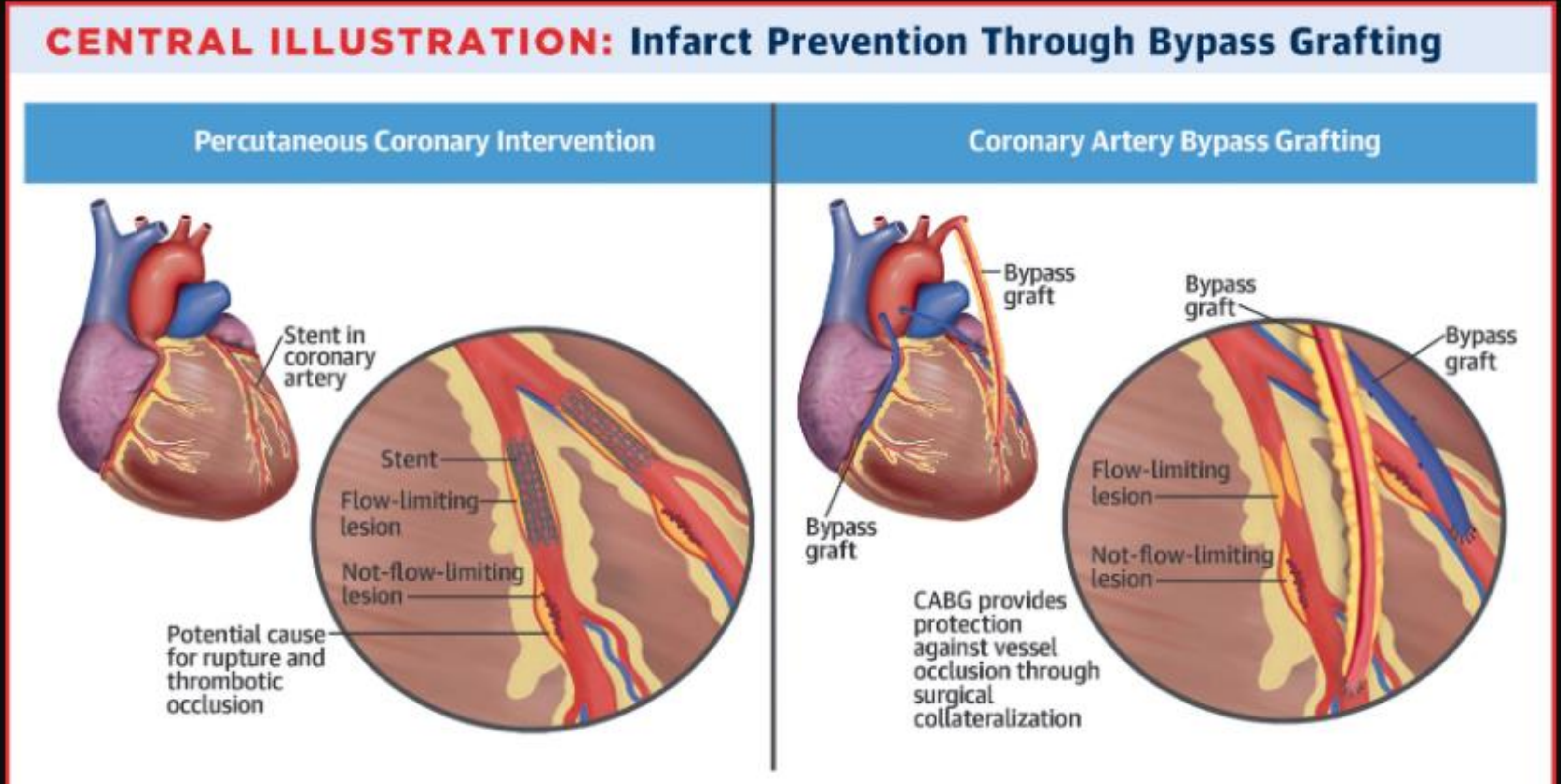
Year in review of cardiac surgery in 2020

30th Two Days in Cardiology

Fighting together

Chanapong Kittayarak
King Chulalongkorn Memorial Hospital

Coronary Artery Disease



Doenst, T. et al. J Am Coll Cardiol. 2019;73(8):964-76.

The NEW ENGLAND JOURNAL of MEDICINE

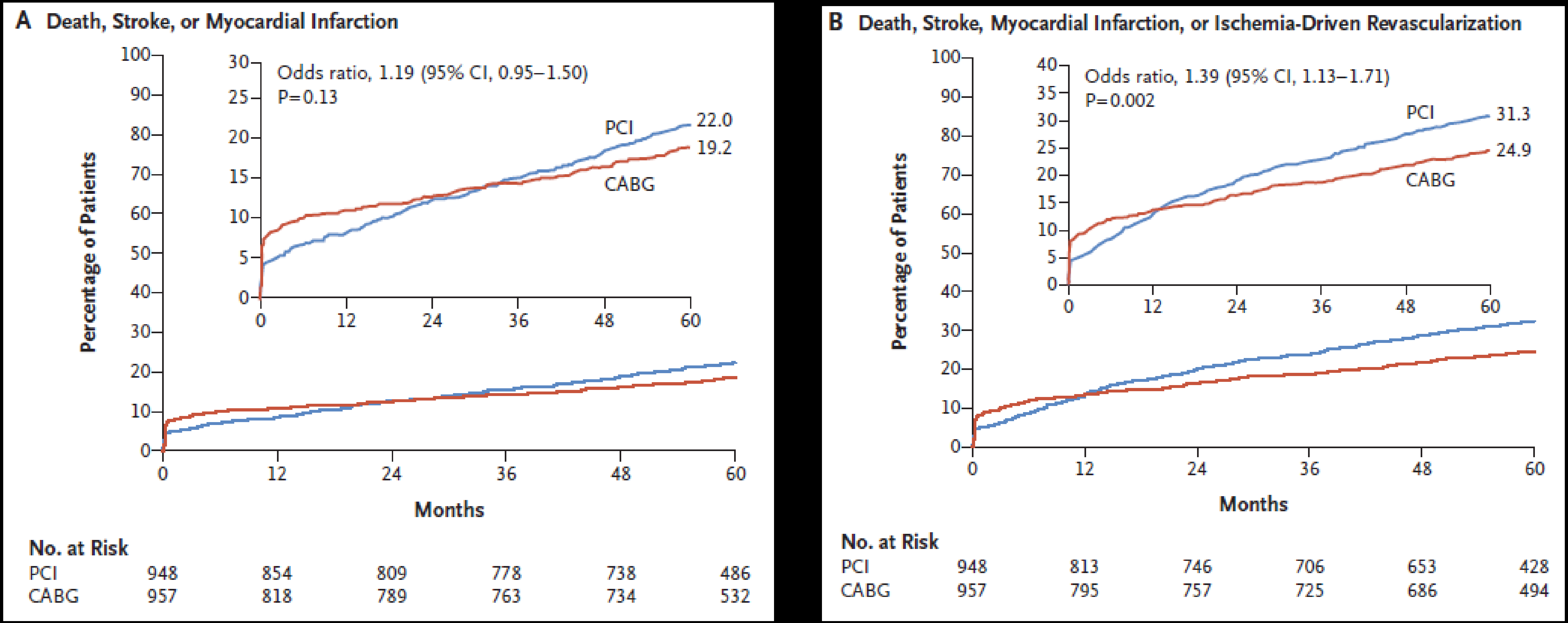
ORIGINAL ARTICLE

Five-Year Outcomes after PCI or CABG for Left Main Coronary Disease

G.W. Stone, A.P. Kappetein, J.F. Sabik, S.J. Pocock, M.-C. Morice, J. Puskas, D.E. Kandzari, D. Karmpaliotis, W.M. Brown III, N.J. Lembo, A. Banning, B. Merkely, F. Horkay, P.W. Boonstra, A.J. van Boven, I. Ungi, G. Bogáts, S. Mansour, N. Noiseux, M. Sabaté, J. Pomar, M. Hickey, A. Gershlick, P.E. Buszman, A. Bochenek, E. Schampaert, P. Pagé, R. Modolo, J. Gregson, C.A. Simonton, R. Mehran, I. Kosmidou, P. Généreux, A. Crowley, O. Dressler, and P.W. Serruys, for the EXCEL Trial Investigators*

LM with SYNTAX<32 2010-2014,
PCI (948 patients) or CABG (957 patients)

N ENGL J MED 381;19 NEJM.ORG NOVEMBER 7, 2019



P2Y12 inhibitor for PCI vs. CABG, 97.6% vs. 32.6%; p < 0.001

JACC: CARDIOVASCULAR INTERVENTIONS VOL. 13, NO. 3, 2020

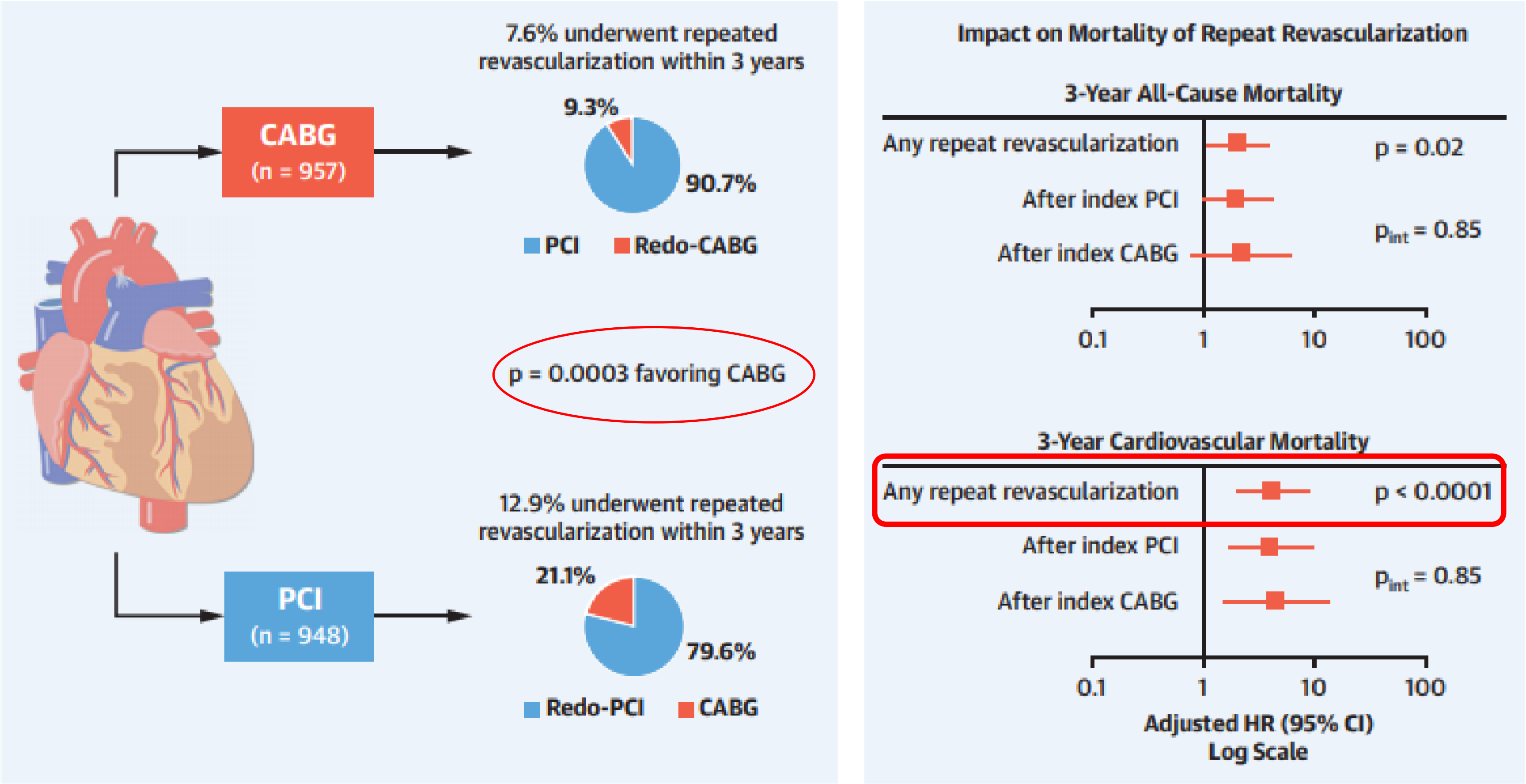
PUBLISHED BY ELSEVIER

Mortality After Repeat Revascularization Following PCI or CABG for Left Main Disease

The EXCEL Trial

Gennaro Giustino, MD,[a] Patrick W. Serruys, MD, PhD,[b] Joseph F. Sabik III, MD,[c] Roxana Mehran, MD,[a,d] Akiko Maehara, MD,[d,e] John D. Puskas, MD,[f] Charles A. Simonton, MD,[g] Nicholas J. Lembo, MD,[d,e] David E. Kandzari, MD,[h] Marie-Claude Morice, MD,[i] David P. Taggart, MD, PhD,[j] Anthony H. Gershlick, MD,[k] Michael Ragosta III, MD,[l] Irving L. Kron, MD,[l] Yangbo Liu, MS,[d] Zixuan Zhang, MS,[d] Thomas McAndrew, PhD,[d] Ovidiu Dressler, MD,[d] Philippe Généreux, MD,[d,m,n] Ori Ben-Yehuda, MD,[d,e] Stuart J. Pocock, PhD,[o] Arie Pieter Kappetein, MD, PhD,[p] Gregg W. Stone, MD[a,d]

CENTRAL ILLUSTRATION Repeat Revascularization and Mortality After Percutaneous Coronary Intervention or Coronary Artery Bypass Grafting for Left Main Coronary Artery Disease



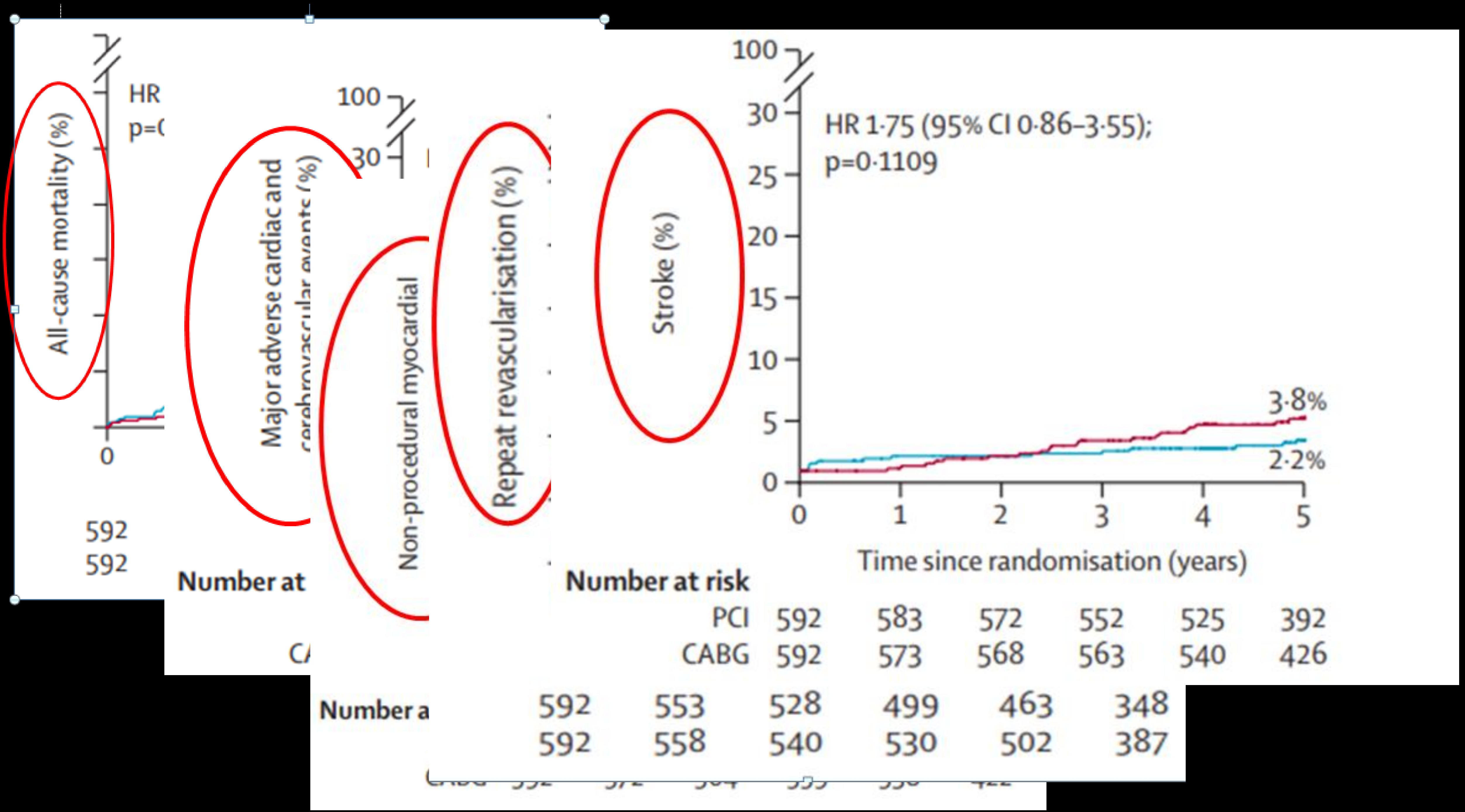
Giustino, G. et al. J Am Coll Cardiol Intv. 2020;13(3):375–87.

Percutaneous coronary angioplasty versus coronary artery bypass grafting in the treatment of unprotected left main stenosis: updated 5-year outcomes from the randomised, non-inferiority NOBLE trial

*Niels R Holm, Timo Mäkikallio, M Mitchell Lindsay, Mark S Spence, Andrejs Erglis, Ian B A Menown, Thor Trovik, Thomas Kellerth, Gintaras Kalinauskas, Lone Juul Hune Mogensen, Per H Nielsen, Matti Niemelä, Jens F Lassen, Keith Oldroyd, Geoffrey Berg, Peteris Stradins, Simon J Walsh, Alastair N J Graham, Petter C Endresen, Ole Fröbert, Uday Trivedi, Vesa Anttila, David Hildick-Smith, Leif Thuesen, Evald H Christiansen, for the NOBLE investigators**

2008- 2015, PCI (n=598) or CABG (n=603)
Median of 4·9 years of follow-up

www.thelancet.com Vol 395 January 18, 2020


All-cause mortality (%)
Major adverse cardiac and
Non-procedural myocardial
Repeat revascularisation (%)
Stroke (%)
HR 1·75 (95% CI 0·86–3·55);
p=0·1109
3·8%
2·2%
Time since randomisation (years)
Number at risk
PCI 592 583 572 552 525 392
CABG 592 573 568 563 540 426
592 553 528 499 463 348
592 558 540 530 502 387

- All-cause mortality was estimated in 9% after PCI versus 9% after CABG (HR 1·08 [95% CI 0·74–1·59]; p=0·68)
- MACCE were 28% (165 events) for PCI and 19% (110 events) for CABG (HR 1·58 [95% CI 1·24–2·01]); **CABG was found to be superior to PCI** for the primary composite endpoint (p=0·0002)
- Non-procedural myocardial infarction was estimated in 8% after PCI versus 3% after CABG (HR 2·99 [95% CI 1·66–5·39]; p=0·0002)
- Repeat revascularisation was estimated in 17% after PCI versus 10% after CABG (HR 1·73 [95% CI 1·25–2·40]; p=0·0009)

Percutaneous coronary angioplasty versus coronary artery bypass grafting in the treatment of unprotected left main stenosis: updated 5-year outcomes from the randomised, non-inferiority NOBLE trial

Niels R Holm, Timo Mäkikallio, M Mitchell Lindsay, Mark S Spence, Andrejs Erglis, Ian B A Menown, Thor Trovik, Thomas Kellerth, Gintaras Kalinauskas, Lone Juul Hune Mogensen, Per H Nielsen, Matti Niemelä, Jens F Lassen, Keith Oldroyd, Geoffrey Berg, Peteris Stradins, Simon J Walsh, Alastair N J Graham, Petter C Endresen, Ole Fröbert, Uday Trivedi, Vesa Anttila, David Hildick-Smith, Leif Thuesen, Evald H Christiansen, for the NOBLE investigators*

Interpretation In revascularisation of left main coronary artery disease, PCI was associated with an inferior clinical outcome at 5 years compared with CABG. Mortality was similar after the two procedures but patients treated with PCI had higher rates of non-procedural myocardial infarction and repeat revascularisation.

www.thelancet.com Vol 395 January 18, 2020

TAVAR

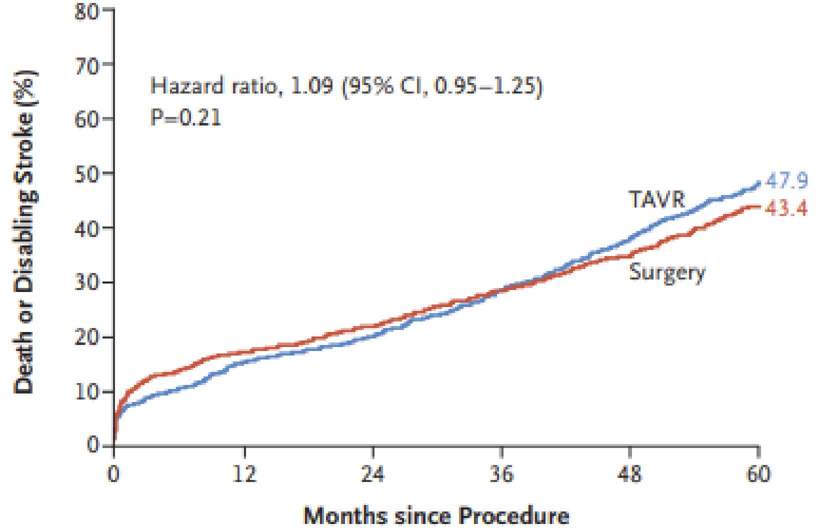

Partner 1 and CoreValve
Edwards Sapien Valve
High Risk / Inoperable
2007
Partner 2 and SURTAVI
Sapien XT Valve
Intermediate Risk
2011
FDA Approval:
Edwards Sapien Valve
High Risk / Inoperable
2011
FDA approval:
Sapien XT Valve
Intermediate Risk
2016
Partner 3 and Evolute Trials
Sapien 3 Valve
Low Risk FDA Approval
2019

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 FEBRUARY 27, 2020 VOL. 382 NO. 9

Five-Year Outcomes of Transcatheter or Surgical Aortic-Valve Replacement

R.R. Makkar, V.H. Thourani, M.J. Mack, S.K. Kodali, S. Kapadia, J.G. Webb, S.-H. Yoon, A. Trento, L.G. Svensson, H.C. Herrmann, W.Y. Szeto, D.C. Miller, L. Satler, D.J. Cohen, T.M. Dewey, V. Babaliaros, M.R. Williams, D.J. Kereiakes, A. Zajarias, K.L. Greason, B.K. Whisenant, R.W. Hodson, D.L. Brown, W.F. Fearon, M.J. Russo, P. Pibarot, R.T. Hahn, W.A. Jaber, E. Rogers, K. Xu, J. Wheeler, M.C. Alu, C.R. Smith, and M.B. Leon, for the PARTNER 2 Investigators*



No. at Risk						
TAVR	1011	843	785	687	581	474
Surgery	1021	771	704	625	547	440

Figure 1. Time-to-Event Curves for Death from Any Cause or Disabling Stroke to 5 Years.

CONCLUSIONS

Among patients with aortic stenosis who were at intermediate surgical risk, there was no significant difference in the incidence of death or disabling stroke at 5 years after TAVR as compared with surgical aortic-valve replacement. (Funded by Edwards Lifesciences; PARTNER 2 ClinicalTrials.gov number, NCT01314313.)

The NEW ENGLAND JOURNAL of MEDICINE

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Five-Year Outcomes of Transcatheter or Surgical Aortic-Valve Replacement

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Incidence of death or disabling stroke was higher after TAVR than after surgery in the transthoracic-access cohort

At 5 years, TAVR had more at least mild paravalvular aortic regurgitation (33.3% vs. 6.3%).

Repeat hospitalizations (33.3% vs. 25.2%)

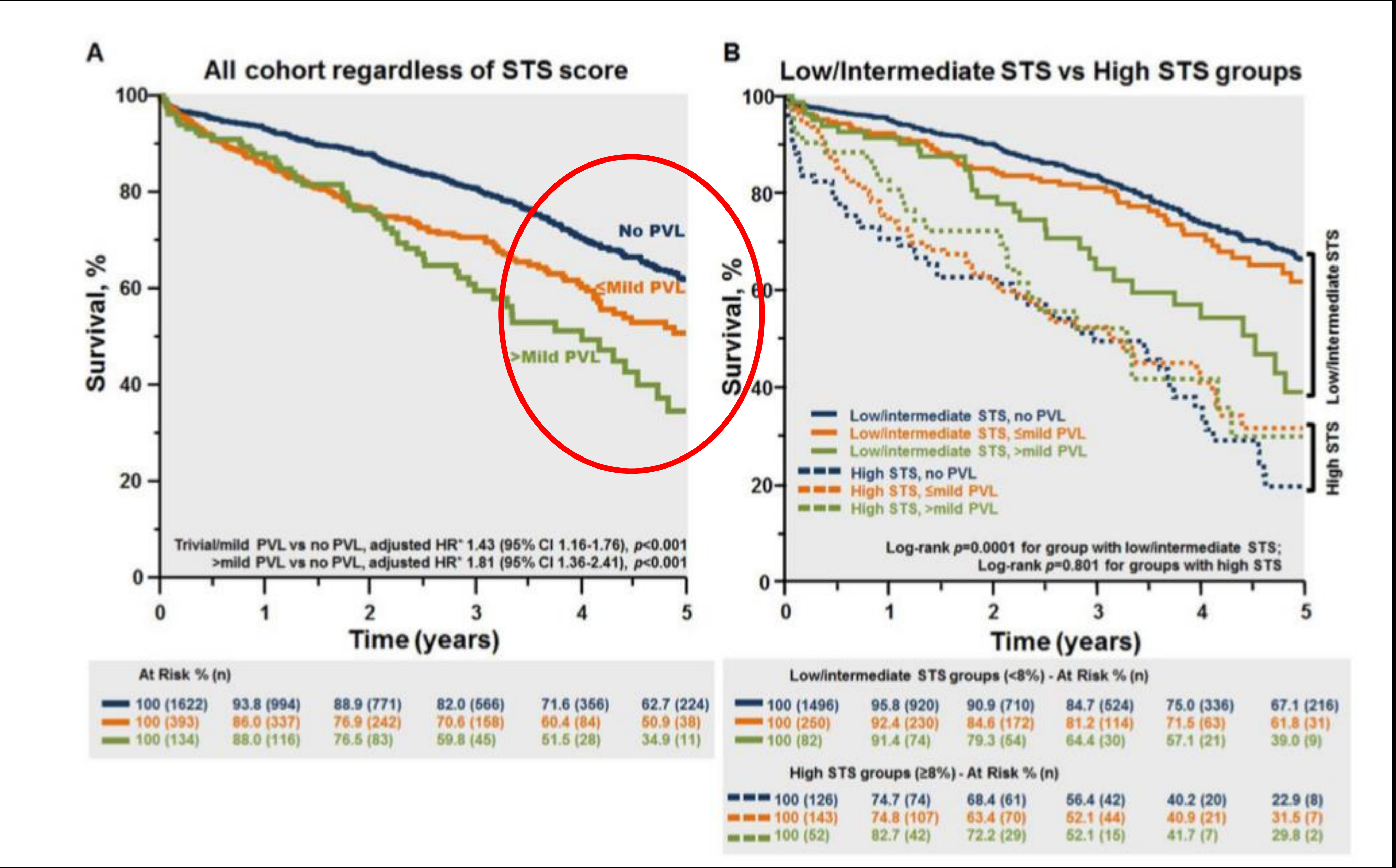
Aortic-valve reinterventions (3.2% vs. 0.8%)

JACC: CARDIOVASCULAR INTERVENTIONS VOL. 11, NO. 3, 2018

PUBLISHED BY ELSEVIER

Long-Term Outcomes in Patients With New Permanent Pacemaker Implantation Following Transcatheter Aortic Valve Replacement

CONCLUSIONS The need for PPI post-TAVR was frequent and associated with an increased risk of heart failure rehospitalization and lack of LVEF improvement, but not mortality, after a median follow-up of 4 years. Most patients with new PPI post-TAVR exhibited some degree of pacing activity at follow-up. (J Am Coll Cardiol Intv 2018;11:301–10)



Padang R, *et al.* *BMJ Open* 2018;**8**:e022437. doi:10.1136/bmjopen-2018-022437

Treatment options for ischemic mitral regurgitation: A meta-analysis

Francesco Nappi, MD,[a] George A. Antoniou, MD, PhD, MSc, FEBVS,[b,c] Antonio Nenna, MD,[d] Robert Michler, MD, PhD,[e] Umberto Benedetto, MD, PhD,[f] Sanjeet Singh Avtaar Singh, MD,[g] Ivan Carmine Gambardella, MD,[h] and Massimo Chello, MD[d]

Treatment options for ischemic mitral regurgitation

- medical therapy
- percutaneous repair (MitraClip)
- CABG
- CABG + mitral valve replacement
- CABG + mitral valve repair
  - annular
  - annular + subvalvular

meta-analysis of high-quality evidences
12 studies (8 RCTs and 4 PSMs)
2848 patients

MitraClip vs OMT												
Obadia et al, 2018[12] (MITRA-FR)	OMT 152	OMT + MitraClip 152	70.6 ± 9.9	70.1 ± 10.1	107	120	39	50	52	75	40	35
Stone et al, 2018[11] (COAPT)	OMT 312	OMT + MitraClip 302	72.8 ± 10.5	71.7 ± 11.8	192	201	123	106	160	156	110	130

TABLE 2. Summary of the outcomes of the meta-analysis

	Long-term mortality	Hospital mortality	Reoperation	Readmission	Composite end point
MitraClip (N = 454) vs optimal medical therapy (N = 464)	0.77 (0.40-1.49) $P = .44$	3.35 (0.25-44.7) $P = .36$	**0.40 (0.22-0.72) $P = .003$**	0.35 (0.04-3.06) $P = .34$	0.39 (0.09-1.73) $P = .21$
CABG associated with mitral valve procedure (N = 301) vs CABG alone (N = 314)	1.10 (0.67-1.79) $P = .71$	0.84 (0.31-2.24) $P = .73$	2.96 (0.64-13.63) $P = .16$	0.53 (0.05-5.07) $P = .58$	0.72 (0.33-1.56) $P = .40$
Mitral valve replacement (N = 553) vs mitral valve repair (N = 556)	1.12 (0.85-1.48) $P = .43$	**1.91 (1.18-3.12) $P = .009$**	**0.60 (0.36-1.00) $P = .05$**	**0.45 (0.23-0.87) $P = .02$**	0.95 (0.74-1.21) $P = .68$
Restrictive annuloplasty with subvalvular repair (N = 103) vs restrictive annuloplasty alone (N = 103)	0.78 (0.35-1.73) $P = .55$	0.70 (0.21-2.28) $P = .55$	0.39 (0.09-1.61) $P = .19$	**0.50 (0.24-1.02) $P = .06$**	**0.30 (0.12-0.74) $P = .009$**

Data are presented as OR with 95% confidence interval, with the corresponding overall *P* value. OR refers to the comparison between the first group and the second group in the treatment group. (a) an OR >1 favors optimal medical therapy, an OR <1 favors optimal medical therapy plus MitraClip. (b) an OR >1 favors CABG alone, an OR <1 favors CABG associated with mitral valve procedure. (c) an OR >1 favors MV repair, an OR <1 favors MV replacement. (d) an OR >1 favors restrictive annuloplasty alone, an OR <1 favors restrictive annuloplasty with subvalvular repair. Bold indicates statistically significant. *CABG*, Coronary artery bypass graft.

	Long-term mortality	Hospital mortality	Reoperation	Readmission	Composite endpoint
MitraClip (N = 454) vs optimal medical therapy (N = 464)	=	=	Mitraclip better	=	=
CABG associated with mitral valve procedure (N = 301) vs CABG alone (N = 314)	=	=	=	=	=
Mitral valve replacement (N = 553) vs mitral valve repair (N = 556)	=	Repair better	Replacement better	Replacement better	=
Restrictive annuloplasty with subvalvular repair (N = 103) vs restrictive annuloplasty alone (N = 103)	=	=	=	Subvalvular repair better	Subvalvular repair better

DOI: 10.1111/jocs.14490

REVIEW ARTICLE

JOURNAL OF CARDIAC SURGERY WILEY

Meta-analysis of results of subvalvular repair for severe ischemic mitral regurgitation

Massimo Meco MD[1] | Antonio Lio MD[2,3] | Andrea Montisci MD[3,4] | Paolo Panisi MD[1] | Matteo Ferrarini MD[3] | Antonio Miceli MD[3] | Mattia Glauber MD[2,3]

478 patients: 228 patient MA alone and 250 patients underwent concomitant PMS.

Early mortality was similar between two groups.

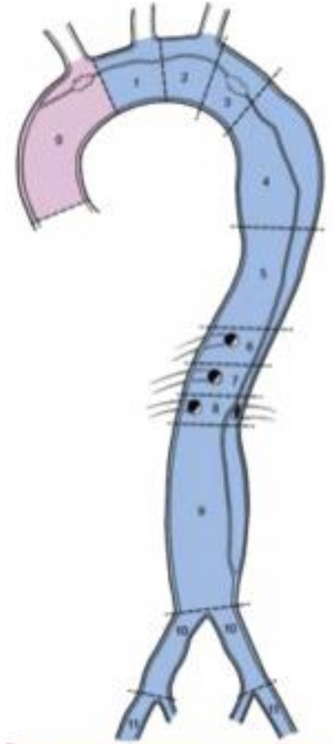
Conclusions: This meta-analysis demonstrated superiority in terms of ventricular remodeling of a combined approach encompassing PMS and MA over MA alone in IMR. Moreover, the association of subvalvular surgery with restrictive MA decreases the incidence of mitral regurgitation recurrence and cardiac-related events at follow-up.

J Card Surg. 2020;35:886–896.

Society for Vascular Surgery (SVS) and Society of Thoracic Surgeons (STS) reporting standards for type B aortic dissections

Check for updates

Joseph V. Lombardi, MD (SVS Co-Chair),[a] G. Chad Hughes, MD (STS Co-Chair),[b] Jehangir J. Appoo, MD,[c] Joseph E. Bavaria, MD,[d] Adam W. Beck, MD,[e] Richard P. Cambria, MD,[f] Kristofer Charlton-Ouw, MD,[g] Mohammad H. Eslami, MD,[h] Karen M. Kim, MD,[i] Bradley G. Leshnower, MD,[j] Thomas Maldonado, MD,[k] T. Brett Reece, MD,[l] *and* Grace J. Wang, MD,[d] *Camden, NJ; Durham, NC; Calgary, Alberta, Canada; Philadelphia and Pittsburgh, Pa; Birmingham, Ala; Brighton, Mass; Houston, Tex; Ann Arbor, Mich; Atlanta, Ga; New York, NY; and Denver, Colo*



Type	Proximal Extent	Distal Extent
	0	0
A_D Entry tear: **Zone 0**	1	1
	2	2
	3	3
	4	4
	5	5
B_{PD} Entry tear: **≥Zone 1**	6	6
	7	7
	8	8
	9	9
I_D Unidentified entry tear involving **Zone 0**	10	10
	11	11
	12	12

Fig 7. Society for Vascular Surgery/Society of Thoracic Surgeons (SVS/STS) Aortic Dissection Classification System.

Journal of Vascular Surgery
March 2020

Ann Thorac Surg
2020;109:959-81

Table 1. Society for Vascular Surgery/Society of Thoracic Surgeons (SVS/STS) Chronicity Classification of Aortic Dissection

Chronicity	Time From Onset of Symptoms
Hyperacute	<24 hours
Acute	1-14 days
Subacute	15-90 days
Chronic	>90 days

Table 5. Stroke Severity: Modified Rankin Scale

The scale runs from 0-6, running from perfect health without symptoms to death.

0. No symptoms.
1. No significant disability. Able to carry out all usual activities, despite some symptoms.
2. Slight disability. Able to look after own affairs without assistance, but unable to carry out all previous activities.
3. Moderate disability. Requires some help, but able to walk unassisted.
4. Moderately severe disability. Unable to attend to own bodily needs without assistance, and unable to walk unassisted.
5. Severe disability. Requires constant nursing care and attention, bedridden, incontinent.
6. Dead.

From Broderick JP, Adeoye O, Elm J. Evolution of the modified Rankin scale and its use in future stroke trials. *Stroke*. 2017;48:2007-2012.

Table 3. Aortic Dissection Acuity

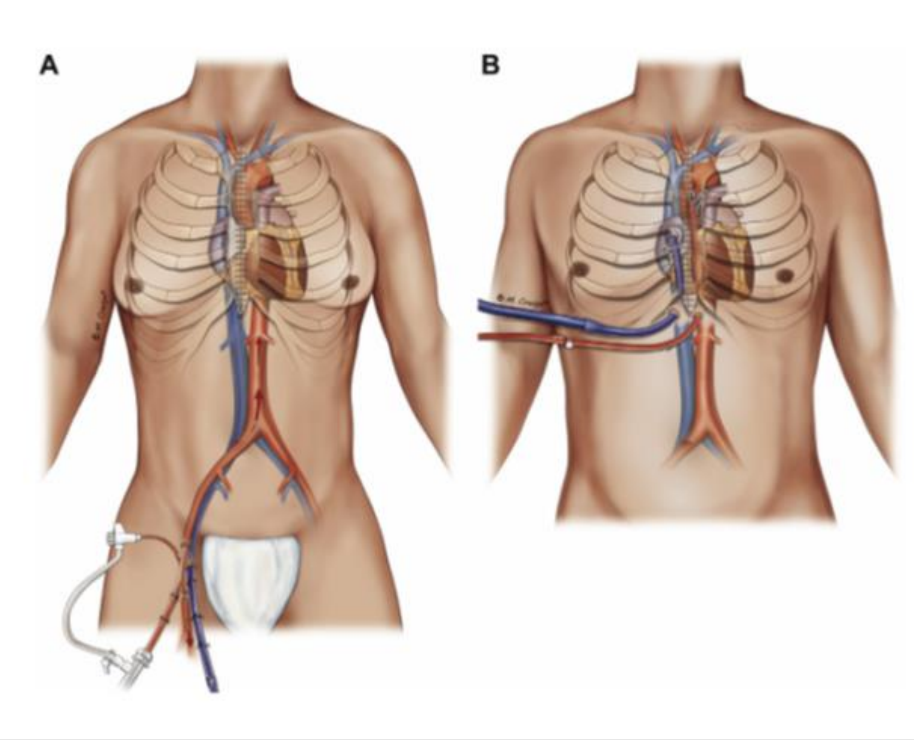
Uncomplicated
No rupture
No malperfusion
No high-risk features
High risk
Refractory pain
Refractory hypertension
Bloody pleural effusion
Aortic diameter >40 mm
Radiographic only malperfusion
Readmission
Entry tear: lesser curve location
False lumen diameter >22 mm
Complicated
Rupture
Malperfusion

2020 EACTS/ELSO/STS/AATS expert consensus on post-cardiotomy extracorporeal life support in adult patients

Roberto Lorusso, Chairperson,[a] Glenn Whitman, Chairperson,[b] Milan Milojevic,[c,d,e] Giuseppe Raffa,[f,g] David M. McMullan,[h] Udo Boeken,[i] Jonathan Haft,[j] Christian Bermudez,[k] Ashish Shah,[l] and David A. D'Alessandro[m]

Table 4. Principles to Consider When Choosing Non-conventional Post-cardiotomy ECLS System Modes and Configurations

Underlying disease (preoperative or intraoperative) (ischemic/inadequate myocardial protection, valve disease with mechanical prosthesis, associated lung dysfunction or edema)
Preoperative uni- or biventricular function (isolated RV versus isolated LV or biventricular dysfunction)
Adequacy of ECLS venous return
Adequacy of ECLS output (septic state) (if higher flow is required)
State of global cardiac contractility (very poor or absent contractility with high risk of intracardiac thrombosis)
Extent of left chamber stasis and distension
Adequacy and efficacy of aortic valve opening under ECLS support
Pulmonary insufficiency/congestion
Adequacy of upper body and/or coronary oxygenation
Presence and extent of peripheral arterial atherosclerosis
Presence of limb ischemia (peripheral cannulation)
Presence of limb hyperperfusion (axillary artery perfusion with 'chimney technique')
Likelihood of ECLS weaning (bridge to VAD or HTx) (a prophylactic 'VAD-like' configuration for a prolonged temporary assistance with short-term mechanical assistance without oxygenator)
Possibility of patient mobility on ECLS (if prolonged support expected)



Ann Thorac Surg. 2020 Oct

Eur J Cardiothorac Surg. 2020 Oct

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TABLE 5. Criteria and clues for weaning from veno-arterial ECLS (modified from ELSO Red Book[110])

Types of ECLS systems	Criteria for weaning
V-A ECLS	Stable hemodynamic conditions for at least 24 h
	Mean arterial pressure >60 mm Hg in the absence of or with low levels of vasopressors/inotropes
	Low arterial lactate levels (<2 mmol/L)
	PaO_2 >100 mm Hg with ECLS FiO_2 <21% and FiO_2 40% on the mechanical ventilator
	Aortic flow velocity time integration >10–12 cm at an ECLS flow of 1–1.5 L/min
	Left ventricular ejection fraction >20%–25%
	Doppler lateral mitral annulus peak systolic velocity ≥6 cm/s
	LV and RV adequate contractile response to volume challenge
	Venous and arterial patency and lack of distal thrombi should be checked after decannulation
	Use of other temporary assist device, like a transaortic suction device, may be used to enhance weaning from ECLS
	Transition to a VAD may be considered once hemodynamic stability has been achieved; however, in the presence of liver dysfunction, systemic inflammation, or obesity, mortality will be high

Eur J Cardiothorac Surg. 2020 Oct

Ann Thorac Surg. 2020 Oct

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Unfavorable for ECPR
Unobserved cardiac arrest
Age >75 years and frailty
No-flow time ≥10 min
Inadequate resuscitation measures
Clinical signs of severe irreversible brain damage or expected poor neurological prognosis
Prolonged CPR of >20 min in the case of asystole (exception: accidental hypothermia, intoxication, and suspected pulmonary embolism) or of >120 min in the case of persistent ventricular fibrillation/ventricular tachycardia
Low pH (<6.8) and high lactate level (>20 mmol/L). Clinical signs of severe irreversible brain damage or expected poor neurological prognosis
Patient's refusal (advance directive, the presence of emergency sheet regarding advance-care planning)
Contraindications to full anticoagulation (eg, active bleeding, severe trauma, or hemothorax after CPR)

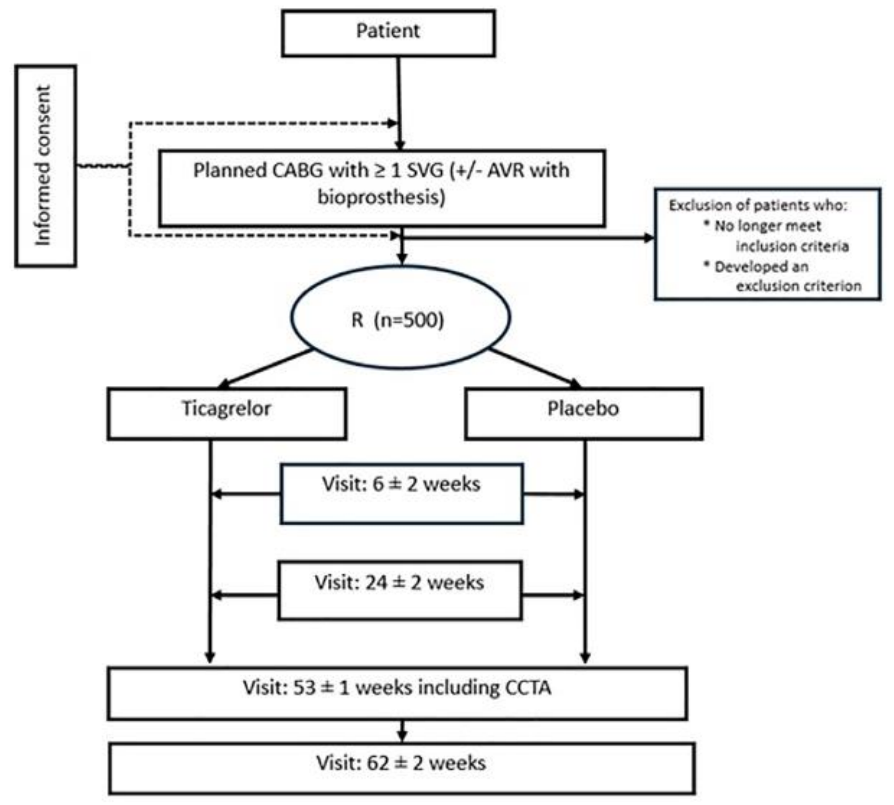

thank you

Effect of Adding Ticagrelor to Standard Aspirin on Saphenous Vein Graft Patency in Patients Undergoing Coronary Artery Bypass Grafting (POPular CABG)

A Randomized, Double-Blind, Placebo-Controlled Trial

Laura M. Willemsen, Paul W.A. Janssen, Joyce Peper, Mohamed A. Soliman-Hamad, Albert H.M. van Straten, Patrick Klein, Chris M. Hackeng, Uday Sonker, Margreet W.A. Bekker, Clemens von Birgelen, Marc A. Brouwer, Pim van der Harst, Eline A. Vlot, Vera H.M. Deneer, Dean R.P.P. Chan Pin Yin, Marieke E. Gimbel, Kasper F. Beukema, Edgar J. Daeter, ... **See all authors**

Originally published 31 Aug 2020 | https://doi.org/10.1161/CIRCULATIONAHA.120.050749 | Circulation. 2020;142:1799–1807



Study flowchart of the main study.*AVR*, Aortic valve replacement; *R*, randomization.

- Patients scheduled for CABG were randomized in a 1:1 fashion to either ticagrelor 90 mg BID (n = 247) or placebo (n = 249).
- All patients received 80-100 mg of aspirin, continued indefinitely.
- Duration of follow-up: 1 year
- Mean patient age: 68 years
- Percentage female: 33%
- Percentage with diabetes: 26%

- Acute coronary syndrome (ACS): 31%
- Left ventricular ejection fraction >50%: 78%
- Cardiopulmonary bypass use: 95%
- Mean number of vein grafts/patient: 2.2

- The primary outcome, SVG occlusion at 1 year on computed tomography/coronary angiography
- Ticagrelor vs. placebo, was 10.5% vs. 9.1% (odds ratio 1.29, 95% confidence interval 0.73-2.30, p = 0.38).

- (~77% in DACAB, ~91% in current trial). This is more in line with other contemporary CABG trials, which have reported 1-year SVG patency rates between 85-95%. One big difference is that approximately three-fourths of CABG surgeries were performed off-pump in DACAB
- **Conclusions:**
- In this randomized, placebo-controlled trial, the addition of ticagrelor to standard aspirin did not reduce SVG occlusion at 1 year after CABG.

Feature Expert Opinion

ASIAN CARDIOVASCULAR & THORACIC ANNALS

Asian Cardiovascular & Thoracic Annals
2020, Vol. 28(7) 360–365

DOI: 10.1177/0218492320930846
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SAGE

Perspectives on surgical treatment of mitral valve disease

Tirone E David

Abstract

A sound knowledge of the functional anatomy of the mitral valve and the alterations caused by different diseases is indispensable for surgeons treating patients with mitral valve disease. Rheumatic mitral valve disease remains the most common heart valvular disorder in developing countries, whereas mitral regurgitation due myxomatous degeneration of the valve is the most common in developed countries. The mitral valve should be repaired whenever possible, as long as the outcome is predictably better than that of replacement. The intraoperative decision to repair or replace is not always simple and depends on the experience of the surgeon and the pathological changes that caused mitral valve dysfunction.

Keywords

Cardiac surgical procedures, heart valve prosthesis implantation, mitral valve annuloplasty, mitral valve insufficiency, mitral valve stenosis, rheumatic heart disease

European Heart Journal
Acute Cardiovascular Care
ESC
European Society of Cardiology

Original scientific paper

Mechanical circulatory support in cardiogenic shock from acute myocardial infarction: Impella CP/5.0 versus ECMO

European Heart Journal: Acute Cardiovascular Care
2020, Vol. 9(2) 164–172

DOI: 10.1177/2048872619865891
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Conclusions: Patients treated with Impella CP/5.0 or ECMO for cardiogenic shock after myocardial infarction did not differ in 30-day mortality. More device-related complications occurred with ECMO compared to Impella support.