SOLACI CACI'24
AUGUST 7 - 9 2024
BUENOS AIRES HILTON
BUENOS AIRES, ARGENTINA

SANTA CASA
DE MISERICÓRDIA DE MACEIÓ

APTMedical

The post-CABG CTO challenge

Dr. Evandro Martins Filho

Título de Especialista de Cardiologia pela SBC
Título de Especialista em Hemodinâmica pela SBHCI
Hemodinamicista na Santa Casa de Misericórdia de Maceió

@evandrofilhobr

APTMedical

Declaração de Potencial Conflito de Interesse

Nome do Palestrante: **Evandro Martins Filho**

Título da Apresentação:

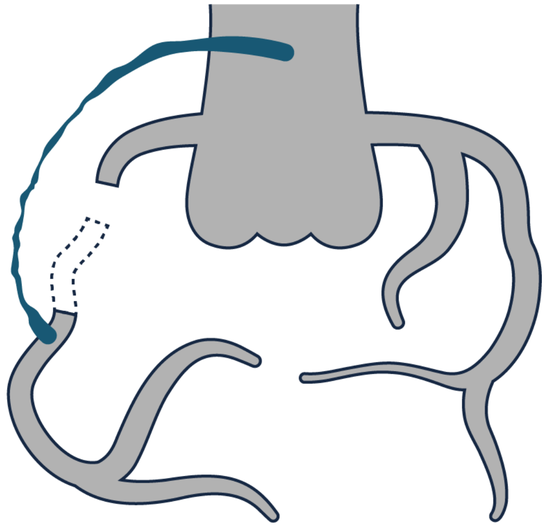
The post-CABG CTO challenge

Affiliation/Financial Relationship	**Company**
Consulting Fees/Honoraria	Terumo, Boston Scientific, Teleflex

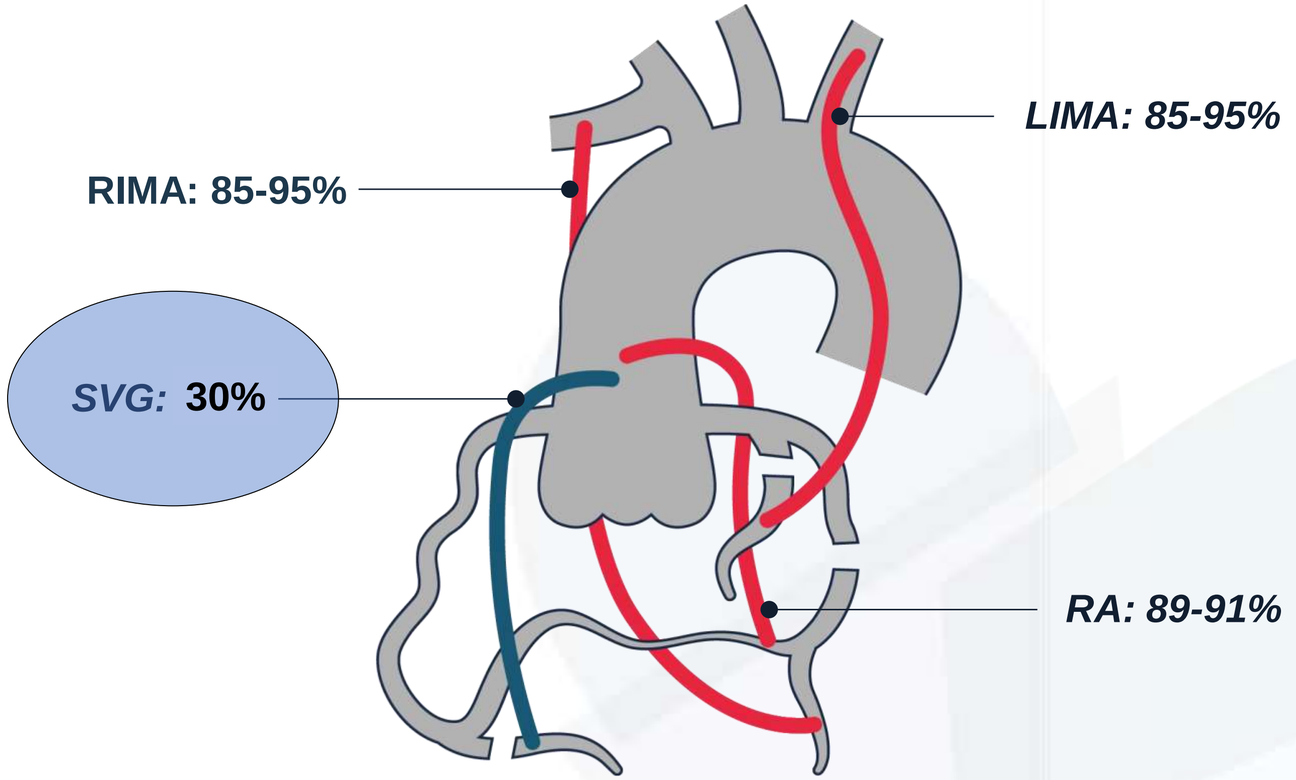
Post CABG - Expectations

APTMedical

CABG long-term efficacy hampered by graft failure and native coronary artery disease progression[4,5]



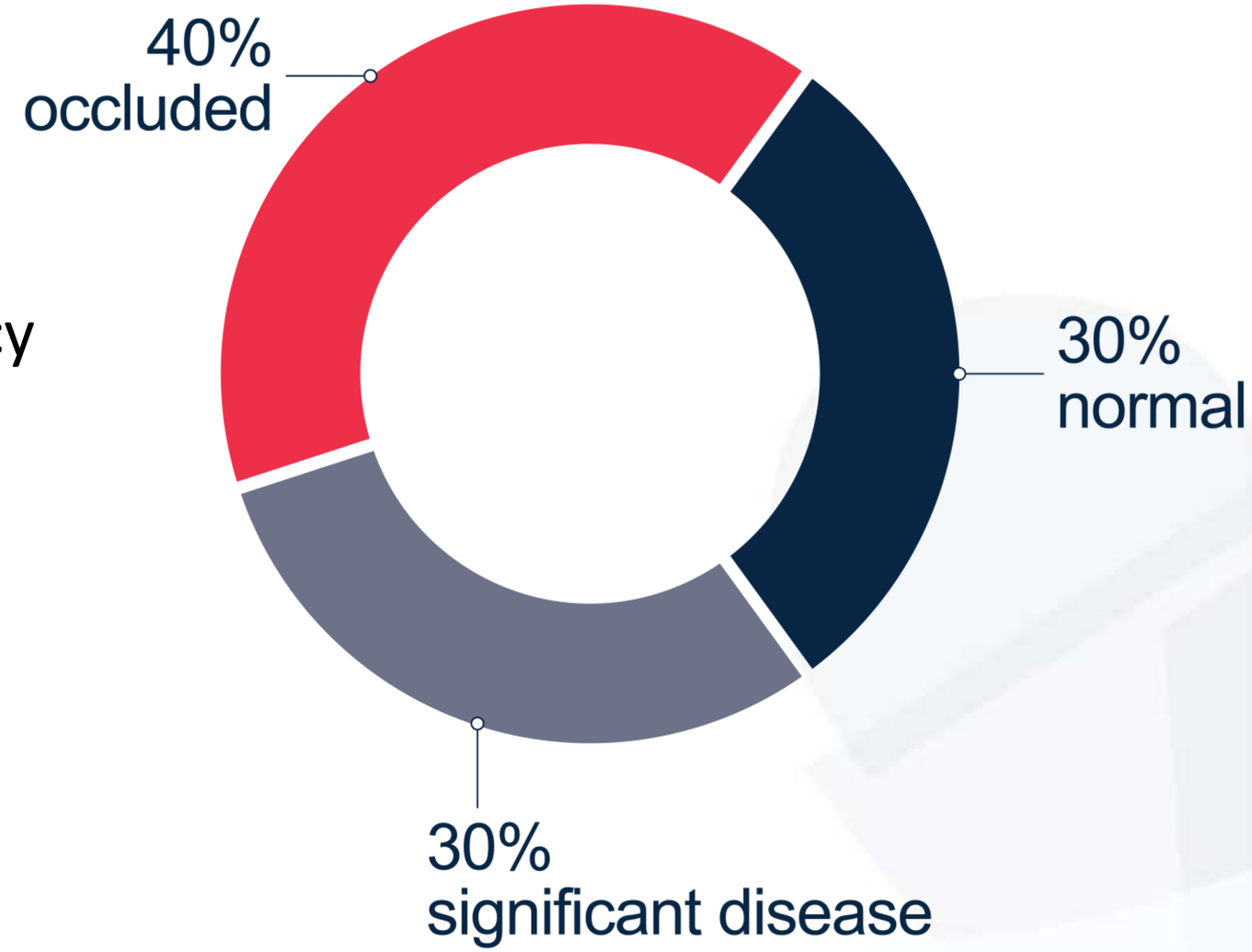
Graft patency (10 years)



11. Sabik et al. Circulation 2011 | 12. Locker et al. Ann Cardiothorac Surg 2013 | 13. Mannacio et al. Int J Surg 2014 | 14. Hess et al. Circulation 2014 | 15. Glineur et al. Circulation Cardiovasc Interv 2016 | 16. Gaudino et al. Circulation 2017 | 17. Gaudino et al. JAHA 2021

Post CABG - Expectations

10y SVG patency

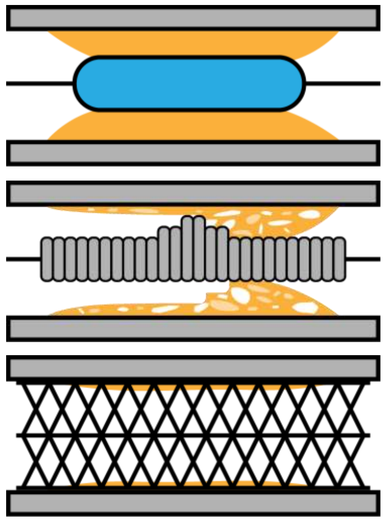


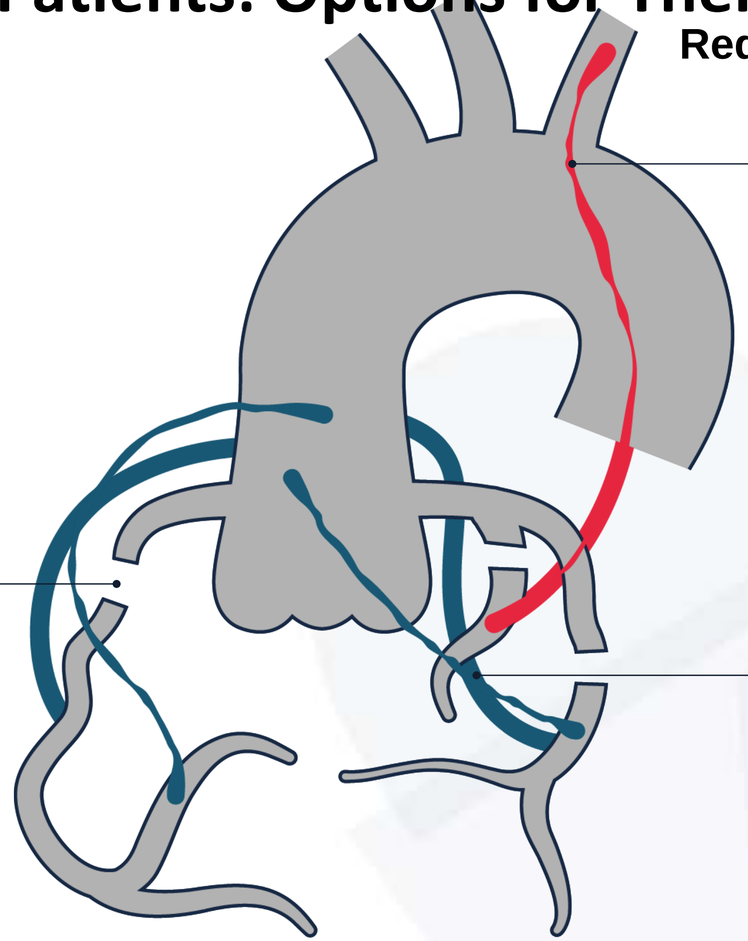
APTMedical

Repeat Revascularization in Post-CABG Patients: Options for Therapy

AND

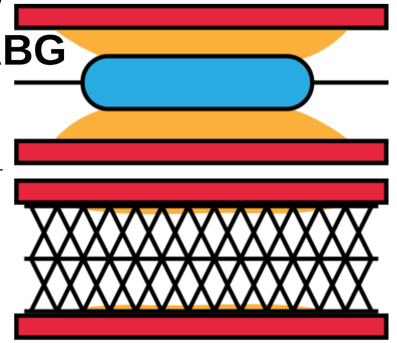
Native vessel PCI



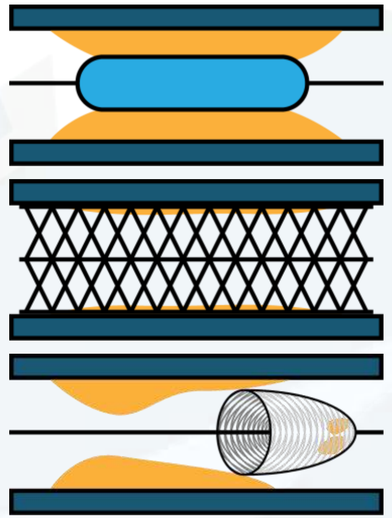


Arterial graft PCI

Redo CABG



Venous graft PCI



23. Beerkens et al. Nature Rev Cardiol 2021 | 29. Hlatky et al. JACC 2013 | 30. Sabik et al. Ann Thorac Surg 2005 | 31. Yap et al. Ann Thorac Surg 2009 | 32. Harskamp et al. J Cardiovasc Med 2013

Post CABG Revasc: What do the guidelines recommend?

Disease progression and late graft failure		
Repeat revascularization is indicated in patients with a large area of ischaemia or severe symptoms despite medical therapy.[84,334]	I	B
If considered safe, PCI should be considered as first choice over CABG.	IIa	C

1. Neumann et al. EHJ 2018

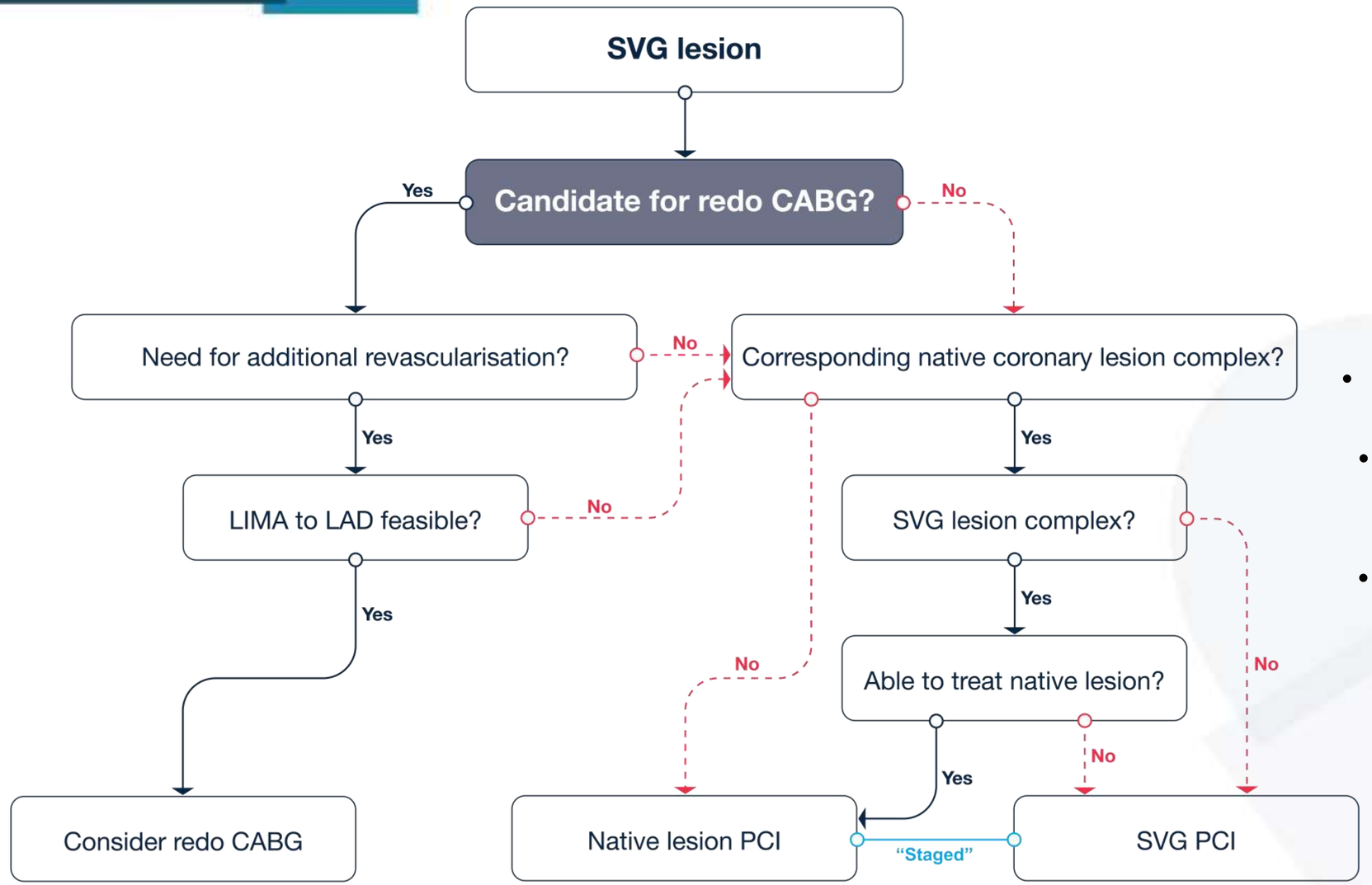
APTMedical

Post CABG Revasc: What do the Guidelines Recommend?

Disease progression and late graft failure		
Repeat revascularization is indicated in patients with a large area of ischaemia or severe symptoms despite medical therapy.[84,334]	I	B
If considered safe, PCI should be considered as first choice over CABG.	IIa	C
Procedural aspects of the revascularization modalities		
CABG		
IMA is the conduit of choice for redo CABG in patients in whom the IMA was not used previously.[344]	I	B
Redo CABG should be considered for patients without a patent IMA graft to the LAD.[340,341,344]	IIa	B
PCI		
Distal protection devices should be considered for PCI of SVG lesions.[348,350,351]	IIa	B
PCI of the bypassed native artery should be considered over PCI of the bypass graft.	IIa	C

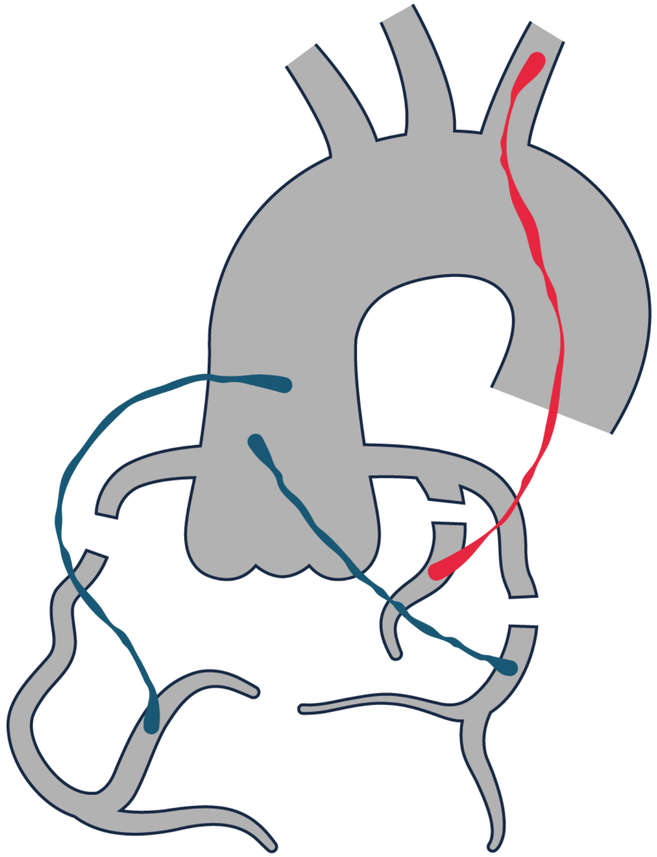
1. Neumann et al. EHJ 2018

SVG Failure: Therapeutic Options



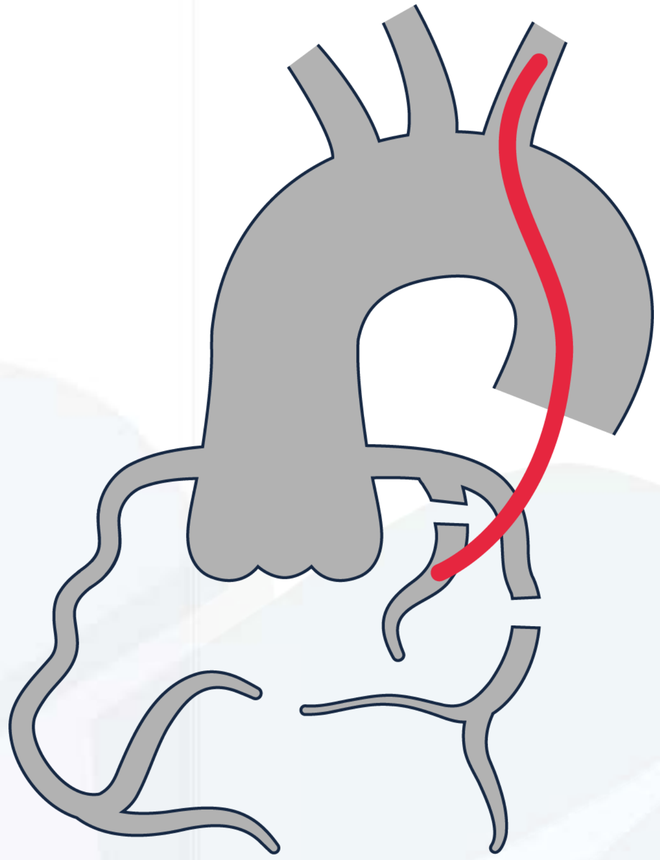
- **Consider redo-CABG when LIMA-LAD is feasible**
- **Consider SVG PCI when complexity is low and patient risk is too high for native CTO PCI**
- **CTO PCI of native artery -> acceptable patient risk / qualified CTO operator**

Should we Perform Redo CABG?
-considerations-



Multiple diseased bypass grafts[1,3]

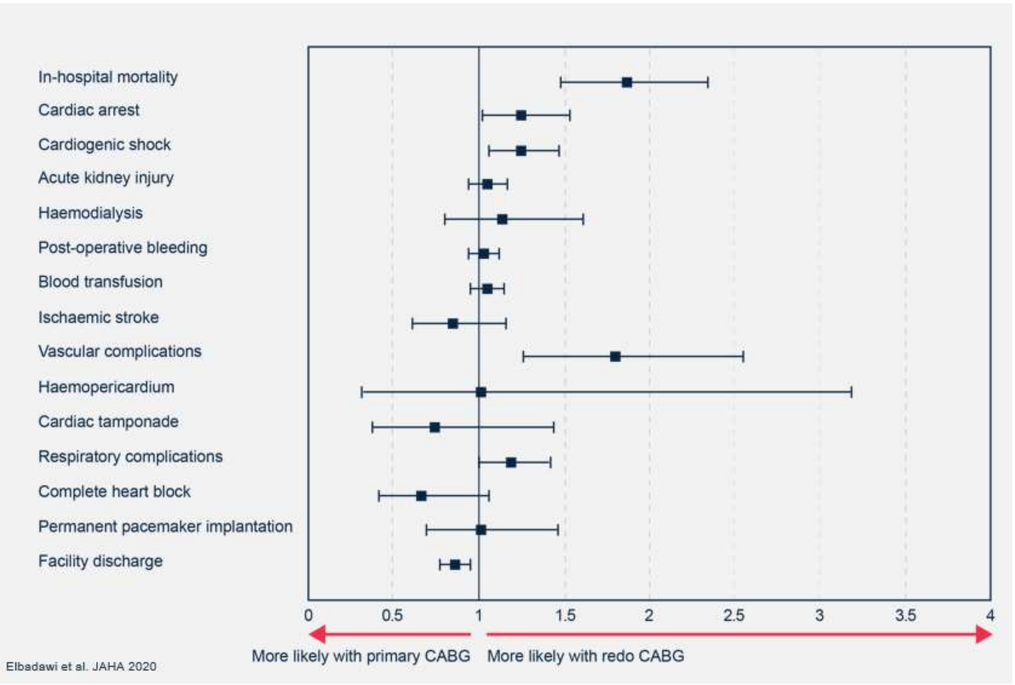
Diffuse native vessel disease, lower LVEF[1,3,36]



LIMA available to bypass LAD lesion[1,3,37]

Redo CABG

Redo CABG = higher mortality vs primary CABG



Elbadawi et al. JAHA 2020

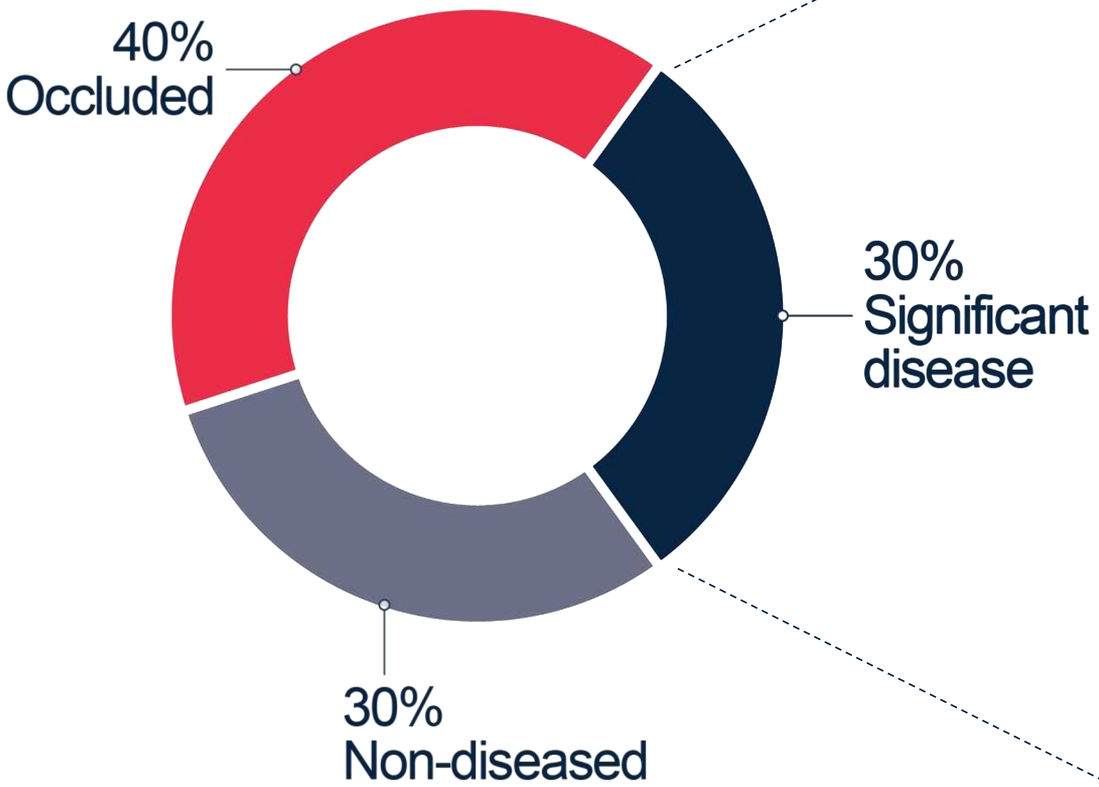
Redo CABG = infrequently performed and rates decreasing

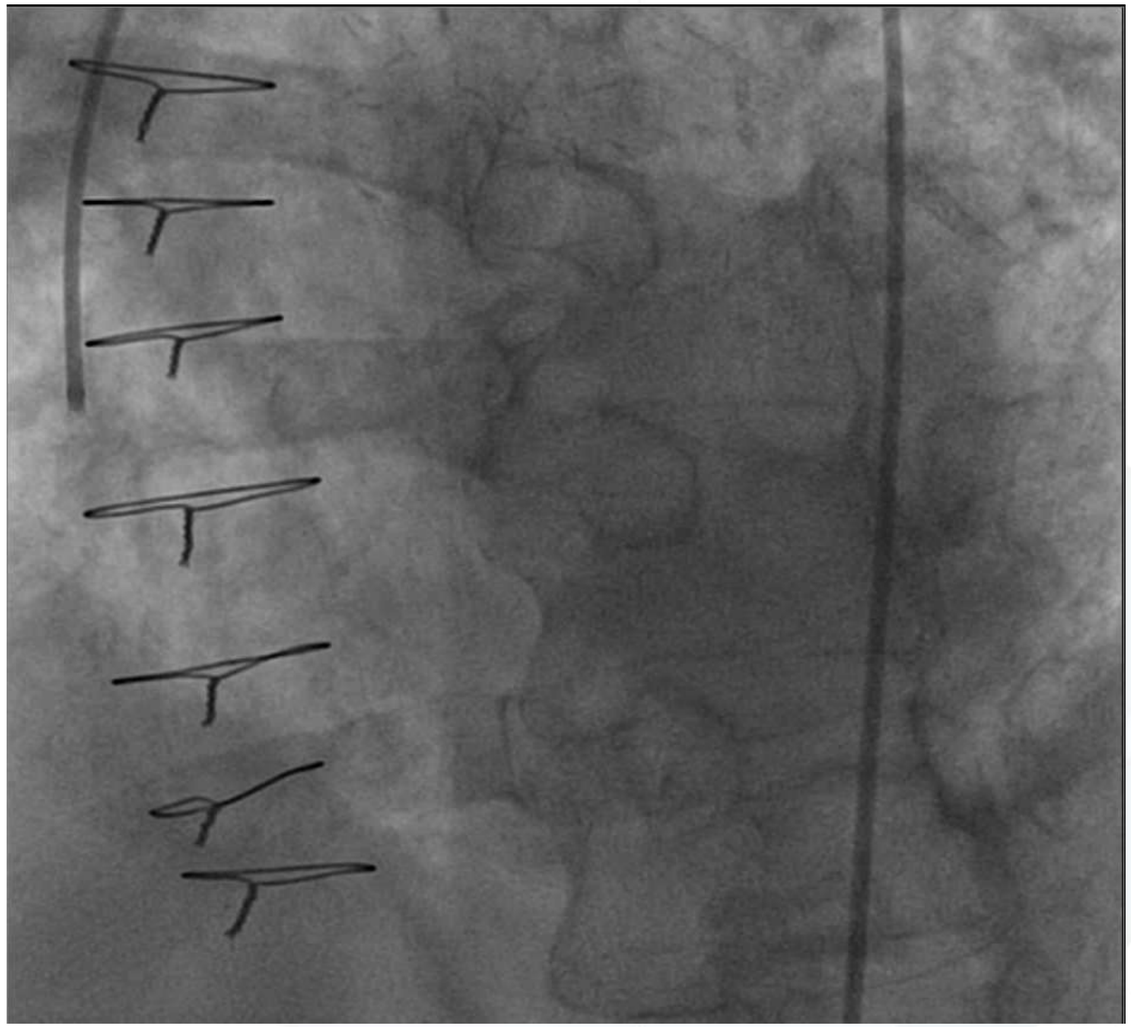
Age (years)	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
<60	26	23	15	19	17	11	20	9
60-69	56	51	30	36	30	20	18	21
70-74	34	32	18	26	34	8	10	7
75-79	36	30	22	17	12	12	4	5
80-84	10	12	2	9	4	7	5	6
>=85	3	3	0	0	0	0	0	0
Totals	165	151	87	107	97	58	57	48

33. NACSA 2022 Annual Report

Redo-CABG: 2x to 4x increasead risk of death when compared to the 1st surgery

Risks for PCI of SVG - Significant Disease

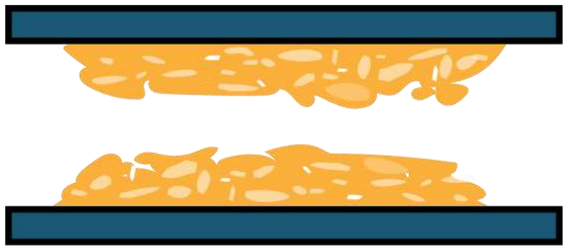




3. Lawton et al. JACC 2021 | 40. L. Campeau, NEJM 1984 | 41. B. Fitzgibbons et al. JACC 1996 | 42. M. Bourassa et al. JACC 1991

Post CABG – Graft Intervention?

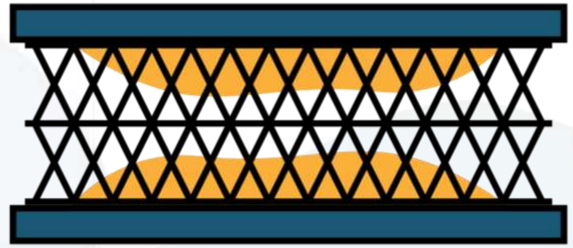
Venous bypass graft PCI associated with periprocedural complications and adverse long-term patient outcome



Diffuse, friable atheromatous plaques[36,37]

Distal debris embolization / No-reflow phenomenon[37,38]

Increased risk of periprocedural MI and mortality[38,39]

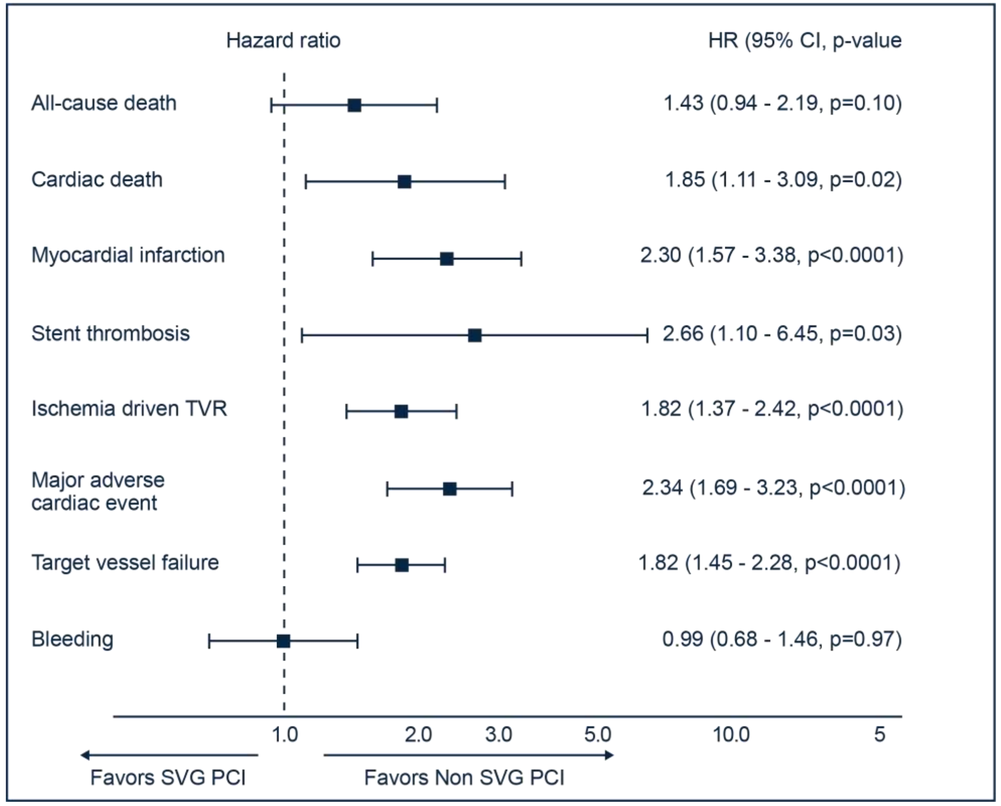


Accelerated in-stent restenosis / occlusion[36-39]

36. Xenogiannis et al. JACC Cardiovasc Interv 2019 | 37. Xenogiannis et al. Circulation 2021 | 38. Beerkens et al. CCI 2021 | 39. Redfors et al. Circ Cardiovasc Interv 2017

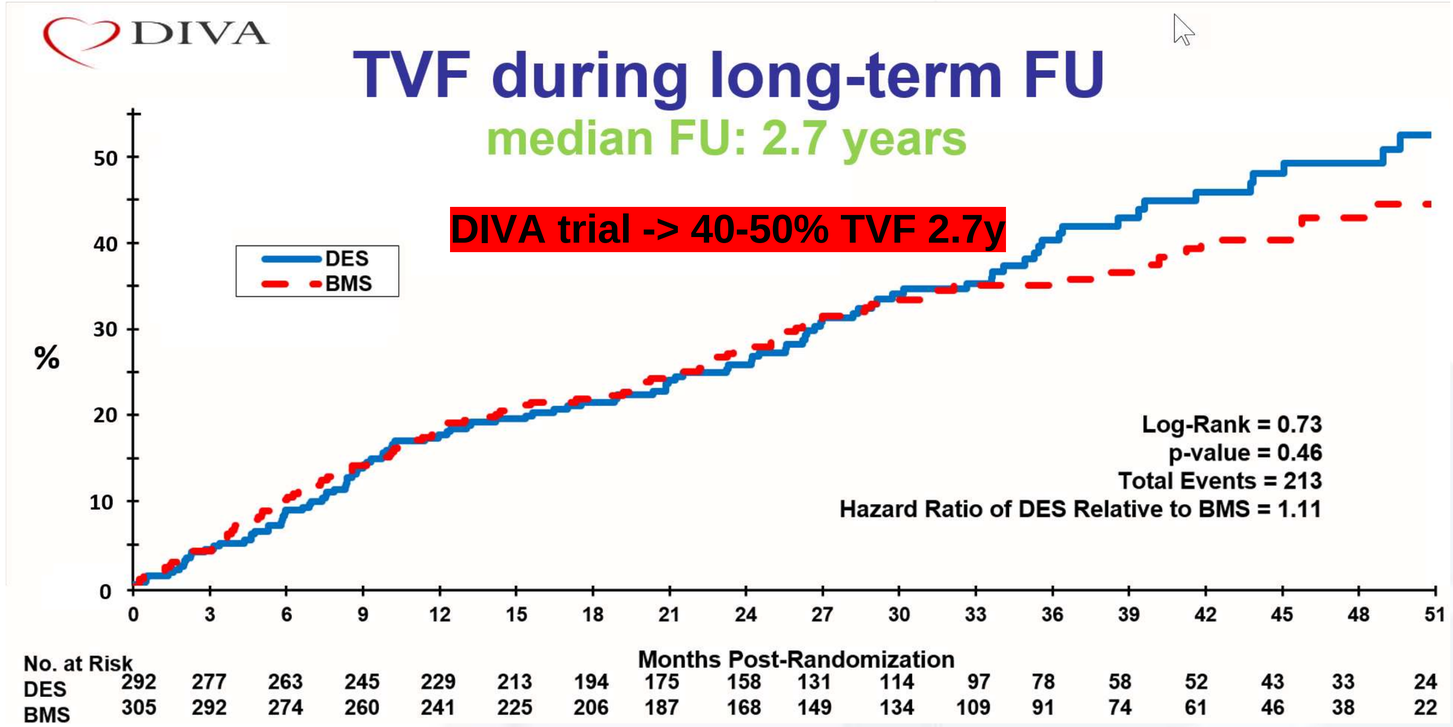
SVG PCI Outcomes

Worse Outcomes vs. non VG PCI



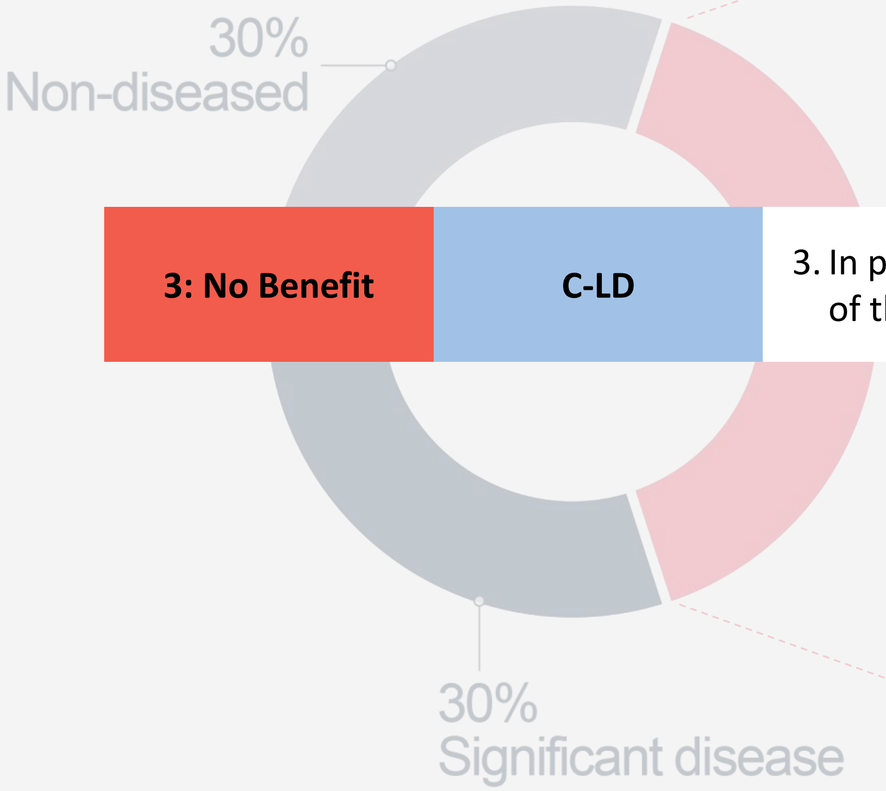
Redfors et al. Circ Cardiovasc Interv 2017

Substantial 4y TVF



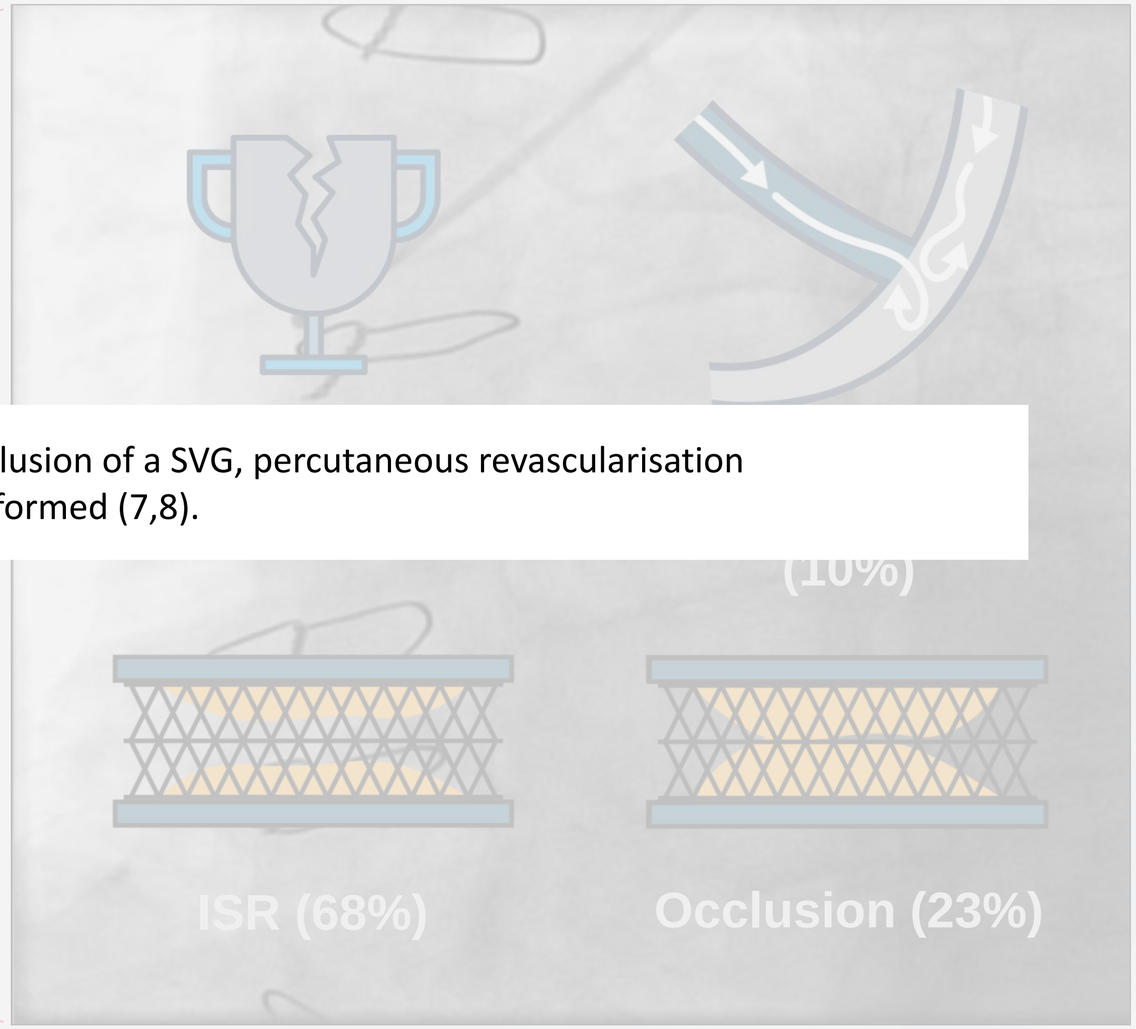
Lancet. 2018;391:1997-2007

SVG PCI Should not be Performed in Chronic VG Occlusions



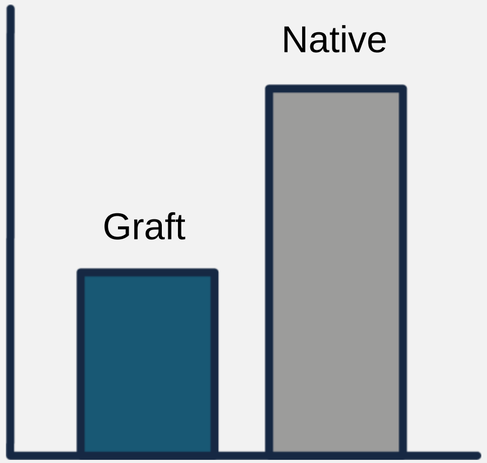
3: No Benefit | **C-LD**

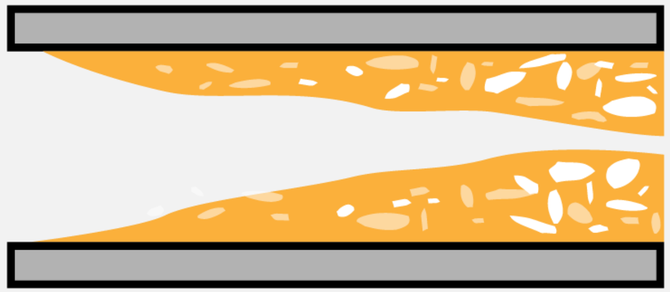
3. In patients with a chronic occlusion of a SVG, percutaneous revascularisation of the SVG should not be performed (7,8).

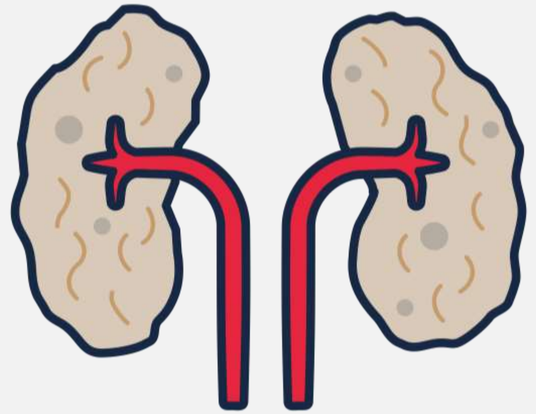


3. Lawton et al. JACC 2021 | 40. L. Campeau, NEJM 1984 | 41. B. Fitzgibbons et al. JACC 1996 | 42. M. Bourassa et al. JACC 1991

Post CABG Native Vessel PCI = Technically More Challenging







Native vessel PCI more frequently performed[9]

Technically challenging due to complex anatomy

(calcium, tortuosity, diffuse disease, CTOs)[22,23,25]

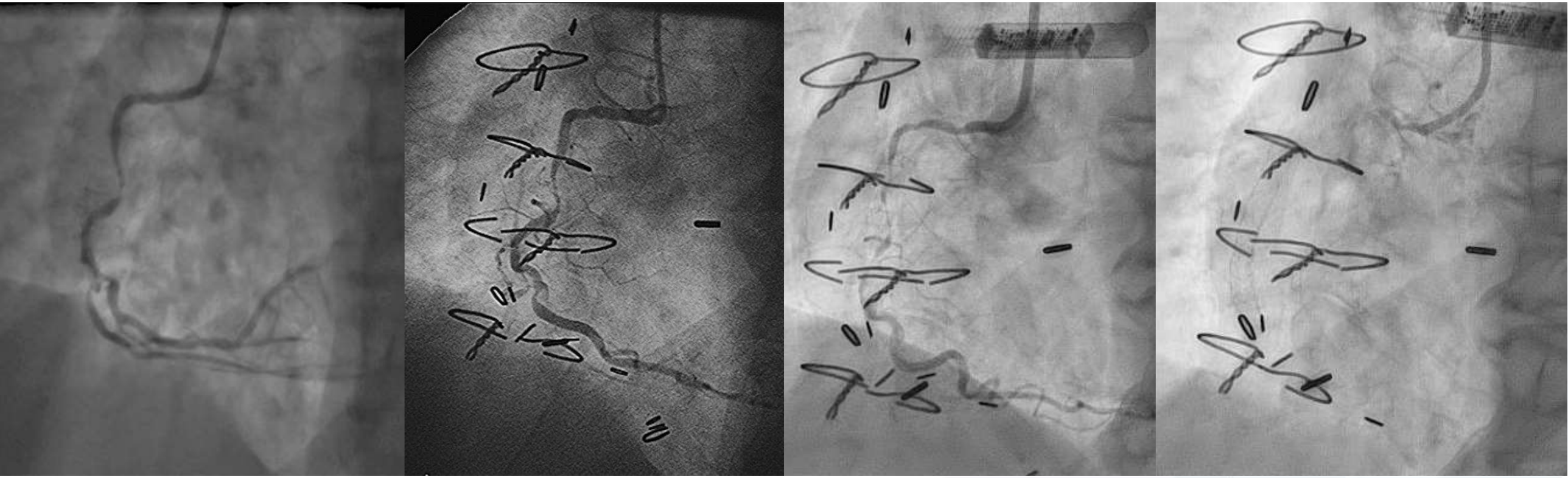
High risk patient characteristics

(frailty, renal failure)[20,21]

9. Brilakis et al. JACC Cardiovasc Interv 2016 | 20. Budassi et al. CCI 2020 | 21. Shoaib et al. Cathether ardiovasc Interv 2021 | 22. De Winter et al. Curr Cardiol Reports 2022 | 23. Beerkens et al. Nature Rev Cardiol 2021 | 25. Fefer et al. JACC 2012

APTMedical

Post CABG - Native Disease Accelerates

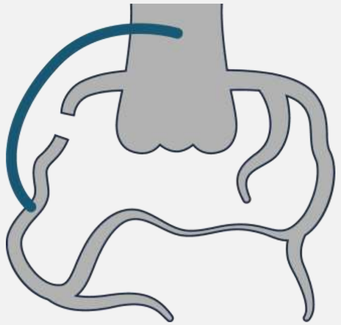


Pre-CABG (2013) 2015 2020 2022

Post CABG Native Vessel CTO PCI = Technically More Challenging

Setup

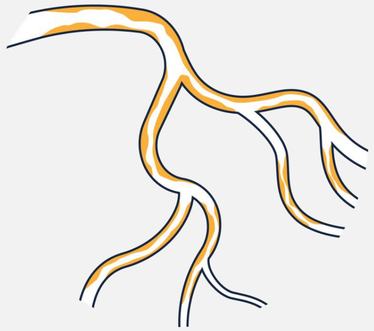
Triple access?!



vs

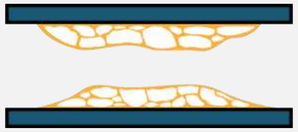
Patients

Older and more males



More complex lesions

(J-CTO 2.7 vs 2.0)

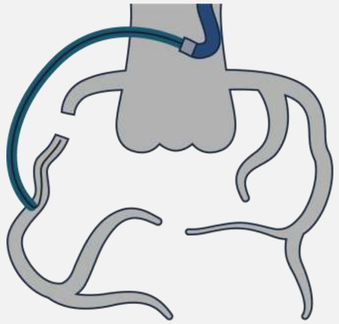


More calcification

Longer lesions

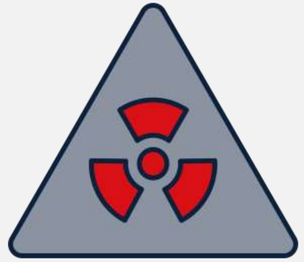
67% vs. 50% > 20mm

Procedural



More retrograde approach

More contrast volume



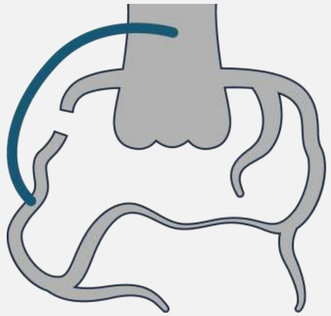
More radiation

Lower success

44. Megaly et al. JACC Interventions 2020

CTO PCI in Patients with Prior CABG

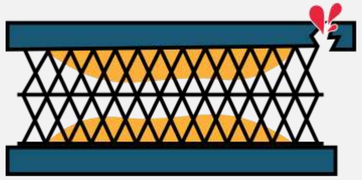
Setup



vs

In-hospital outcomes

Higher mortality



Higher perforation risk

Increased risk of MI

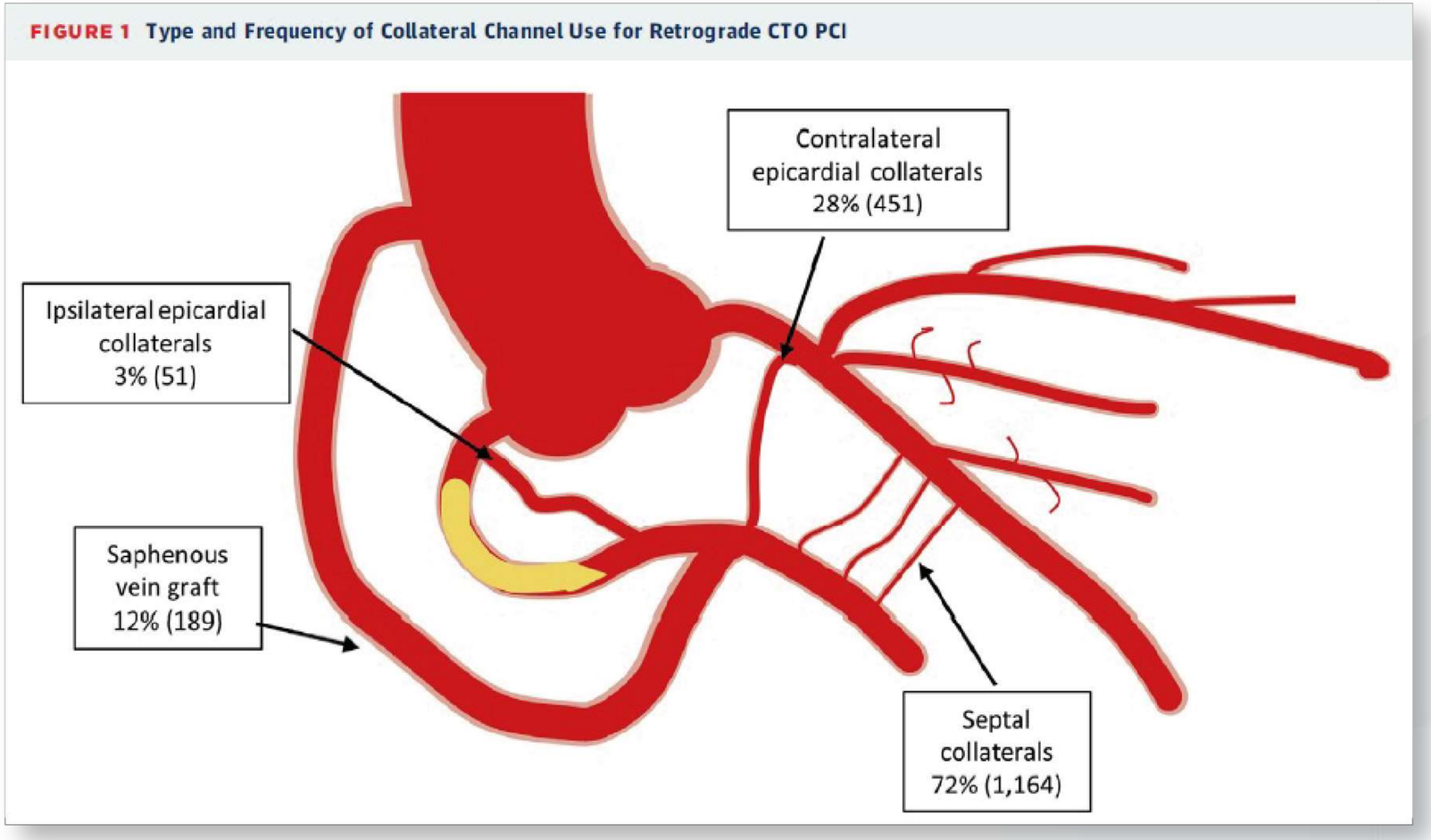
44. Megaly et al. JACC Interventions 2020

Post CABG Revasc - Some Good News!

Bypass grafts can facilitate retrograde CTO PCI

SVG (open, stenotic or occluded) may serve as retrograde access instead of collaterals

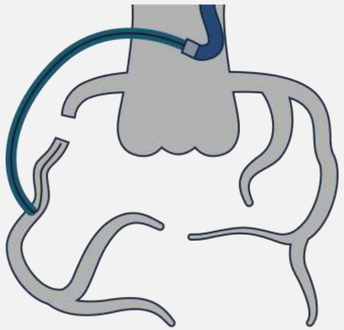
FIGURE 1 Type and Frequency of Collateral Channel Use for Retrograde CTO PCI



Xenogiannis et al. JACC Cardiovasc Interv 2020

SVG as a Retrograde Conduit for CTO PCI

Setup



vs

Outcomes

Higher technical success

Lower contrast use

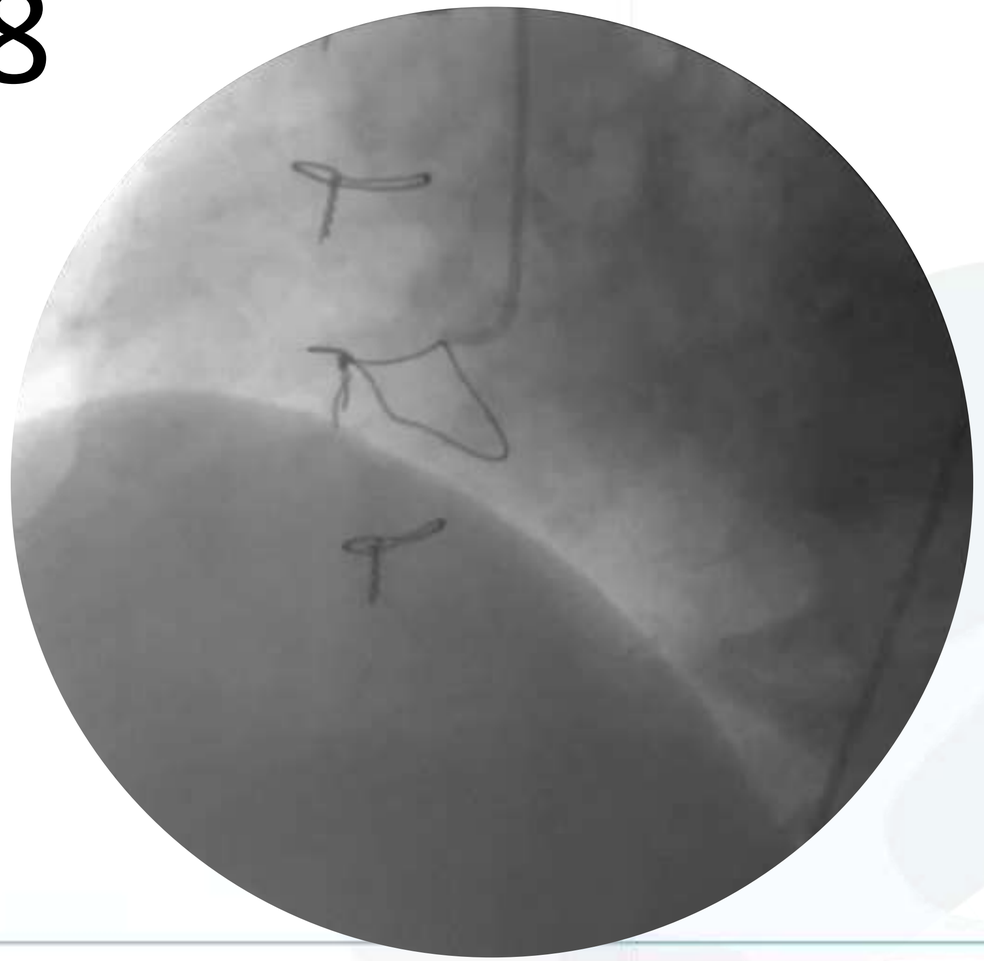
Similar MACE rates

45. Xenogiannis et al. JACC Cardiovasc Interv 2020

APTMedical

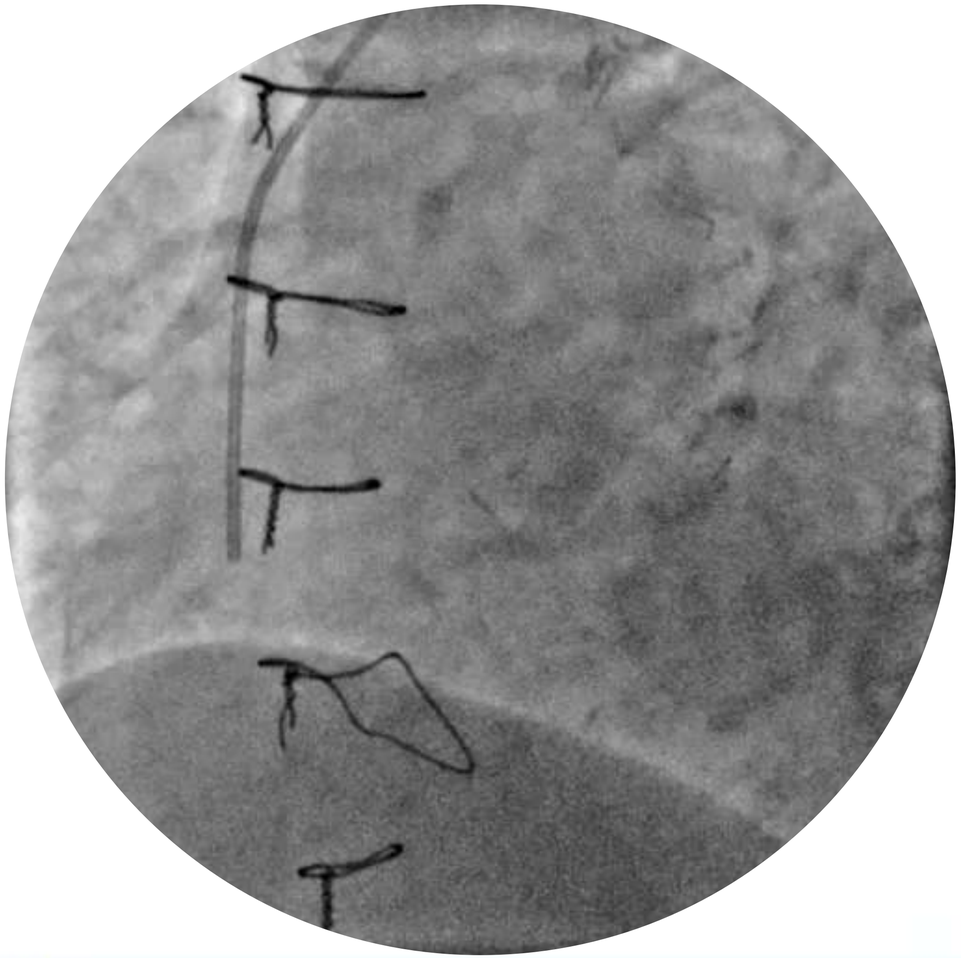
POST-CABG CTO PCI features: occluded SVGs as possible retro conduits

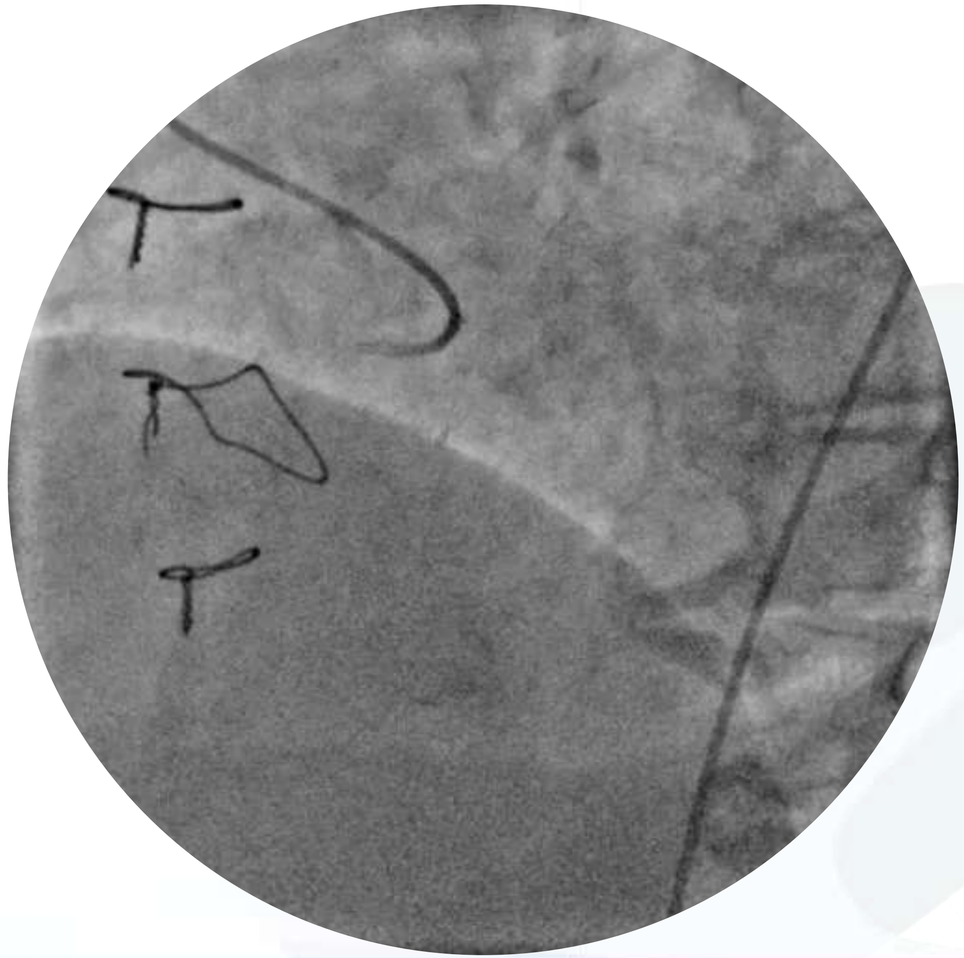
2018



CTO PCI features: occluded SVGs as possible retro conduits

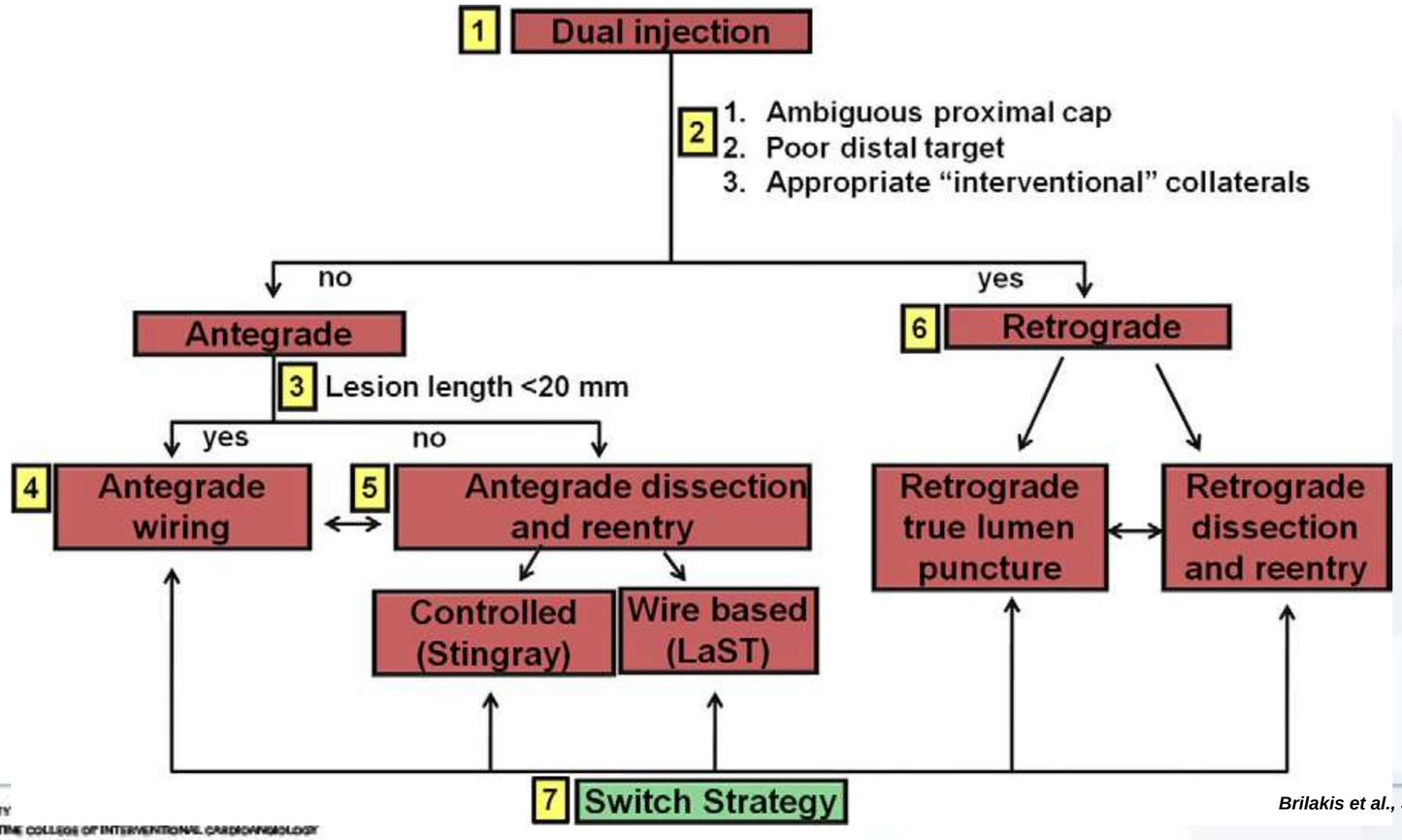
2020





Post-CABG CTO PCI: same approach as for native CTO PCI

Hybrid CTO algorithm



Brilakis et al., JACC CI, 2012

CTO PCI features: occluded SVGs as possible retro conduits

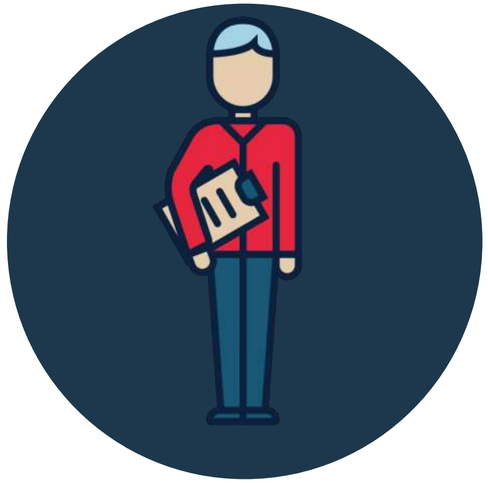
2020

CTO PCI features: occluded SVGs as possible retro conduits

2020

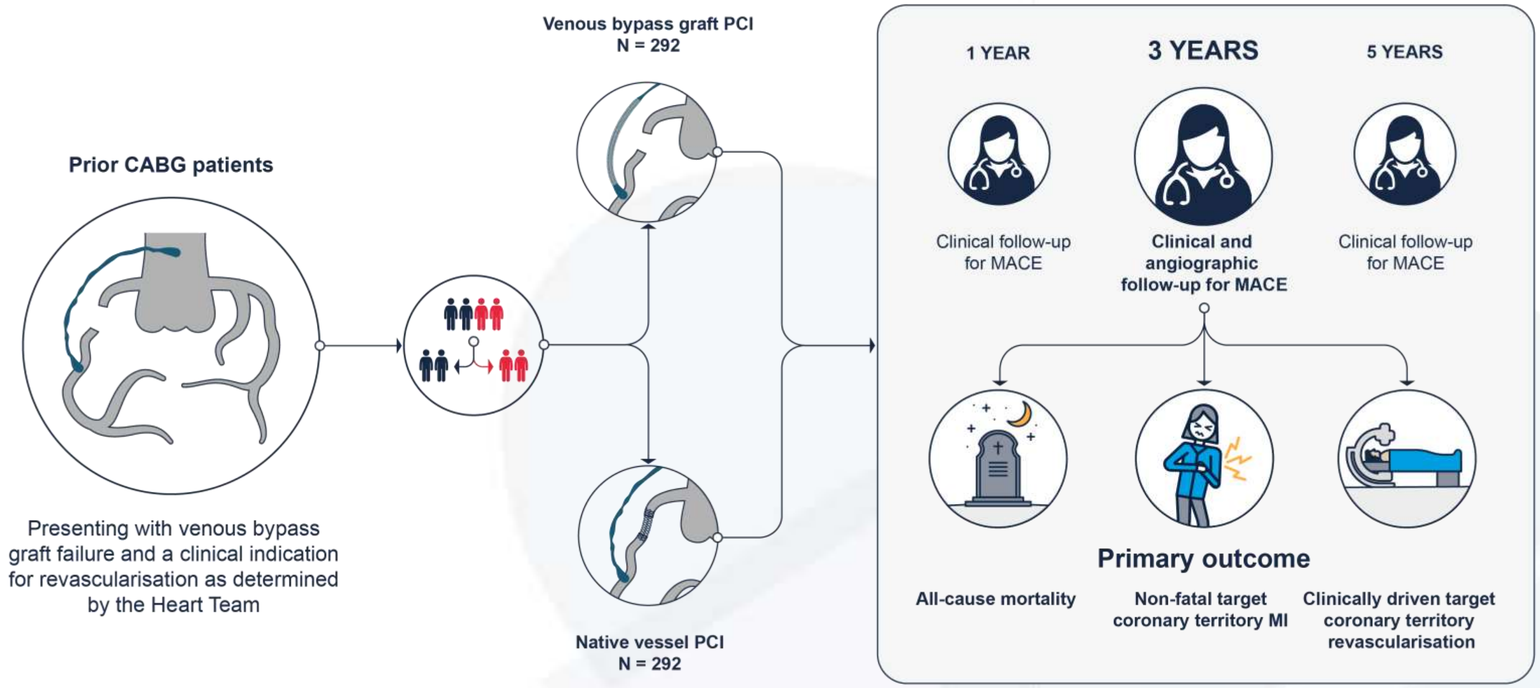
PROCTOR STUDY

PeRcutaneous COronary Intervention of Native Coronary ArTery versus Venous Bypass Graft in Patients with Prior CORonary Artery Bypass Graft Surgery



PROCTOR Trial objective:

Investigate the clinical and angiographic outcome of a strategy of native vessel PCI vs. PCI of a dysfunctional venous bypass graft



APTMedical

Post-CABG CTO PCI
LATAM CTO Registry

Received: 15 September 2021 | Revised: 13 November 2021 | Accepted: 27 November 2021
DOI: 10.1002/ccd.30041

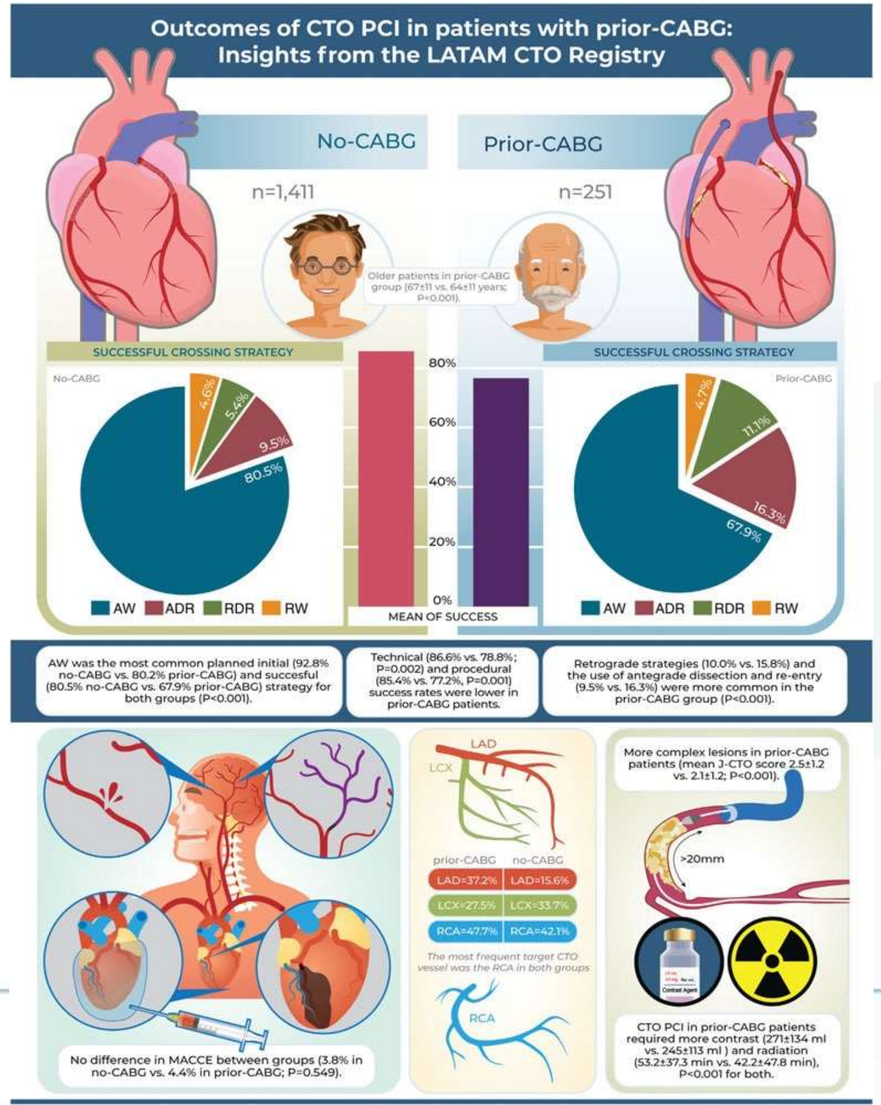
ORIGINAL STUDIES

WILEY

Outcomes of chronic total occlusion percutaneous coronary intervention in patients with prior coronary artery bypass graft surgery: Insights from the LATAM CTO registry

Dagmar F. Hernandez-Suarez MD, MSc[1] | Lorenzo Azzalini MD PhD MSc[2] |
Francesco Moroni MD[2] | João Eduardo Tinoco de Paula MD[3] |
Pablo Lamelas MD MSc[4,5] | Carlos M. Campos MD PhD[6,7] |
Marcelo Harada Ribeiro MD[6] | Evandro Martins Filho MD[8] |
Felix Damas de los Santos MD[9,10] | Lucio Padilla MD[4] |
Marco Alcantara-Melendez MD[11,12] | Marcelo A. Abud MD[13] |
Israel A. Almodóvar-Rivera PhD[14] | Marcia Moura Schmidt DSc[15] |
Mauro Echavarria MD MSc PhD[16] | Antonio Carlos Botelho MD[17] |
Valentin Del Rio MD[18,19] | Alexandre Quadros MD PhD[15] | Ricardo Santiago MD[18,19]

15,1% of total CTO PCI
Older patients
Lower technical success (86% vs 78%)
More complex lesions (higher JCTO)
More DRT in post-CABG
No difference in MACE rates



Summary:

The post-CABG CTO challenge

- Post-CABG PCI revascularization can provide our patients a better angina relief option than Redo-CABG in majority of the cases
- Graft PCI > higher periprocedural risk of distal embolization, no-reflow and worse short & long-term outcomes
- The standard approach to CTO PCI is the same (recognize the use of grafts as retro conduits)
- Post CABG native vessel PCI = more complex, more calcified lesions and frequently CTOs **BUT** better durability
- PROCTOR trial (clinicaltrials.gov: NCT03805048)
- #fixthenative

evandrofilhobr@hotmail.com
Twitter = @evandrofilhobr

Muito obrigado! Gracias!

@evandrofilhobr