Des études, des études et encore des études !

Dr. Jean Buithieu, cardiologue interniste, Hôpital Royal Victoria - MUHC

Dr. Marc Jolicœur, cardiologue, Institut de Cardiologie de Montréal, Université de Montréal

Conflit intérêt (Marc Jolicoeur)

Research Grants (significant):
AstraZeneca,
Boston Scientific, Philips

Dr. Jolicoeur is supported by research grants from the FRSQ and the CIHR

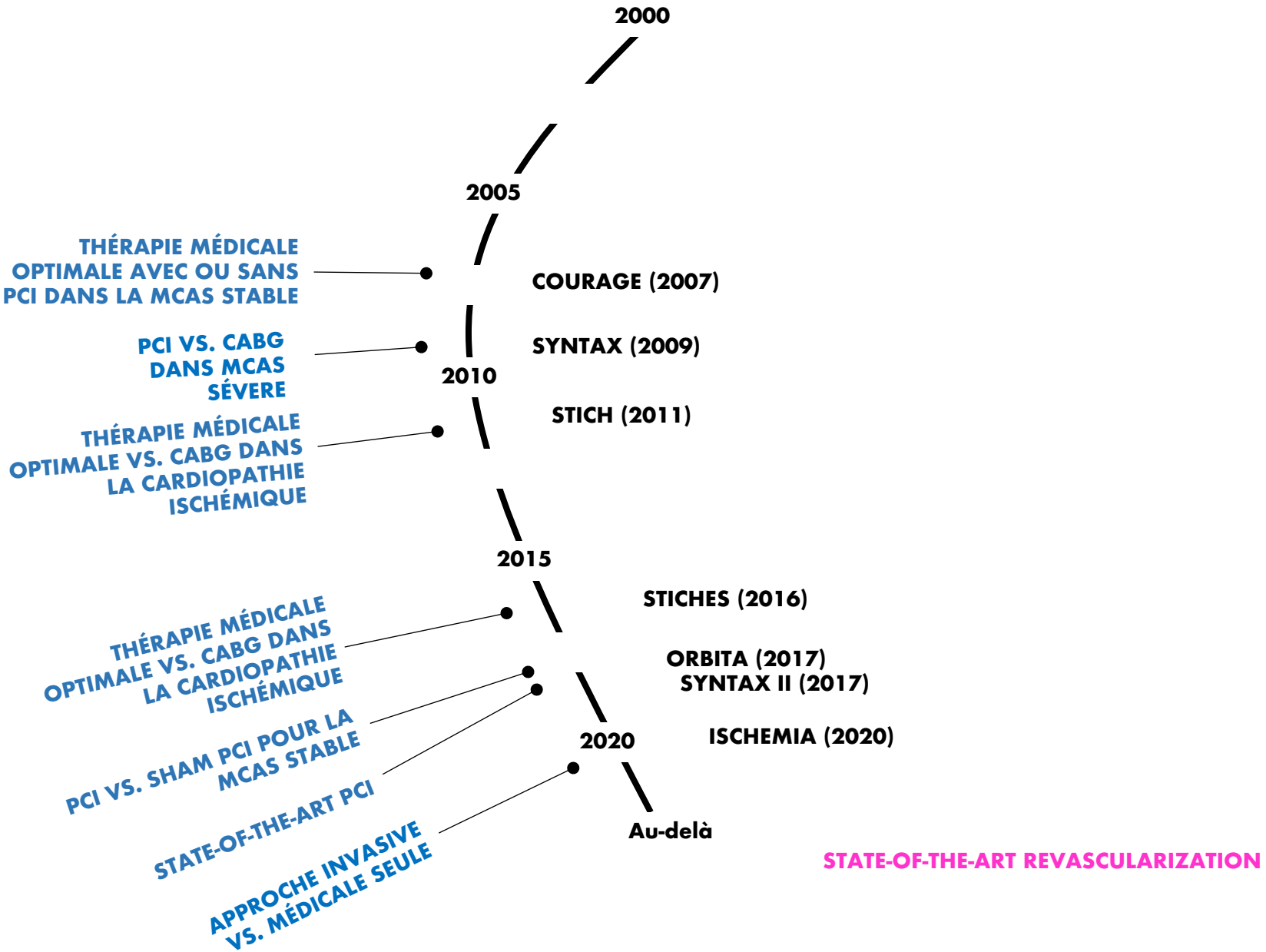
Fonds de la recherche en santé Québec

CIHR IRSC
Canadian Institutes of Health Research
Instituts de recherche en santé du Canada

Objectifs

- Réviser les faits marquants en MCAS au cours des 20 dernières années.
- Connaître les avenues diagnostiques et thérapeutiques futures possibles en MCAS au cours des 20 prochaines années.

- La revascularisation des syndromes ischémiques stables semble intuitive mais des incongruences émergent
- Pourtant, il demeure incertain si la stratification par ischémie et viabilité sont fiables sur le plan pronostique
- Ou si même le revascularisation (par angioplastie) améliore les symptômes


2000
2005
THÉRAPIE MÉDICALE OPTIMALE AVEC OU SANS PCI DANS LA MCAS STABLE
COURAGE (2007)
PCI VS. CABG DANS MCAS SÉVERE
SYNTAX (2009)
2010
THÉRAPIE MÉDICALE OPTIMALE VS. CABG DANS LA CARDIOPATHIE ISCHÉMIQUE
STICH (2011)
2015
STICHES (2016)
THÉRAPIE MÉDICALE OPTIMALE VS. CABG DANS LA CARDIOPATHIE ISCHÉMIQUE
ORBITA (2017)
SYNTAX II (2017)
PCI VS. SHAM PCI POUR LA MCAS STABLE
2020
ISCHEMIA (2020)
STATE-OF-THE-ART PCI
APPROCHE INVASIVE VS. MÉDICALE SEULE
Au-delà
STATE-OF-THE-ART REVASCULARIZATION

COURAGE

The NEW ENGLAND JOURNAL of MEDICINE

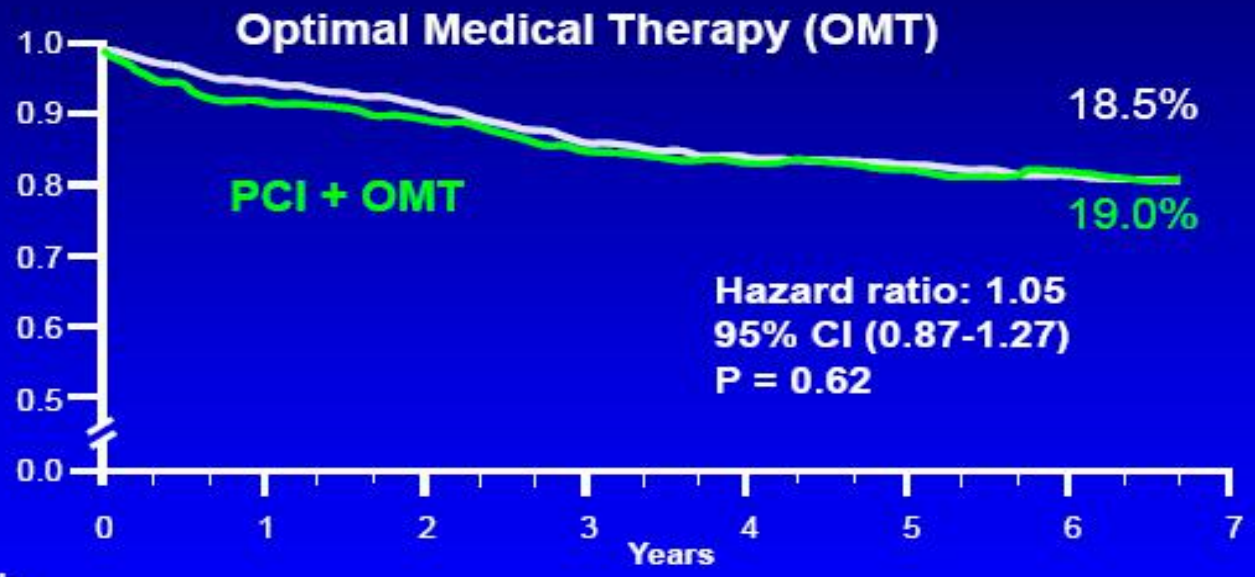
ESTABLISHED IN 1812 APRIL 12, 2007 VOL. 356 NO. 15

Optimal Medical Therapy with or without PCI for Stable Coronary Disease

William E. Boden, M.D., Robert A. O'Rourke, M.D., Koon K. Teo, M.B., B.Ch., Ph.D., Pamela M. Hartigan, Ph.D., David J. Maron, M.D., William J. Kostuk, M.D., Merril Knudtson, M.D., Marcin Dada, M.D., Paul Casperson, Ph.D., Crystal L. Harris, Pharm.D., Bernard R. Chaitman, M.D., Leslee Shaw, Ph.D., Gilbert Gosselin, M.D., Shah Nawaz, M.D., Lawrence M. Title, M.D., Gerald Gau, M.D., Alvin S. Blaustein, M.D., David C. Booth, M.D., Eric R. Bates, M.D., John A. Spertus, M.D., M.P.H., Daniel S. Berman, M.D., G.B. John Mancini, M.D., and William S. Weintraub, M.D., for the COURAGE Trial Research Group*

Déterminer si l'ajout de l'ICP au traitement médical optimal, lorsqu'il est utilisé comme stratégie de prise en charge initiale, réduit le risque de décès ou d'infarctus du myocarde chez les patients atteints de MCAS vs. le traitement médical optimal seul

PCI Did Not Reduce Death or MI



Number at Risk

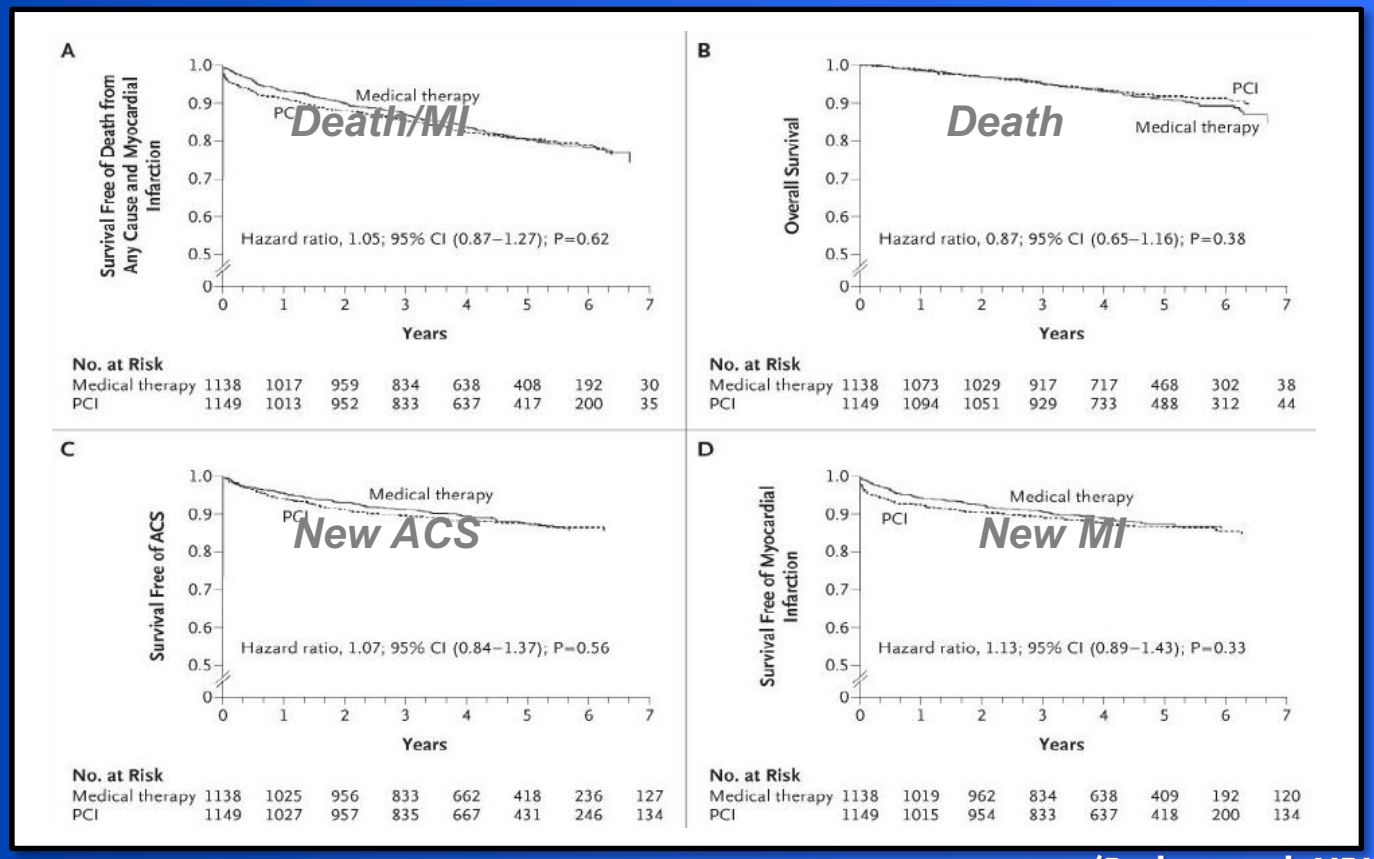
Medical Therapy	1138	1017	959	834	638	408	192	30
PCI	1149	1013	952	833	637	417	200	35

ISCHEMIA [7.22.2011]

Boden et al NEJM 2007

COURAGE: Points d'aboutissement primaire et secondaire

En comparaison au traitement médical seul, la PCI n'apporte aucun **avantage supplémentaire sur les mortality/IM, Mortalité, IM ou de SCA**



(Boden, et al. NEJM 2007;356:1503

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 AUGUST 14, 2008 VOL. 359 NO. 7

Effect of PCI on Quality of Life in Patients with Stable Coronary Disease

William S. Weintraub, M.D., John A. Spertus, M.D., M.P.H., Paul Kolm, Ph.D., David J. Maron, M.D., Zefeng Zhang, M.D., Ph.D., Claudine Jurkovitz, M.D., M.P.H., Wei Zhang, M.S., Pamela M. Hartigan, Ph.D., Cheryl Lewis, R.N., Emir Veledar, Ph.D., Jim Bowen, B.S., Sandra B. Dunbar, D.S.N., Christi Deaton, Ph.D., Stanley Kaufman, M.D., Robert A. O'Rourke, M.D., Ron Goeree, M.S., Paul G. Barnett, Ph.D., Koon K. Teo, M.D., and William E. Boden, M.D., for the COURAGE Trial Research Group*

CONCLUSIONS

Among patients with stable angina, both those treated with PCI and those treated with optimal medical therapy alone had marked improvements in health status during follow-up. The PCI group had small, but significant, incremental benefits that disappeared by 36 months. (ClinicalTrials.gov number, NCT00007657.)

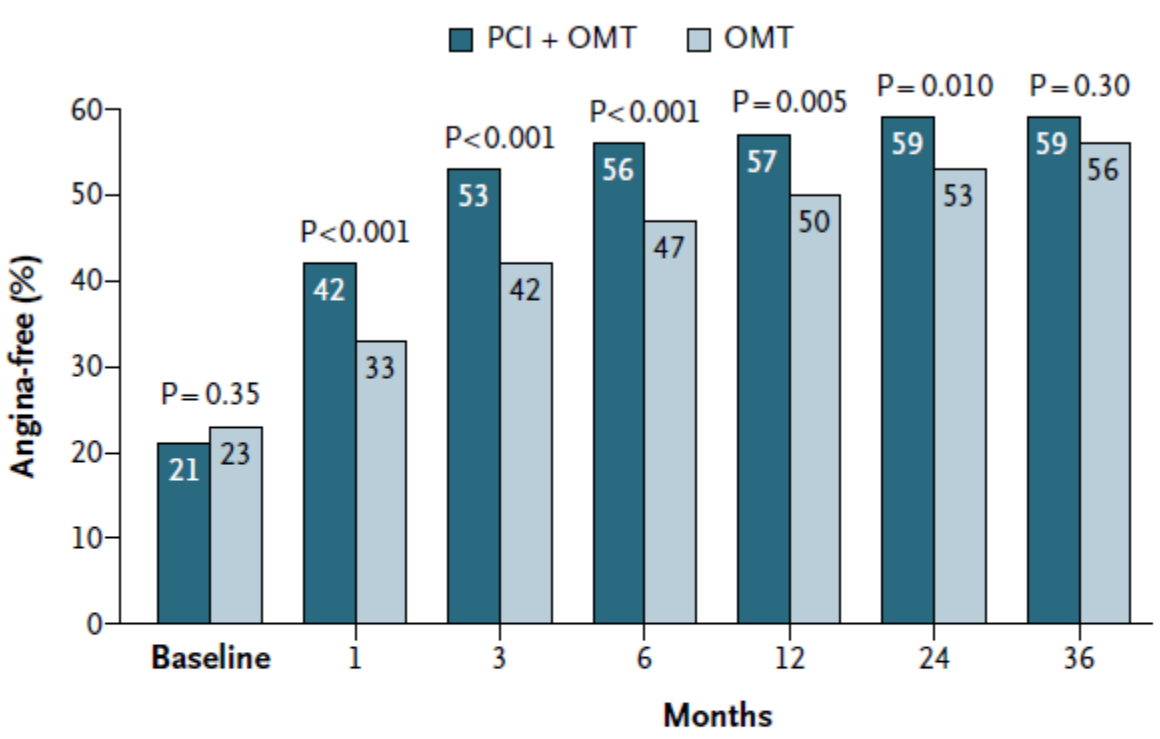
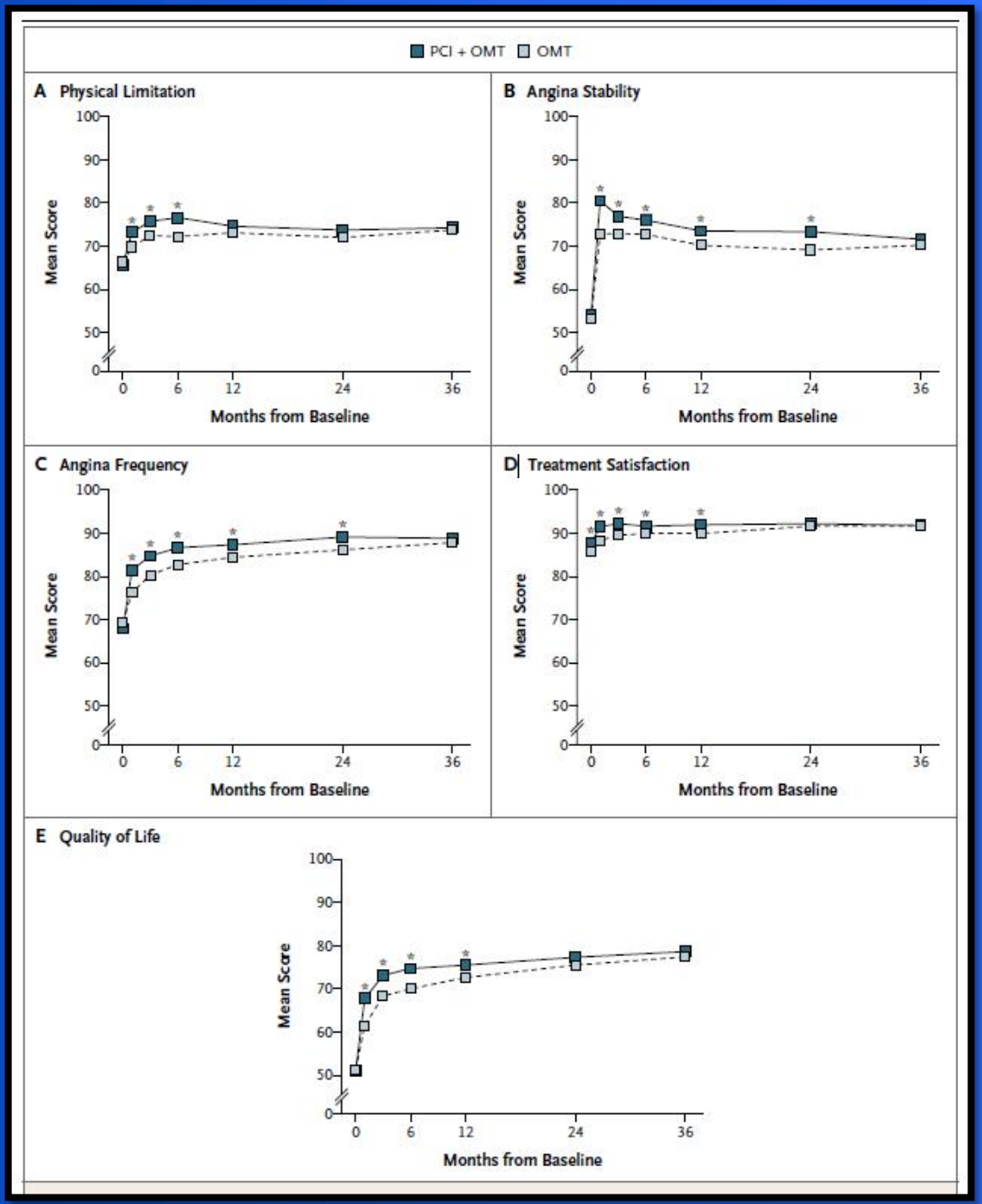


Figure 1. Freedom from Angina over Time as Assessed with the Angina-Frequency Scale of the Seattle Angina Questionnaire, According to Treatment Group.

OMT denotes optimal medical therapy, and PCI percutaneous coronary intervention.

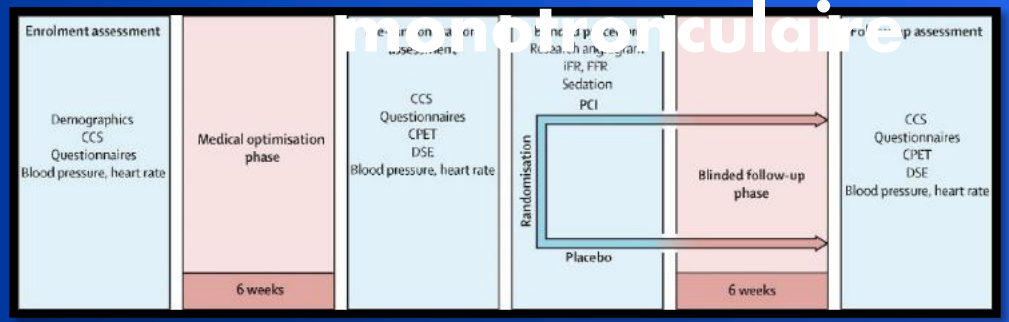

PCI + OMT
OMT
A Physical Limitation
B Angina Stability
C Angina Frequency
D Treatment Satisfaction
E Quality of Life
Mean Score
Months from Baseline
0
6
12
24
36
50
60
70
80
90
100

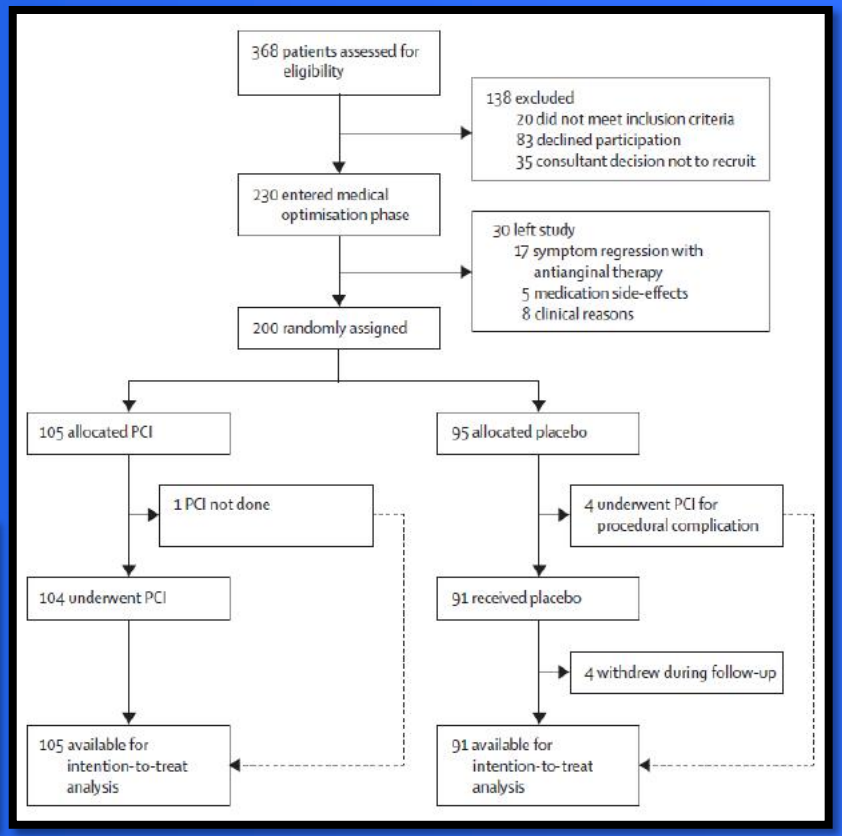
Lancet 2018; 391: 31–40

Percutaneous coronary intervention in stable angina (ORBITA): a double-blind, randomised controlled trial

*Rasha Al-Lamee, David Thompson, Hakim-Moulay Dehbi, Sayan Sen, Kare Tang, John Davies, Thomas Keeble, Michael Mielewczik, Raffi Kaprielian, Iqbal S Malik, Sukhjinder S Nijjer, Ricardo Petraco, Christopher Cook, Yousif Ahmad, James Howard, Christopher Baker, Andrew Sharp, Robert Gerber, Suneel Talwar, Ravi Assomull, Jamil Mayet, Roland Wensel, David Collier, Matthew Shun-Shin, Simon A Thom, Justin E Davies, Darrel P Francis, on behalf of the ORBITA investigators**

- **1ER essai avec groupe témoin placebo en double-aveugle comparant PCI à intervention factice chez patients avec MCAS et lésion > 70% monovasculaire**



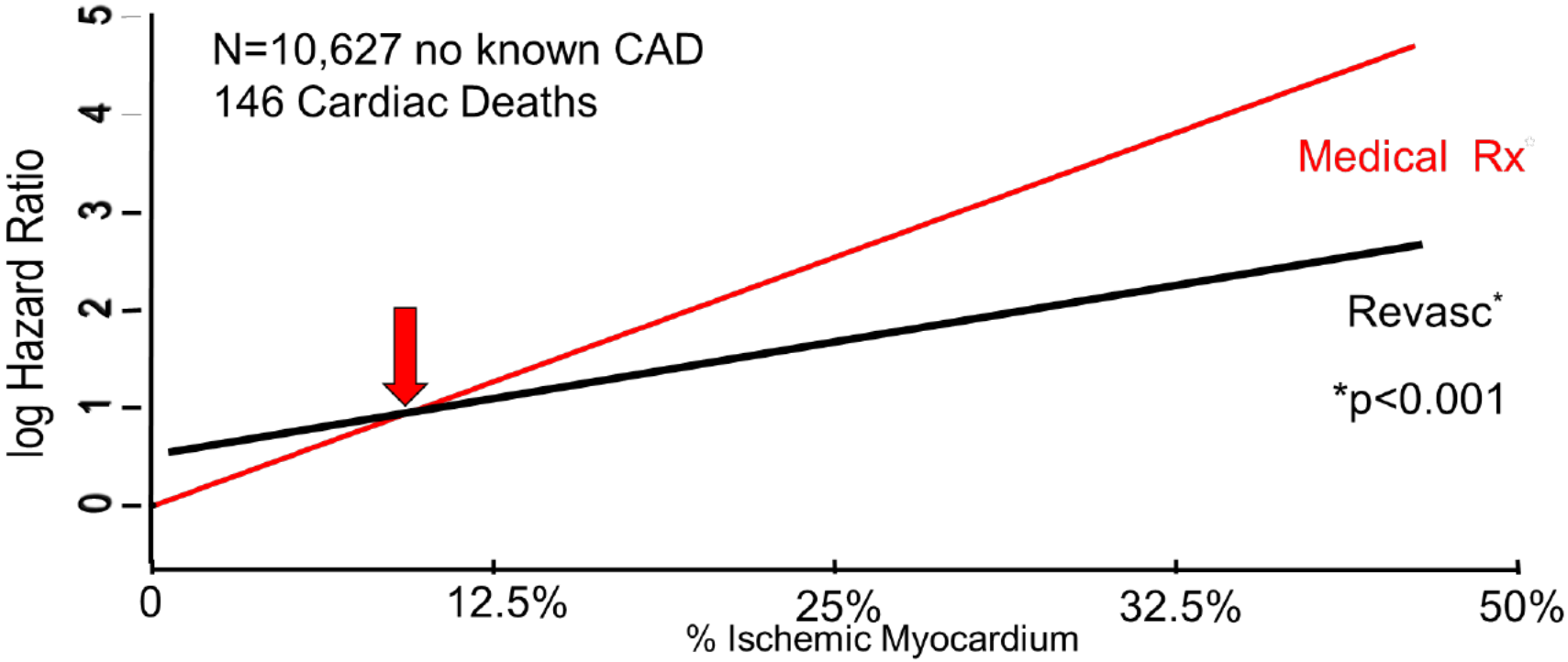


	PCI	Placebo
Exercise time (s)		
Patients assessed	104	90
Pre-randomisation	528·0 (178·7)	490·0 (195·0)
Follow-up	556·3 (178·7)	501·8 (190·9)
Increment (pre-randomisation to follow-up)	28·4 (95% CI 11·6 to 45·1)	11·8 (95% CI −7·8 to 31·3)
Difference in increment between groups	16·6 (95% CI −8·9 to 42·0)	..
p value	0·200	..
SAQ-angina frequency		
Patients assessed	103	90
Pre-randomisation	63·2 (20·4)	60·0 (25·1)
Follow-up	74·4 (21·4)	67·7 (22·1)
Increment (prerandomisation to follow-up)	11·2 (20·3; 95% CI 7·2 to 15·1)	7·7 (22·7; 95% CI 2·9 to 12·4)
Difference in increment between groups	3·5 (95% CI −2·6 to 9·6)	..
p value	0·260	..

MAIS POUR QUEL SYNDROME ISCHÉMIQUE STABLE FAUT-IL RÉSERVER LA REVASCULARISATION ALORS?

Art: Antoine Tava; « Screeming heart »

Données observationelles: Revascularisation associée à une mortalité moindre seulement si charge ischémique >10% à l'imagerie médicale



Une charge ischémique sévère signifie une augmentation des risques de mourir, soit d'arythmies ou encore d'infarctus/SCA

Hachamovitch Circulation 2003;107:2900-

International Study Of Comparative Health Effectiveness With Medical And Invasive Approaches (ISCHEMIA):

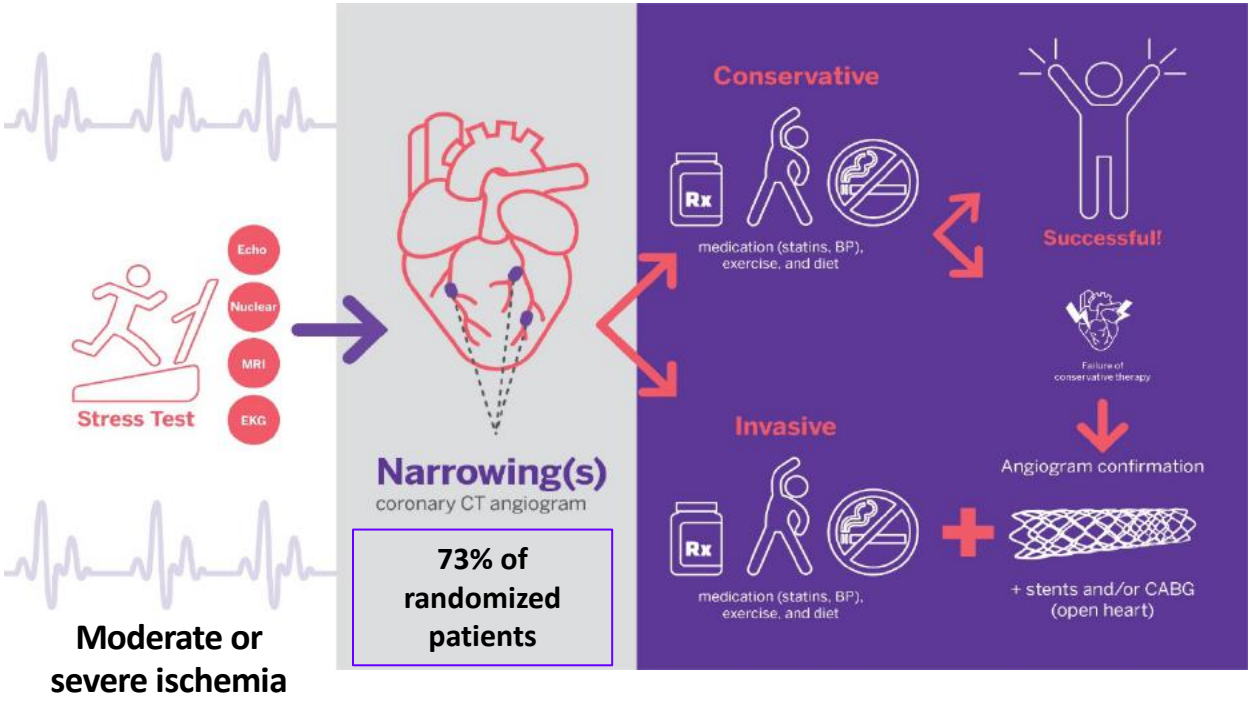
Primary Report of Clinical Outcomes

Funded by the National Heart, Lung, and Blood Institute

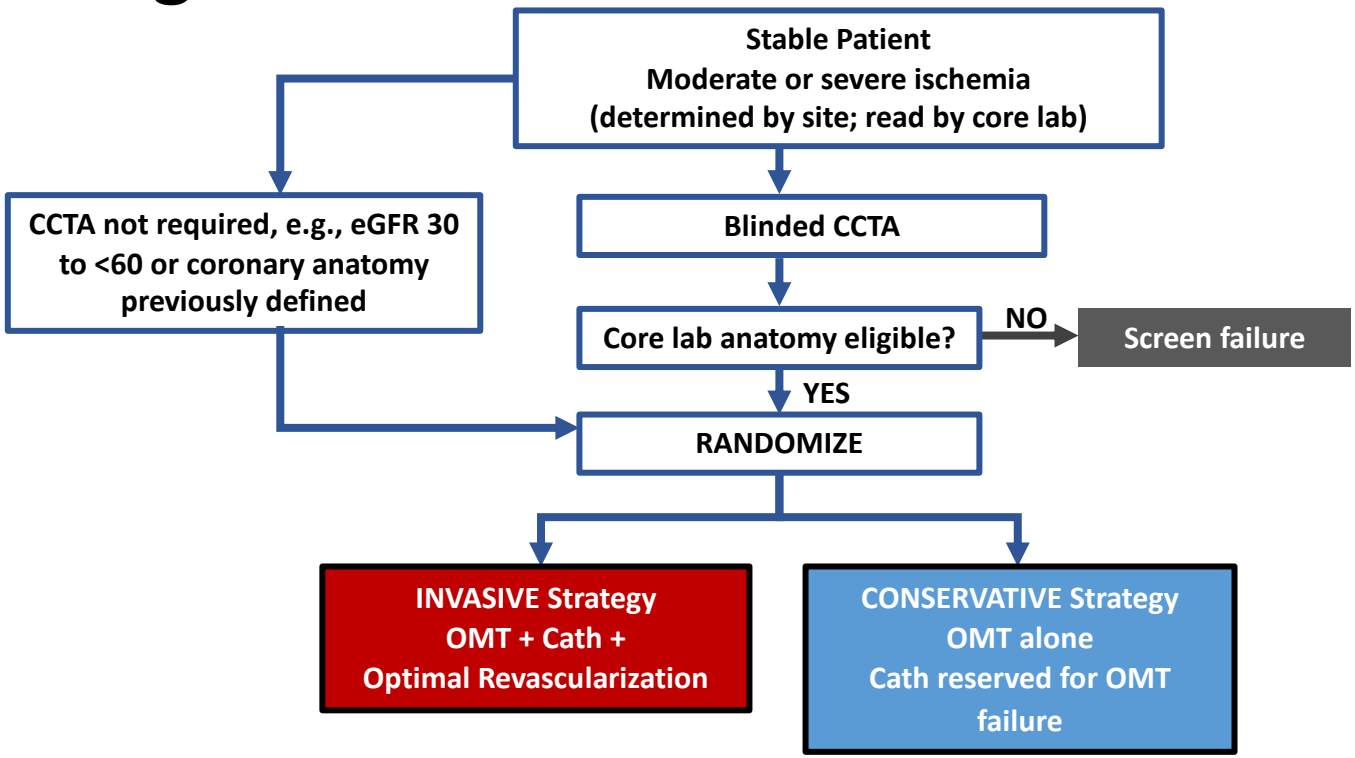
Judith S. Hochman, MD
NYU School of Medicine
On behalf of the ISCHEMIA Research Group

ISCHEMIA – Question de recherche

- **Y a-t-il une bénéfice à la coronarographie ± revascularisation , chez des patients avec syndrome ischémique stable et démontrant une ischémique modérée ou sévère à l'imagerie?**



Study Design



Maron DJ, et al. American Heart Journal. 2018; 201;124-135.

Eligibility Criteria

Clinical and Stress Test Eligibility Criteria

Inclusion Criteria

- Age ≥21 years
- Moderate or severe ischemia*
  - Nuclear ≥10% LV ischemia (summed difference score ≥7)
  - Echo ≥3 segments stress-induced moderate or severe hypokinesis, or akinesis
  - CMR
    - Perfusion: ≥12% myocardium ischemic, and/or
    - Wall motion: ≥3/16 segments with stress-induced severe hypokinesis or akinesis
  - Exercise Tolerance Testing (ETT) ≥1.5mm ST depression in ≥2 leads or ≥2mm ST depression in single lead at <7 METS, with angina

Major Exclusion Criteria

- NYHA Class III-IV HF
- Unacceptable angina despite medical therapy
- EF < 35%
- ACS within 2 months
- PCI or CABG within 1 year
- eGFR <30 mL/min or on dialysis

CCTA Eligibility Criteria

Inclusion Criteria

- ≥50% stenosis in a major epicardial vessel (stress imaging participants)
- ≥70% stenosis in a proximal or mid vessel (ETT participants)

Major Exclusion Criteria

- ≥50% stenosis in unprotected left main

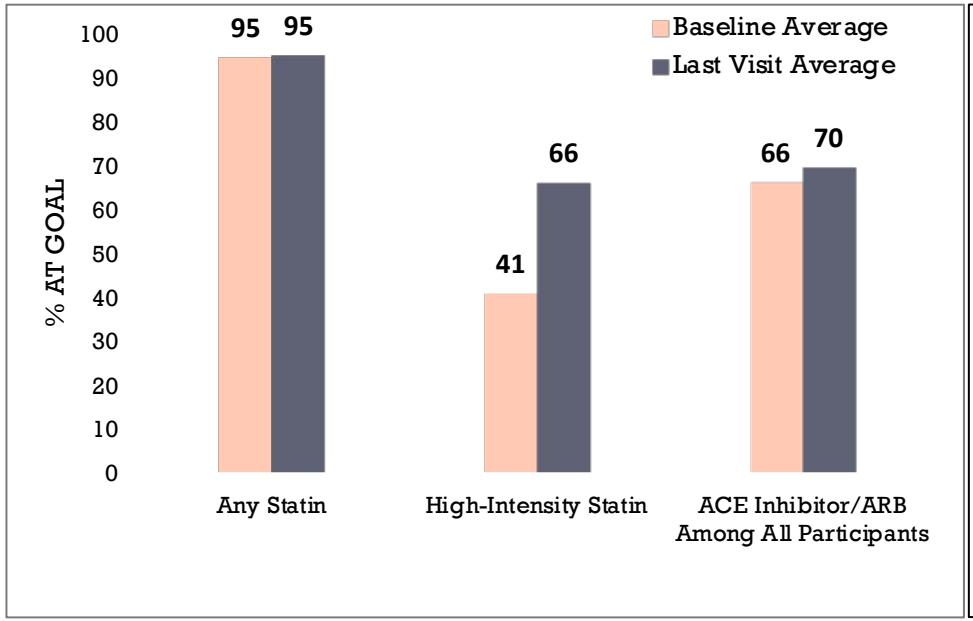
**Ischemia eligibility determined by sites. All stress tests interpreted at core labs.*

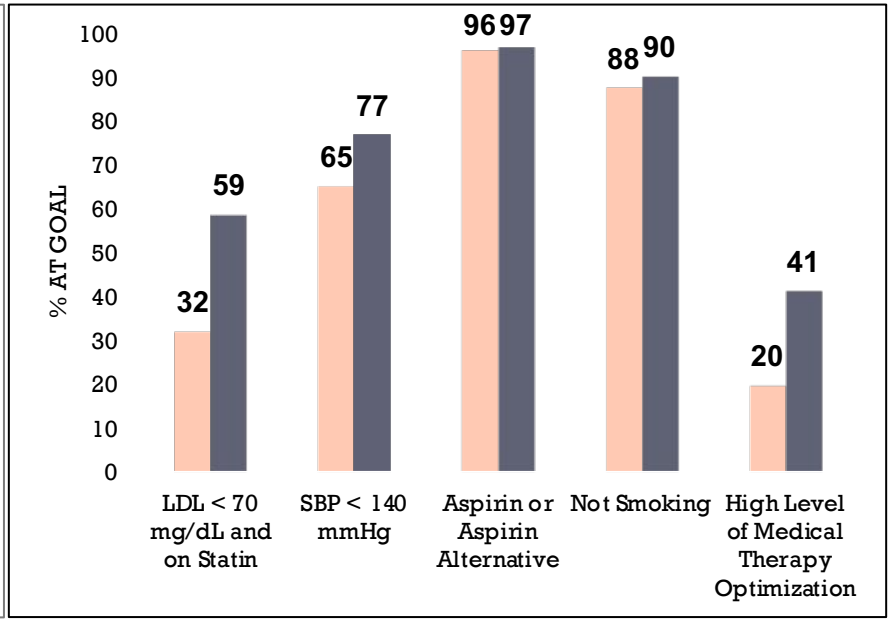
Maron DJ, et al. American Heart Journal. 2018; 201;124-135.

Risk Factor Management

Baseline vs last visit

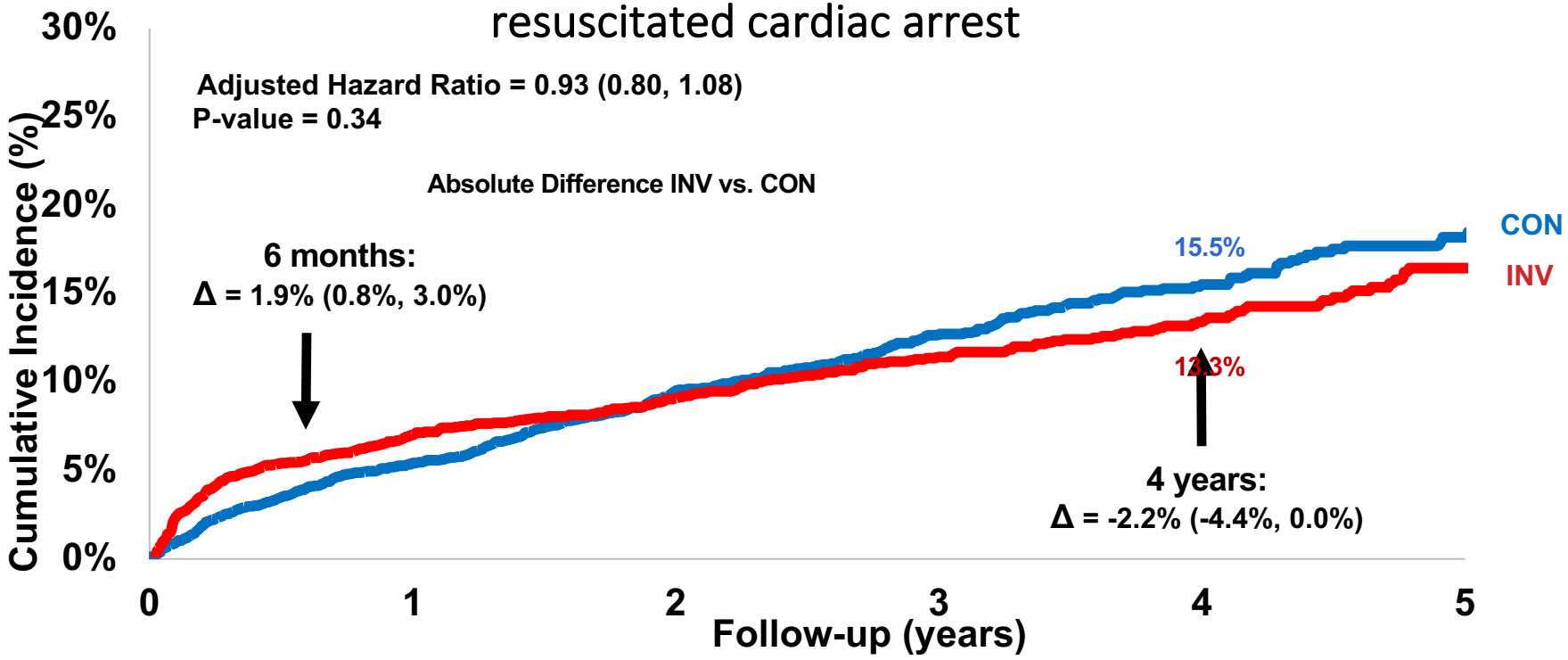
No between group differences INV vs CON





High Level of Medical Therapy Optimization is defined as a participant meeting all of the following goals: LDL < 70 mg/dL and on any statin, systolic blood pressure < 140 mm/Hg, on aspirin or other antiplatelet or anticoagulant, and not smoking. High level of medical therapy optimization is missing if any of the individual goals are missing.

Primary Outcome: CV Death, MI, hospitalization for UA, HF or resuscitated cardiac arrest



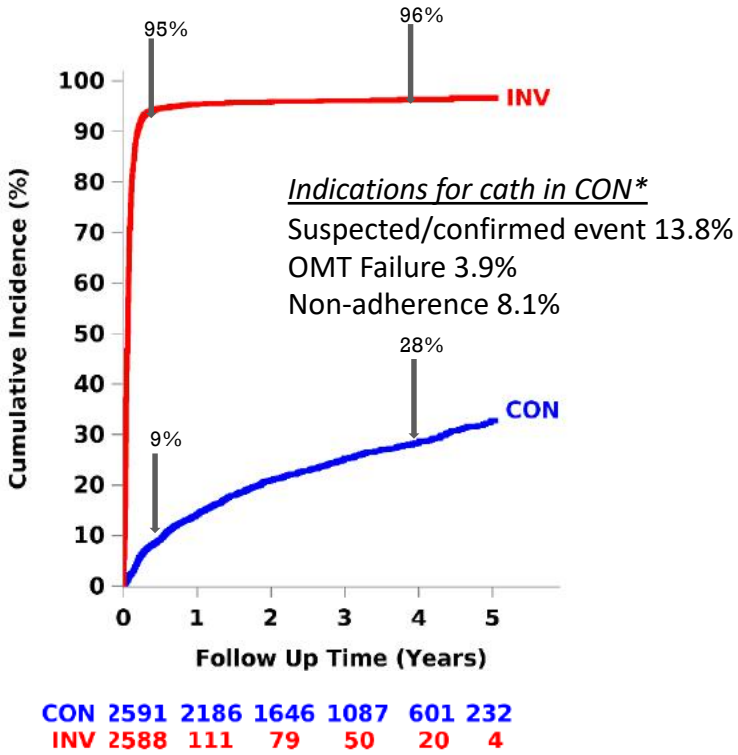
Subjects at Risk

CON	2591	2431	1907	1300	733	293
INV	2588	2364	1908	1291	730	271

ISCHEMIA

Cardiac Catheterization and Revascularization

Cardiac Catheterization



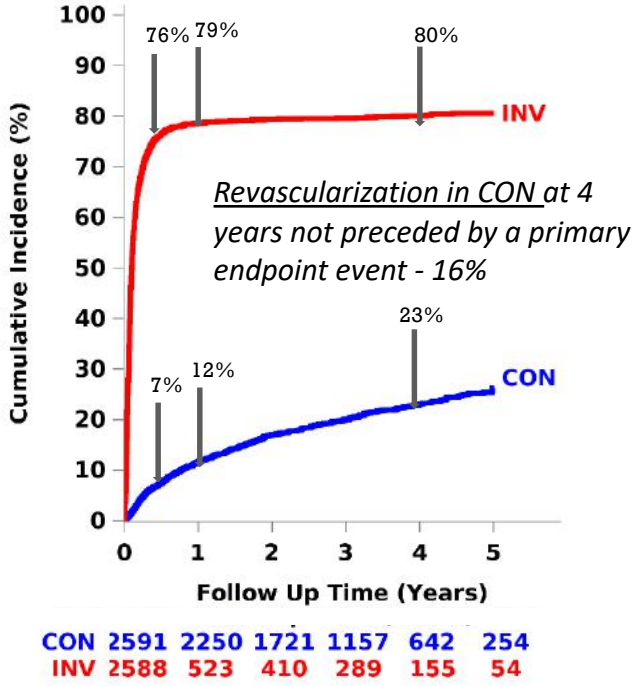
*Indications for cath in CON**

Suspected/confirmed event 13.8%

OMT Failure 3.9%

Non-adherence 8.1%

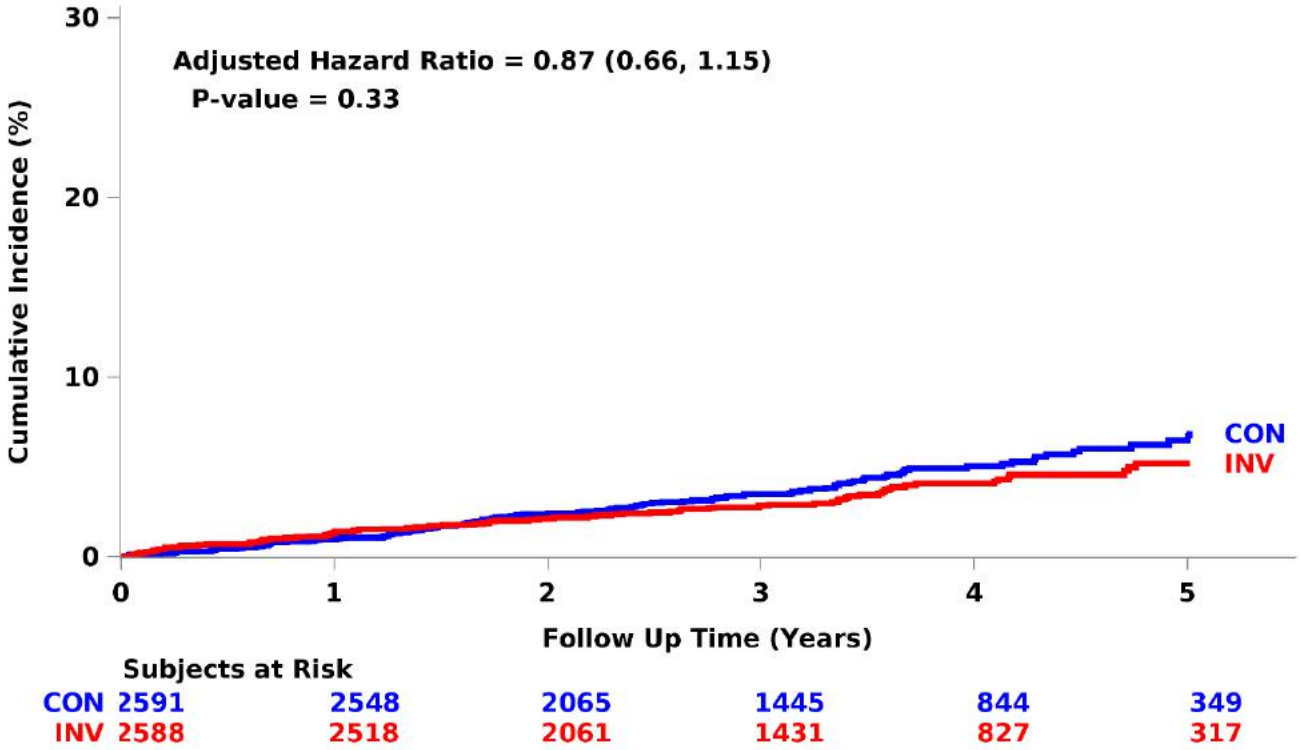
Revascularization



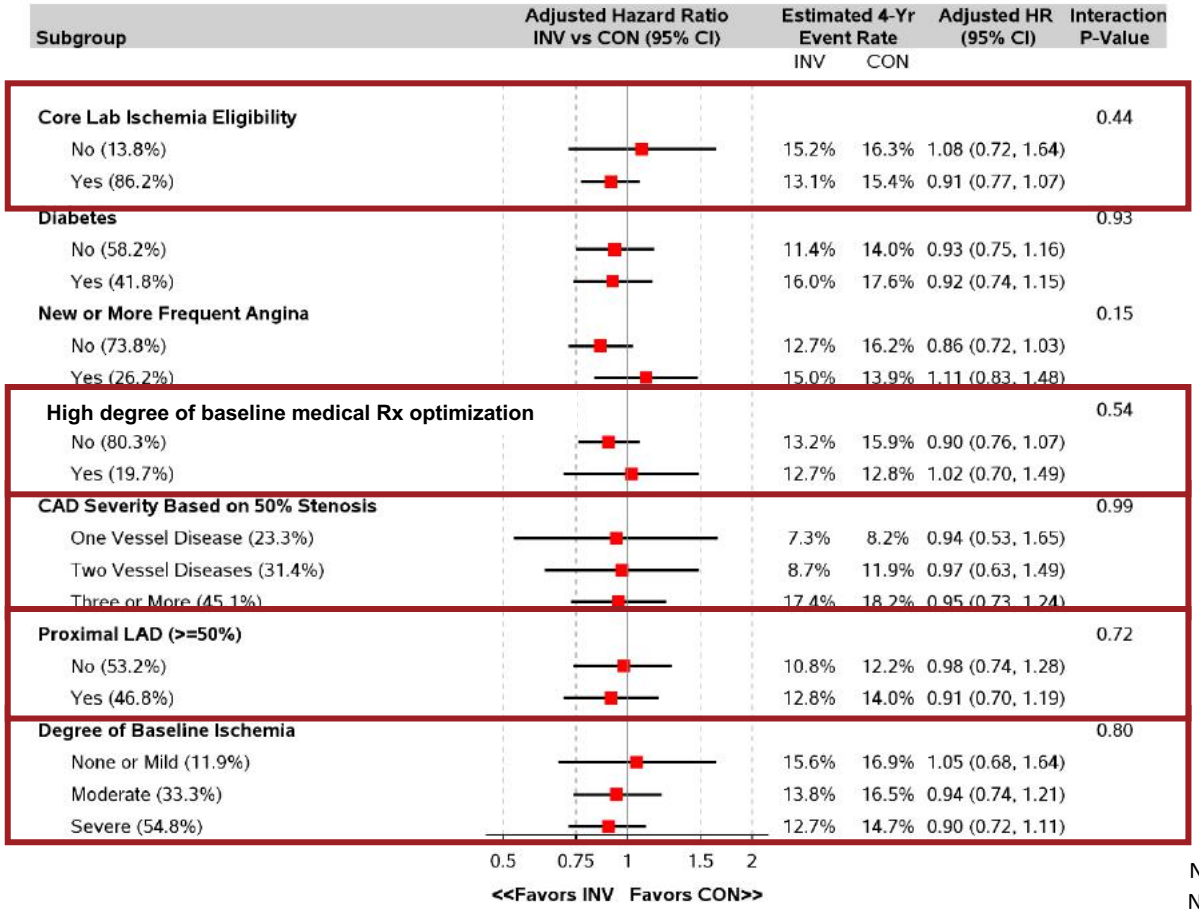
Revascularization in CON at 4 years not preceded by a primary endpoint event - 16%

*Indications for Cath are percentages of CON patients whereas cumulative event rate shown at 4 years reflects censoring and the rate at that time point.

Cardiovascular Death



Primary endpoint
Pre-specified Important Subgroups
There was no heterogeneity of treatment effect



N=3739 for Prox LAD Y/N
N=2982 for # diseased vessels

The NEW ENGLAND JOURNAL of MEDICINE

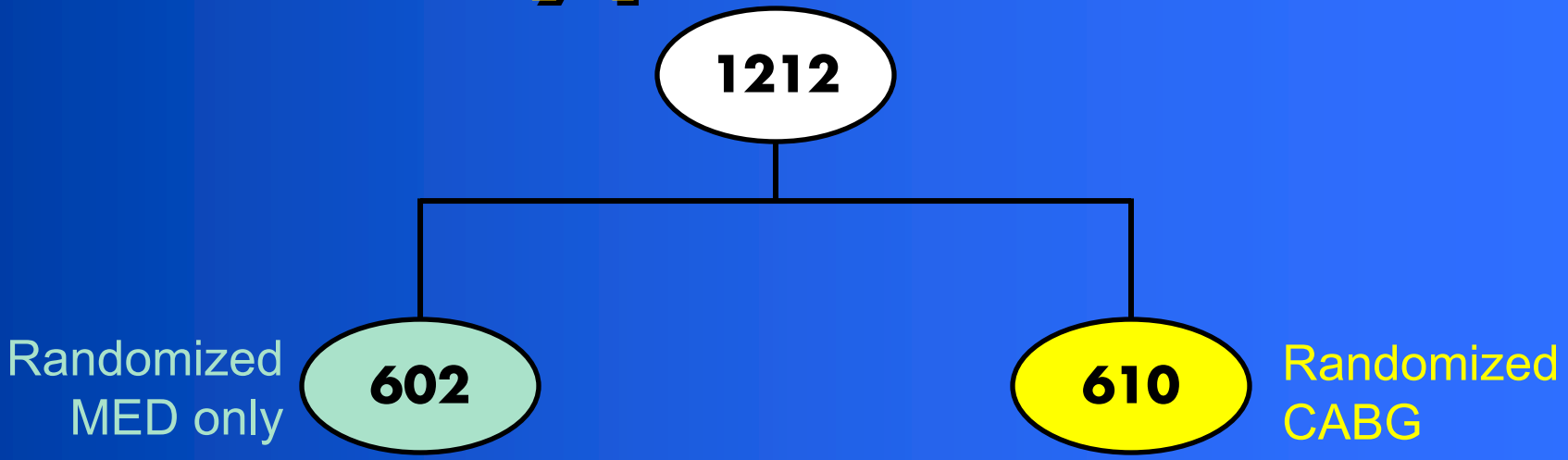
ESTABLISHED IN 1812 APRIL 21, 2016 VOL. 374 NO. 16

Coronary-Artery Bypass Surgery in Patients with Ischemic Cardiomyopathy

Eric J. Velazquez, M.D., Kerry L. Lee, Ph.D., Robert H. Jones, M.D., Hussein R. Al-Khalidi, Ph.D., James A. Hill, M.D., Julio A. Panza, M.D., Robert E. Michler, M.D., Robert O. Bonow, M.D., Torsten Doenst, M.D., Mark C. Petrie, M.D., Jae K. Oh, M.D., Lilin She, Ph.D., Vanessa L. Moore, A.A.S., Patrice Desvigne-Nickens, M.D., George Sopko, M.D., M.P.H., and Jean L. Rouleau, M.D., for the STICHES Investigators*

Chez les patients atteints de cardiopathie ischémique (FEVG<35%) avec une MCAS significative amenable a revascularisation, les pontages + MED invasif réduiront la mortalité totale vs. MED invasif seule.

STICH Revascularization Hypothesis

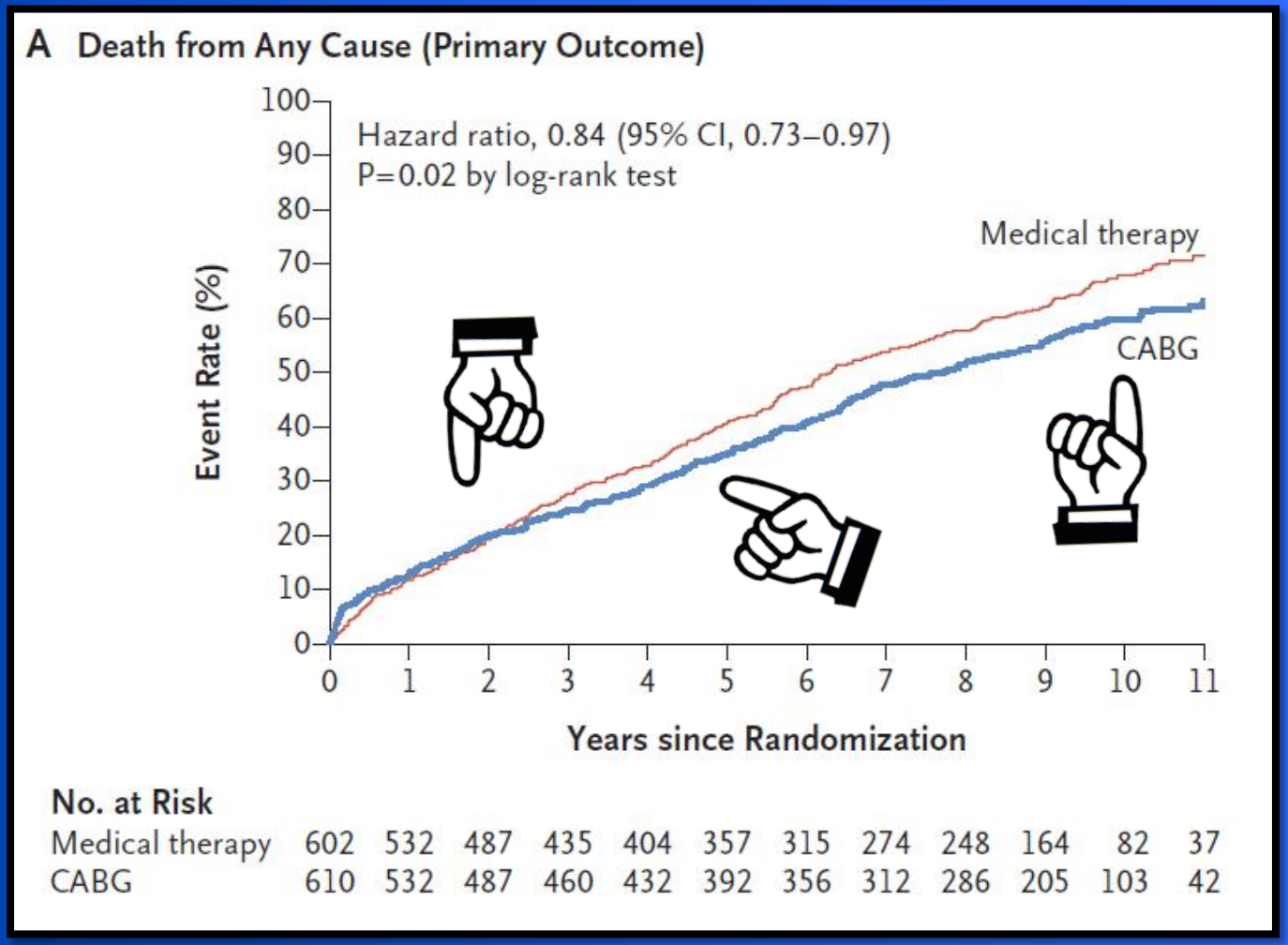


- 99 clinical sites in 22 countries
- Enrollment: July 2002 – May 2007

Medical Therapy

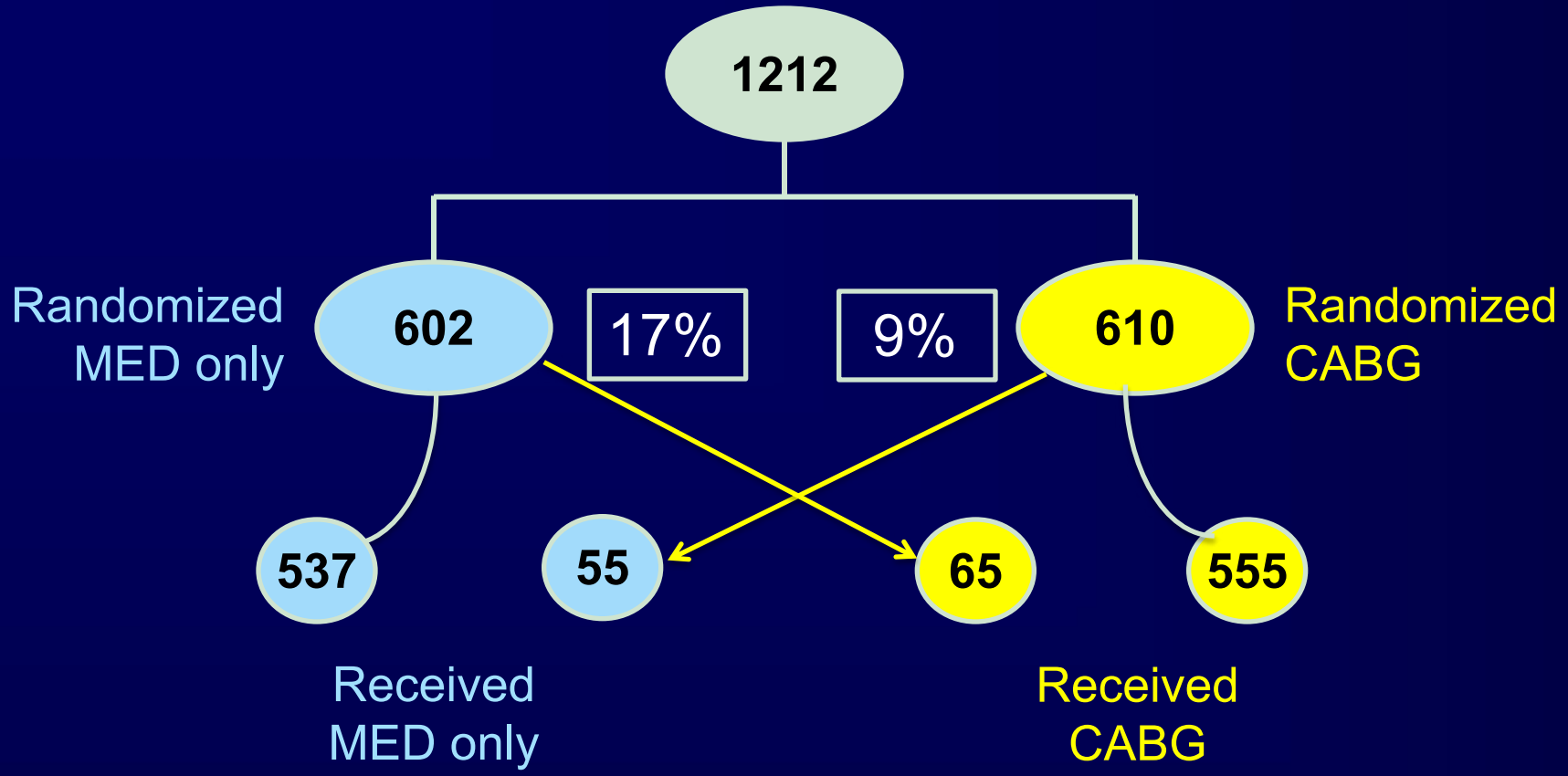
	MED (N=602)		CABG (N=610)	
Medication, %	**Baseline**	**Latest Follow-up**	**Baseline**	**Latest Follow-up**
Aspirin	85	84	80	84
Aspirin or warfarin	91	93	84	92
ACE inhibitor or ARB	88	89	91	89
Beta-blocker	88	90	83	90
Statin	83	87	79	90
K+ sparing diuretic	46	53	46	54
ICD	2	19	2	15

STICHES


A Death from Any Cause (Primary Outcome)
Hazard ratio, 0.84 (95% CI, 0.73–0.97)
P=0.02 by log-rank test
Medical therapy
CABG
Event Rate (%)
100
90
80
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11
Years since Randomization
No. at Risk
Medical therapy 602 532 487 435 404 357 315 274 248 164 82 37
CABG 610 532 487 460 432 392 356 312 286 205 103 42

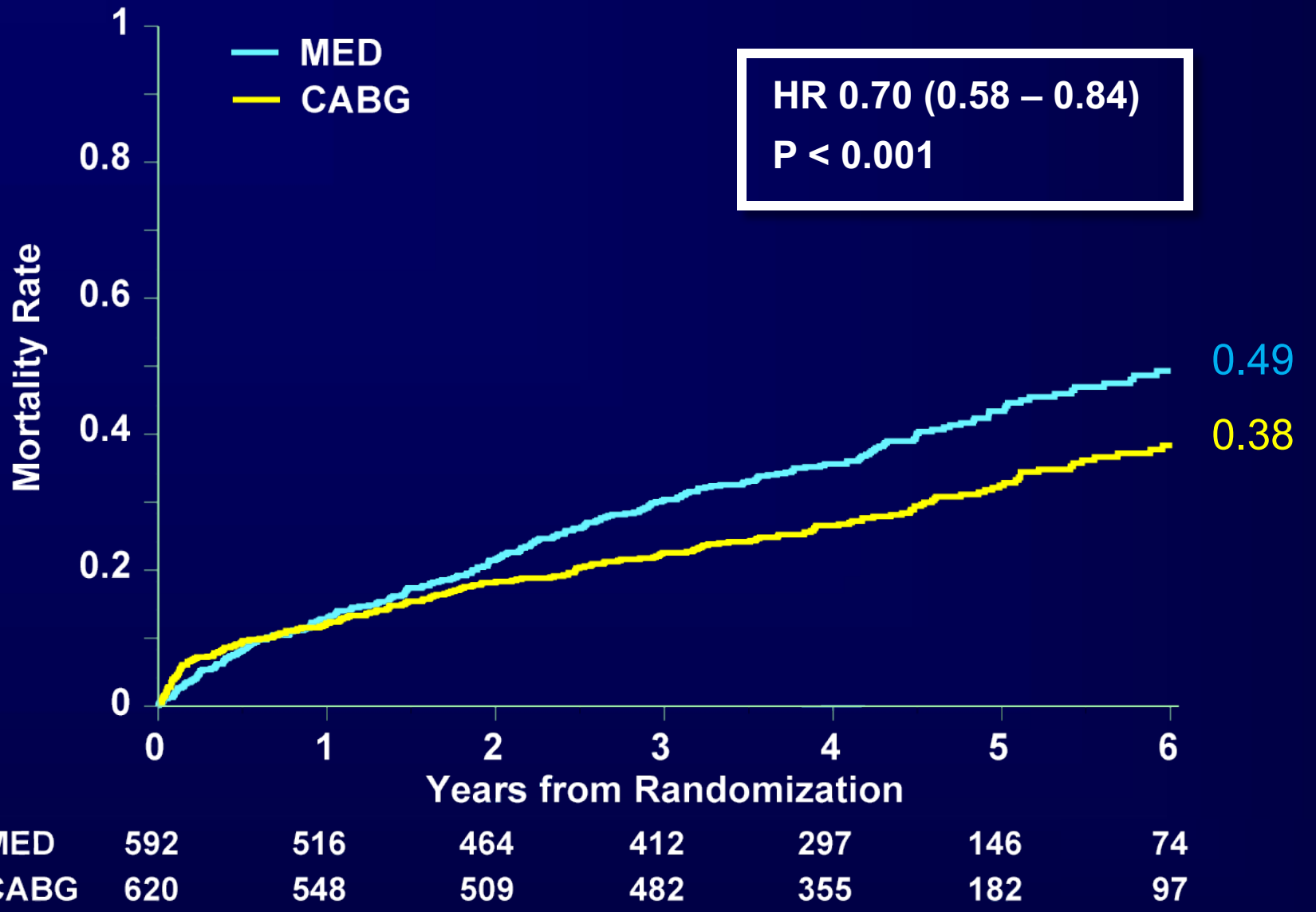
STICH Revascularization Hypothesis

Treatment As Received

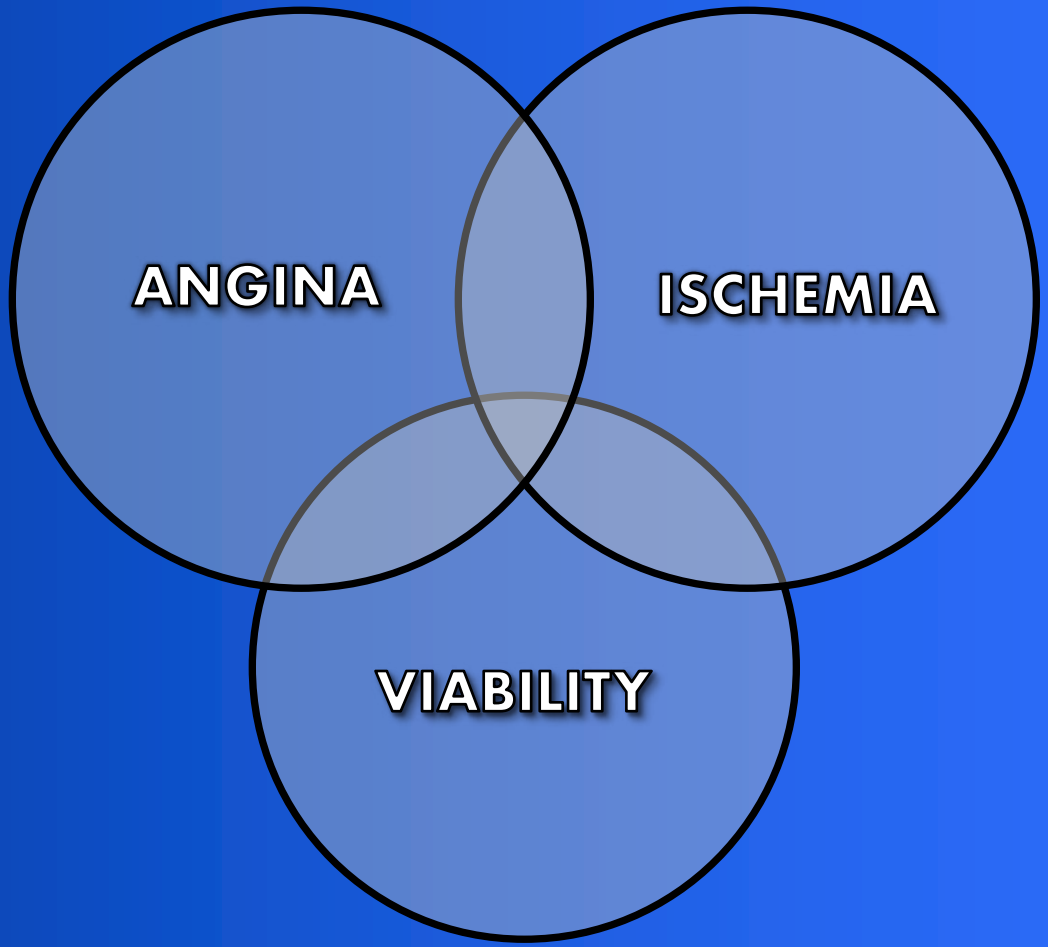


As treated MED (592) vs. CABG (620)

All-Cause Mortality — As Treated



MED	592	516	464	412	297	146	74
CABG	620	548	509	482	355	182	97


ANGINA
ISCHEMIA
VIABILITY

PRACTICE GUIDELINE

2013 ACCF/AHA Guideline for the Management of Heart Failure

A Report of the American College of Cardiology Foundation/ American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With the American College of Chest Physicians, H and International Society for Heart and Lung Transplantati

Endorsed by the American Association of Cardiovascular and Pulmonary

WRITING COMMITTEE MEMBERS*

Clyde W. Yancy, MD, MSc, FACC, FAHA, Chair†‡; Mariell Jessup, MD, FACC, FAHA, Vice Chair*†; Biykem Bozkurt, MD, Ph Javed Butler, MBBS, FACC, FAHA*†; Donald E. Casey, Jr, MD, MPH, MB Mark H. Drazner, MD, MSc, FACC, FAHA*†; Gregg C. Fonarow, MD, F Stephen A. Geraci, MD, FACC, FAHA, FCCP‡; Tamara Horwich, M James L. Januzzi, MD, FACC*†; Maryl R. Johnson, MD, FACC, Edward K. Kasper, MD, FACC, FAHA‡; Wayne C. Levy, MD, F Frederick A. Masoudi, MD, MSPH, FACC, FAHA‖#; Patrick E. McBride, M John J. V. McMurray, MD, FACC*†; Judith E. Mitchell, MD, FACC Pamela N. Peterson, MD, MSPH, FACC, FAHA‡; Barbara Riegel, DNSc Flora Sam, MD, FACC, FAHA‡; Lynne W. Stevenson, MD, FA W. H. Wilson Tang, MD, FACC*†; Emily J. Tsai, MD, FAC Bruce L. Wilkoff, MD, FACC, FHRS*†‡

ESC/EACTS GUIDELINES

Guidelines on myocardial revascularization

The Task Force on Myocardial Revascularizatio Society of Cardiology (ESC) and the European Cardio-Thoracic Surgery (EACTS)

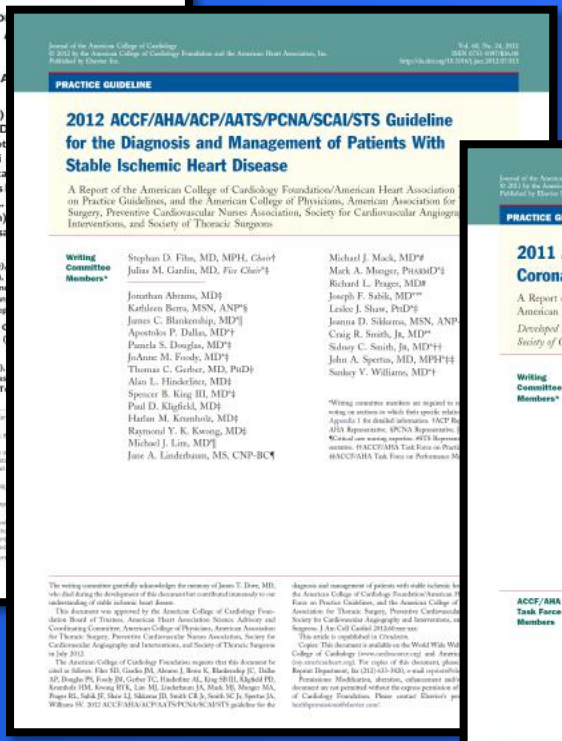
Developed with the special contribution of the European A for Percutaneous Cardiovascular Interventions (EAPCI)‡

Authors/Task Force Members: William Wijns (Chairperson) (Chairperson) (Belgium)*, Nicolas Danchin (France), Carlo D Volkmar Falk (Switzerland), Thierry Folliguet (France), Scot Kurt Huber (Austria), Stefan James (Sweden), Juhani Knuuti Lopez-Sendon (Spain), Jean Marco (France), Lorenzo Menica Miodrag Ostojic (Serbia), Massimo F. Piepoli (Italy), Charles Jose L. Pomar (Spain), Nicolaus Reifart (Germany), Flavio L. Martin J. Schalij (The Netherlands), Paul Sergeant (Belgium), (The Netherlands), Sigmund Silber (Germany), Miguel Sousa David Taggart (UK)

ESC Committee for Practice Guidelines: Alec Vahanian (Chairperson) (France), Jeroen Bax (The Netherlands), Claudio Ceconi (Italy), Veronica Dean (France), Christian Funck-Brentano (France), Richard Hobbs (UK), Peter Kearney (Irelan Bogdan A. Popescu (Romania), Zeljko Reiner (Croatia), Udo Sechtem (Germa Michal Tendera (Poland), Panos E. Vardas (Greece), Petr Widimsky (Czech Rep

EACTS Clinical Guidelines Committee: Philippe Kolh (Chairperson) (Belgium), C (UK), Stefano Elia (Italy), Pieter Kappetein (The Netherlands), Ulf Lockowandt Pascal Vouhe (France)

Document Reviewers: Peter Kearney (ESC CPG Review Coordinator) (Ireland), Review Coordinator) (Switzerland), Stefan Agewall (Norway), Alexander Aladas Dimitrios Alexopoulos (Greece), Manuel J. Antunes (Portugal), Enver Atalar (T



PRACTICE GUIDELINE

2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease

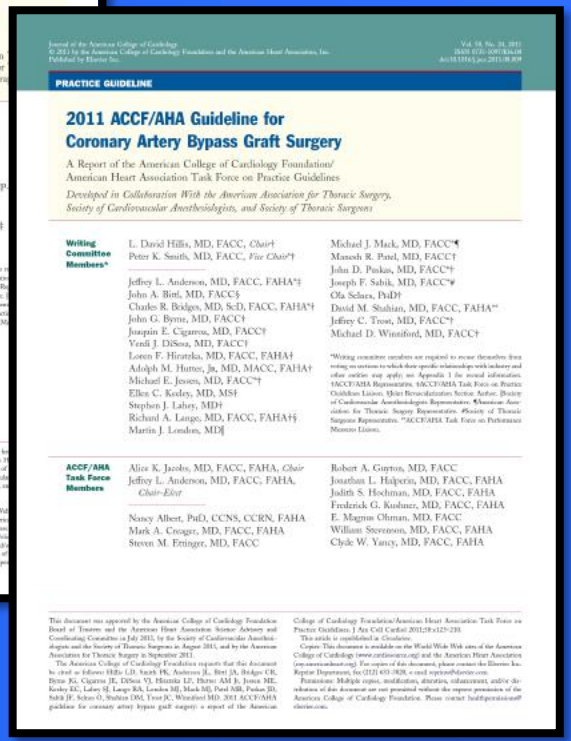
A Report of the American College of Cardiology Foundation/American Heart Association on Practice Guidelines, and the American College of Physicians, American Association for Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiogra Interventions, and Society of Thoracic Surgeons

Writing Committee Members*

Stephan D. Fihn, MD, MPH, *Chair*†
Julius M. Gardin, MD, *Vice Chair**‡

Jonathan Abrams, MD‡
Kathleen Berra, MSN, ANP*§
James C. Blankenship, MD*‖
Apostolos P. Dallas, MD*†
Pamela S. Douglas, MD*†
JoAnne M. Foody, MD*‡
Thomas C. Gerber, MD, PhD‡
Alan L. Hinderliter, MD‡
Spencer B. King III, MD*‡
Paul D. Klugfield, MD‡
Harlan M. Krumholz, MD‡
Raymond Y. K. Kwong, MD‡
Michael J. Lim, MD*‖
Jane A. Linderbaum, MS, CNP-BC¶
Michael J. Mack, MD*#
Mark A. Munger, PharmD*‡
Richard L. Prager, MD#
Joseph F. Sabik, MD**
Leslee J. Shaw, PhD*‡
Joanna D. Sikkema, MSN, ANP
Craig R. Smith, Jr, MD**
Sidney C. Smith, Jr, MD*†‡
John A. Spertus, MD, MPH*‡‡
Sankey V. Williams, MD*†

*Writing committee members are required to r voting on sections in which their specific relati Appendix 1 for detailed information. †ACP Re AHA Representative. ‖PCNA Representative. ¶Critical care nursing expertise. #STS Represen nutrition. **ACCF/AHA Task Force on Practi ††ACCF/AHA Task Force on Performance M



PRACTICE GUIDELINE

2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery

A Report of the American College of Cardiology Foundation/ American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With the American Association for Thoracic Surgery, Society of Cardiovascular Anesthesiologists, and Society of Thoracic Surgeons

Writing Committee Members*

L. David Hillis, MD, FACC, *Chair*†
Peter K. Smith, MD, FACC, *Vice Chair**†

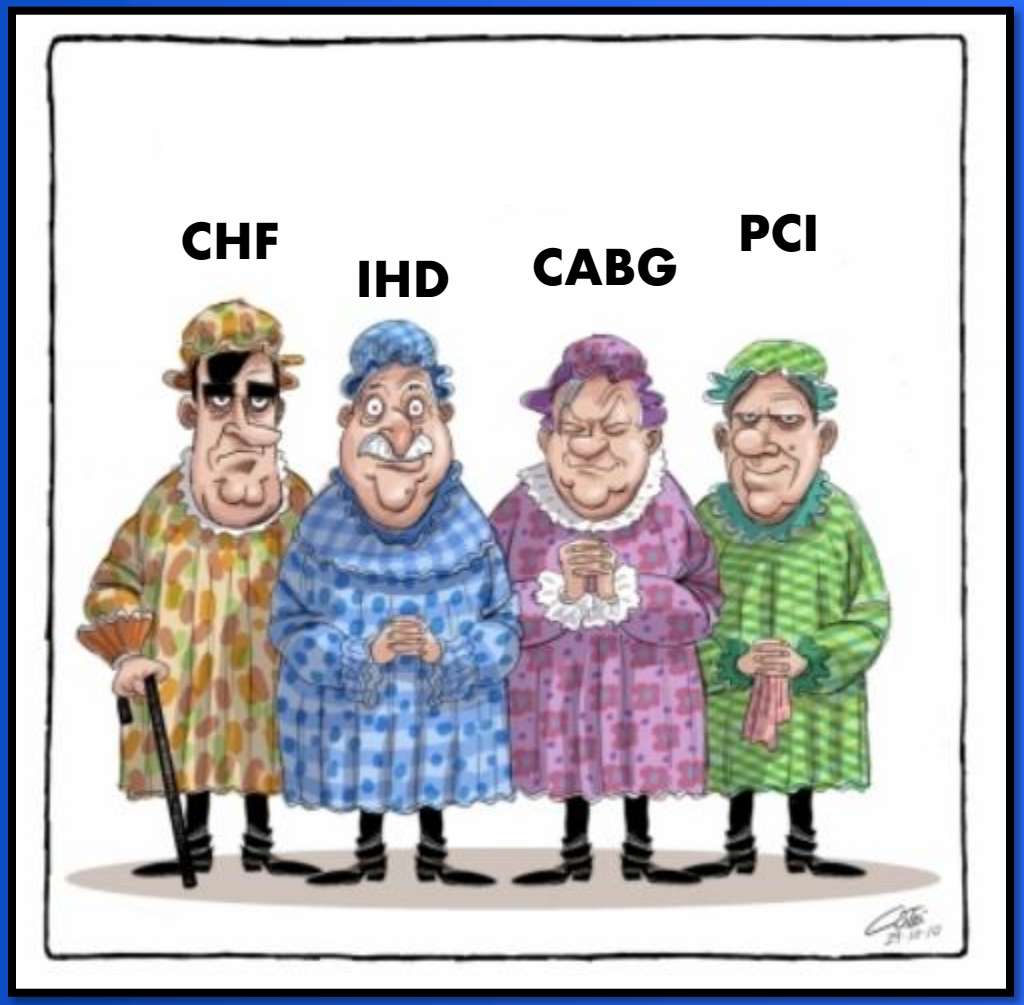
Jeffrey L. Anderson, MD, FACC, FAHA*‡
John A. Bittl, MD, FACC§
Charles R. Bridges, MD, ScD, FACC, FAHA*‖
John G. Byrne, MD, FACC¶
Joaquin E. Cigarroa, MD, FACC†
Lesli J. DiSesa, MD, FACC†
Loren F. Hiratzka, MD, FACC, FAHA†
Adolph M. Hutter, Jr, MD, MACC, FAHA†
Michael E. Jessen, MD, FACC*†
Ellen C. Keeley, MD, MS†
Stephen J. Lahey, MD†
Richard A. Lange, MD, FACC, FAHA‡‖
Martin J. London, MD‖
Michael J. Mack, MD, FACC*¶
Manesh R. Patel, MD, FACC†
John D. Puskas, MD, FACC*†
Joseph F. Sabik, MD, FACC*¶
Ola Selnes, PhD†
David M. Shahian, MD, FACC, FAHA**
Jeffrey C. Trost, MD, FACC*†
Michael D. Winniford, MD, FACC†

*Writing committee members are required to recuse themselves from voting on sections to which their specific relationships with industry and other entities may apply; see Appendix 1 for recusal information. †ACCF/AHA Representative. ‡ACCF/AHA Task Force on Practice Guidelines Liaison. §Joint Revascularization Section Author. ‖Society of Cardiovascular Anesthesiologists Representative. ¶American Association for Thoracic Surgery Representative. #Society of Thoracic Surgeons Representative. **ACCF/AHA Task Force on Performance Measures Liaison.

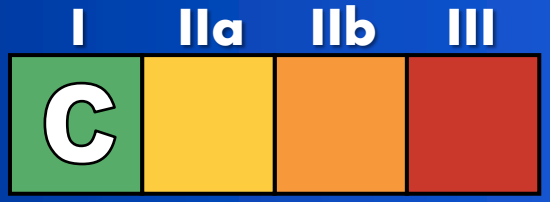
ACCF/AHA Task Force Members

Alice K. Jacobs, MD, FACC, FAHA, *Chair*
Jeffrey L. Anderson, MD, FACC, FAHA, *Chair-Elect*

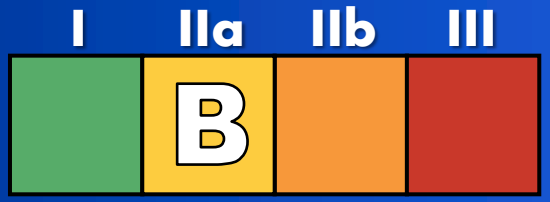
Nancy Albert, PhD, CCNS, CCRN, FAHA
Mark A. Creager, MD, FACC, FAHA
Steven M. Ettinger, MD, FACC
Robert A. Guyton, MD, FACC
Jonathan L. Halperin, MD, FACC, FAHA
Judith S. Hochman, MD, FACC, FAHA
Frederick G. Kushner, MD, FACC, FAHA
E. Magnus Ohman, MD, FACC
William Stevenson, MD, FACC, FAHA
Clyde W. Yancy, MD, FACC, FAHA


CHF
IHD
CABG
PCI

Recommendations for revascularization in CHF



CABG or PCI is indicated for HF patients on GDMT with angina and suitable coronary anatomy, especially significant left main stenosis or left main equivalent

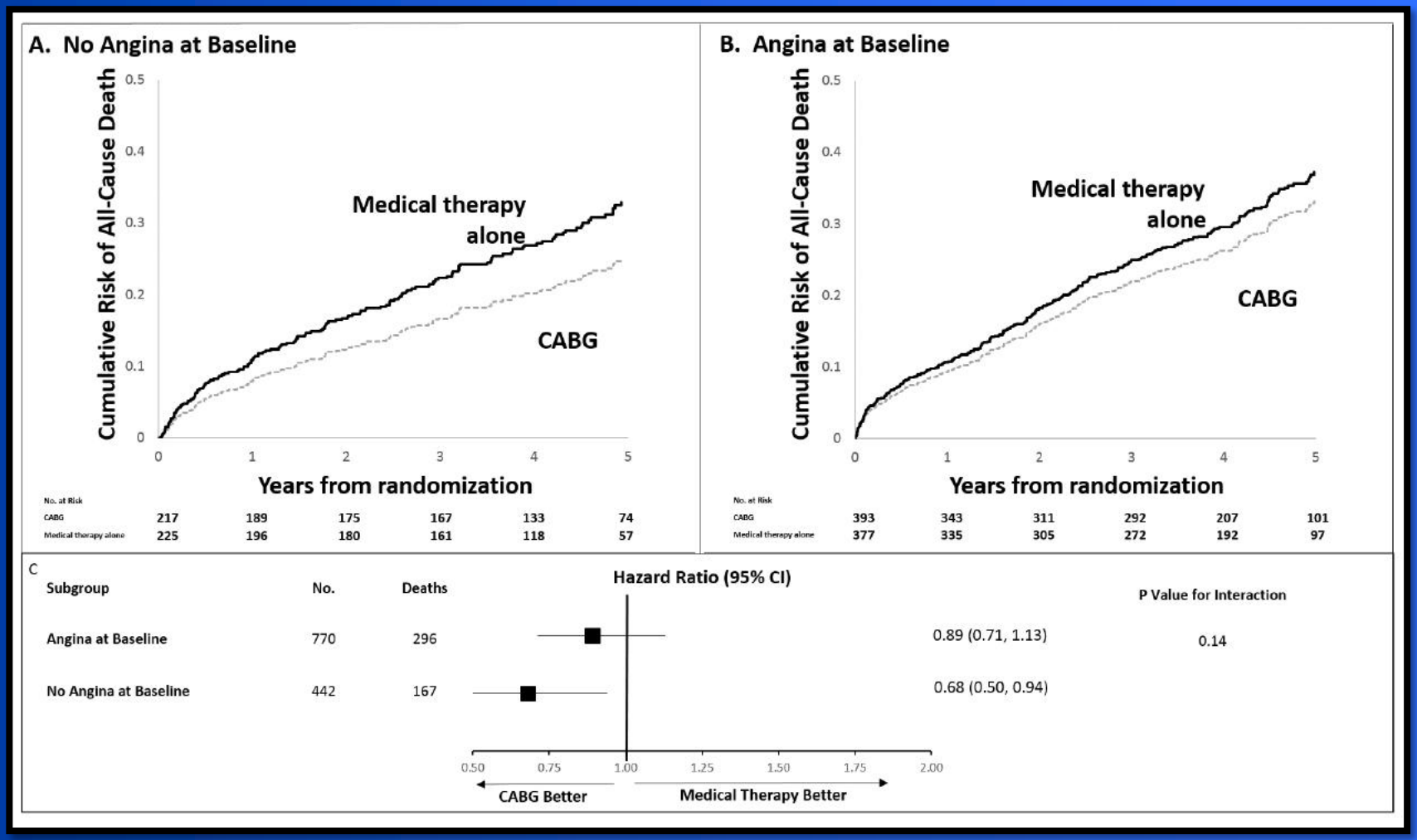


CABG or medical therapy is reasonable to improve morbidity and mortality for patients with severe LV dysfunction (EF <35%), HF, and significant CAD

CABG may be considered in patients with ischemic heart disease, severe LV systolic dysfunction, and operable coronary anatomy whether or not viable myocardium is present

2013 ACCF/AHA Guideline for the Management of Heart Failure, JACC 2013;62:e147

Figure 2. Adjusted Kaplan-Meier Analysis of the Probability of All-Cause Death According to Angina Status and Treatment Arm

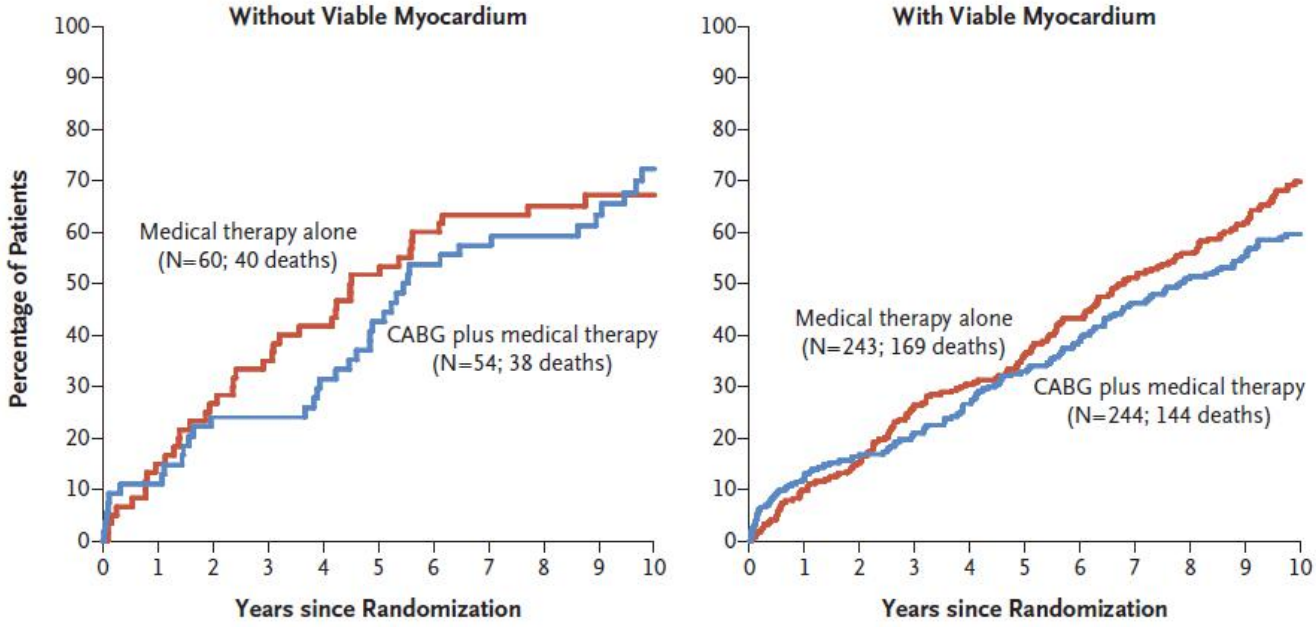


ORIGINAL ARTICLE

Myocardial Viability and Long-Term Outcomes in Ischemic Cardiomyopathy

Julio A. Panza, M.D., Alicia M. Ellis, Ph.D., Hussein R. Al-Khalidi, Ph.D., Thomas A. Holly, M.D., Daniel S. Berman, M.D., Jae K. Oh, M.D., Gerald M. Pohost, M.D., George Sopko, M.D., Lukasz Chrzanowski, M.D., Daniel B. Mark, M.D., Tomasz Kukulski, M.D., Liliana E. Favaloro, M.D., Gerald Maurer, M.D., Pedro S. Farsky, M.D., Ru-San Tan, M.D., Federico M. Asch, M.D., Eric J. Velazquez, M.D., Jean L. Rouleau, M.D., Kerry L. Lee, Ph.D., and Robert O. Bonow, M.D.

B Death from Any Cause, According to Myocardial Viability Status



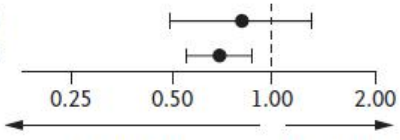
No. at Risk

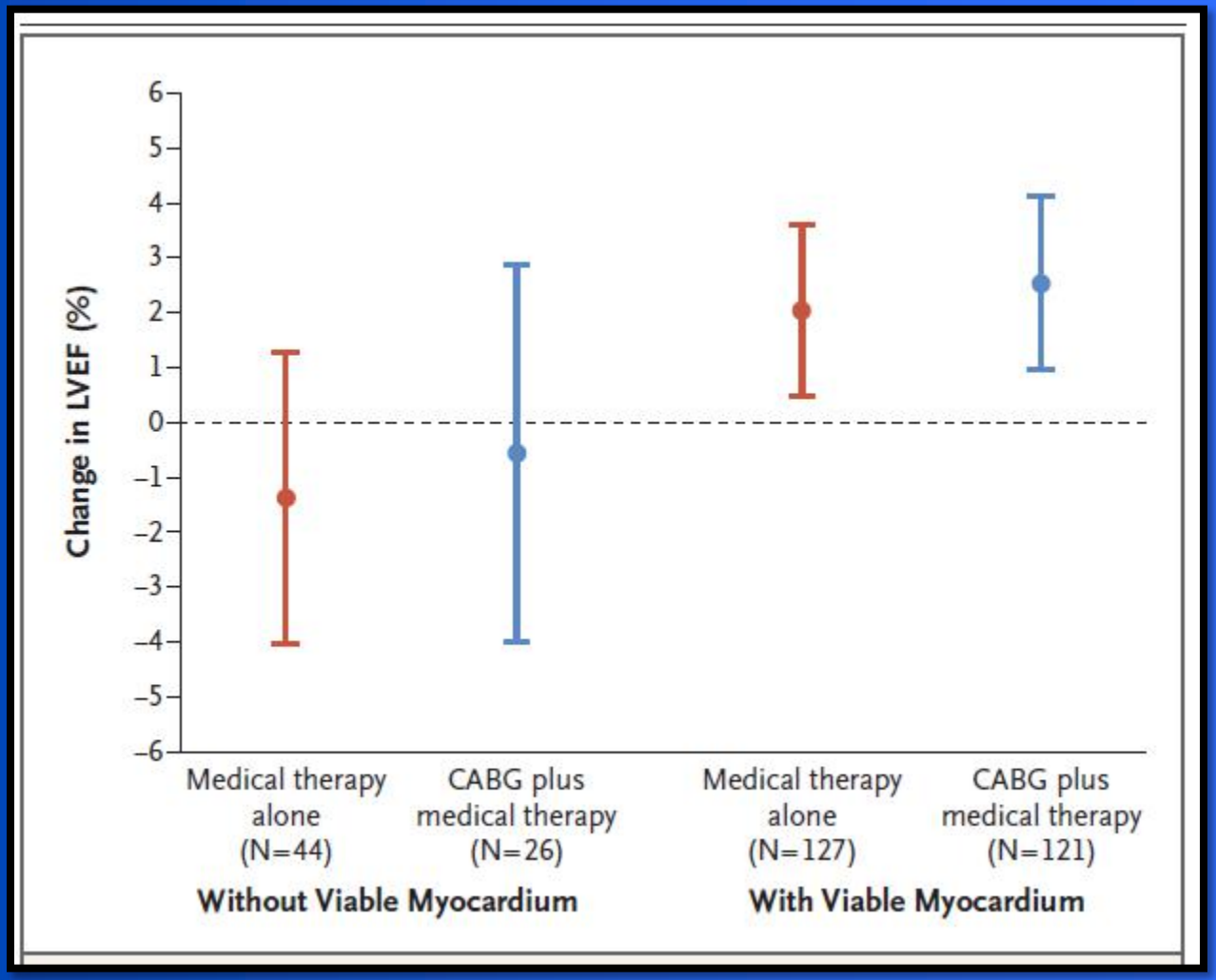
Medical therapy alone	60	51	44	39	35	29	24	22	21	14	11
CABG plus medical therapy	54	48	41	41	37	31	25	23	22	17	11

Medical therapy alone	243	219	206	179	169	155	137	117	106	79	48
CABG plus medical therapy	244	213	203	193	179	161	146	128	116	94	58

C Interaction between Treatment Assignment and Myocardial Viability Status

Subgroup	No. of Patients	No. of Deaths	Medical Therapy Alone	CABG plus Medical Therapy	Adjusted Hazard Ratio (95% CI)	P Value for Interaction
			10-yr Kaplan–Meier Incidence (%)			
Without viable myocardium	114	78	67.2	72.3	0.81 (0.50–1.31)	0.34
With viable myocardium	487	313	69.8	59.6	0.70 (0.56–0.88)	





La viabilité cardiaque marque le pronostic, mais ne marque pas la réponse à la revascularisation!

ESC European Society of Cardiology

European Heart Journal (2017) **38**, 3124–3134
doi:10.1093/eurheartj/ehx512

FASTTRACK CLINICAL RESEARCH
ESC Late Breaking Science in PCI 1

Interventional cardiology

Clinical outcomes of state-of-the-art percutaneous coronary revascularization in patients with *de novo* three vessel disease: 1-year results of the SYNTAX II study

Javier Escaned[1], Carlos Collet[2], Nicola Ryan[1], Giovanni Luigi De Maria[3], Simon Walsh[4], Manel Sabate[5], Justin Davies[6], Maciej Lesiak[7], Raul Moreno[8], Ignacio Cruz-Gonzalez[9], Stephan P. Hoole[10], Nick Ej West[10], J. J. Piek[2], Azfar Zaman[11], Farzin Fath-Ordoubadi[12], Rodney H. Stables[13], Clare Appleby[13], Nicolas van Mieghem[14], Robert Jm. van Geuns[14], Neal Uren[15], Javier Zueco[16], Pawel Buszman[17], Andres Iñiguez[18], Javier Goicolea[19], David Hildick-Smith[20], Andrzej Ochala[21], Dariusz Dudek[22], Colm Hanratty[4], Rafael Cavalcante[14], Arie Pieter Kappetein[14], David P. Taggart[3], Gerrit-Anne van Es[23,24], Marie-Angèle Morel[23], Ton de Vries[23], Yoshinobu Onuma[14,23], Vasim Farooq[12], Patrick W. Serruys[6]*, and Adrian P. Banning[3]

SYNTAX-II historical trial

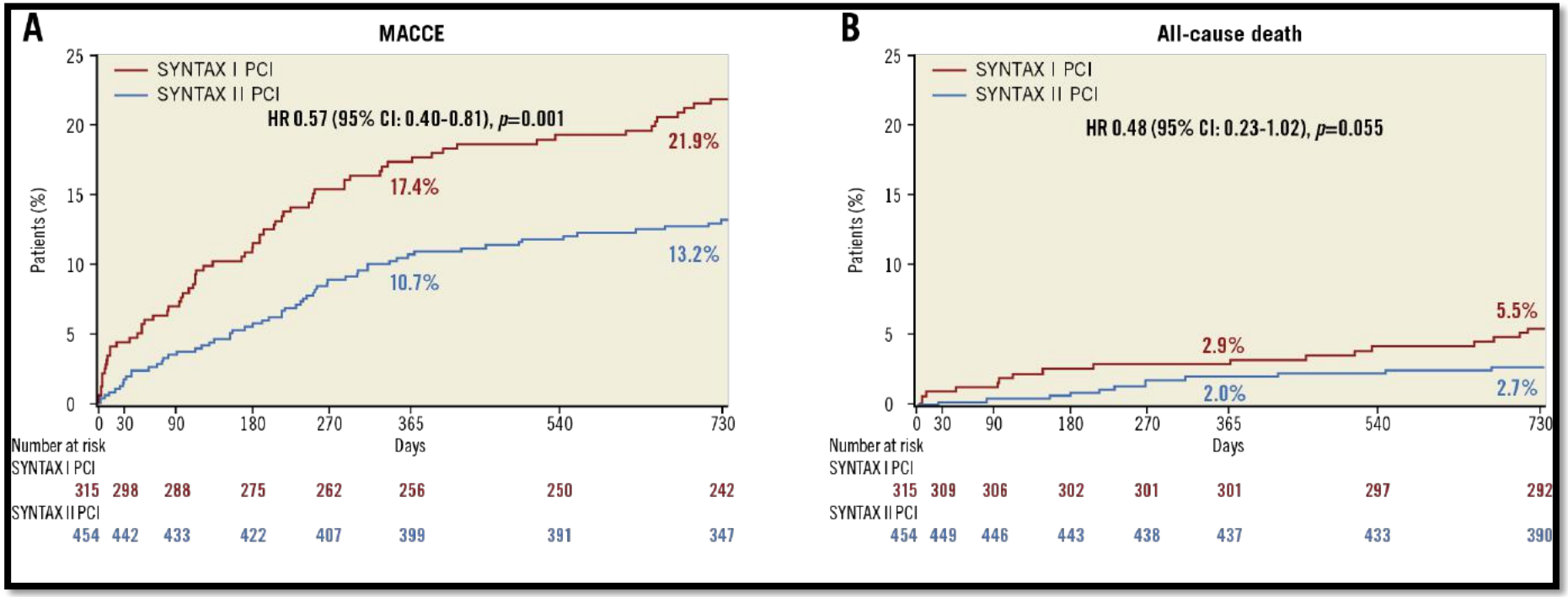
- The SYNTAX II study is a multicenter, all-comers, open-label, single arm study that investigated the impact of a contemporary PCI strategy on clinical outcomes in patients with 3VD
- The rate of all-cause death, cerebrovascular event, MI and any revascularisation]) was compared to a predefined PCI cohort from the original SYNTAX-I trial selected on the basis of equipoise 4-year mortality between CABG and PCI.
- As an exploratory endpoint, comparisons were made with the historical CABG cohort of the original SYNTAX-I trial.

Table I Baseline clinical characteristics

	SYNTAX II ($n = 454$)	SYNTAX I PCI arm ($n = 315$)	*P*-value
Age (years)	66.7±9.7 (454)	66.7±9.1 (315)	0.99
Male	93.2% (423/454)	93.0% (293/315)	0.93
Body mass index (kg/m^2)	28.9±4.7 (449)	28.2±4.4 (315)	0.032
Diabetes mellitus type I or II	30.3% (135/446)	29.2% (92/315)	0.75
Insulin treated	8.5% (38/446)	10.5% (33/315)	0.36
Oral medication	19.5% (87/446)	16.8% (53/315)	0.35
Diet only	2.0% (9/446)	1.9% (6/315)	0.91
Current smoker	14.7% (64/435)	17.8% (56/315)	0.26
Previous MI	12.5% (56/447)	28.7% (89/310)	<0.001
Previous stroke	5.6% (25/449)	1.9% (6/315)	0.010
Hypertension	77.0% (344/447)	73.4% (229/312)	0.26
Hyperlipidaemia	77.3% (341/441)	74.4% (232/312)	0.35
Creatinine clearance (ml/min)	82.0±26.9 (454)	87.3±28.5 (315)	0.008
Ejection fraction (%)	58.1±8.3 (454)	61.8±11.3 (315)	<0.001
Peripheral vascular disease	7.7% (35/454)	9.5% (30/315)	0.37
COPD	10.8% (49/454)	12.7% (40/315)	0.42
Clinical presentation			<0.001
Silent ischaemia	5.5% (30/449)	13.3% (42/315)	
Stable angina	68.8% (309/449)	61.6% (194/315)	
Unstable angina	25.6% (115/449)	25.1% (79/315)	
Anatomic SYNTAX Score	20.3±6.4 (454)	22.8±8.7 (315)	<0.001
SYNTAX Score II PCI	30.2±8.6 (454)	30.6±8.7 (315)	0.528
Predicted 4-year mortality PCI (%)	8.9±8.8% (454)	9.2±8.7% (315)	0.64
SYNTAX Score II CABG	29.1±10.4 (454)	29.1±9.6 (315)	1.0
Predicted 4-year mortality CABG (%)	9.0±9.3 (454)	8.5±8.1 (315)	0.44

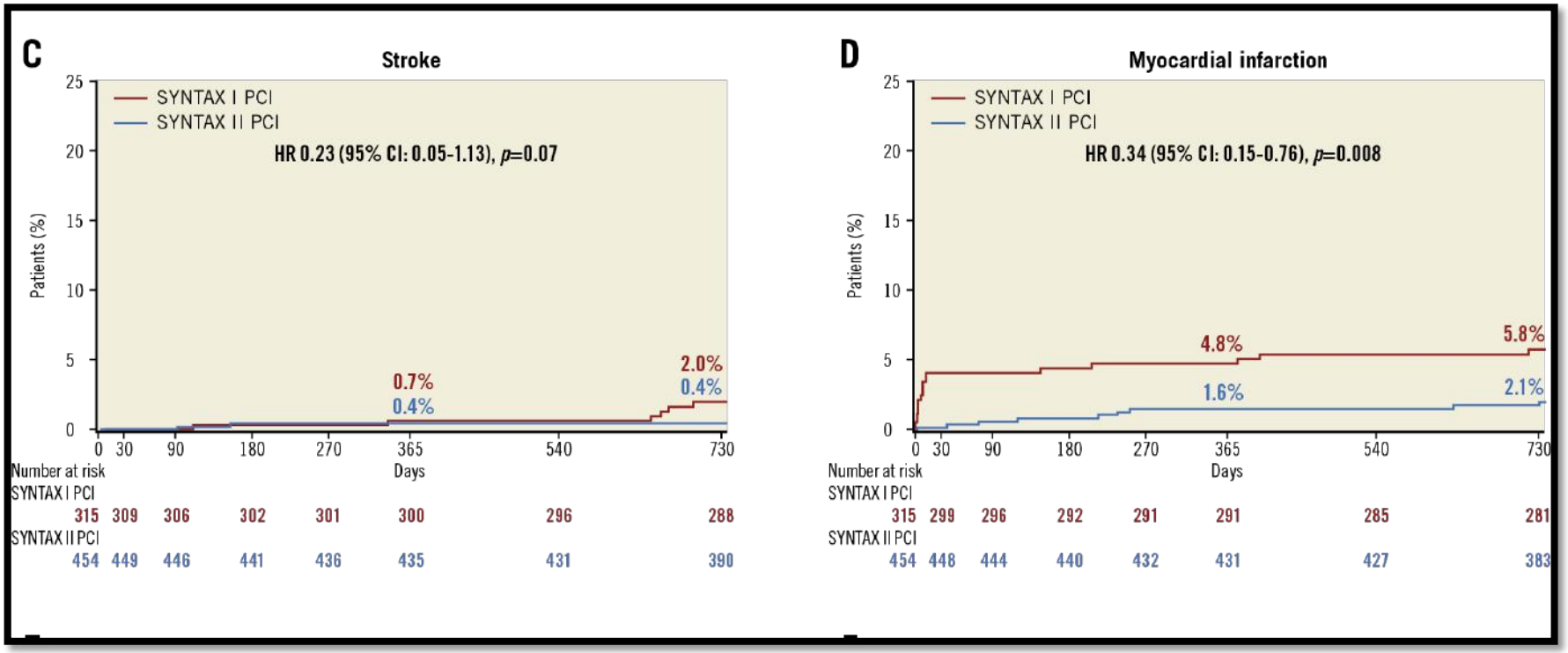
MI, myocardial infarction; PCI, percutaneous coronary intervention; CABG, coronary artery bypass graft; COPD, chronic obstructive pulmonary disease.

Two-year clinical outcomes among the study patients, compared with the SYNTAX-I PCI cohort.

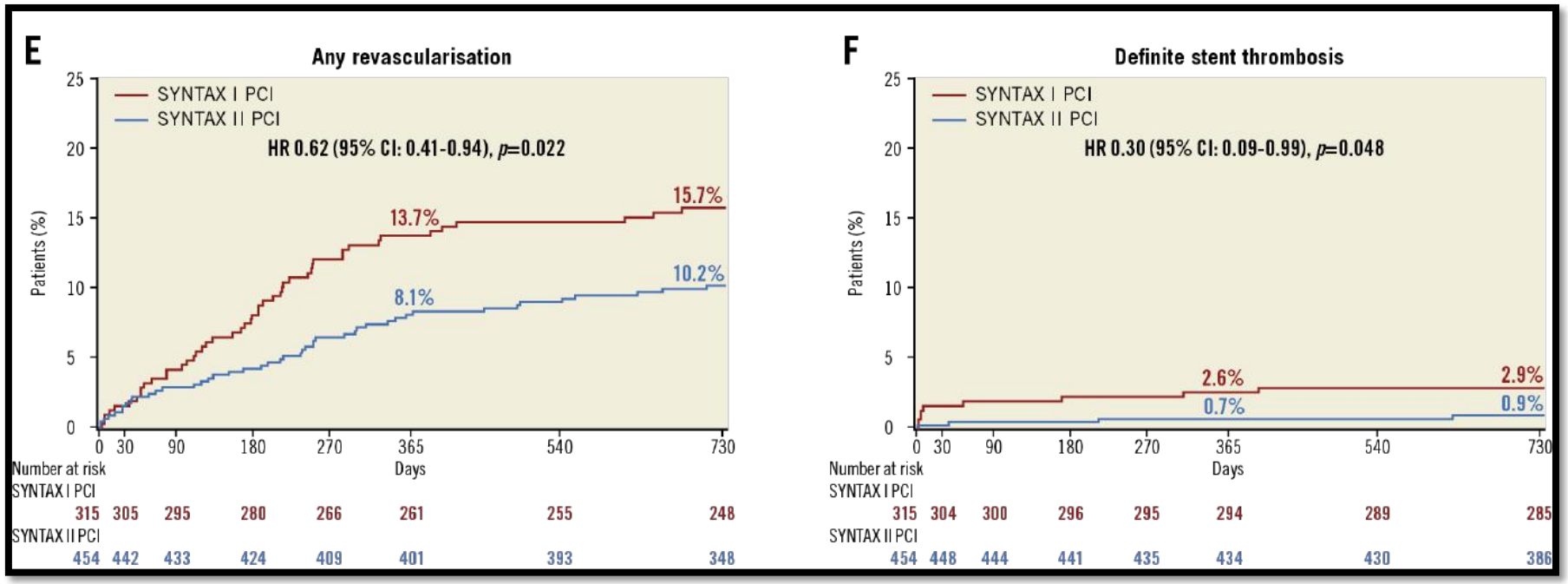


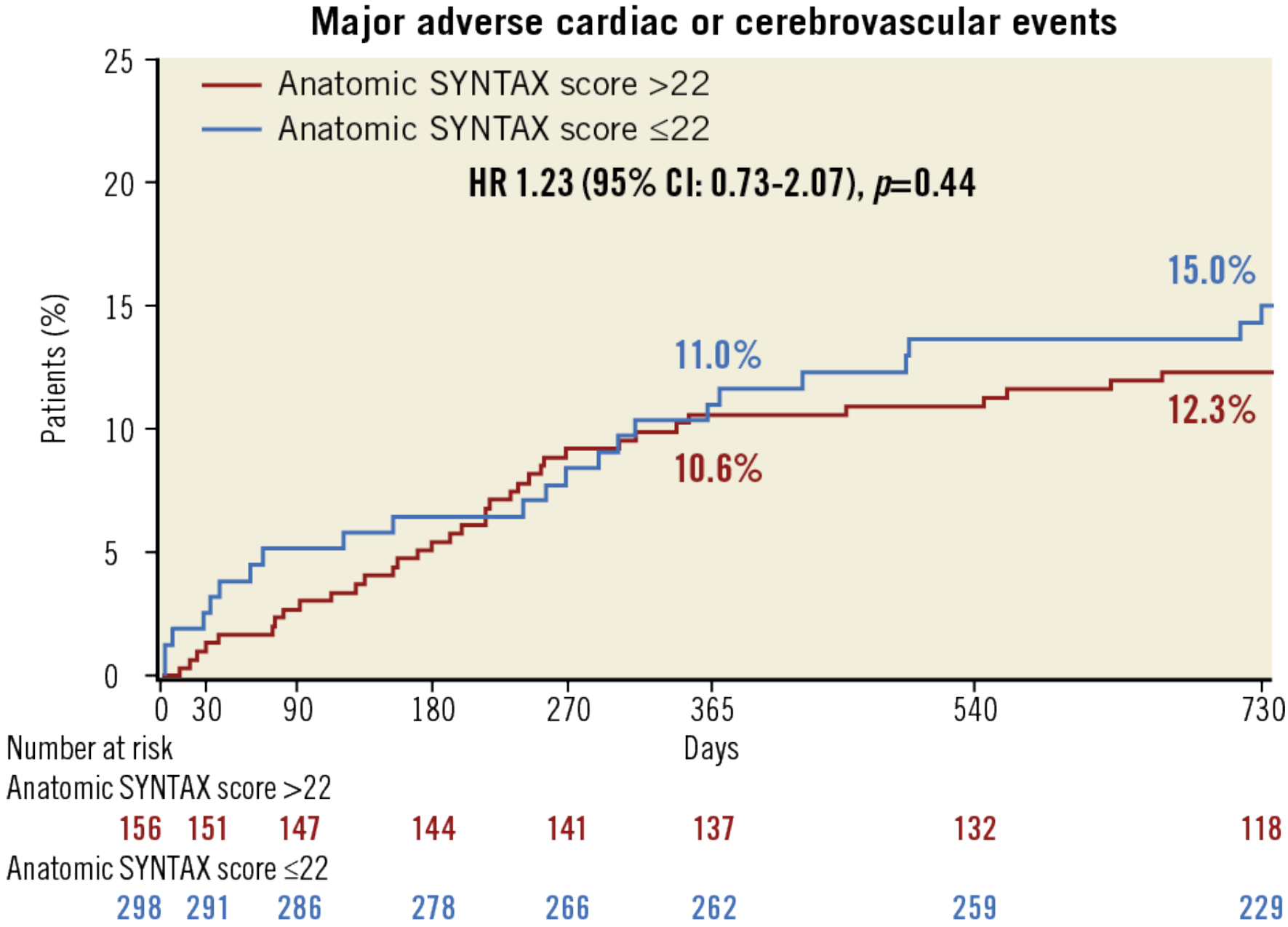
For the primary endpoint, a sensitivity analysis using inverse propensity score weighting (IPTW) and multivariate Cox proportional hazard regression model were performed

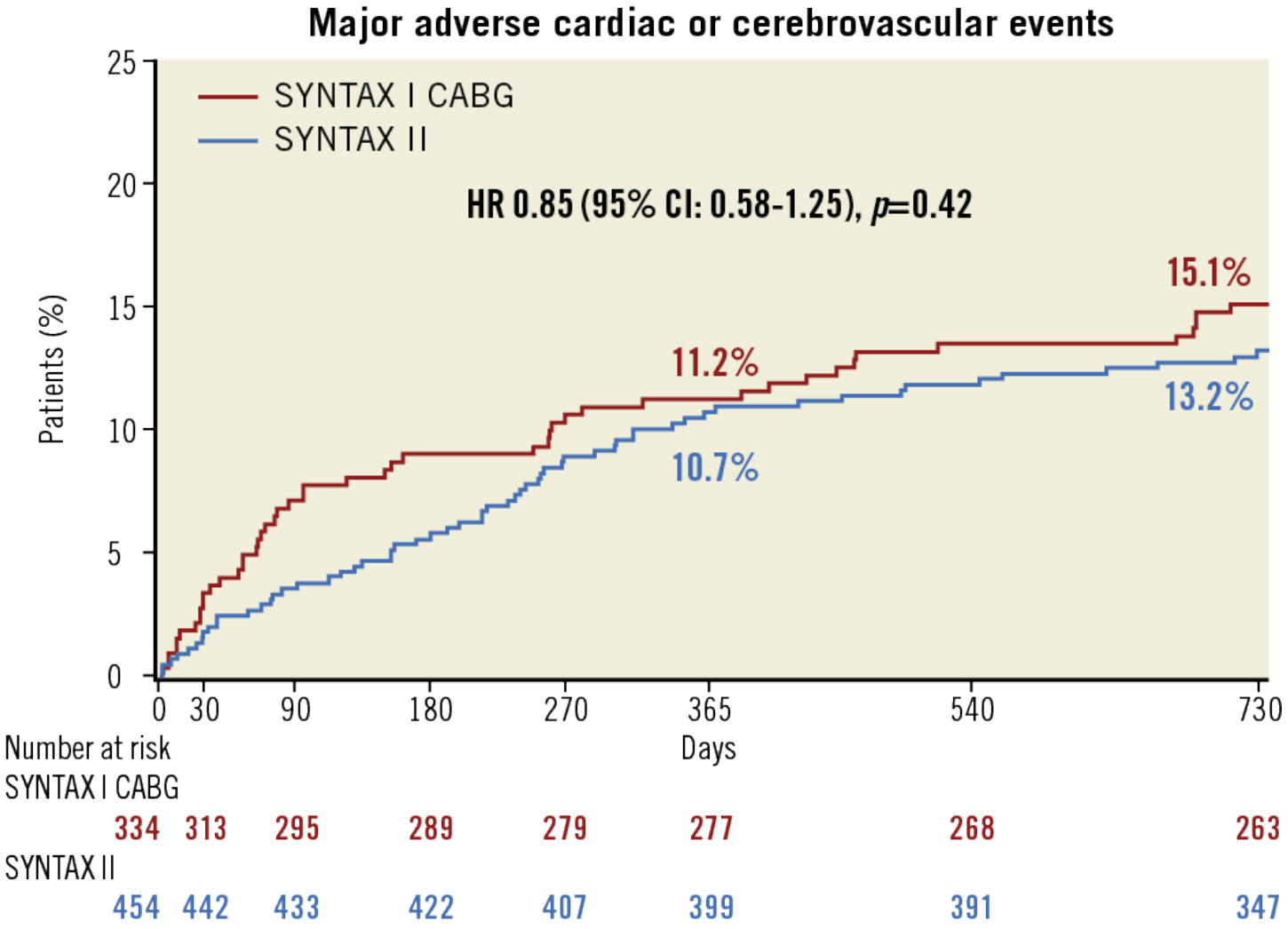
Two-year clinical outcomes among the study patients, compared with the SYNTAX-I PCI cohort.



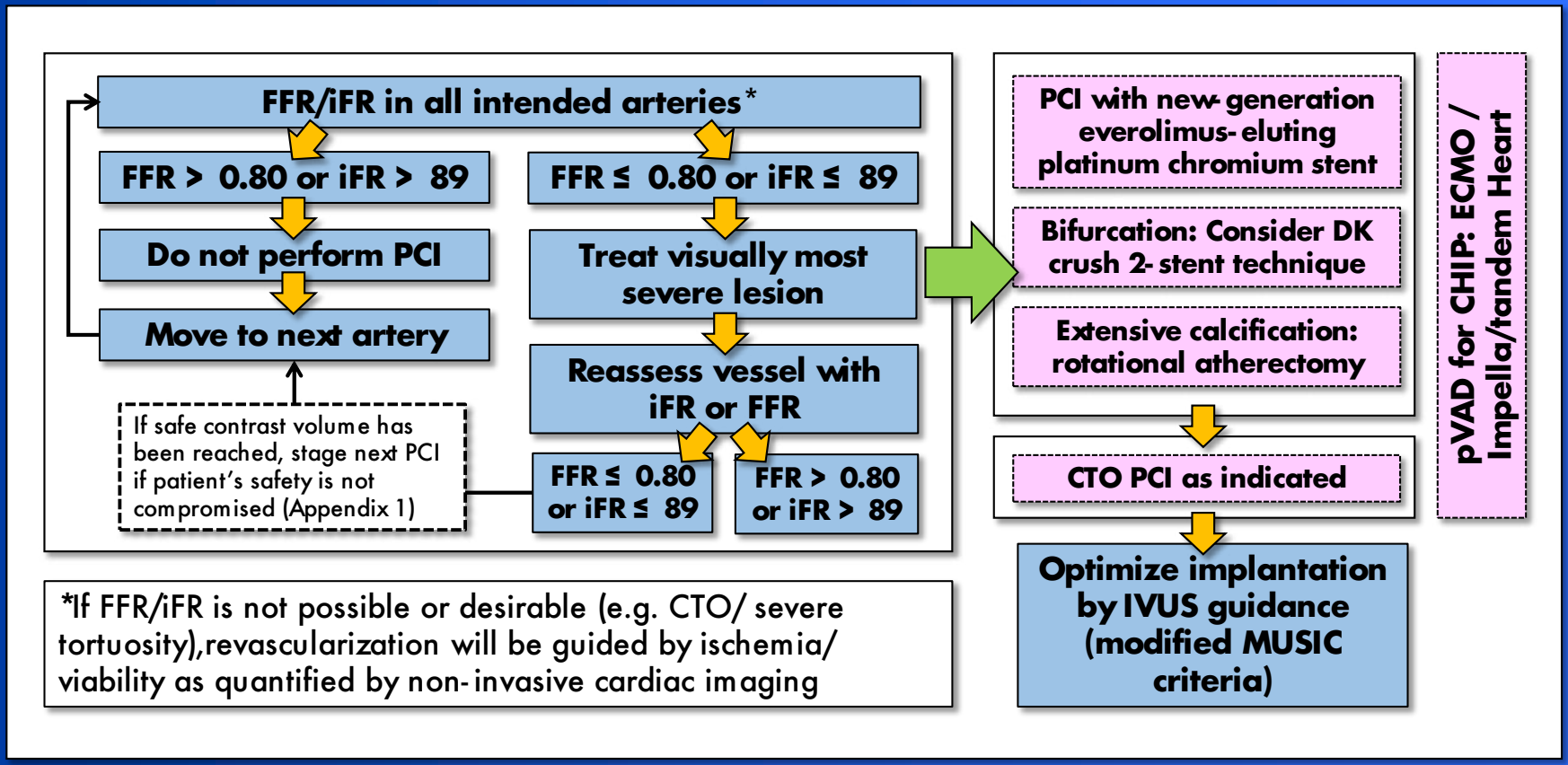
Two-year clinical outcomes among the study patients, compared with the SYNTAX-I PCI cohort.



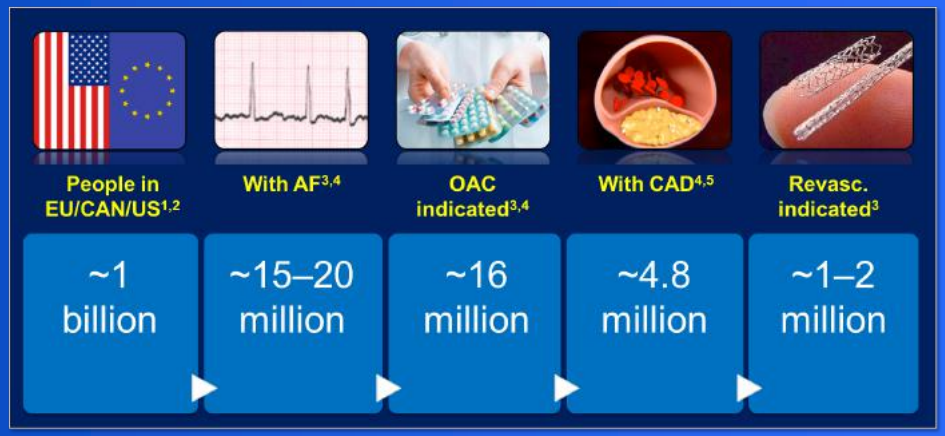

Major adverse cardiac or cerebrovascular events
Anatomic SYNTAX score >22
Anatomic SYNTAX score ≤22
HR 1.23 (95% CI: 0.73-2.07), p=0.44
15.0%
11.0%
12.3%
10.6%
Patients (%)
25
20
15
10
5
0
0 30 90 180 270 365 540 730
Days
Number at risk
Anatomic SYNTAX score >22
156 151 147 144 141 137 132 118
Anatomic SYNTAX score ≤22
298 291 286 278 266 262 259 229


Major adverse cardiac or cerebrovascular events
SYNTAX I CABG
SYNTAX II
HR 0.85 (95% CI: 0.58-1.25), p=0.42
15.1%
11.2%
13.2%
10.7%
Patients (%)
25
20
15
10
5
0
0 30 90 180 270 365 540 730
Days
Number at risk
SYNTAX I CABG
334 313 295 289 279 277 268 263
SYNTAX II
454 442 433 422 407 399 391 347

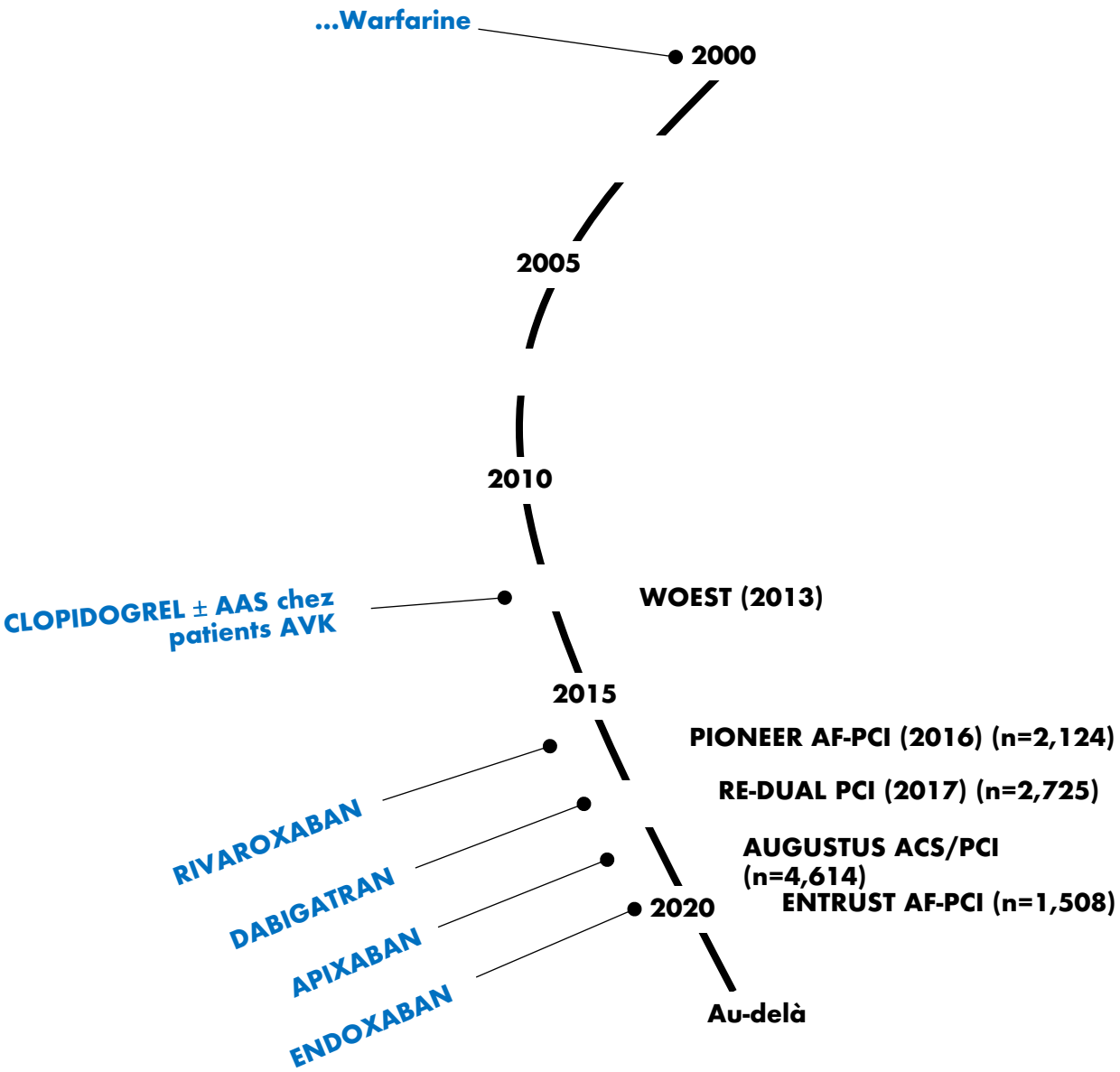
State-of-the-Art PCI for the STICH 3.0 Trial



- **Champ relativement récent qui débute avec l'étude WOEST (AAS+clopi vs. clopi seul chez patients anticoagulés avec warfarine) et qui montre une ↓ surprise des saignement et des événements ischémique avec l'arrêt de l'AAS. avec ou sans AAS**



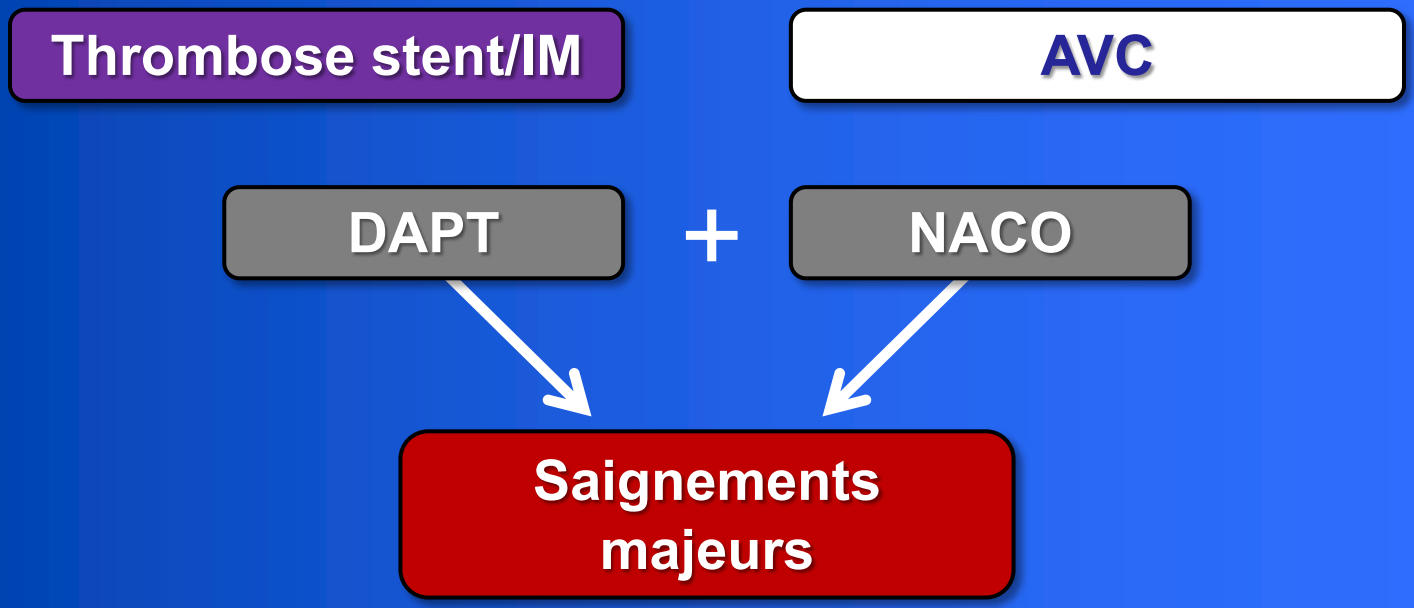
1. US population. Available at: www.census.gov/popclock. Accessed Aug 2019; 2. EU population. Available at: europa.eu/european-union/about-eu/figures/living_en. Accessed Aug 2019; 3. Capodanno D, Angiolillo DJ. Circ Cardiovasc Interv 2014;7:113–24; 4. Capodanno D, et al. J Am Coll Cardiol 2019;74:83–99; 5. Verheugt FWA, et al. J Am Coll Cardiol 2019. pii: S0735-1097(19)35400-2.



1. Gibson CM, et al. N Engl J Med 2016;375:2423–34; 2. Cannon CP, et al. N Engl J Med 2017;377:1513–24; 3. Lopes RD, et al. N Engl J Med 2019;380:1509–24; 4. Vranckx P, et al. Am Heart J 2018;196:105–12; 5.

PCI + endoprothèse chez patients avec FA et risque AVC élevé

Le problème: vous ne pouvez tout prévenir simultanément



Bewildering number of strategies in the ACS patient with atrial fibrillation

ASA dose:	None Low High	2	1+8 = 9
ASA duration (mos):	1 3 6 12	4	ASA
Thienopyridine:	None Clop Ticlid Pras Ticag	4	1+16 = 17
Thienopyridine duration (mos):	1 3 6 12	4	Thieno
AC:	None Warf Dabi Riva Apix Edox	5	1+10 = 11
AC INR/dose:	Low High	2	ACs

Permutations of single, dual or triple therapy as *Early Initial Therapy (0, 1, 3, 6 mos)* following ACS: 9 x 17 x 11 = 1,683

Permutations of single or dual therapy *Late After Early Therapy (0, 1, 3, 6 mos)* following ACS: 1,683

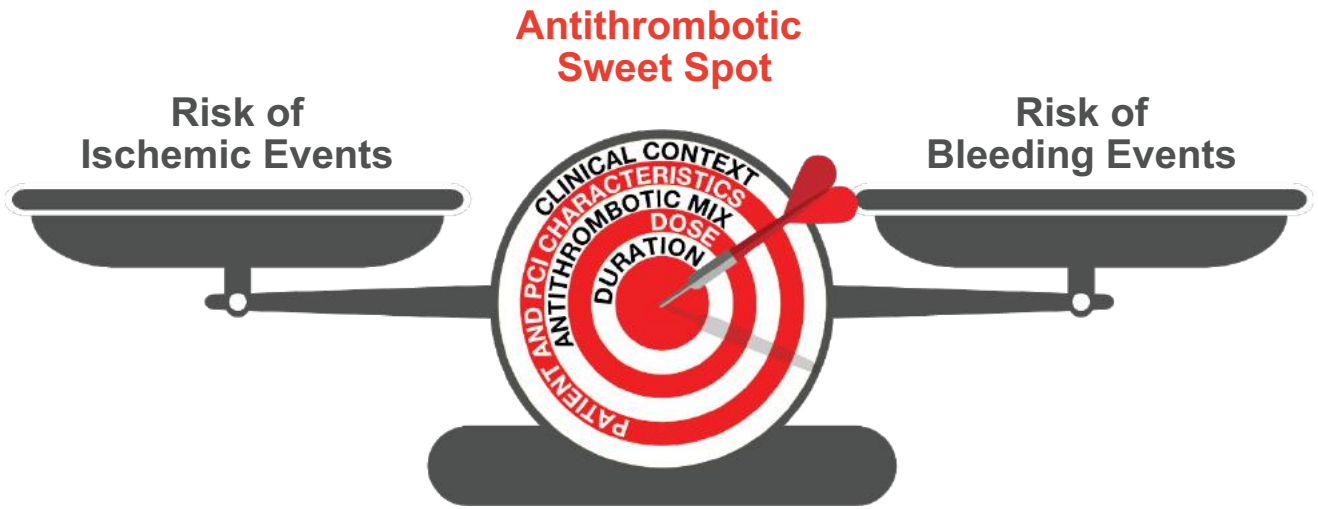
Total Permutations *throughout one year:* 2.8 million

AC, anticoagulant; Apix, apixaban; ASA, acetylsalicylic acid; Clop, clopidogrel; Dabi, dabigatran; Edox, edoxaban; INR, international normalised ratio; mos, months; Pras, prasugrel; Riva, rivaroxaban; Ticag, ticagrelor; Warf, warfarin.

Slide by C. Michael Gibson, M.S., M.D.

1. Data adapted from Gibson CM. J Am Coll Cardiol 2017;69:172–5.

Trouver la bonne combinaison!



The right combination of antithrombotic agents at the right dose and duration to reduce ischemic events as much as possible at a minimal cost of bleeding

Lopes RD et al. EHJ, 2019

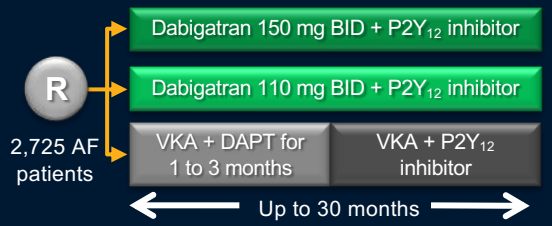
NOAC AF-PCI clinical studies

PIONEER AF-PCI – Rivaroxaban[1]

Primary endpoint:
TIMI major, minor bleeding or bleeding requiring medical attention (for 12 months)

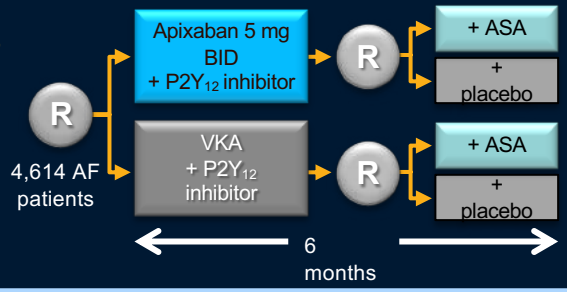
RE-DUAL AF-PCI – Dabigatran[2]

Primary endpoint:
Time to first major or CRNM bleeding (ISTH)



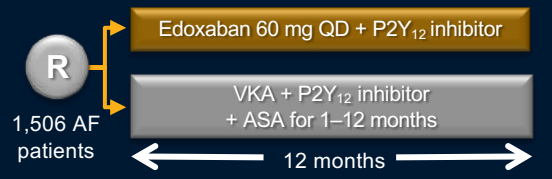
AUGUSTUS AF-PCI – Apixaban[3]

2x2 Factorial design
Primary endpoint:
ISTH major bleeding or CRNM bleeding



ENTRUST AF-PCI – Edoxaban[4]

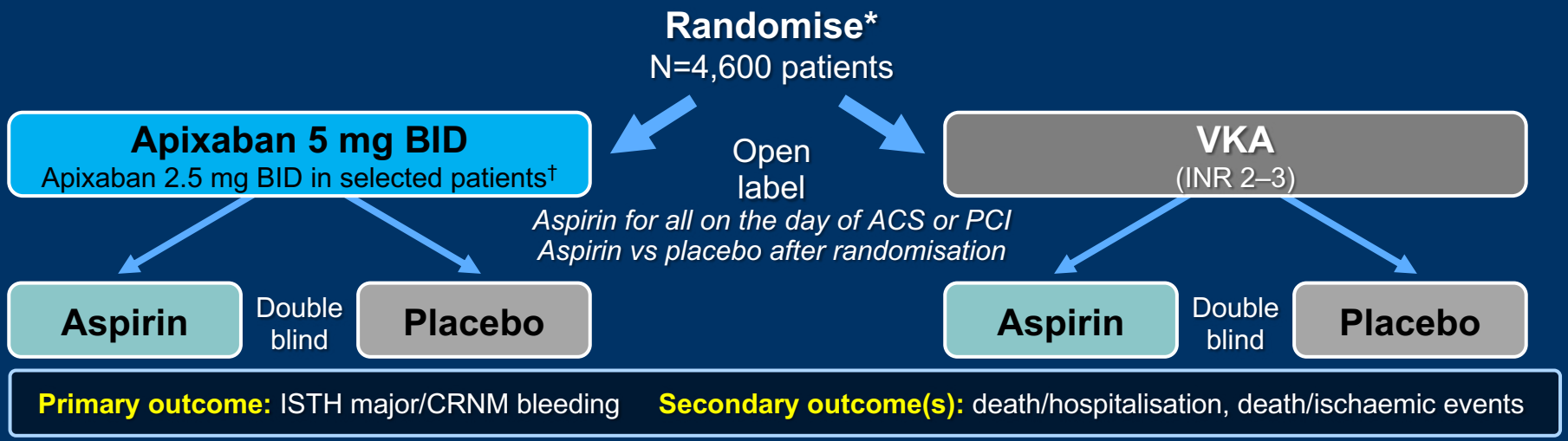
Primary endpoint:
ISTH major and CRNM bleeding



Aucun de ces RCTs n'a été conçu pour évaluer l'efficacité

1. Gibson CM, et al. N Engl J Med 2016;375:2423–34; 2. Cannon CP, et al. N Engl J Med 2017;377:1513–24;
3. Lopes RD, et al. N Engl J Med 2019;380:1509–24; 4. Vranckx P, at al. Lancet 2019;394:1335–43.

AUGUSTUS: Trial design



INCLUSION

- AF (prior, persistent, >6 hours); physician decision for OAC
- ACS or PCI; planned $P2Y_{12}$ inhibitor for ≥6 months

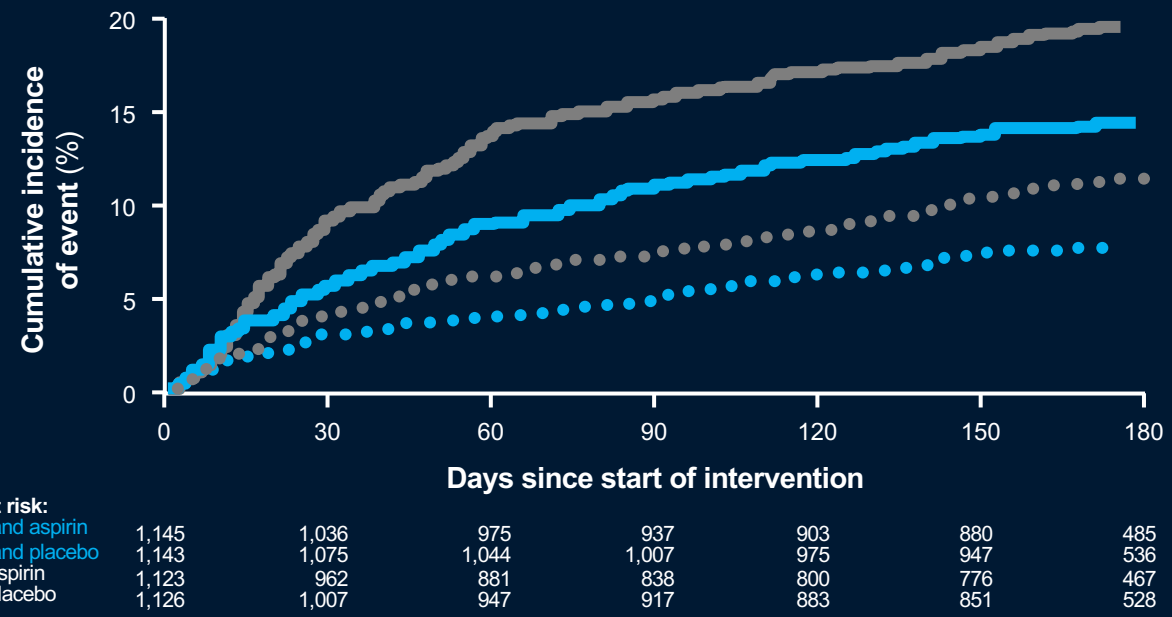
EXCLUSION

- Contraindication to DAPT
- Other conditions that require OAC (such as prosthetic valves or moderate or severe mitral stenosis), severe renal insufficiency, and history of intracranial haemorrhage
- Recent or planned CABG, coagulopathy or ongoing bleeding, contraindication to VKA, apixaban, all $P2Y_{12}$ inhibitors, or aspirin

*Randomisation was not sequential; at enrolment, eligible patients were randomised simultaneously to apixaban or VKA and to aspirin or aspirin placebo; †2.5 mg BID used in patients with ≥2 of the following criteria: age ≥80 years, weight ≤60 kg, or serum creatinine ≥1.5 mg/dL (133 µmol/L).

Lopes RD, et al. Am Heart J 2018;200:17–23.

Saignements majeurs



VKA + aspirin: 18.7%[2]

Apixaban + aspirin: 13.8%[2]

VKA + placebo: 10.9%[2]

Apixaban + placebo: 7.3%[2]

Apixaban + placebo vs VKA + aspirin:[2]

11.4% absolute risk reduction (NNT=9)

AUGUSTUS was not powered to compare individual primary outcomes for apixaban + placebo vs VKA + aspirin

1. Lopes RD, et al. N Engl J Med 2019;380:1509–24;
2. Lopes RD, et al. N Engl J Med 2019;380:1509–24. Suppl appendix.

Ischemic outcomes

Apixaban vs VKA

Endpoint	Apixaban (N=2,306)	VKA (N=2,308)	HR (95% CI)
Death/ischaemic events (%)	6.7	7.1	0.93 (0.75, 1.16)
Death (%)	3.3	3.2	1.03 (0.75, 1.42)
CV death (%)	2.5	2.3	1.05 (0.72, 1.52)
Stroke (%)	**0.6**	**1.1**	**0.50 (0.26, 0.97)**
Myocardial infarction (%)	3.1	3.5	0.89 (0.65, 1.23)
Definite or probable stent thrombosis (%)	0.6	0.8	0.77 (0.38, 1.56)
Urgent revascularisation (%)	1.7	1.9	0.90 (0.59, 1.38)
Hospitalisation (%)	**22.5**	**26.3**	**0.83 (0.74, 0.93)**

Lopes RD, et al. N Engl J Med 2019;380:1509–24.

Ischemic outcomes

Aspirin vs placebo

Endpoint	Aspirin (N=2,307)	Placebo (N=2,307)	HR (95% CI)
Death/ischaemic events (%)	6.5	7.3	0.89 (0.71, 1.11)
Death (%)	3.1	3.4	0.91 (0.66, 1.26)
CV death (%)	2.3	2.5	0.92 (0.63, 1.33)
Stroke (%)	0.9	0.8	1.06 (0.56, 1.98)
Myocardial infarction (%)	2.9	3.6	0.81 (0.59, 1.12)
Definite or probable stent thrombosis (%)	0.5	0.9	0.52 (0.25, 1.08)
Urgent revascularisation (%)	1.6	2.0	0.79 (0.51, 1.21)
Hospitalisation (%)	25.4	23.4	1.10 (0.98, 1.24)

Lopes RD, et al. N Engl J Med 2019;380:1509–24.

Lopes RD, et al. JAMA Cardiol 2020

Research

JAMA Cardiology | Brief Report

Optimal Antithrombotic Regimens for Patients With Atrial Fibrillation Undergoing Percutaneous Coronary Intervention
An Updated Network Meta-analysis

Renato D. Lopes, MD, PhD; Hwanhee Hong, PhD; Ralf E. Harskamp, MD, PhD; Deepak L. Bhatt, MD, MPH; Roxana Mehran, MD; Christopher P. Cannon, MD; Christopher B. Granger, MD; Freek W. A. Verheugt, MD, PhD; Jianghao Li, MS; Jurriën M. ten Berg, MD, PhD; Nikolaus Sarafoff, MD; Pascal Vranckx, MD; Andreas Goette, MD; C. Michael Gibson, MD; John H. Alexander, MD, MHS

IMPORTANCE Antithrombotic treatment in patients with atrial fibrillation (AF) and percutaneous coronary intervention (PCI) presents a balancing act with regard to bleeding and ischemic risks.

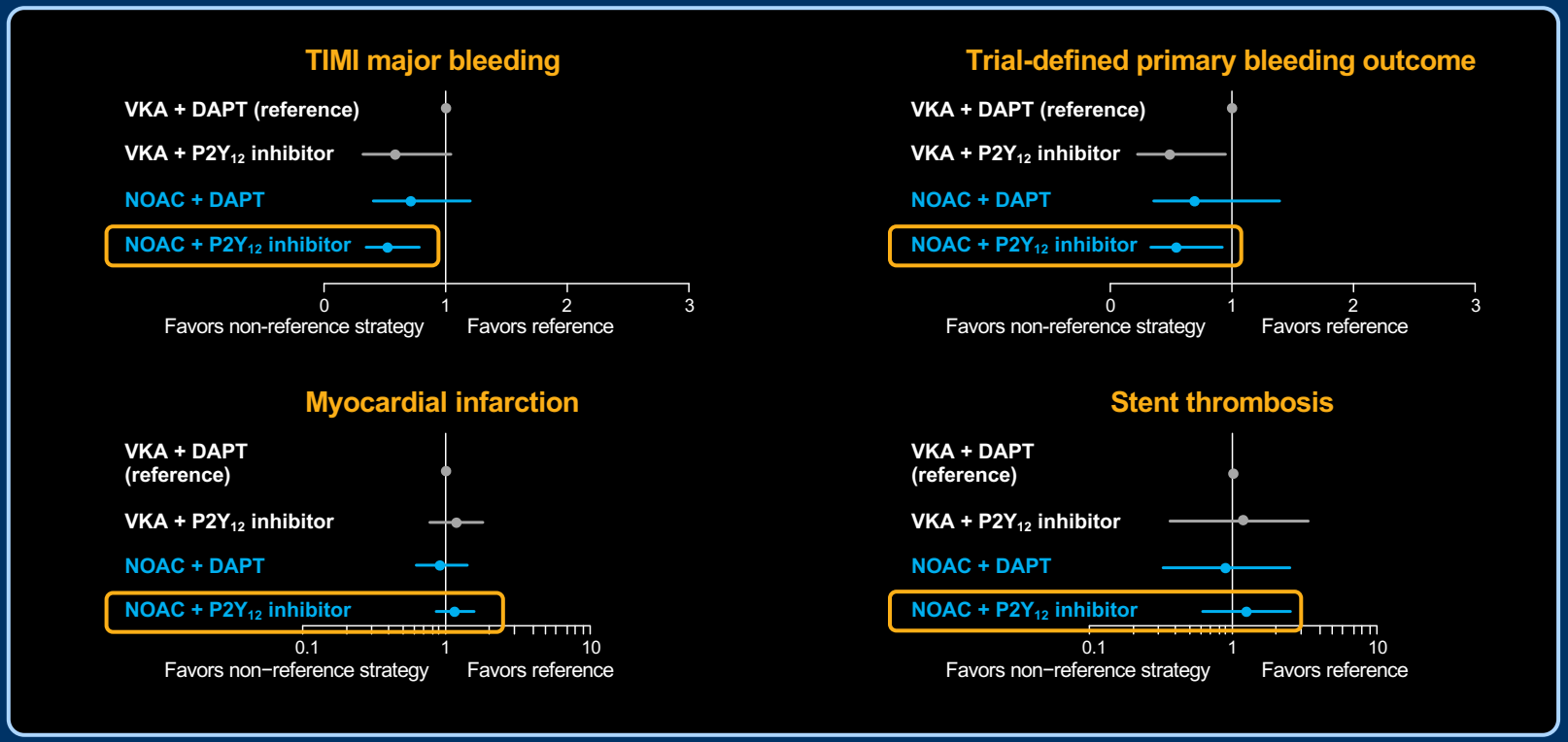
OBJECTIVES To evaluate the safety and efficacy of 4 antithrombotic regimens by conducting an up-to-date network meta-analysis and to identify the optimal treatment for patients with AF undergoing PCI.

DATA SOURCES Online computerized database (MEDLINE).

STUDY SELECTION Five randomized studies were included (N = 11 542; WOEST, PIONEER AF-PCI, RE-DUAL PCI, AUGUSTUS, ENTRUST-AF PCI).

Supplemental content

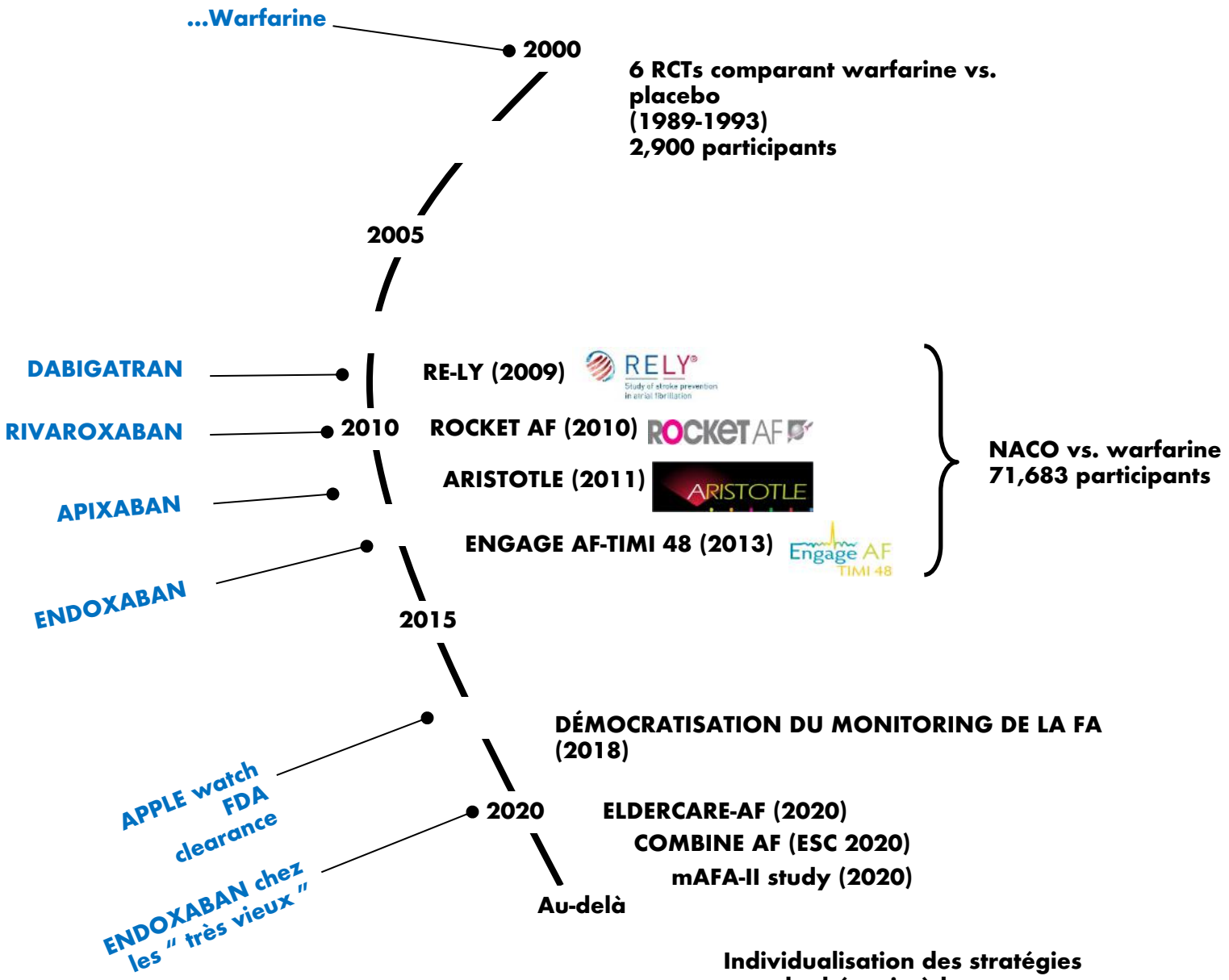
Métaanalysis (~12,000 participants)
Patients avec FA traités par PCI/stent



Data show odds ratio (95% CI)

1. Lopes RD, et al. JAMA Cardiol 2020;5:582–9.

- Les 20 dernières années auront assisté à l'émergence des nouveaux anticoagulants oraux
- ... et un profilage en fonction du risque de saignement
- Les technologies digitales auront permis la démocratisation du dépistage de la FA asymptomatique.


...Warfarine
2000
6 RCTs comparant warfarine vs. placebo
(1989-1993)
2,900 participants
2005
DABIGATRAN
RE-LY (2009)
RELY
Study of stroke prevention in atrial fibrillation
RIVAROXABAN
2010
ROCKET AF (2010)
ROCKET AF
APIXABAN
ARISTOTLE (2011)
ARISTOTLE
ENDOXABAN
ENGAGE AF-TIMI 48 (2013)
Engage AF TIMI 48
NACO vs. warfarine
71,683 participants
2015
DÉMOCRATISATION DU MONITORING DE LA FA (2018)
APPLE watch FDA clearance
2020
ELDERCARE-AF (2020)
COMBINE AF (ESC 2020)
mAFA-II study (2020)
ENDOXABAN chez les " très vieux "
Au-delà
Individualisation des stratégies pour la thérapie à long–terme

Les essais de phase III

	RELY	ROCKET	ARISTOTLE	ENGAGE-AF
Sample size	18,113	14,266	18,201	21,150
New treatment	Dabigatran 110mg BID Dabigatran 150mg BID	Rivaroxaban 20mg QD	Apixaban 5mg BID	Edoxaban 30mg QD Edoxaban 60mg QD
Design	Non-inferiority PROBE	Non-inferiority Double-blind	Non-inferiority Double-blind	Non-inferiority Double-blind
Patients	AF + CHADS2 ≥ 1	AF + CHADS2 ≥ 2	AF + CHADS2 ≥ 1	AF + CHADS2 ≥ 2
Renal Exclusion	CrCl < 30 ml/min	CrCl < 30 ml/min	CrCl < 25 ml/min	CrCl < 30 ml/min
Primary outcome	Stroke (ischemic or hemorrhagic) or systemic embolism	Stroke (ischemic or hemorrhagic) or systemic embolism	Stroke (ischemic or hemorrhagic) or systemic embolism	Stroke (ischemic or hemorrhagic) or systemic embolism
Safety outcome	Primary: Major Bleeding Secondary: Major Bleeding + CRNM	Primary: Major Bleeding Secondary: Major Bleeding + CRNM	Primary: Major Bleeding Secondary: Major Bleeding + CRNM	Primary: Major Bleeding Secondary: Major Bleeding + CRNM

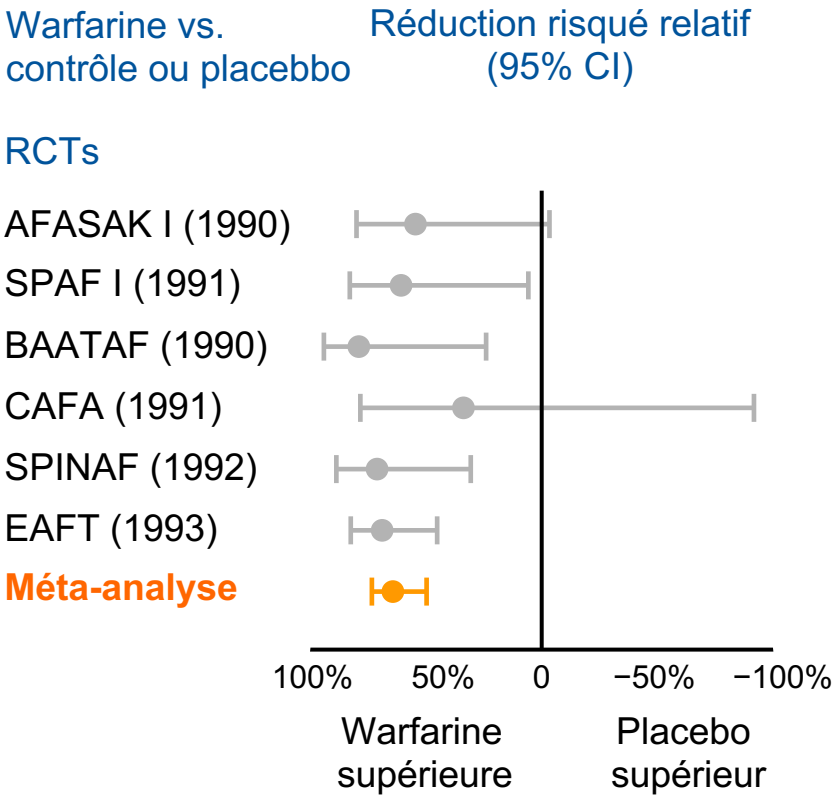
Connolly S et al NEJM 2009; Patel M et al NEJM 2011; Granger C et al NEJM 2011; ENGAGE- AF Study Investigators. AHJ 2010

Les anticoagulants oraux

	Dabigatran	Rivaroxaban	Apixaban	Edoxaban
Mechanism of action	Selective direct FIIa inhibitor	Selective direct FXa inhibitor	Selective direct FXa inhibitor	Selective direct FXa inhibitor
Bioavailability	Oral prodrug with poor oral bioavailability (6.5%)	Good oral bioavailability	Good oral bioavailability	Good oral bioavailability
$T_{½}$	12 - 17 hours	6 - 9 hours	12 hours	9 - 11 hours
Dosing	Twice daily	Once or twice daily	Twice daily	Once or twice daily
Time action	1 - 4 hrs post-dose for max. inhibition	1 - 4 hrs post-dose for max. inhibition	1 - 4 hrs post-dose for max. inhibition	1 - 4 hrs post-dose for max. inhibition
Platelet aggregation	No direct effect	No direct effect	No direct effect	No direct effect
Elimination	80% renal	35% renal	25% renal	50% renal

Eriksson BI, et al. *Clin Pharmacokinet.* 2009;48:1-22.

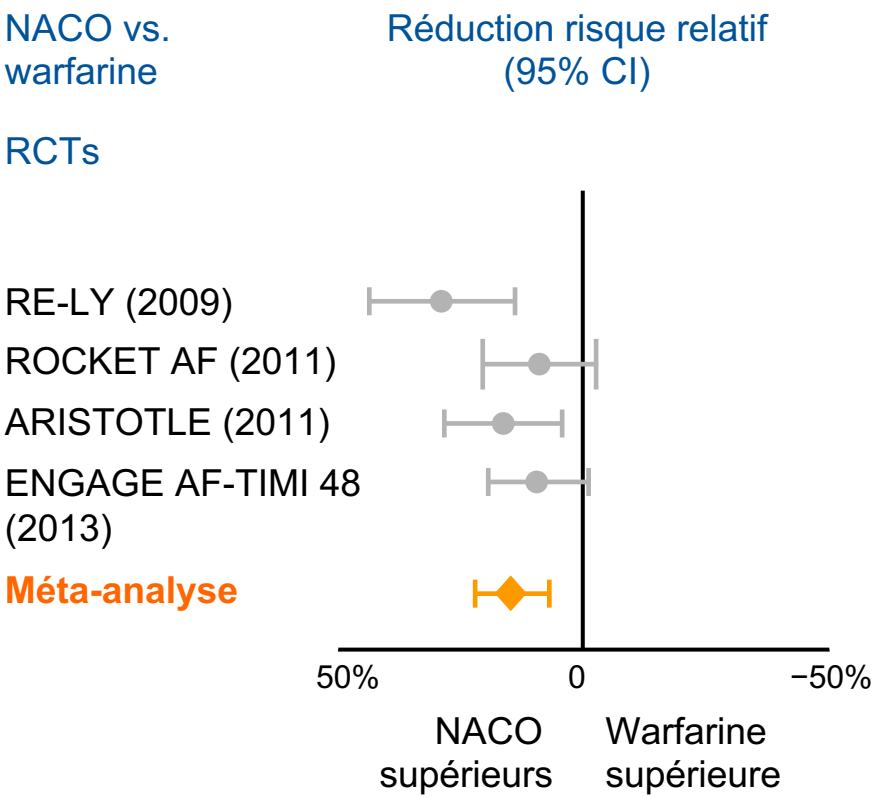
Anticogulation orale et prévention des AVC



RRR 64%

Warfarin vs. Placebo or Control
(6 trials, total n=2,900)

Hart R, et al. Ann Intern Med. 2007;146:857-867.



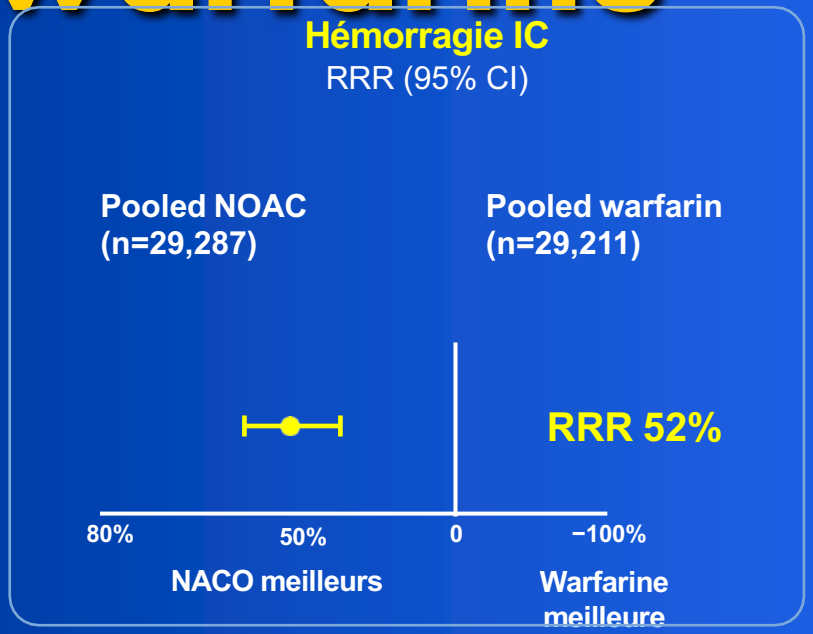
RRR 19%

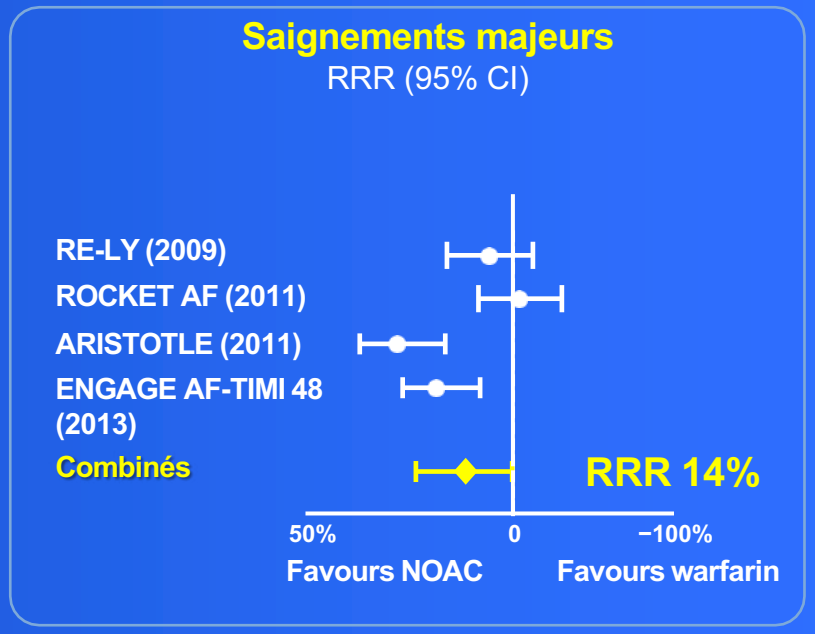
NOAC vs. Warfarin
(4 trials, total n=71,683)

Ruff C, et al. Lancet. 2014;383:955–962.

Saignements: NACOs vs. warfarine

4 RCTs, total n=71,683





Head-to-head trials do not exist and direct comparisons between agents cannot be made. This analysis compared NOACs with warfarin in randomised studies

Adapted from Ruff C, et al. Lancet 2014;383:955–62.

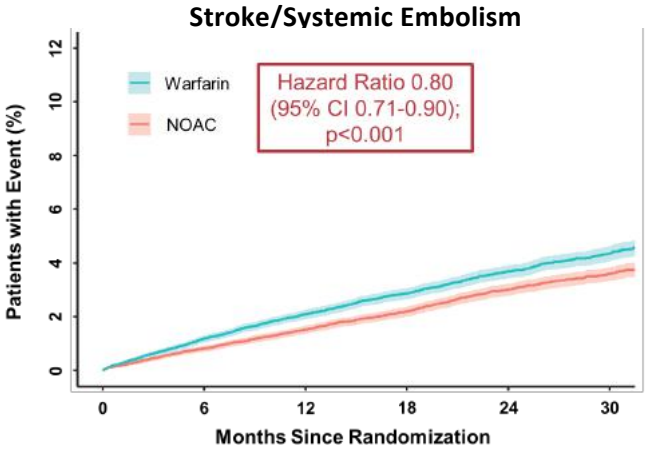
Non-Vitamin K Antagonist Oral Anticoagulants Versus Warfarin in Atrial Fibrillation

Individual Patient Data from the Pivotal Randomized Trials

(A **CO**llaboration between **M**ultiple institutions to **B**etter **I**nvestigate **N**on-vitamin K antagonist oral anticoagulant us**E** in **A**trial **F**ibrillation)

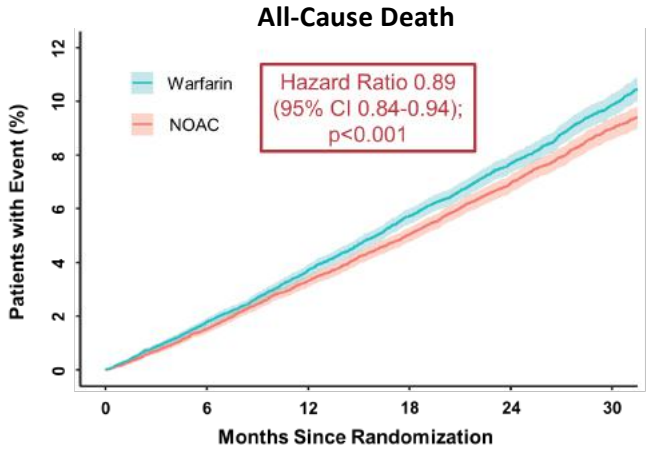
Kaplan-Meier Curves

COMBINE-AF



Number at Risk (number of events)

Warfarin	29229 (0)	28027 (336)	27051 (591)	21654 (786)	15324 (944)	8870 (1031)
NOAC	29312 (0)	28256 (231)	27328 (431)	21907 (602)	15595 (761)	9027 (837)

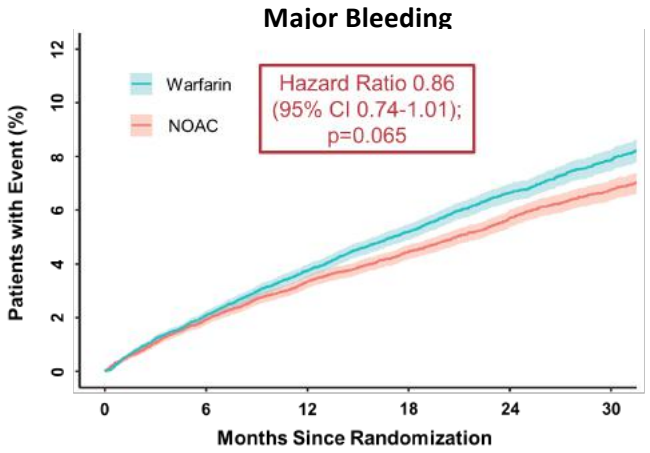


Number at Risk (number of events)

Warfarin	29229 (0)	28302 (512)	27476 (1067)	22120 (1587)	15735 (1987)	9139 (2289)
NOAC	29312 (0)	28462 (442)	27654 (956)	22276 (1404)	15951 (1794)	9271 (2080)

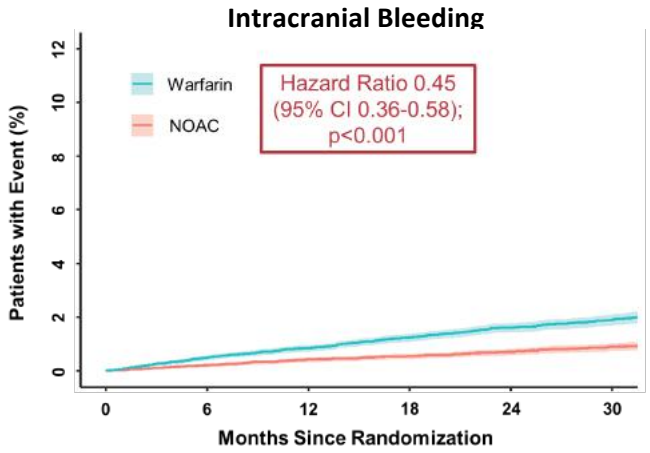
Kaplan-Meier Curves

COMBINE-AF



Number at Risk (number of events)

Warfarin	29187 (0)	25639 (572)	23562 (992)	18382 (1311)	12618 (1555)	7009 (1686)
NOAC	29270 (0)	25375 (521)	23456 (877)	18258 (1117)	12577 (1321)	7050 (1434)



Number at Risk (number of events)

Warfarin	29187 (0)	25900 (132)	23995 (219)	18854 (306)	13037 (369)	7299 (398)
NOAC	29270 (0)	25624 (55)	23863 (107)	18685 (133)	12986 (159)	7317 (179)

ELDERCARE-AF

Low-Dose Edoxaban in Very Elderly Patients with AF

- Les patients âgés (> 80ans) atteints de FAC qui n'étaient pas des candidats appropriés pour des doses standard d'anticoagulants oraux en raison d'un risque élevé de saignement ont été assignés à edoxaban 15 mg die vs. placebo.

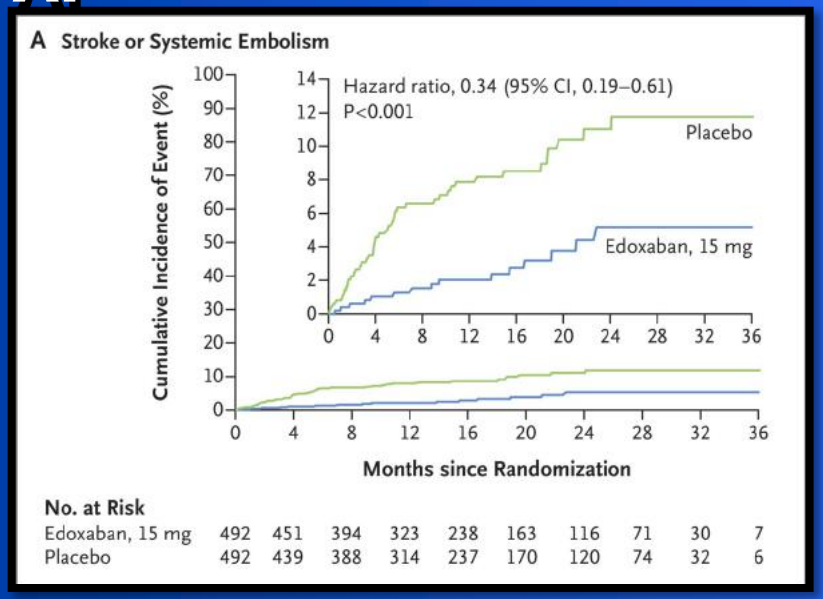
- Un total de 984 participants Japonais furents randomisés (1:1) à edoxaban 15 mg (492 patients) ou placebo (492 patients).
  - Un total 303 participants ont abandonnés (158 retrait de consentement, 135 décès et 10 autres raisons)

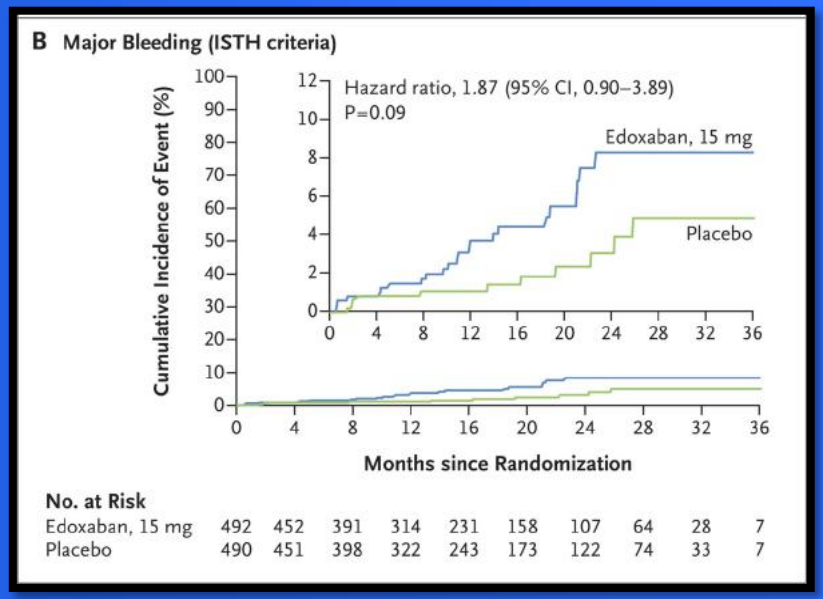
- FA non-valvulaire, pointage CHADS2 ≥ 2
- Faible clairance de la créatinine (15 à 30 ml/m);
- Antécédents d'hémorragie organe cible ou gastro-intestinal;
- Petit poids corporel (≤45 kg),
- Utilisation continue d'un AINS, ou d'un antiplaquettaire.

N Engl J Med 2020; 383:1735-1745

ELDERCARE-AF

Low-Dose Edoxaban in Very Elderly Patients with AF





Taux annualisé d'AVC ou d'embolie systémique

Édoxaban = 2,3%

Placebo = 6,7%

(HR = 0.34 [0.19 – 0.61] ; p <0,001)

Taux annualisé de saignements majeurs

Édoxaban = 3,3%

Placebo = 1.8%

(HR = 1.87 [0.90 – 3.89]; p = 0,09)

Mortalité = 9.9%

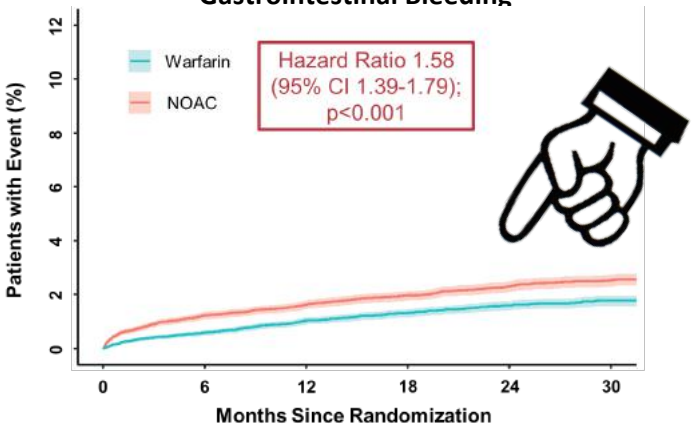
Mortalité = 10.2%

N Engl J Med 2020; 383:1735-1745

Kaplan-Meier Curves

COMBINE-AF

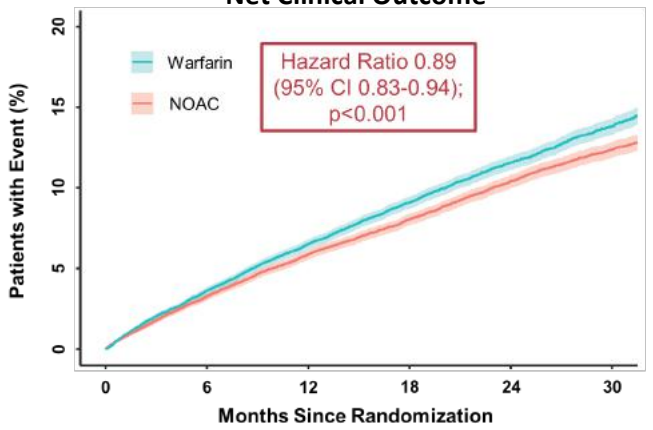
Gastrointestinal Bleeding



Number at Risk (number of events)

Warfarin	29187 (0)	25792 (160)	23804 (269)	18677 (330)	12906 (377)	7226 (395)
NOAC	29270 (0)	25393 (335)	23577 (436)	18413 (508)	12791 (564)	7206 (588)

Net Clinical Outcome



Number at Risk (number of events)

Warfarin	29187 (0)	25567 (999)	23446 (1744)	18260 (2327)	12504 (2758)	6946 (3012)
NOAC	29270 (0)	25323 (890)	23378 (1555)	18178 (2040)	12502 (2445)	6996 (2666)

Net clinical outcome = composite stroke, systemic embolism, major bleeding, all-cause death

2016 ESC Guidelines: Patients at high-risk of gastrointestinal bleeding

	Class	Level
In patients at high-risk of gastrointestinal bleeding, a VKA or another NOAC preparation should be preferred over dabigatran 150 mg twice daily, rivaroxaban 20 mg once daily, or edoxaban 60 mg once daily.	IIa	B

ORIGINAL ARTICLE

Large-Scale Assessment of a Smartwatch to Identify Atrial Fibrillation

Marco V. Perez, M.D., Kenneth W. Mahaffey, M.D., Haley Hedlin, Ph.D., John S. Rumsfeld, M.D., Ph.D., Ariadna Garcia, M.S., Todd Ferris, M.D., Vidhya Balasubramanian, M.S., Andrea M. Russo, M.D., Amol Rajmane, M.D., Lauren Cheung, M.D., Grace Hung, M.S., Justin Lee, M.P.H., Peter Kowey, M.D., Nisha Talati, M.B.A., Divya Nag, Santosh E. Gummidipundi, M.S., Alexis Beatty, M.D., M.A.S., Mellanie True Hills, B.S., Sumbul Desai, M.D., Christopher B. Granger, M.D., Manisha Desai, Ph.D., and Mintu P. Turakhia, M.D., M.A.S., for the Apple Heart Study Investigators*

APPLE HEART STUDY

La probabilité de recevoir une notification de pouls irrégulier était faible (0.52%). Parmi ceux ayant reçu une telle notification, 84% étaient concordantes avec FA et 34% représentaient de la FA lors de lectures ultérieures.

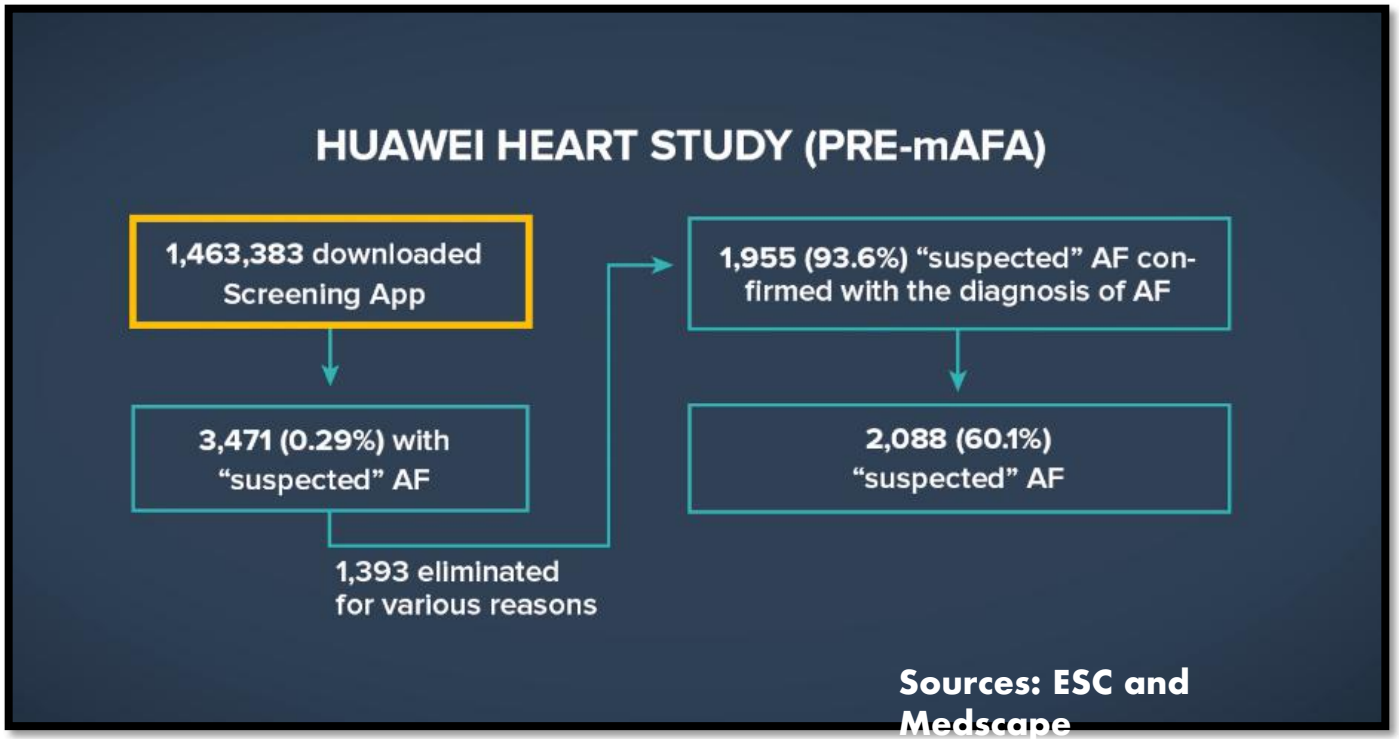
N Engl J Med 2019; 381:1909-1917

Wiley Online Library

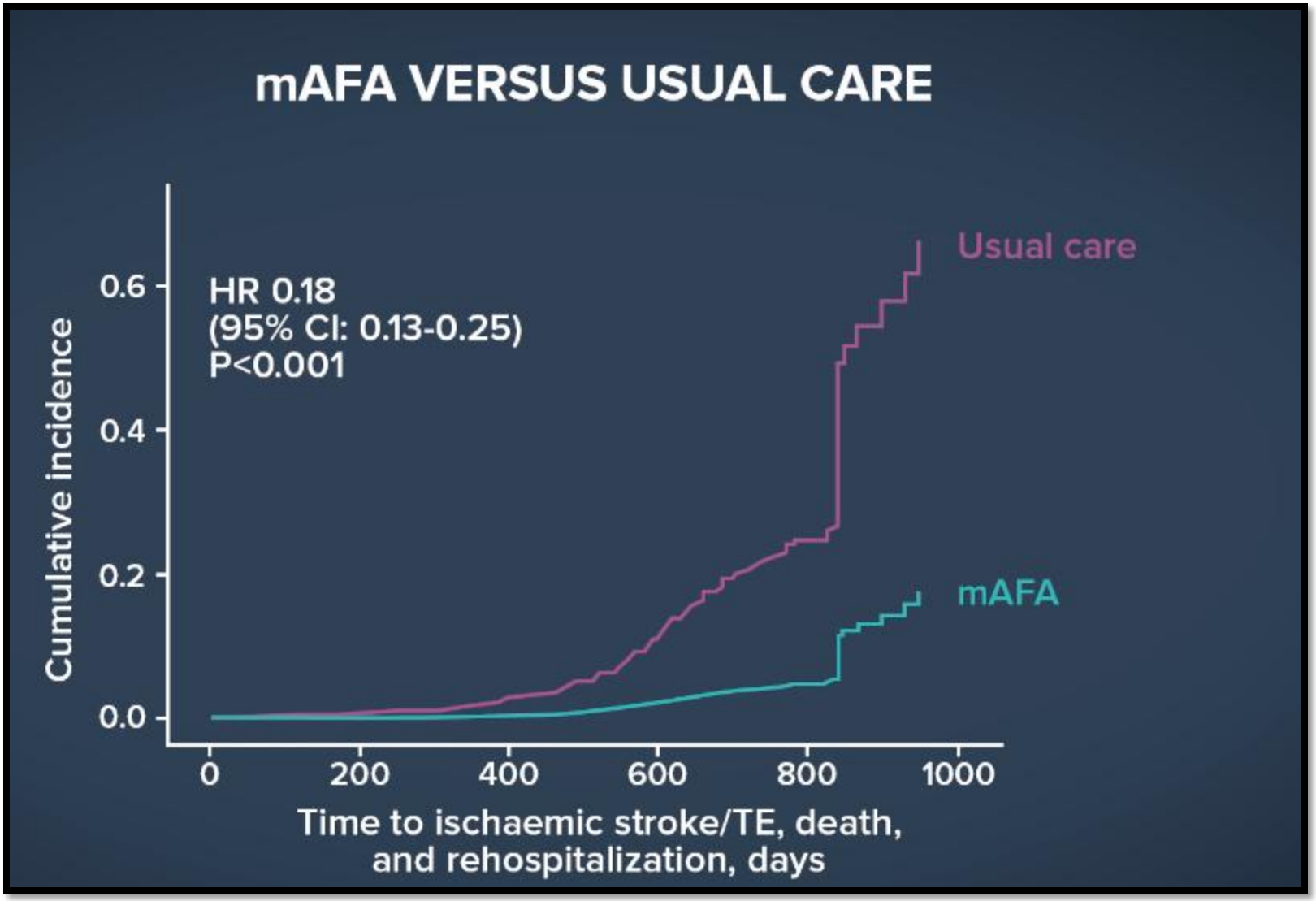
19 April 2019

Mobile Health (mHealth) technology for improved screening, patient involvement and optimising integrated care in atrial fibrillation: The mAFA (mAF-App) II randomised trial

Yutao Guo ✉, Deirdre A. Lane, Liming Wang, Yundai Chen, Gregory Y. H. Lip, On behalf of the mAF-App II Trial investigators




Vital sign
Graph
Table
Blood pressure
Blood pressure, mmHg
SBP
DBP
Vital sign
Pulse rate
Reset zoom
Pulse rate, counts/min
PR
Vital sign
Graph
Table
Date SBP DBP PR Weight
2016-12-20 120 70 66 67.0
2016-12-20 120 60 66 无
2016-12-26 120 60 66 67.0
2016-12-26 110 55 66 无
2016-12-28 110 55 66 无
2016-12-29 110 60 60 67.0
2016-12-29 110 55 54 无


mAFA VERSUS USUAL CARE
HR 0.18
(95% CI: 0.13-0.25)
P<0.001
Usual care
mAFA
Cumulative incidence
0.0
0.2
0.4
0.6
0
200
400
600
800
1000
Time to ischaemic stroke/TE, death,
and rehospitalization, days

APPRAISE-2 Publication

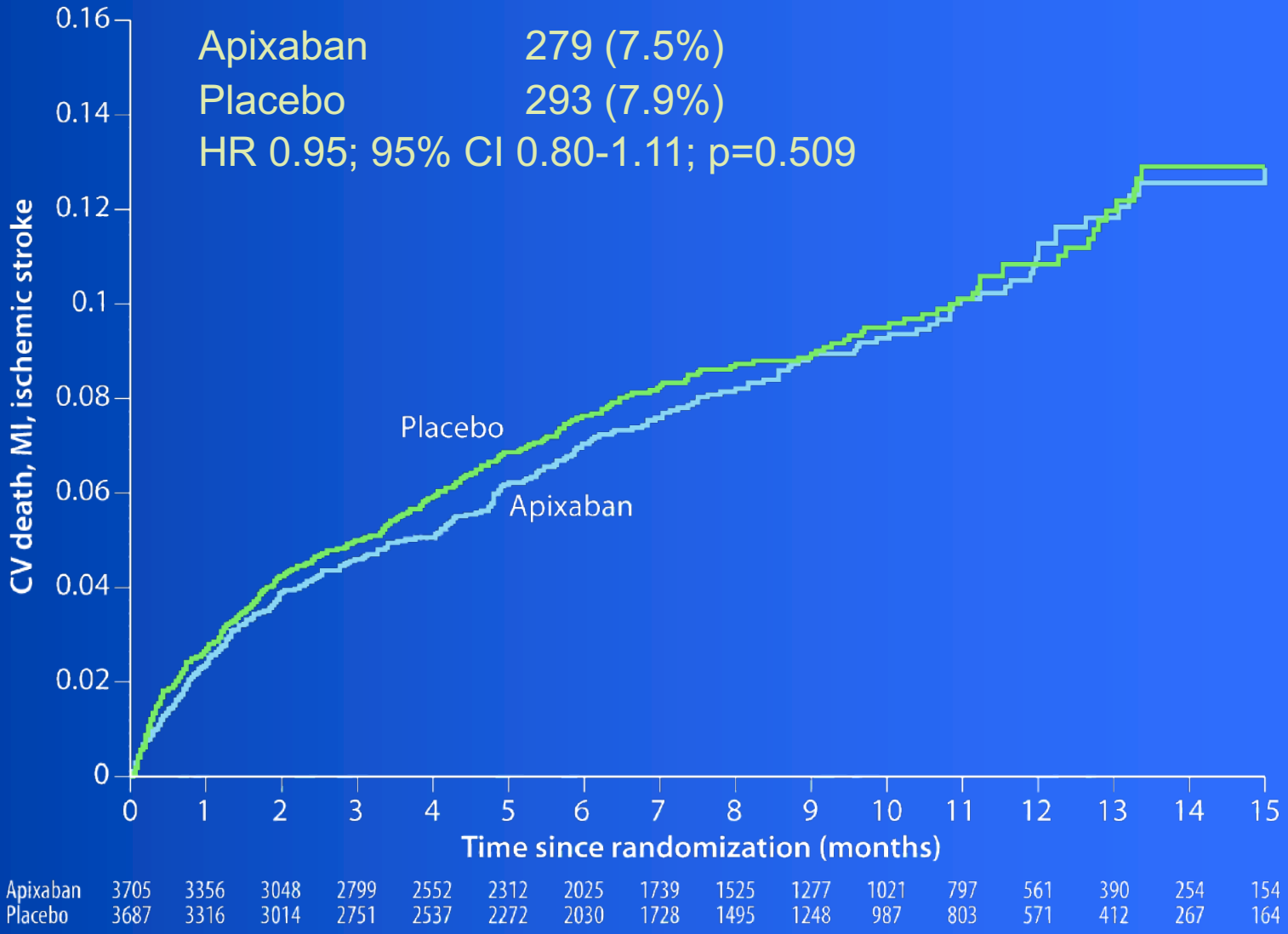
ORIGINAL ARTICLE

Apixaban with Antiplatelet Therapy after Acute Coronary Syndrome

John H. Alexander, M.D., M.H.S., Renato D. Lopes, M.D., Ph.D., Stefan James, M.D., Ph.D., Rakhi Kilaru, M.S., Yaohua He, M.D., Ph.D., Puneet Mohan, M.D., Ph.D., Deepak L. Bhatt, M.D., M.P.H., Shaun Goodman, M.D., Freek W. Verheugt, M.D., Ph.D., Marcus Flather, M.D., Kurt Huber, M.D., Danny Liaw, M.D., Ph.D., Steen E. Husted, M.D., Jose Lopez-Sendon, M.D., Raffaele De Caterina, M.D., Petr Jansky, M.D., Harald Darius, M.D., Dragos Vinereanu, M.D., Jan H. Cornel, M.D., Frank Cools, M.D., Dan Atar, M.D., Jose Luis Leiva-Pons, M.D., Matyas Keltai, M.D., Hisao Ogawa, M.D., Ph.D., Prem Pais, M.D., Alexander Parkhomenko, M.D., Witold Ruzyllo, M.D., Rafael Diaz, M.D., Harvey White, M.D., Mikhail Ruda, M.D., Margarida Geraldes, Ph.D., Jack Lawrence, M.D., Robert A. Harrington, M.D., and Lars Wallentin, M.D., Ph.D., for the APPRAISE-2 Investigators*

Primary Outcome

CV Death, MI, Ischemic Stroke



TIMI Major Bleeding

Apixaban 48 (1.3%)
Placebo 18 (0.5%)
HR 2.59; 95% CI 1.50–4.46; p=0.001