused on value and on rewarding innovation that advances medicine, what would that system look like? The next question would be, how can the system migrate

The *Heart Team* concept to decide on whether PCI or CABG should be preferred for individual patients



Recommendations	Class[a]	Level[b]	Ref[c]
It is recommended that patients undergoing coronary angiography are informed about benefits and risks as well as potential therapeutic consequences ahead of the procedure.	I	C	–
It is recommended that patients are adequately informed about short- and long-term benefits and risks of the revascularization procedure as well as treatment options. Enough time should be allowed for informed decision-making.	I	C	–
It is recommended that institutional protocols are developed by the Heart Team to implement the appropriate revascularization strategy in accordance with current guidelines. In case of PCI centres without on-site surgery, institutional protocols should be established with partner institutions providing cardiac surgery.	I	C	–
It is recommended that patients for whom decision-making is complex or who are not covered by the institutional protocol are discussed by the Heart Team.	I	C	–

Cambio epidemiológico: envejecimiento y cronicidad



Cost, quality, and value in coronary artery bypass grafting

Ruben L. Osnabrugge, MSc,[a] Alan M. Speir, MD,[b] Stuart J. Head, PhD,[a] Philip G. Jones, MS,[c] Gorav Ailawadi, MD,[d] Clifford E. Fonner, BA,[e,f] Edwin Fonner, Jr, DrPH,[f] A. Pieter Kappetein, MD, PhD,[a] and Jeffrey B. Rich, MD[g]

TABLE 2. Postoperative clinical outcomes and resource use

Variable	N = 42,839
Postoperative ventilation >24 h	9.3
Postoperative renal failure	3.5
Postoperative pneumonia	2.9
Postoperative atrial fibrillation	17.2
Postoperative stroke	1.4
Postoperative deep sternal wound infection	0.4
Reoperation bleeding	1.7
Reoperation other cardiac reasons	0.8
Reoperation noncardiac reasons	2.0
Operative mortality	1.8
Operative morbidity/mortality*	14.4
Total length of stay, d	9.3 ± 7.9
Postoperative length of stay, d	6.9 ± 7.0
Total costs, US$ ± SD [median]	38,848 ± 29,299 [32,397]

Data defined as mean ± SD, or % of patients. SD, Standard deviation. *Defined as operative deep sternal wound infection, reoperation, permanent stroke, prolonged ventilation, renal failure, or mortality.

Cost, quality, and value in coronary artery bypass grafting

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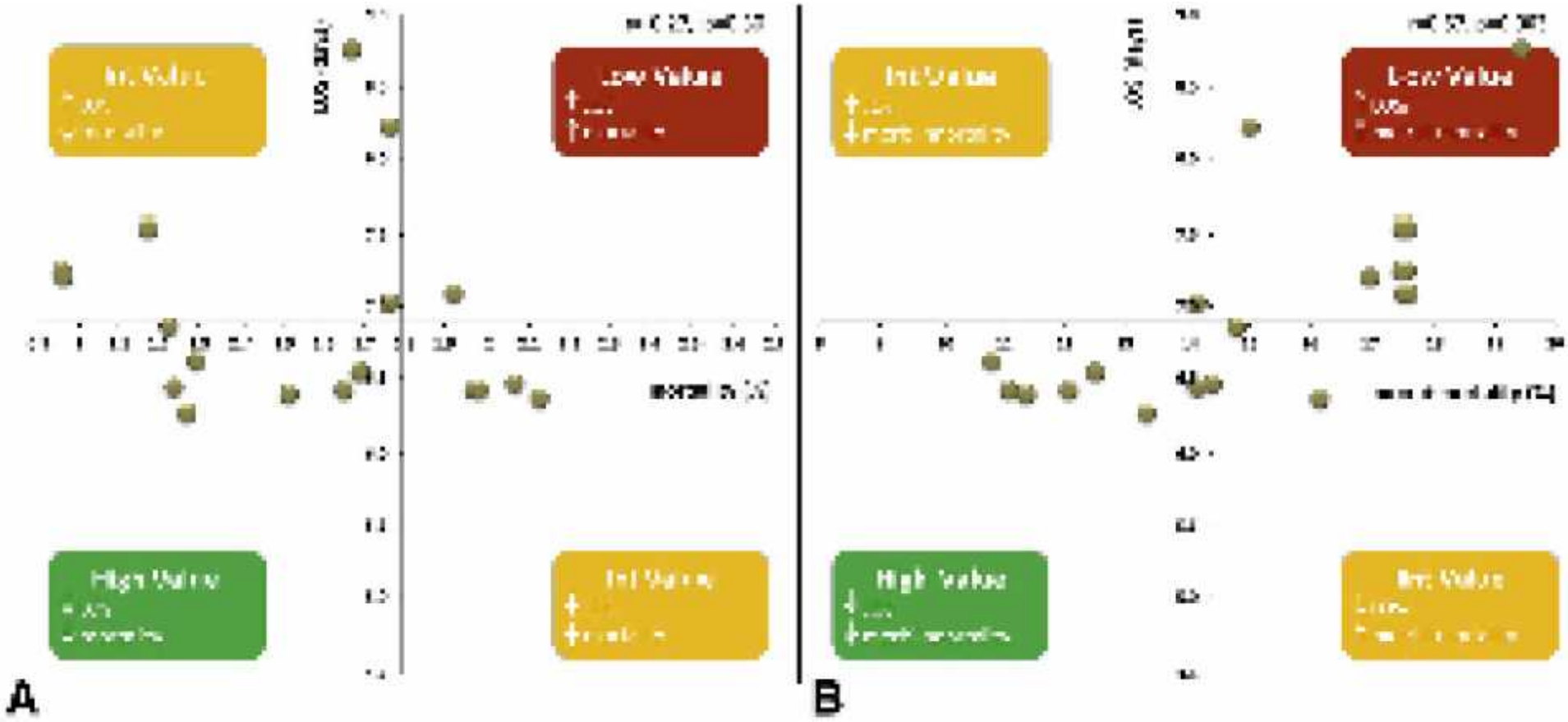

¿Crisis? ¿Qué crisis?


Hemodinamica
Nefrología
Anestesia
GRACIAS
EL PACIEI
UN
SERVIDOR
Cardiólogo clínico