

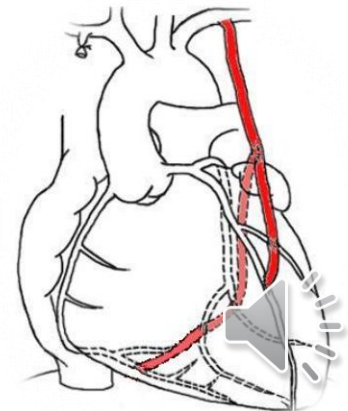
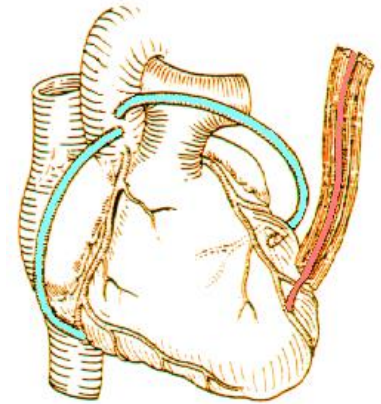
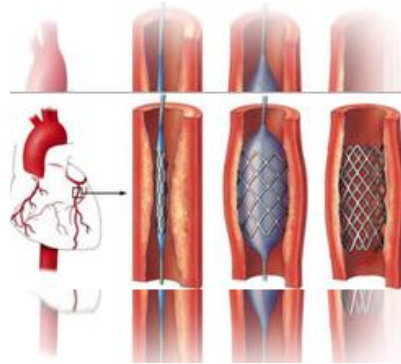
Decision Making on Coronary Intervention: Indication of PCI & CABG

Ho Young Hwang

Professor

Seoul National University Hospital

Seoul National University College of Medicine



Decision Making on Coronary Intervention: Indication of PCI & CABG

- 의학적 근거와 협업을 바탕으로!
 - American & European Guidelines
 - Heart Team Approach

2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery: Executive Summary

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*

2018 ESC/EACTS Guidelines on myocardial revascularization

The Task Force on myocardial revascularization of the European
Society of Cardiology (ESC) and European Association for
Cardio-Thoracic Surgery (EACTS)



Decision Making on Coronary Intervention: Indication of PCI & CABG

- 근무 병원이나 타원 내과에서 CABG를 권유하는 경우.....



Introduction

Landmark Trials

Recent Guidelines

Summary



History of PCI



1958 - **Dr F. Mason Sones** performed the 1st coronary angiography of the RCA

- ✓ **Gruentzig 1977**
- ✓ **The world's first PTCA**

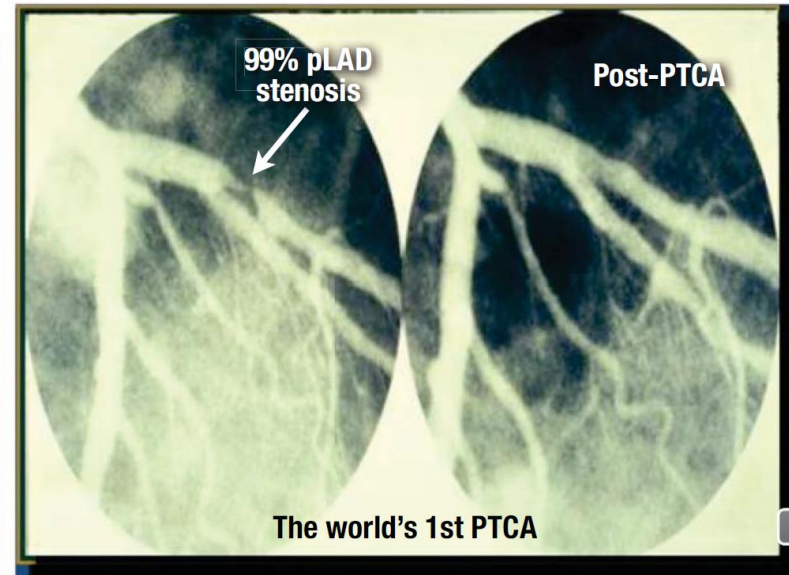


Andreas Gruentzig (1939-1985)

FATHER OF INTERVENTIONAL CARDIOLOGY

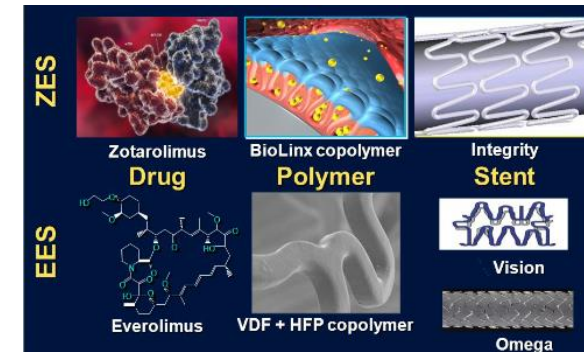
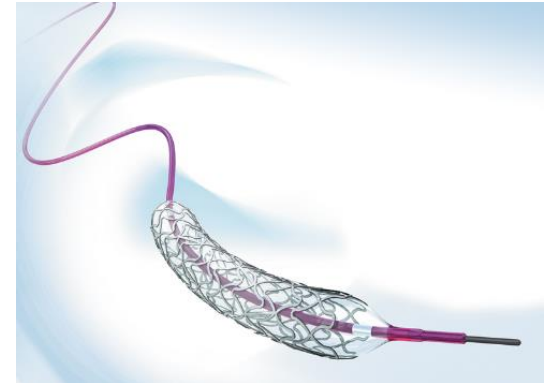
DREAM

Percutaneous Catheter-based non-invasive treatment of vascular disease in a conscious patient

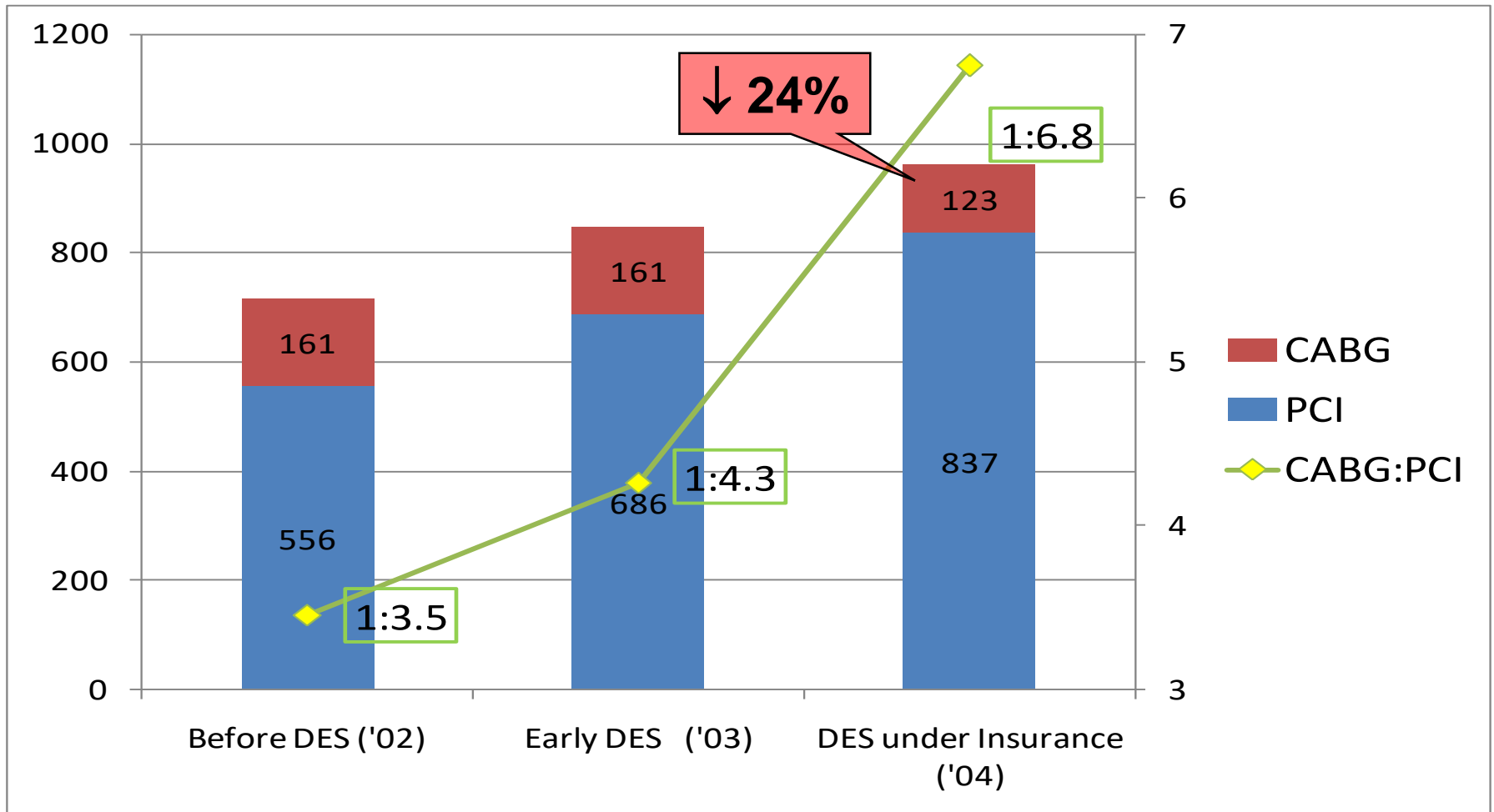


History of PCI

- **POBA (1977-)**
 - Plain Old Balloon Angioplasty
- **Bare Metal Stent (1986-)**
 - Stainless steel
 - Coabl-t-chromium alloys
- **Drug Eluting Stent (1999-)**
 - Cypher (sirolimus), Taxus (paclitaxel)
- **Second generation DES**
 - Xience V (everolimus), Endeavor (Zotaroliumus)
- **Third generation**
 - Biodegradable polymer / polymer-free



PCI vs isolated CABG



Anything that can be done w/ surgery, we will do w/ a catheter



History of CABG

✓ Sabiston 1962

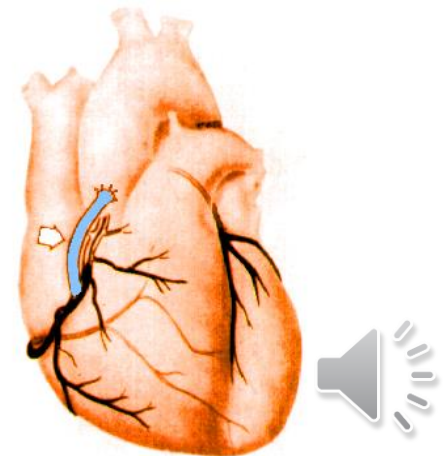
- 1st use of saphenous vein
- failed aorto-coronary bypass

✓ Kolessov 1964

- 1st sutured **LITA** to LAD anastomosis

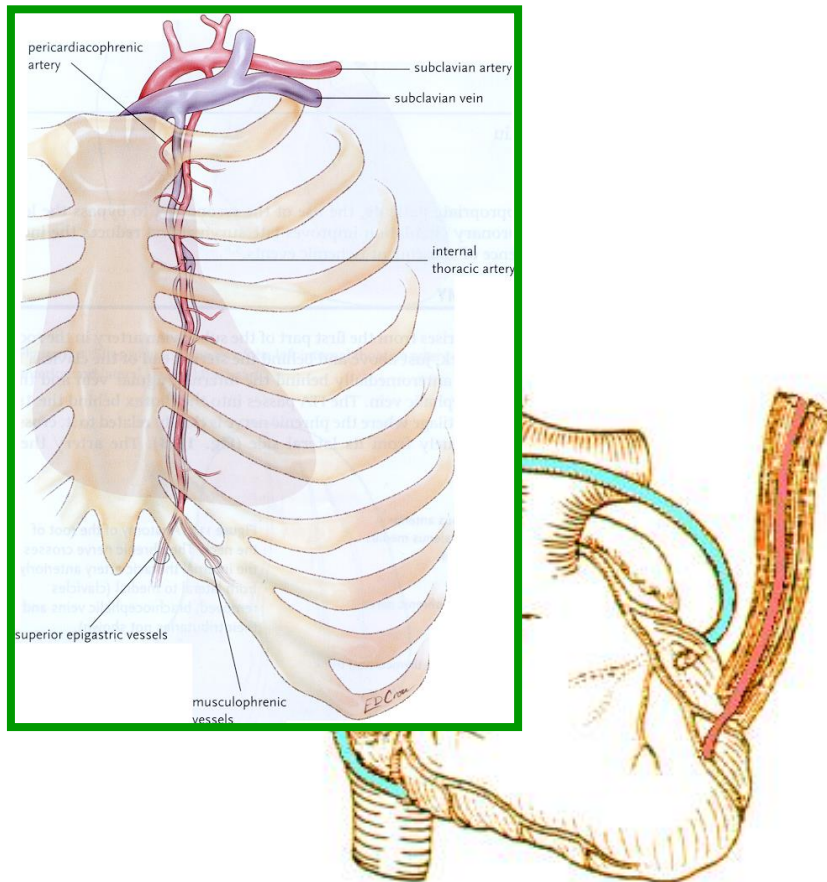
✓ Favaloro 1967~

- Large experience of CABG w/ **SVG**



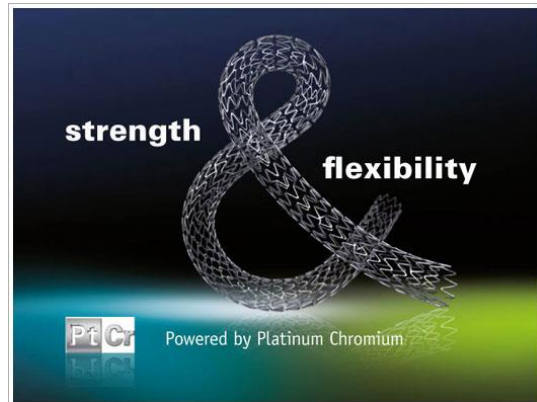
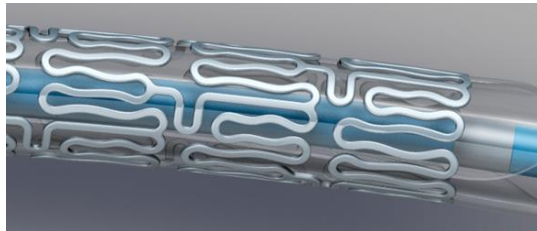
LITA (1st Conduit of Choice) to LAD

✓ Coronary Surgeon의 강력한 무기

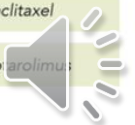


Concerns Remain...

- The results of **PCI** would be expected to **improve** w/ every new generation of stents w/ regard to restenosis & stent thrombosis



US FDA approval	Stent	Manufacturer	Generation	Type of stent: Platform	Drug eluted
2000	Bx Velocity	Cordis, Bridgewater, NJ	First	BMS: 316L Stainless steel	N/A
2002	Liberté → VeriFLEX*	Boston Scientific, Natick, MA	First	BMS: 316L Stainless steel	N/A
2003	Vision	Guidant/Abbott, Indianapolis, IN	Second	BMS: Cobalt chromium	N/A
2003	Driver/Integrity	Medtronic, Minneapolis, MN	Second	BMS: Cobalt chromium	N/A
Trials underway	Omega	Boston Scientific, Natick, MA	Third	BMS: Platinum chromium	N/A
2003 [†]	Cypher	Cordis, Bridgewater, NJ	First	DES: 316L Stainless steel	Sirolimus
2004	Taxus Express	Boston Scientific, Natick, MA	First	DES: 316L Stainless steel	Paclitaxel
2008	Taxus Liberté	Boston Scientific, Natick, MA	First	DES: 316L Stainless steel	Paclitaxel
2008	Endeavor	Medtronic, Minneapolis, MN	Second	DES: Cobalt chromium	Zotarolimus
2008	Xience V/Prime	Guidant/Abbott, Indianapolis, IN	Second	DES: Cobalt chromium	Everolimus
2008	Promus	Boston Scientific, Natick, MA	Second	DES: Cobalt chromium	Everolimus
2011	Promus Element	Boston Scientific, Natick, MA	Third	DES: Platinum chromium	Everolimus
2012	Taxus Element	Boston Scientific, Natick, MA	Third	DES: Platinum chromium	Paclitaxel
2013	Resolute Integrity	Medtronic, Minneapolis, MN	Third	DES: Cobalt chromium	Zotarolimus



Introduction

Landmark Trials

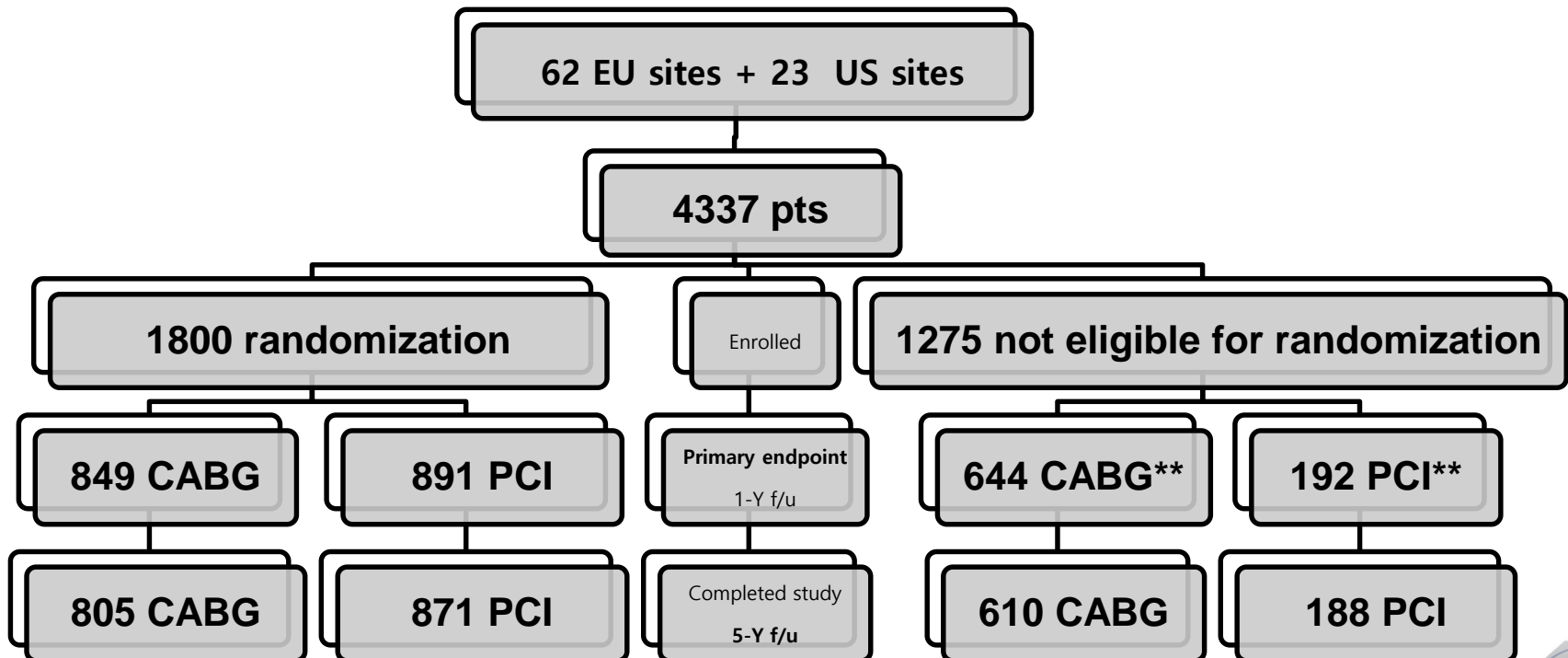
Recent Guidelines

Summary




The SYnergy between percutaneous coronary intervention with TAXus and cardiac surgery (**SYNTAX**) Trial;
All Comers : Nested Study Design

1. Most important & well-designed clinical trial of CABG vs PCI
2. Real-world clinical practice was well reflected

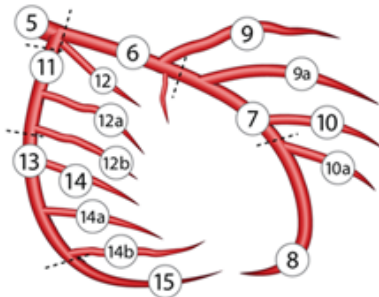
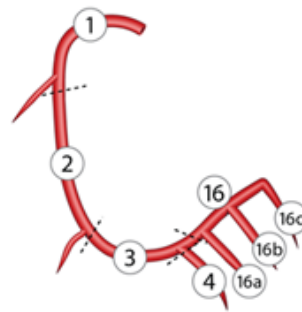
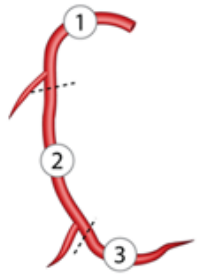


The SYnergy between percutaneous coronary intervention with TAXus and cardiac surgery (SYNTAX) Score

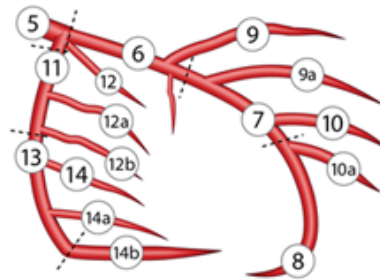
<http://www.syntaxscore.com/calculator/start.htm>

3. Specify which segments are diseased for **lesion 1**. 
Click on the coronary tree image to select or unselect segments.

Select dominance coronary system



Left dominance



Right dominance

		Lesion:	1
<i>Segments:</i>			
RCA	RCA proximal	1	<input type="checkbox"/>
	RCA mid	2	<input type="checkbox"/>
	RCA distal	3	<input checked="" type="checkbox"/>
	Posterior descending	4	<input type="checkbox"/>
	Posterolateral from RCA	16	<input type="checkbox"/>
	Posterolateral from RCA	16a	<input type="checkbox"/>
	Posterolateral from RCA	16b	<input type="checkbox"/>
	Posterolateral from RCA	16c	<input type="checkbox"/>
LM	Left main	5	<input type="checkbox"/>
LAD	LAD proximal	6	<input type="checkbox"/>
	LAD mid	7	<input type="checkbox"/>
	LAD apical	8	<input type="checkbox"/>
	First diagonal	9	<input type="checkbox"/>
	Add. first diagonal	9a	<input type="checkbox"/>
	Second diagonal	10	<input type="checkbox"/>
	Add. second diagonal	10a	<input type="checkbox"/>
LCX	Proximal circumflex	11	<input type="checkbox"/>
	Intermediate/anterolateral	12	<input type="checkbox"/>
	Obtuse marginal	12a	<input type="checkbox"/>
	Obtuse marginal	12b	<input type="checkbox"/>
	Distal circumflex	13	<input type="checkbox"/>
	Left posterolateral	14	<input type="checkbox"/>
	Left posterolateral	14a	<input type="checkbox"/>
	Left posterolateral	14b	<input type="checkbox"/>

[Click here for segment definitions](#)



SYNTAX SCORE

SYNTAX SCORE II

Boston
Scientific

CARDIOLYSIS
Clinical Trial Management - Core Laboratories

IMPORTANT INFORMATION

The SYNTAX Score is a tool developed in connection with the SYNTAX Trial, a trial comparing PCI and Cardiac Surgery in complex, high-risk LM and/or 3VD patients. It is important to note that **the safety and effectiveness of drug-eluting stents have not been established in these high risk patients**, and physicians are strongly encouraged to review the indications, contraindications, warnings and instructions included in the products' Directions for Use.

The SYNTAX Score and related materials are not intended to provide medical advice or guidance as to appropriate treatment strategies for individual patients. Risks and benefits should be carefully considered for each patient taking into account all available data and

Yes, I have fully read the Important Information above.

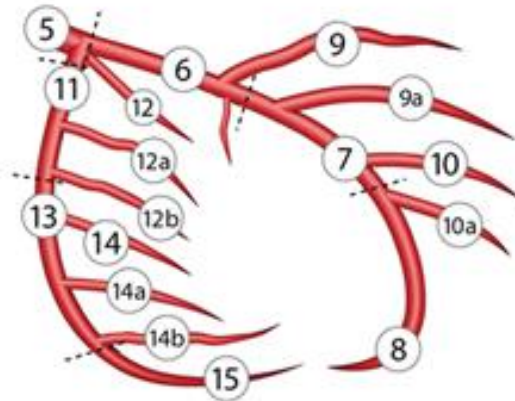
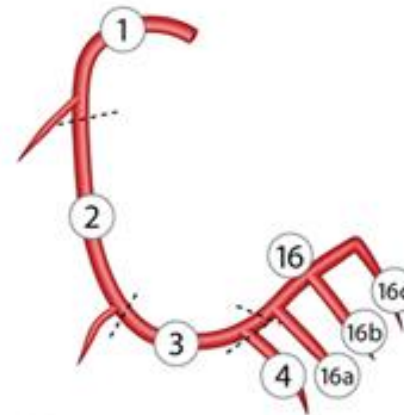
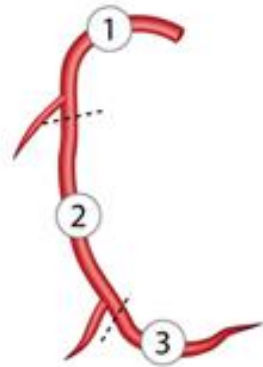
Proceed with SYNTAX Score I

Proceed with SYNTAX Score II

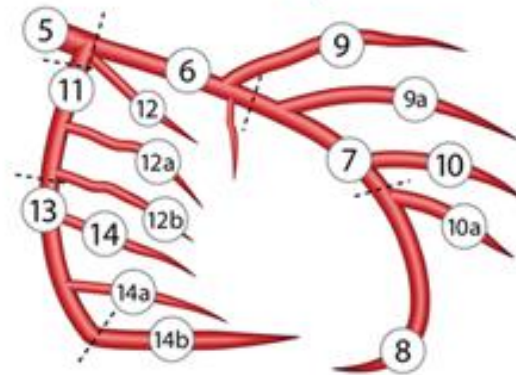
Close calculator



Select dominance coronary system



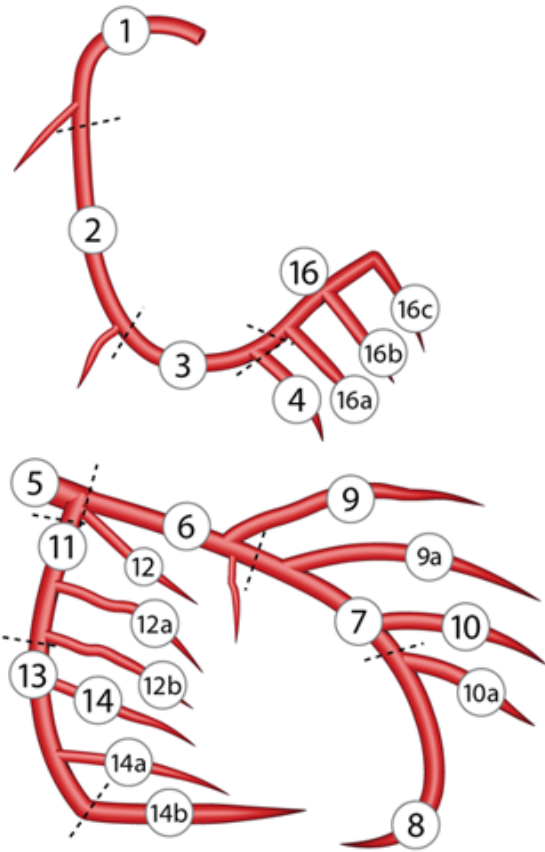
Left dominance



Right dominance

In case both the RCA and LCA provide the posterior-descending branch (PD), please select Right Dominance.





3. Specify which segments are diseased for lesion 1. [i](#)
 Click on the coronary tree image to select or unselect segments.

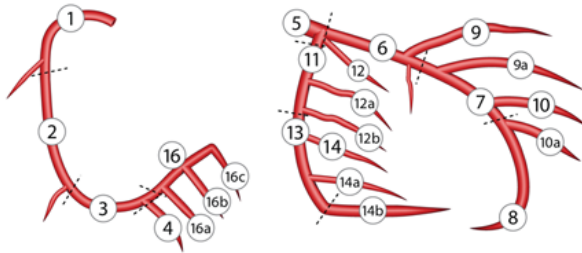
		Lesion:	1
	<i>Segments:</i>		
RCA	RCA proximal	1	<input type="checkbox"/>
	RCA mid	2	<input type="checkbox"/>
	RCA distal	3	<input type="checkbox"/>
	Posterior descending	4	<input type="checkbox"/>
	Posterolateral from RCA	16	<input type="checkbox"/>
	Posterolateral from RCA	16a	<input type="checkbox"/>
	Posterolateral from RCA	16b	<input type="checkbox"/>
	Posterolateral from RCA	16c	<input type="checkbox"/>
LM	Left main	5	<input type="checkbox"/>
LAD	LAD proximal	6	<input type="checkbox"/>
	LAD mid	7	<input type="checkbox"/>
	LAD apical	8	<input type="checkbox"/>
	First diagonal	9	<input type="checkbox"/>
	Add. first diagonal	9a	<input type="checkbox"/>
	Second diagonal	10	<input type="checkbox"/>
	Add. second diagonal	10a	<input type="checkbox"/>
LCX	Proximal circumflex	11	<input type="checkbox"/>
	Intermediate/anterolateral	12	<input checked="" type="checkbox"/>
	Obtuse marginal	12a	<input type="checkbox"/>
	Obtuse marginal	12b	<input type="checkbox"/>
	Distal circumflex	13	<input type="checkbox"/>
	Left posterolateral	14	<input type="checkbox"/>
	Left posterolateral	14a	<input type="checkbox"/>
	Left posterolateral	14b	<input type="checkbox"/>

next

[Click here for segment definitions](#)



	Segments:	Lesions:	1
RCA	RCA proximal	1	
	RCA mid	2	
	RCA distal	3	
	Posterior descending	4	
	Posterolateral from RCA	16	
	Posterolateral from RCA	16a	
	Posterolateral from RCA	16b	
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LM	Left main	5	
	LAD		
LAD	LAD proximal	6	
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	Intermediate/anterolateral	12	v
	Obtuse marginal	12a	
	Obtuse marginal	12b	
	Distal circumflex	13	
	Left posterolateral	14	
	Left posterolateral	14a	
Left posterolateral	14b		



Please fill in the following variables :

4. Total occlusion (T.O.) ⓘ

- a. No
- b. Yes:

5. Trifurcation ⓘ

- a. No
- b. Yes ⓘ

6. Bifurcation ⓘ

- a. No
- b. Yes ⓘ

8. Severe Tortuosity ⓘ

- a. No
- b. Yes

9. Length >20 mm ⓘ

- a. No
- b. Yes

10. Heavy calcification ⓘ

- a. No
- b. Yes

11. Thrombus ⓘ

- a. No
- b. Yes

Comment

continue



The SYnergy between percutaneous coronary intervention with TAXus and cardiac surgery (SYNTAX) Score

- ✓ *Low: 0-22*
- ✓ *Intermediate: 23-32*
- ✓ *High: ≥ 33*

SYNTAX Score I

Lesion 1

(segment 3): 1x2=	2
Bifurcation Type: Medina 1,1,0:	1
Angulation $<70^\circ$	1
Severe Tortuosity	2
Length >20 mm	1
Heavy calcification	2
Thrombus	1
<i>Sub total lesion 1</i>	<i>10</i>

Diffuse disease/Small vessels

Segment 2	1
Segment 3	1
<i>Sub total diffuse disease/small vessels</i>	<i>2</i>

TOTAL:

12

**The SYnergy between percutaneous coronary intervention
with TAXus and cardiac surgery (SYNTAX) Trial;
*All Comers : Nested Study Design***

The **NEW ENGLAND**
JOURNAL *of* **MEDICINE**

ESTABLISHED IN 1812

MARCH 5, 2009

VOL. 360 NO. 10

**Percutaneous Coronary Intervention versus Coronary-Artery
Bypass Grafting for Severe Coronary Artery Disease**

Patrick W. Serruys, M.D., Ph.D., Marie-Claude Morice, M.D., A. Pieter Kappetein, M.D., Ph.D.,
Antonio Colombo, M.D., David R. Holmes, M.D., Michael J. Mack, M.D., Elisabeth Stähle, M.D.,
Ted E. Feldman, M.D., Marcel van den Brand, M.D., Eric J. Bass, B.A., Nic Van Dyck, R.N., Katrin Leadley, M.D.,
Keith D. Dawkins, M.D., and Friedrich W. Mohr, M.D., Ph.D., for the SYNTAX Investigators*

**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**

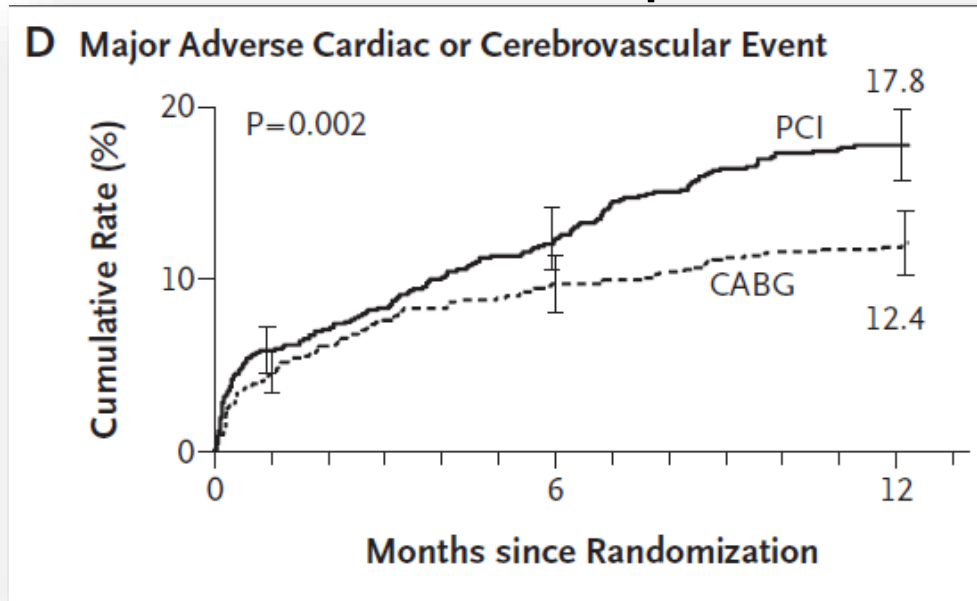
Lancet 2013; 381: 629-38



Percutaneous Coronary Intervention versus Coronary-Artery Bypass Grafting for Severe Coronary Artery Disease

Patrick W. Serruys, M.D., Ph.D., Marie-Claude Morice, M.D., A. Pieter Kappetein, M.D., Ph.D., Antonio Colombo, M.D., David R. Holmes, M.D., Michael J. Mack, M.D., Elisabeth Stähle, M.D., Ted E. Feldman, M.D., Marcel van den Brand, M.D., Eric J. Bass, B.A., Nic Van Dyck, R.N., Katrin Leadley, M.D., Keith D. Dawkins, M.D., and Friedrich W. Mohr, M.D., Ph.D., for the SYNTAX Investigators*

- Primary endpoint
: Death + Stroke + MI + Repeat revascularization

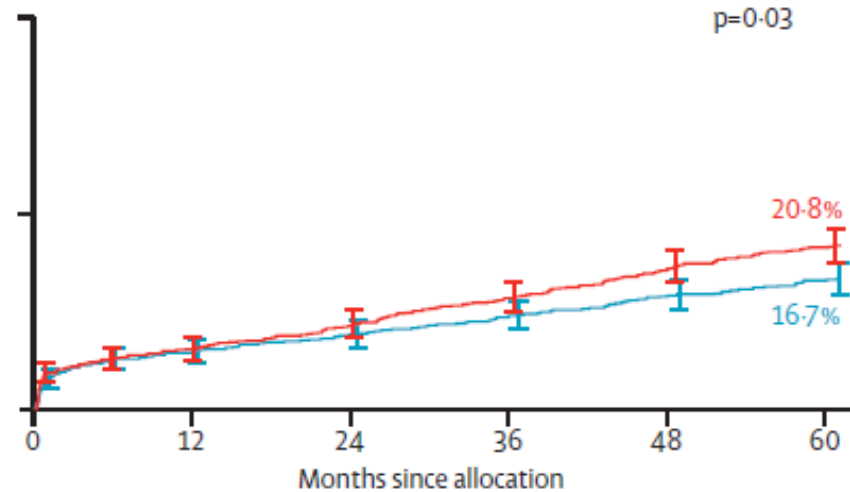


CONCLUSIONS

CABG remains the standard of care for patients with three-vessel or left main coronary artery disease, since the use of CABG, as compared with PCI, resulted in lower rates of the combined end point of major adverse cardiac or cerebrovascular events at 1 year (ClinicalTrials.gov number, NCT00114972.)

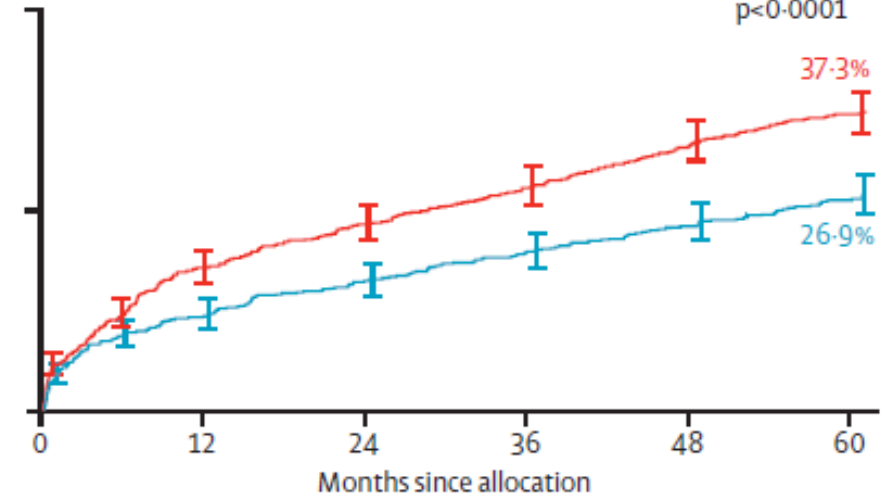
The SYnergy between percutaneous coronary intervention with TAXus and cardiac surgery (SYNTAX) Trial; All Comers : Nested Study Design

D Death or stroke or myocardial infarction



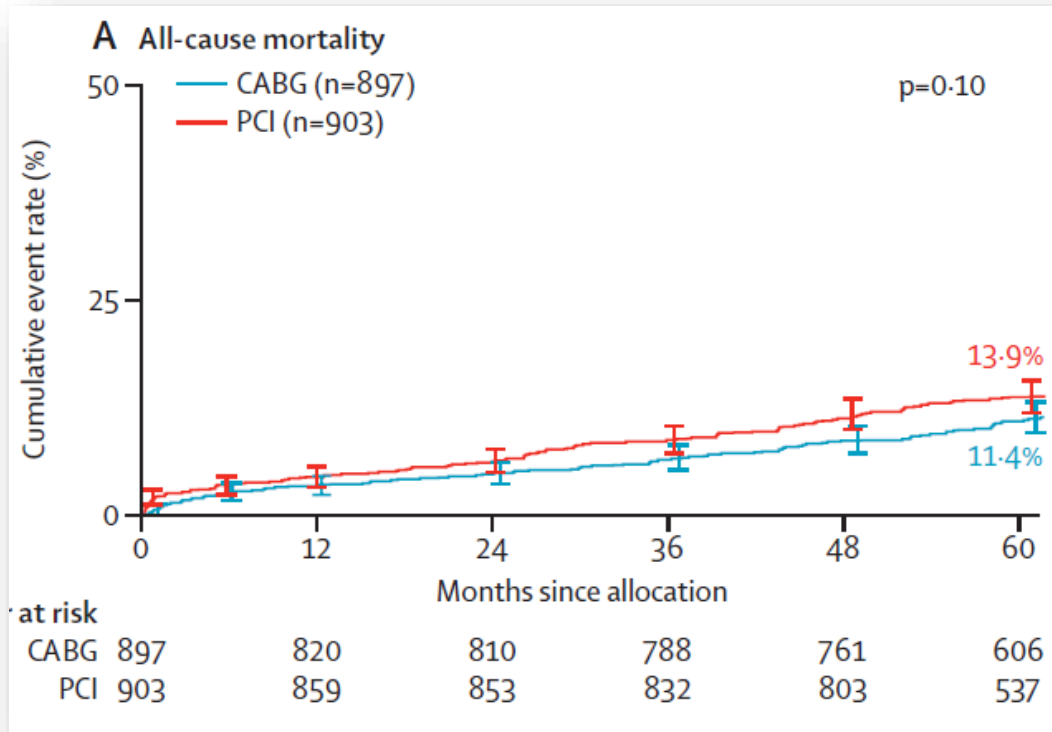
897	787	776	749	717	566
903	830	824	792	756	592

F MACCE



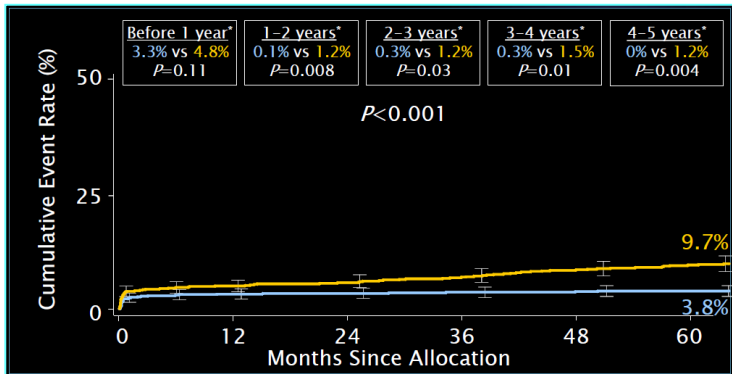
897	751	739	694	654	512
903	747	733	681	634	483

The SYnergy between percutaneous coronary intervention with TAXus and cardiac surgery (SYNTAX) Trial; All Comers : Nested Study Design

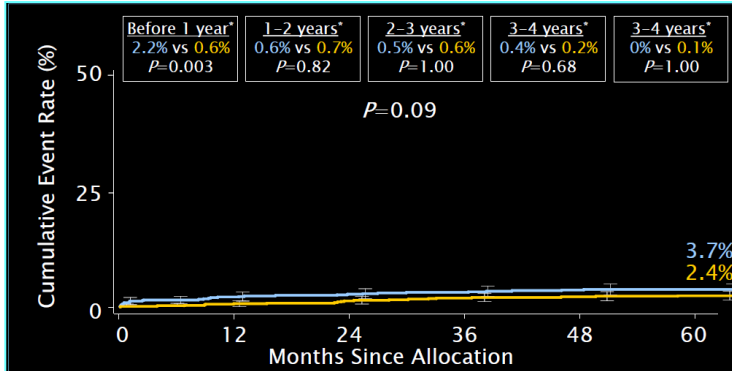


No difference in all-cause death at 5 years

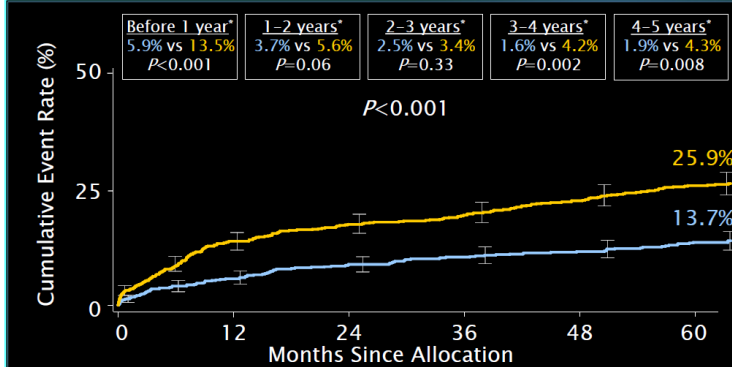
The SYnergy between percutaneous coronary intervention with TAXus and cardiac surgery (SYNTAX) Trial; All Comers : Nested Study Design



Lower non-fatal MI rate from 1 year in CABG group



No difference in stroke at 5 years (higher in CABG group before 1 y)

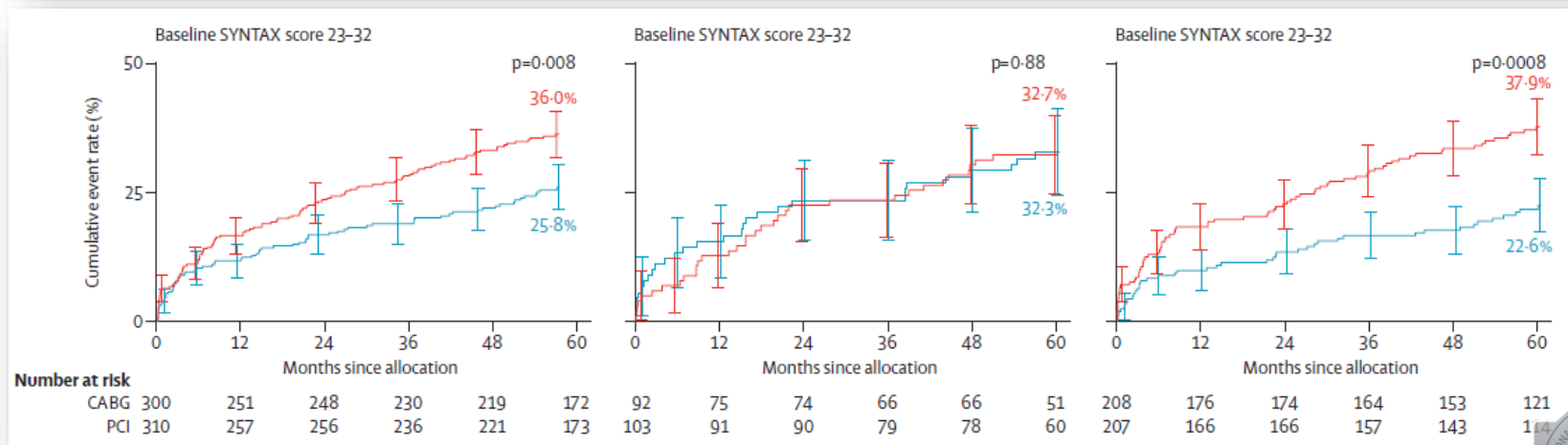
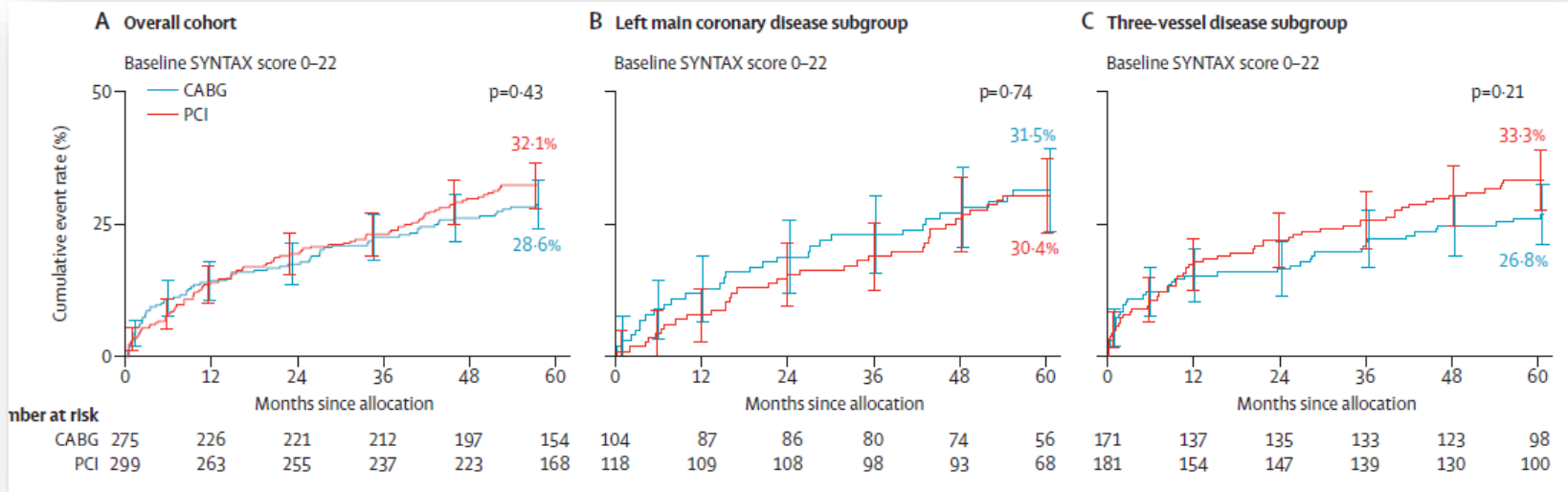


Lower incidence of repeat revascularization in CABG group from the first year

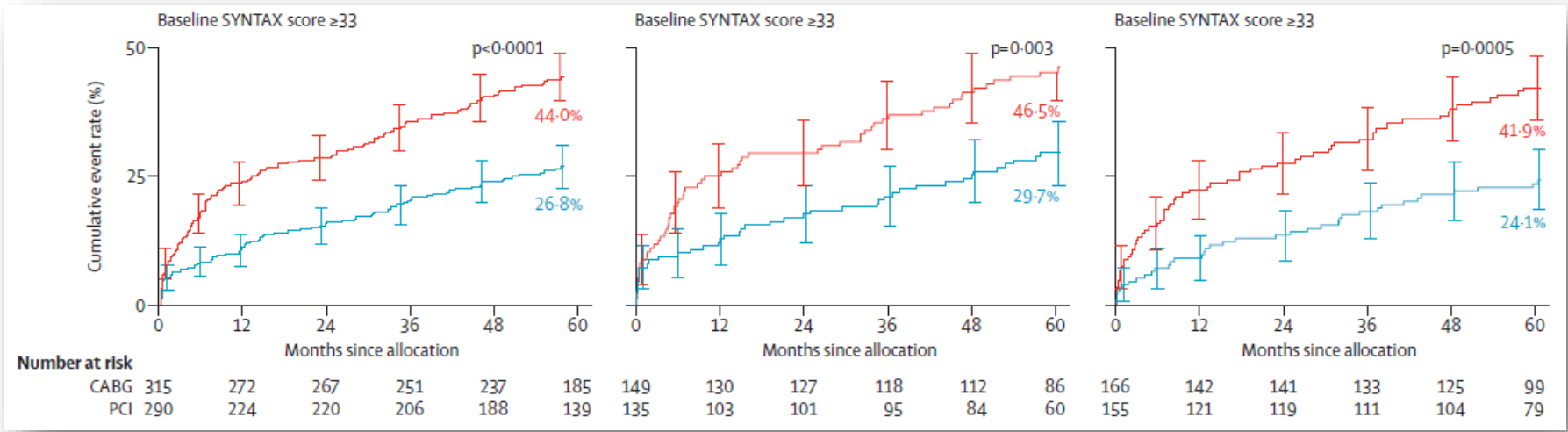
(Mohr et al, Lancet, 2013)



The SYnergy between percutaneous coronary intervention with TAXus and cardiac surgery (SYNTAX) Trial; All Comers : Nested Study Design



The SYnergy between percutaneous coronary intervention with TAXus and cardiac surgery (SYNTAX) Trial; All Comers : Nested Study Design



Interpretation CABG should remain the standard of care for patients with complex lesions (high or intermediate SYNTAX scores). For patients with less complex disease (low SYNTAX scores) or left main coronary disease (low or intermediate SYNTAX scores), PCI is an acceptable alternative. All patients with complex multivessel coronary artery disease should be reviewed and discussed by both a cardiac surgeon and interventional cardiologist to reach consensus on optimum treatment.

Anatomy PCI vs CABG

SYNTAX Score I

Anatomy and comorbidity after PCI
2-year mortality

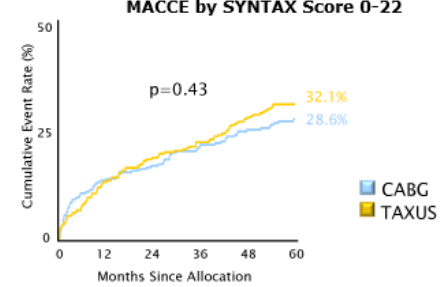
Logistic Clinical SYNTAX Score

Anatomy and comorbidity PCI vs CABG
4-year mortality

SYNTAX Score II

Anatomy and comorbidity PCI vs CABG
5-year MACCE and 10-year mortality

SYNTAX Score 2020



The cumulative MACCE rate is displayed for the SYNTAX Trial group this score corresponds to

SYNTAX Score I

Lesion 1 (segment 12): 1x2= Length >20 mm Sub total lesion 1	2 1 3
Lesion 2 (segment 7): 2.5x2= Sub total lesion 2	5 5
Lesion 3 (segment 3): 1x2= Bifurcation Type: Medina 1,1,0: Heavy calcification Sub total lesion 3	2 1 2 5
Lesion 4 (segment 4): 1x2= Sub total lesion 4	2 2
TOTAL:	15

SYNTAX Score II

SYNTAX II

Decision making -between CABG and PCI- guided by the SYNTAX Score II to be endorsed by the Heart Team.

PCI
SYNTAX Score II: 28.8
PCI 4 Year Mortality: 6.2 %

CABG
SYNTAX Score II: 17.0
CABG 4 Year Mortality: 2.3 %

Treatment recommendation ⓘ: CABG



- Syntax score + Age + CrCl + LVEF + LM + Gender + COPD + PVD

FREEDOM Trial

The NEW ENGLAND JOURNAL *of* MEDICINE

ESTABLISHED IN 1812

DECEMBER 20, 2012

VOL. 367 NO. 25

Strategies for Multivessel Revascularization in Patients with Diabetes

Michael E. Farkouh, M.D., Michael Domanski, M.D., Lynn A. Sleeper, Sc.D., Flora S. Siami, M.P.H.,
George Dangas, M.D., Ph.D., Michael Mack, M.D., May Yang, M.P.H., David J. Cohen, M.D.,
Yves Rosenberg, M.D., M.P.H., Scott D. Solomon, M.D., Akshay S. Desai, M.D., M.P.H.,
Bernard J. Gersh, M.B., Ch.B., D.Phil., Elizabeth A. Magnuson, Sc.D., Alexandra Lansky, M.D.,
Robin Boineau, M.D., Jesse Weinberger, M.D., Krishnan Ramanathan, M.B., Ch.B., J. Eduardo Sousa, M.D., Ph.D.,
Jamie Rankin, M.D., Balram Bhargava, M.D., John Buse, M.D., Whady Hueb, M.D., Ph.D., Craig R. Smith, M.D.,
Victoria Muratov, M.D., M.P.H., Sameer Bansilal, M.D., Spencer King III, M.D., Michel Bertrand, M.D.,
and Valentin Fuster, M.D., Ph.D., for the FREEDOM Trial Investigators*

N Engl J Med 2012;367:2375-84.



FREEDOM Trial

- Future REvascularization Evaluation in patients with Diabetes mellitus: Optimal Management of multi-vessel disease



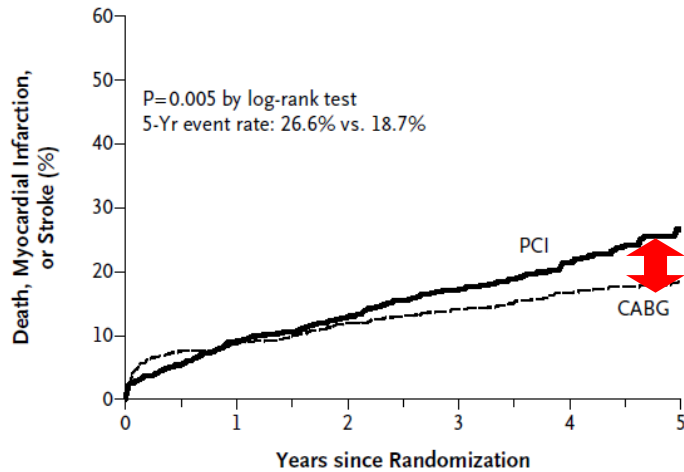
Future REvascularization Evaluation in patients with D diabetes mellitus: Optimal management of Multivessel disease

FREEDOM Trial

- ✓ 2005-2010, 140 centers
1900 patients enrolled (947 CABG vs 953 PCI)
- ✓ 2VD or 3VD (no LMD) with diabetes
- Primary outcome ; Composite of all-cause death, MI & stroke
- 83% had 3VD
- Minimum follow-up of 2 years (median; 3.8 years)

FREEDOM Trial

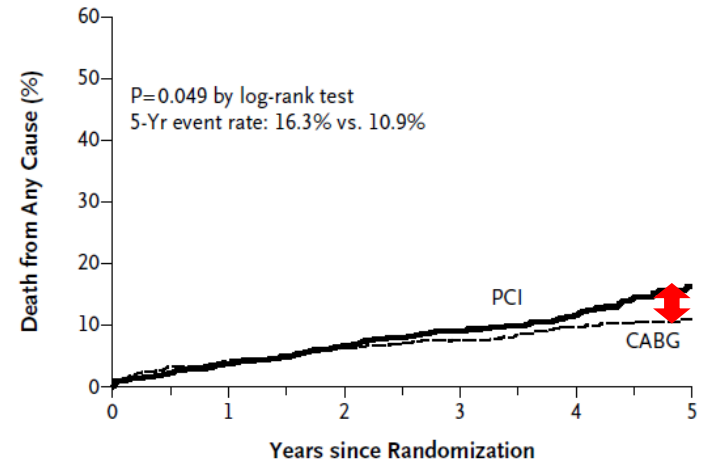
A Primary Outcome



No. at Risk

PCI	953	848	788	625	416	219
CABG	947	814	758	613	422	221

B Death



No. at Risk

PCI	953	897	845	685	466	243
CABG	947	855	806	655	449	238

primary outcome (death, MI and stroke) : divergence starting at 2 years.

Introduction

Landmark Trials

Recent Guidelines

Summary



What Guidelines Tell

- ✓ 정책이나 시책 따위의 지침
- ✓ 임상에서 맞닥뜨리는 각종 상황에서 진단, 검사 및 치료방법에 대한 지침
- ✓ 권고의 등급: **Class of Recommendation**
- ✓ 근거 수준: **Level of Evidence**

Class of Recommendations

✓ Class of Recommendation (I, IIa IIb, III)

		SIZE OF TREATMENT EFFECT												
		CLASS I <i>Benefit >>> Risk</i> Procedure/Treatment SHOULD be performed/administered	CLASS IIa <i>Benefit >> Risk</i> Additional studies with <i>focused objectives</i> needed IT IS REASONABLE to perform procedure/administer treatment	CLASS IIb <i>Benefit ≥ Risk</i> Additional studies with <i>broad objectives</i> needed; <i>additional registry data</i> would be helpful Procedure/Treatment MAY BE CONSIDERED	CLASS III <i>No Benefit or CLASS III Harm</i> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Procedure/ Test</th> <th>Treatment</th> </tr> </thead> <tbody> <tr> <td>COR III: No benefit</td> <td>Not Helpful</td> <td>No Proven Benefit</td> </tr> <tr> <td>COR III: Harm</td> <td>Excess Cost w/o Benefit or Harmful</td> <td>Harmful to Patients</td> </tr> </tbody> </table>		Procedure/ Test	Treatment	COR III: No benefit	Not Helpful	No Proven Benefit	COR III: Harm	Excess Cost w/o Benefit or Harmful	Harmful to Patients
	Procedure/ Test	Treatment												
COR III: No benefit	Not Helpful	No Proven Benefit												
COR III: Harm	Excess Cost w/o Benefit or Harmful	Harmful to Patients												
		■ Recommendation that procedure or treatment is useful/effective	■ Recommendation in favor of treatment or procedure being useful/effective	■ Recommendation's usefulness/efficacy less well established	■ Recommendation that procedure or treatment is not useful/effective and may be harmful									
ESTIMATE OF CERTAINTY (PRECISION) OF TREATMENT EFFECT	LEVEL A	Multiple populations evaluated* Data derived from multiple randomized clinical trials or meta-analyses												
	LEVEL B	Limited populations evaluated* Data derived from a single randomized trial or nonrandomized studies												
	LEVEL C	Very limited populations evaluated* Only consensus opinion of experts, case studies, or standard of care												
	Classes of recommendations	Definition	Suggested wording to use											
	Class I	Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.	Is recommended/is indicated											
Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.													
Class IIa	<i>Weight of evidence/opinion is in favour of usefulness/efficacy.</i>	Should be considered												
Class IIb	<i>Usefulness/efficacy is less well established by evidence/opinion.</i>	May be considered												
Class III	Evidence or general agreement that the given treatment or procedure is not useful/effective, and in some cases may be harmful.	Is not recommended												



Level of Evidence

✓ Level of Evidence: A B C

ESTIMATE OF CERTAINTY (PRECISION) OF TREATMENT EFFECT

	SIZE OF TREATMENT EFFECT												
	CLASS I <i>Benefit >>> Risk</i>	CLASS IIa <i>Benefit >> Risk</i> <i>Additional studies with focused objectives needed</i>	CLASS IIb <i>Benefit ≥ Risk</i> <i>Additional studies with broad objectives needed; additional registry data would be helpful</i>	CLASS III <i>No Benefit or CLASS III Harm</i>									
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LEVEL B Limited populations evaluated* Data derived from a single randomized trial or nonrandomized studies	<ul style="list-style-type: none"> Recommendation that procedure or treatment is useful/effective Sufficient evidence from multiple randomized trials or meta-analyses 	<ul style="list-style-type: none"> Recommendation in favor of treatment or procedure being useful/effective Some conflicting evidence from multiple randomized trials or meta-analyses 	<ul style="list-style-type: none"> Recommendation's usefulness/efficacy less well established Greater conflicting evidence from multiple randomized trials or meta-analyses 	<ul style="list-style-type: none"> Recommendation that procedure or treatment is not useful/effective and may be harmful Sufficient evidence from multiple randomized trials or meta-analyses 									
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Updated CABG Guidelines

2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery: Executive Summary

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*

2014 ESC/EACTS Guidelines on myocardial revascularization

**The Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC)
and the European Association for Cardio-Thoracic Surgery (EACTS)**

2018 ESC/EACTS Guidelines on myocardial revascularization

**The Task Force on myocardial revascularization of the European
Society of Cardiology (ESC) and European Association for
Cardio-Thoracic Surgery (EACTS)**



2014 ESC/EACTS Guidelines on myocardial revascularization

**Recommendation for the type of revascularization (CABG or PCI)
in pts w/ SCAD w/ suitable coronary anatomy
for both procedures & 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 a SYNTAX score ≤ 22.	I	B	I	B
Left main disease with a SYNTAX score 23–32.	I	B	IIa	B
Left main disease with a SYNTAX score >32.	I	B	III	B
Three-vessel disease with a SYNTAX score ≤ 22.	I	A	I	B
Three-vessel disease with a SYNTAX score 23–32.	I	A	III	B
Three-vessel disease with a SYNTAX score >32.	I	A	III	B

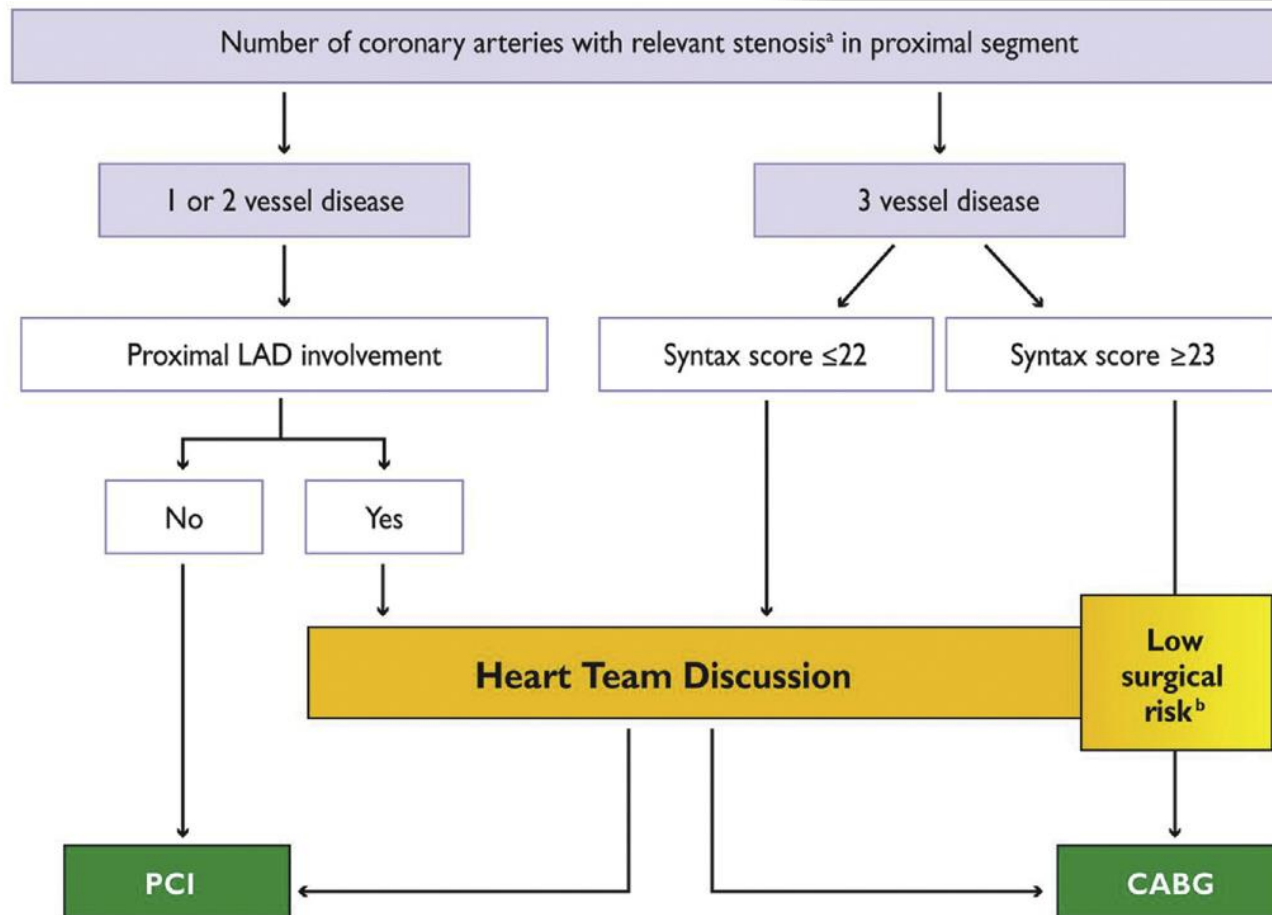




Transatlantic Editorial: A Comparison Between European and North American Guidelines on Myocardial Revascularization

Philippe Kolh, MD, PhD, Paul Kurlansky, MD, Jochen Cremer, MD, PhD, Jennifer Lawton, MD, Matthias Siepe, MD, and Stephen Fremes, MD, MSc

Ann Thorac Surg 2016;101:2031-44





Mortality after coronary artery bypass grafting versus percutaneous coronary intervention with stenting for coronary artery disease: a pooled analysis of individual patient data

Lancet 2018; 391: 939-48

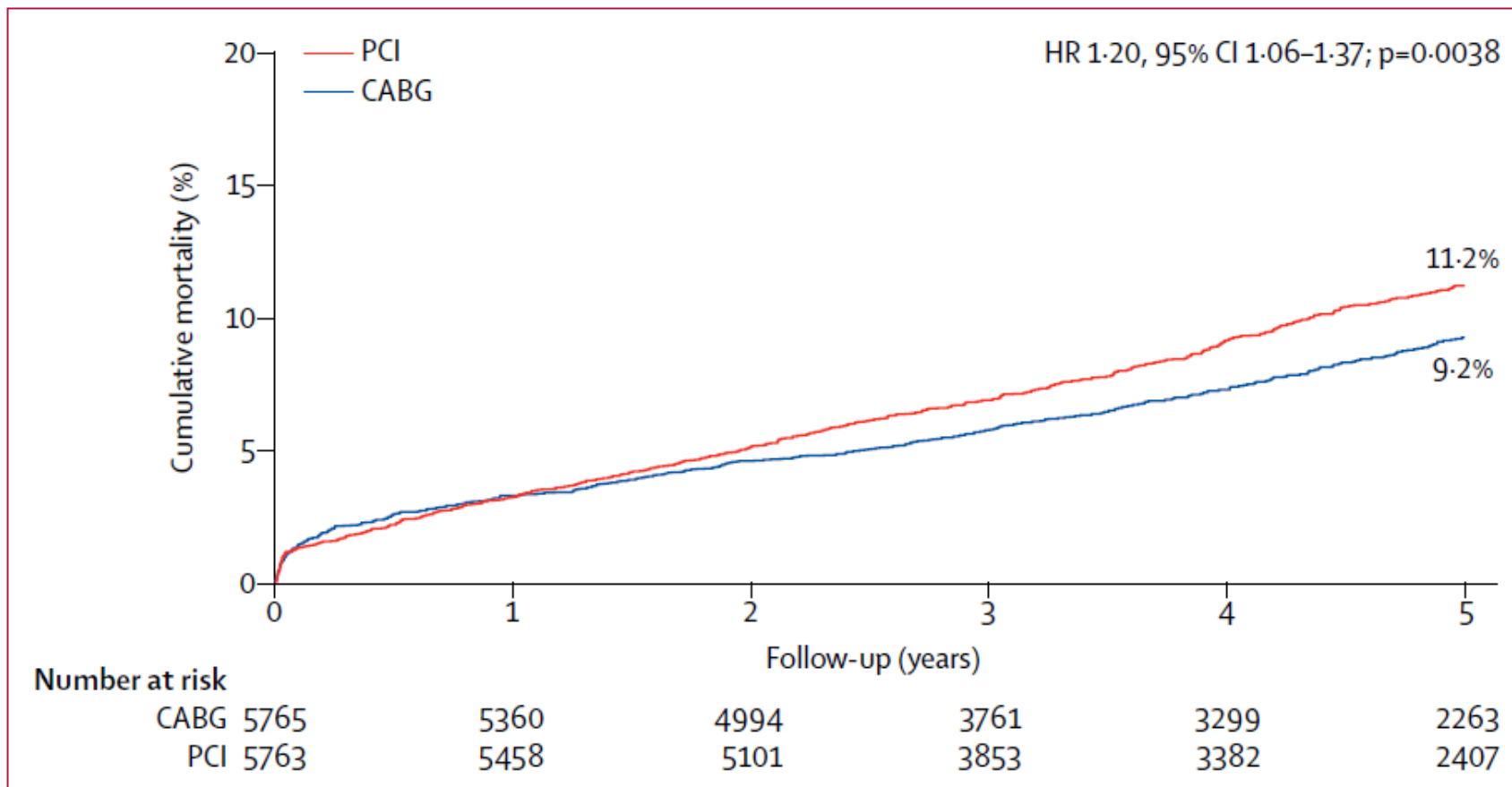
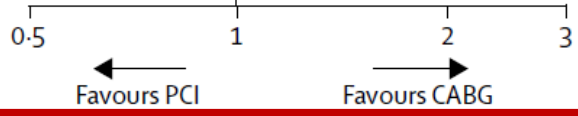


Figure 1: Mortality after CABG versus after PCI during 5 years' follow-up



	PCI	CABG	HR (95% CI)	p value	p _{Interaction}
Sex					
Male	387/4380 (10.7%)	318/4394 (8.8%)	1.20 (1.03-1.39)	0.0181	0.82
Female	152/1373 (12.7%)	119/1371 (10.6%)	1.23 (0.97-1.57)	0.0854	
Age at baseline (years)					
<65	200/2971 (8.0%)	160/2940 (6.4%)	1.23 (1.00-1.51)	0.0534	0.98
≥65	339/2782 (14.8%)	277/2825 (12.5%)	1.19 (1.02-1.40)	0.0284	
Body-mass index (kg/m ²)					
<30	373/3958 (11.2%)	304/3953 (9.4%)	1.20 (1.04-1.40)	0.0156	0.43
≥30	148/1548 (12.1%)	106/1558 (8.6%)	1.35 (1.05-1.73)	0.0179	
Hypertension					
Yes	391/3880 (12.2%)	332/3913 (10.6%)	1.16 (1.00-1.34)	0.0527	0.25
No	145/1859 (9.1%)	103/1835 (6.6%)	1.37 (1.06-1.76)	0.0144	
Hypercholesterolaemia					
Yes	364/3982 (11.0%)	288/3862 (9.1%)	1.19 (1.02-1.39)	0.0272	0.76
No	173/1744 (11.6%)	148/1873 (9.5%)	1.24 (1.00-1.55)	0.0527	
Diabetes					
Yes	278/2215 (15.7%)	185/2171 (10.7%)	1.44 (1.20-1.74)	0.0001	0.0077
No	261/3538 (8.7%)	252/3594 (8.4%)	1.02 (0.86-1.21)	0.81	
Peripheral vascular disease					
Yes	75/424 (20.7%)	58/440 (16.0%)	1.35 (0.96-1.90)	0.0869	0.66
No	428/4734 (10.6%)	346/4724 (8.7%)	1.21 (1.05-1.39)	0.0094	
Previous myocardial infarction					
Yes	183/1438 (14.2%)	146/1417 (11.6%)	1.21 (0.97-1.50)	0.0852	0.97
No	318/3700 (10.2%)	257/3739 (8.4%)	1.22 (1.03-1.44)	0.0180	
Left-ventricular ejection fraction					
≥50%	356/4447 (9.6%)	311/4597 (8.3%)	1.14 (0.98-1.32)	0.0974	0.65
30-49%	132/807 (19.3%)	95/779 (15.1%)	1.41 (1.08-1.84)	0.0122	
<30%	18/40 (5.2%)	16/54 (24.4%)	1.25 (0.64-2.46)	0.52	
SYNTAX score					
0-22	105/1533 (8.8%)	100/1585 (8.1%)	1.02 (0.77-1.34)	0.91	0.21
23-32	163/1677 (12.4%)	122/1545 (10.9%)	1.20 (0.94-1.51)	0.14	
≥33	117/871 (16.5%)	83/927 (11.6%)	1.52 (1.15-2.02)	0.0029	



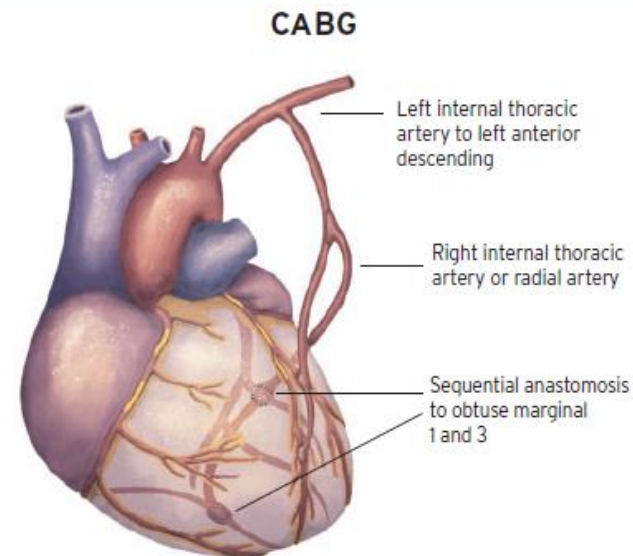
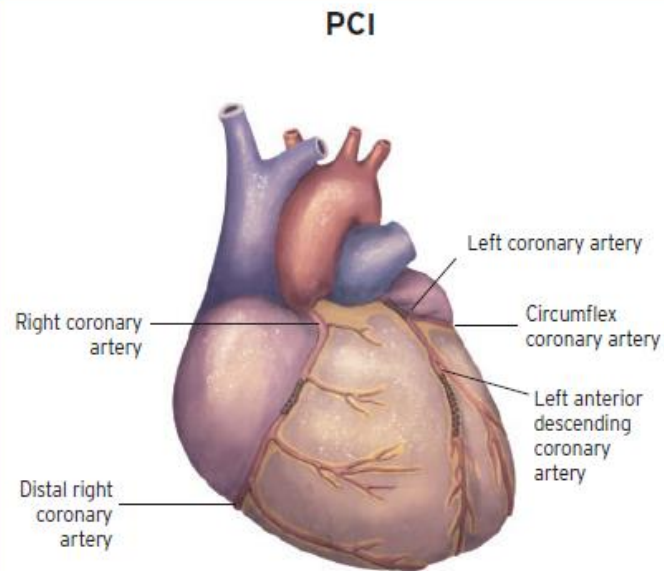
2018 ESC/EACTS Guidelines on myocardial revascularization

Left main CAD				
Left main disease with low SYNTAX score (0 - 22). ^{69,121,122,124,145-148}	I	A	I	A
Left main disease with intermediate SYNTAX score (23 - 32). ^{69,121,122,124,145-148}	I	A	IIa	A
Left main disease with high SYNTAX score (≥ 33). ^{c 69,121,122,124,146-148}	I	A	III	B

Three-vessel CAD without diabetes mellitus				
Three-vessel disease with low SYNTAX score (0 - 22). ^{102,105,121,123,124,135,149}	I	A	I	A
Three-vessel disease with intermediate or high SYNTAX score (>22). ^{c 102,105,121,123,124,135,149}	I	A	III	A
Three-vessel CAD with diabetes mellitus				
Three-vessel disease with low SYNTAX score 0-22. ^{102,105,121,123,124,135,150-157}	I	A	IIb	A
Three-vessel disease with intermediate or high SYNTAX score (>22). ^{c 102,105,121,123,124,135,150-157}	I	A	III	A



2018 ESC/EACTS Guidelines on myocardial revascularization



FAVOURS PCI

Clinical characteristics

Presence of severe co-morbidity (not adequately reflected by scores)

Advanced age/frailty/reduced life expectancy

Restricted mobility and conditions that affect the rehabilitation process

Anatomical and technical aspects

MVD with SYNTAX score 0-22

Anatomy likely resulting in incomplete revascularization with CABG due to poor quality or missing conduits

Severe chest deformation or scoliosis

Sequelae of chest radiation

Porcelain aorta^a

FAVOURS CABG

Clinical characteristics

Diabetes

Reduced LV function (EF \leq 35%)

Contraindication to DAPT

Recurrent diffuse in-stent restenosis

Anatomical and technical aspects

MVD with SYNTAX score \geq 23

Anatomy likely resulting in incomplete revascularization with PCI

Severely calcified coronary artery lesions limiting lesion expansion

Need for concomitant interventions

Ascending aortic pathology with indication for surgery

Concomitant cardiac surgery



Introduction

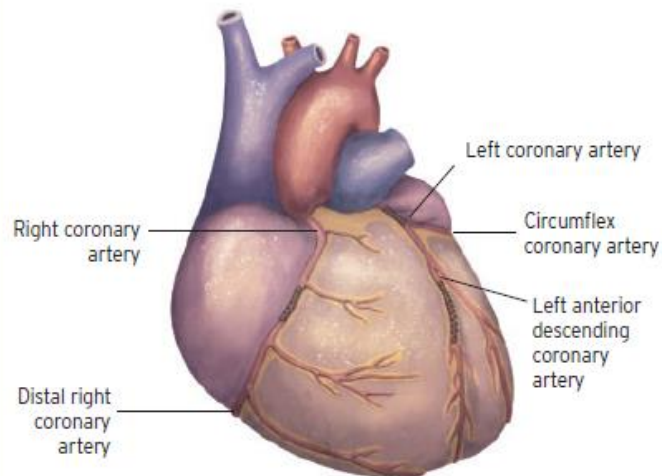
Guidelines & SYNTAX Trial

FREEDOM Trial

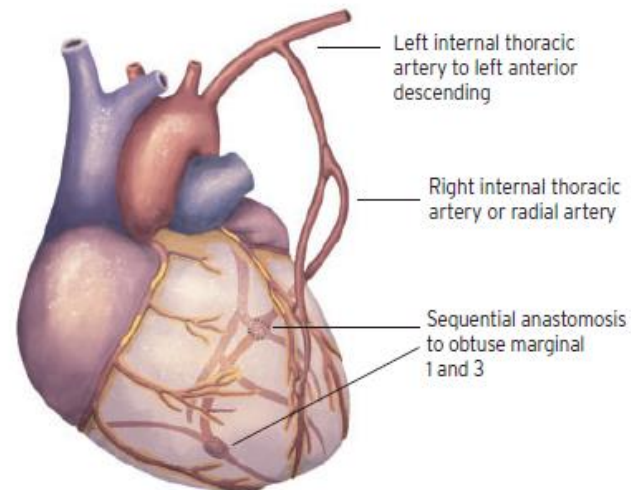
Summary



PCI



CABG



FAVOURS PCI

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Thank You for Your Attention!

