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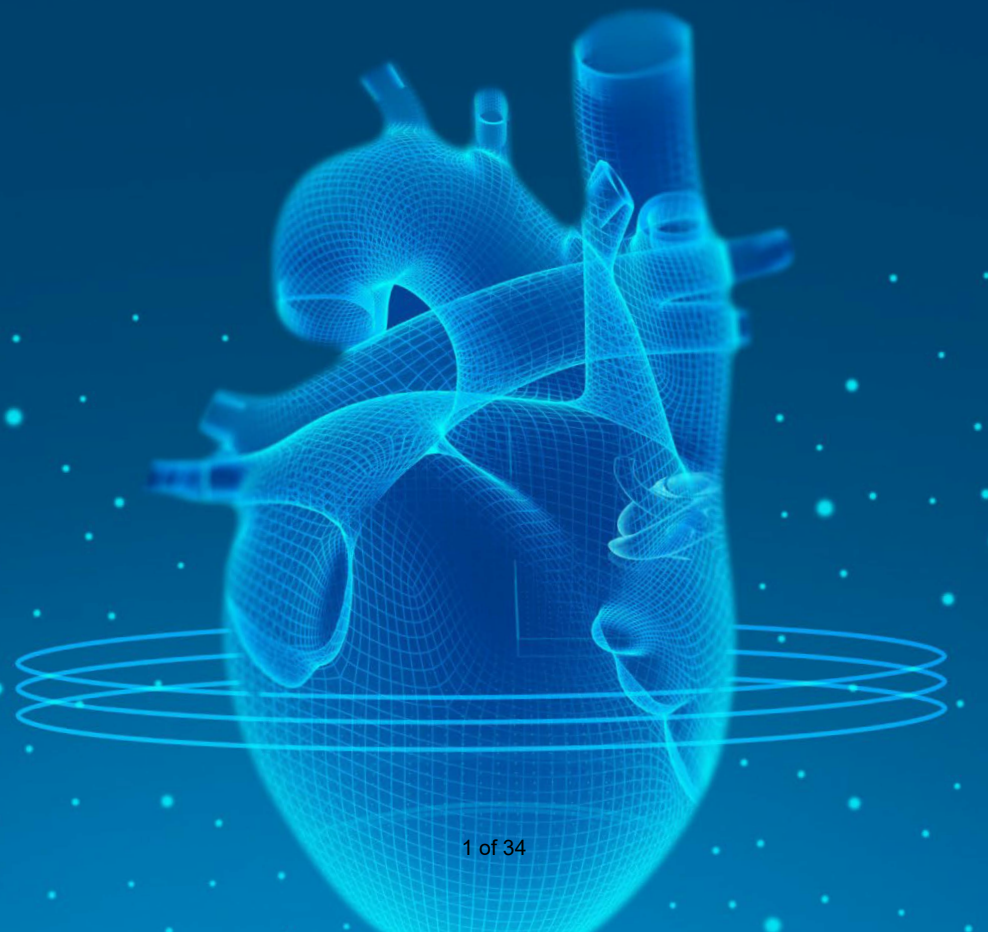

Coronary Chronic Total Occlusion Percutaneous Coronary Intervention: Analysis of Criticisms

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CTO/CHIP FELLOW
MINNEAPOLIS HEART INSTITUTE FOUNDATION

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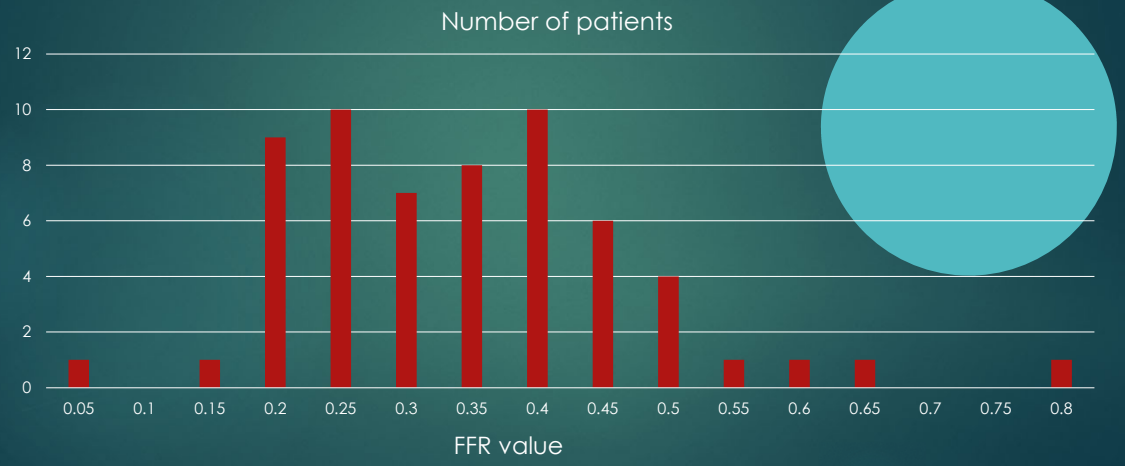
Criticism 1: No clear benefit in randomized controlled trials

- DECISION CTO
- EURO CTO
- EXPLORE
- REVASC
- IMPACTOR CTO

2

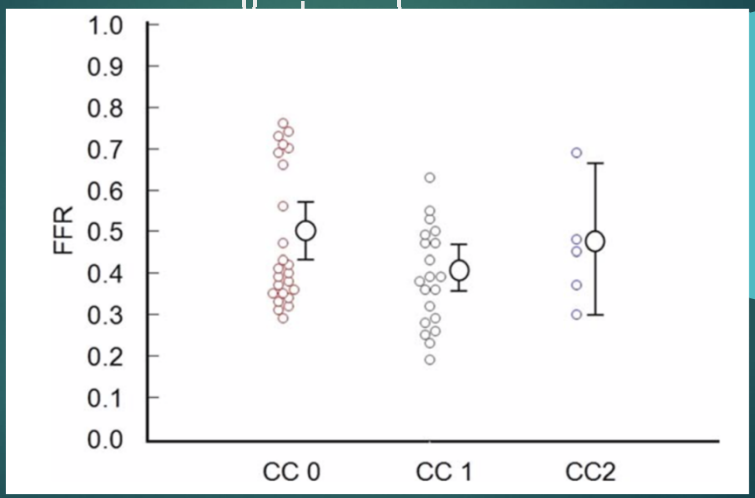
Criticism 2: CTO PCI may not be needed in the presence of good collaterals



Werner GS et al. European Heart Journal (2006) 27, 2406–2412

3

Criticism 2: CTO PCI may not be needed in the presence of good



Sachdeva R et al. CCI 2014 83(1):9-16.

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Criticism 3: CTO PCI has low success rate

TABLE 2 Success and MACE Rates of CTO PCI Over Time

Outcome	Total (N = 22,365)	2009 (n = 2,695)	2010 (n = 6,373)	2011 (n = 6,161)	2012 (n = 5,650)	2013 (n = 1,486)	p Value
CTO PCI as percentage of total PCI volume	22,365 of 594,510 (3.8)	2,695 of 84,483 (3.2)	6,373 of 183,649 (3.5)	6,161 of 160,072 (3.8)	5,650 of 135,331 (4.2)	1,486 of 30,975 (4.8)	<0.001
Procedural success	13,077 (58.5)	1,495 (55.5)	3,637 (57.1)	3,645 (59.2)	3,380 (59.8%)	920 (61.9)	<0.001
MACE	357 (1.6)	50 (1.9)	103 (1.6)	104 (1.7)	81 (1.4)	19 (1.3)	0.108

- Patent vessel PCI success rate 96%

Brilakis M et al. JACC Cardiovasc Interv 2015:8; 245–53

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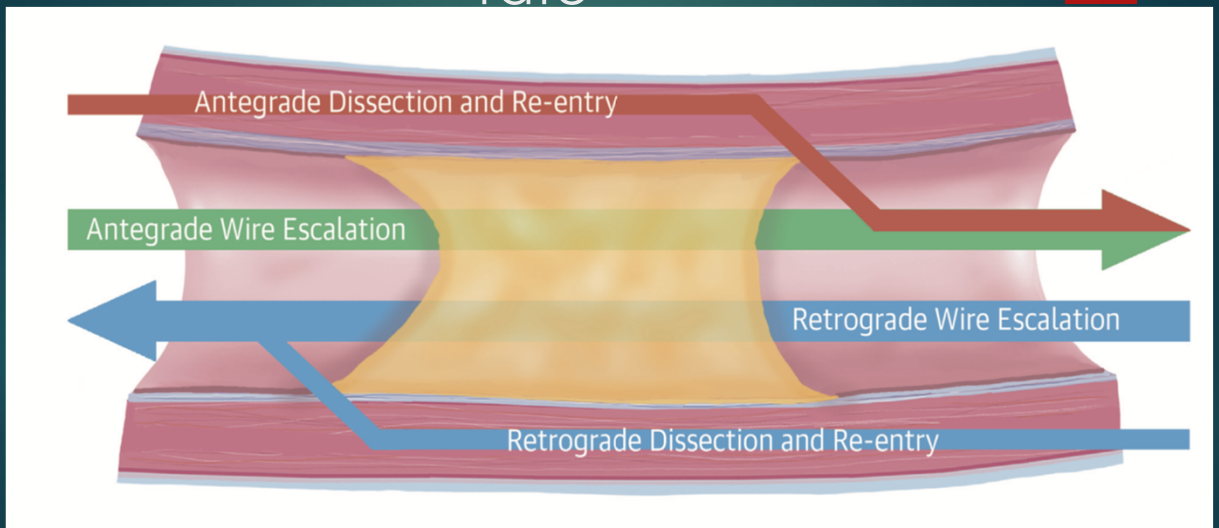
Criticism 3: CTO PCI has low success rate



Vescovo GM et al. US Cardiology Review 2020;14:e11
Maeremans J et al. J Am Coll Cardiol 2016;68:1958–70

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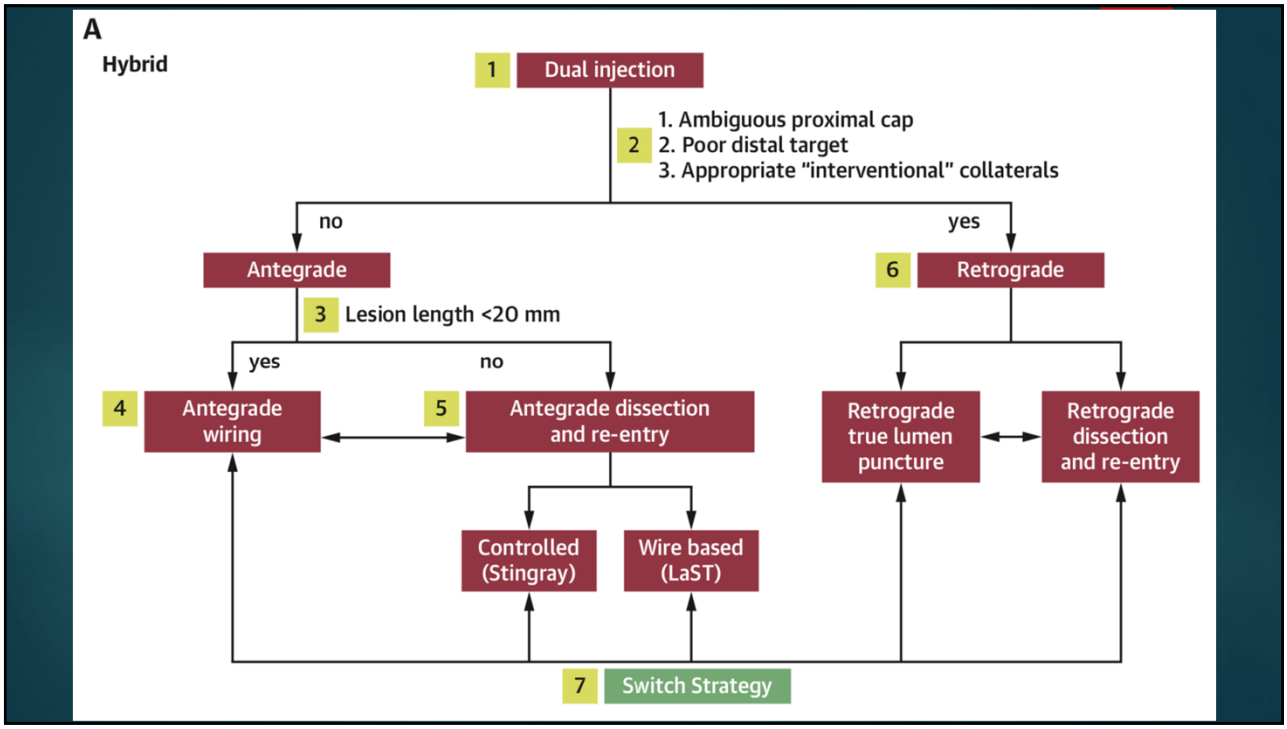
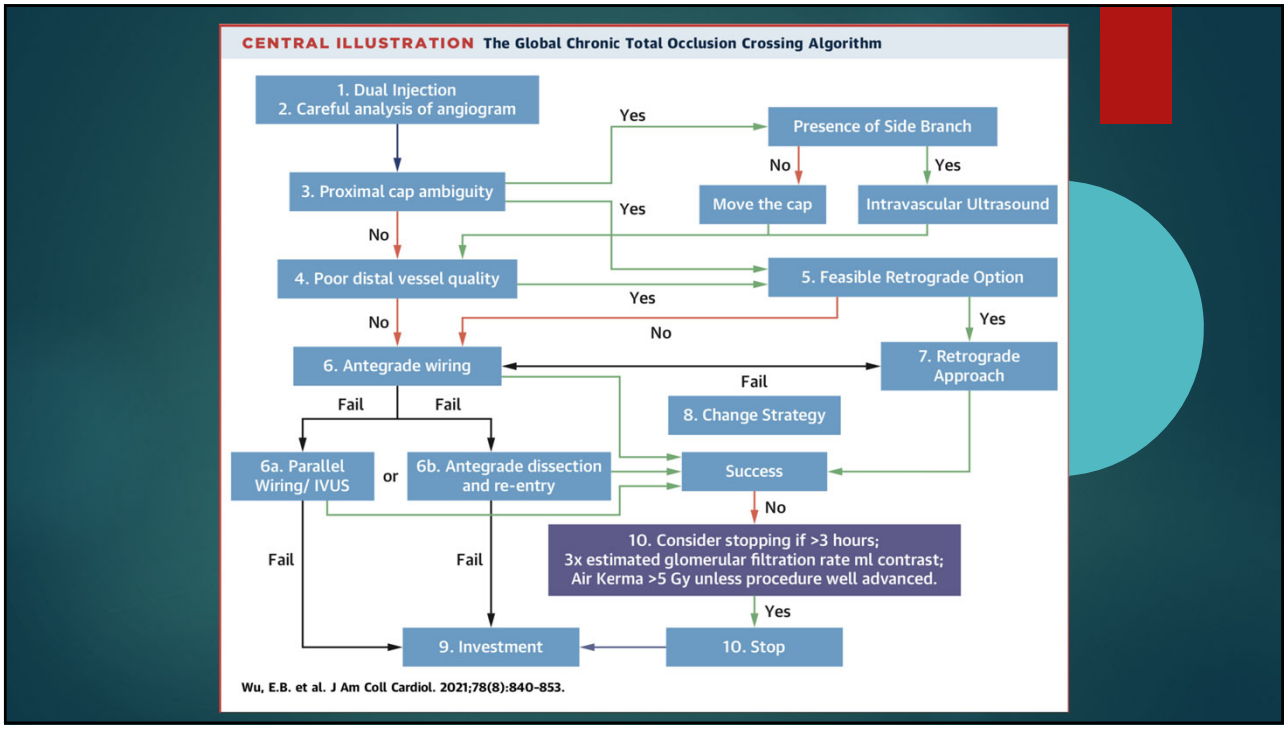

A
Hybrid
1 Dual injection
2 1. Ambiguous proximal cap
2. Poor distal target
3. Appropriate "interventional" collaterals
no
yes
Antegrade
6 Retrograde
3 Lesion length <20 mm
yes
no
4 Antegrade wiring
5 Antegrade dissection and re-entry
Retrograde true lumen puncture
Retrograde dissection and re-entry
Controlled (Stingray)
Wire based (LaST)
7 Switch Strategy

7


CENTRAL ILLUSTRATION The Global Chronic Total Occlusion Crossing Algorithm
1. Dual Injection
2. Careful analysis of angiogram
Yes
Presence of Side Branch
No
Yes
3. Proximal cap ambiguity
Yes
Move the cap
Intravascular Ultrasound
No
4. Poor distal vessel quality
5. Feasible Retrograde Option
Yes
No
No
Yes
6. Antegrade wiring
7. Retrograde Approach
Fail
Fail
Fail
8. Change Strategy
6a. Parallel Wiring/ IVUS
or
6b. Antegrade dissection and re-entry
Success
No
10. Consider stopping if >3 hours;
3x estimated glomerular filtration rate ml contrast;
Air Kerma >5 Gy unless procedure well advanced.
Fail
Fail
Yes
9. Investment
10. Stop
Wu, E.B. et al. J Am Coll Cardiol. 2021;78(8):840-853.

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Criticism 3: CTO PCI has low success rate

- Progress CTO registry
- Data from highest volume CTO PCI US centers
- 3122 CTO PCI attempted between 2012 and 2017
- Technical success rate for CTO PCI was 86.8%
- Success rate as the final strategy
  - 46% for AWE
  - 19% ADR
  - 24% Retrograde (Retrograde wire escalation and dissection reentry)

Tajti P et al. JACC Cardiovasc Interv 2018: 11; 1325–35

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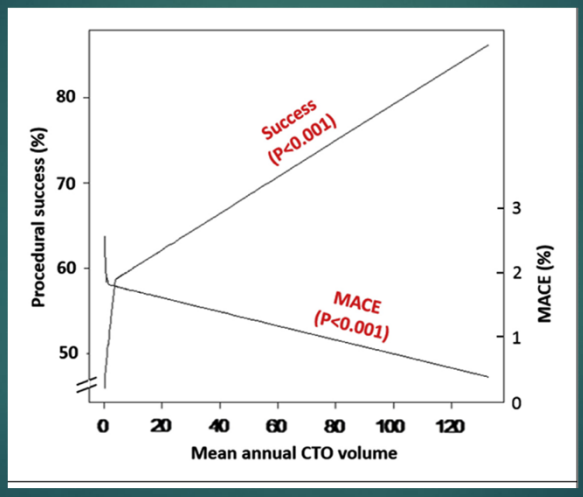
Criticism 3: CTO PCI has low success rate



Brilakis ES et al. JACC Cardiovasc Interv 2015:8; 245–53

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Criticism 4: CTO PCI has higher complication rate

TABLE 1 Comparison of Patients With Stable Coronary Artery Disease Undergoing CTO PCI Versus Those Undergoing Non-CTO PCI

Variable	All Patients (N = 594,510)	CTO PCI (n = 22,365)	Non-CTO PCI (n = 572,145)	p Value
PCI outcomes				
Procedural success	94	59	96	<0.001
MACE	0.8	1.6	0.8	<0.001
Death	0.3	0.4	0.3	<0.001
Urgent CABG surgery	0.4	0.8	0.4	<0.001
Stroke	0.1	0.1	0.1	0.045
Tamponade	0.1	0.3	0.1	<0.001
MI	1.9	2.7	1.9	<0.001
RBC transfusion	1.9	2.7	1.9	<0.001
Contrast volume	189.1 ± 92.3	243.8 ± 124.7	187.0 ± 90.1	<0.001
Fluoroscopy time	15.0 ± 12.4	29.9 ± 20.8	14.5 ± 11.6	<0.001

Brilakis ES et al. JACC Cardiovasc Interv 2015:8; 245–53

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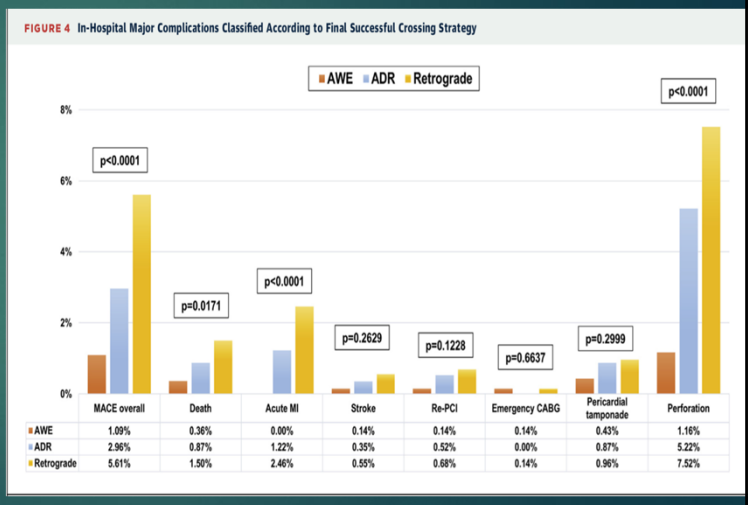
Criticism 4: CTO PCI has higher complication rate

Progress CTO registry

	Complication rate
All In hospital MACE	3.04%
Death	0.85%
Acute MI	1.08%
Stroke	0.26%
Emergency CABG	0.16%
Urgent repeat PCI	0.36%
Cardiac tamponade	0.85%



Tajti P et al. JACC Cardiovasc Interv 2018: 11; 1325–35

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Criticism 4: CTO PCI has higher complication rate

TABLE 4 In-Hospital Complications of the Entire Cohort

MACCE	70 (7.0)
Death	9 (0.9)
Myocardial infarction	26 (2.6)
Stroke	0 (0.0)
Emergent surgery	7 (0.7)
Clinical perforation	48 (4.8)

Sapontis J et al. J Am Coll Cardiol Intv 2017;10:1523–34

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Coronary Intervention Related Mortality

- Chronic total occlusion PCI 0.9%
- Routine PCI 0.65%
- Left main PCI 1.0%
- Significant calcification that require atherectomy 2.3%
- Device assisted PCI 7.6%
- PCI in patients turned down for CABG surgery 7%
- PCI in the elderly (≥80 years old) 3.2%
- Graft vessel intervention 1.1%

Riley RF, Henry TD, Kong JA, et al. A CHIP fellow's transition into practice: Building a complex coronary therapeutics program [published online ahead of print, 2019 Nov 25]. Catheter Cardiovasc Interv. 2019;10.1002/ccd.28599. doi:10.1002/ccd.28599

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Criticism 5: CTO PCI may have less durable result than CABG

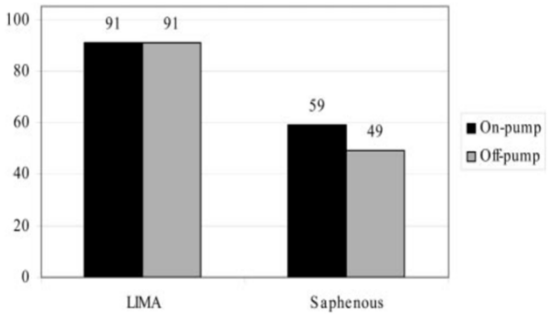

Figure 2. One-year patency (%) of grafts done on pump vs off pump (n=255).

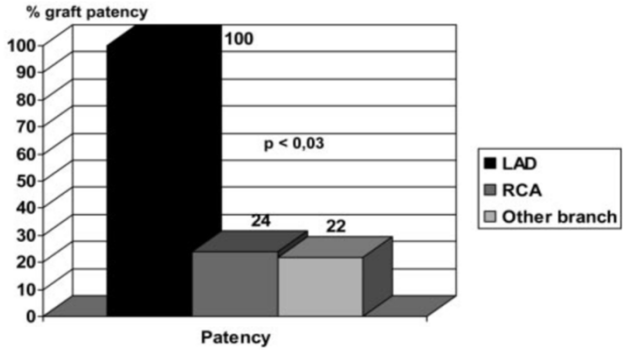

Figure 4. Percent graft patency in chronic collateralized total coronary occlusions.

Widimsky P et al. Circulation. 2004;110:3418-3423

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Criticism 5: CTO PCI may have less durable result than CABG

- Florence CTO PCI registry data: From 2003 to 2010, 1,035 patients underwent PCI for at least 1 CTO. Of these, 802 (77%) had a successful PCI. The angiographic follow-up was at 6-9 months.
- Reocclusion rate was 7.5%

Valenti R et al. J Am Coll Cardiol 2013;61:545–50

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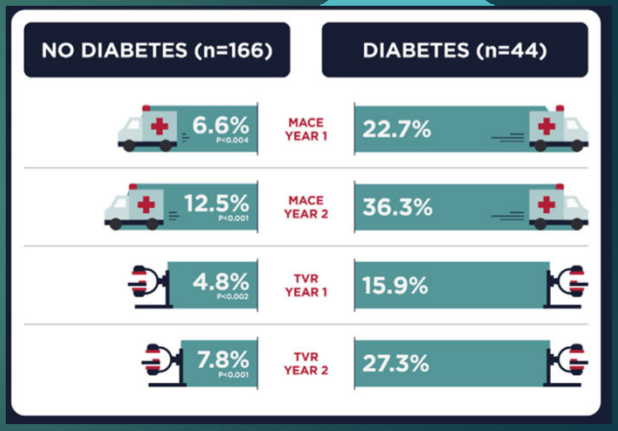
Criticism 5: CTO PCI has less durable result than CABG

- Consistent CTO trial prospective, multicenter, single-arm trial of patients with appropriate indications for CTO PCI.
- Successful CTO PCI was performed in 210 of 231 patients (91% success).
- AWE 34%, RWE, 18% RWE, 18% ADR, 30% RDR
- 2nd generation EES DES used in all
- IVUS used in 90.5%
- Target vessel failure at 1 year was 5.7%
- Reocclusion 3.4%
- Binary in stent restenosis 14.5%



Walsh S et al. J Am Coll Cardiol Intv 2020;13:1448–57

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Summary

- Chronic total coronary occlusions are associated with overall worse prognosis
- There are benefits of CTO intervention specially with respect to improvement in anginal symptoms.
- The technical success rate for CTO procedures has improved and complication rate decreased.

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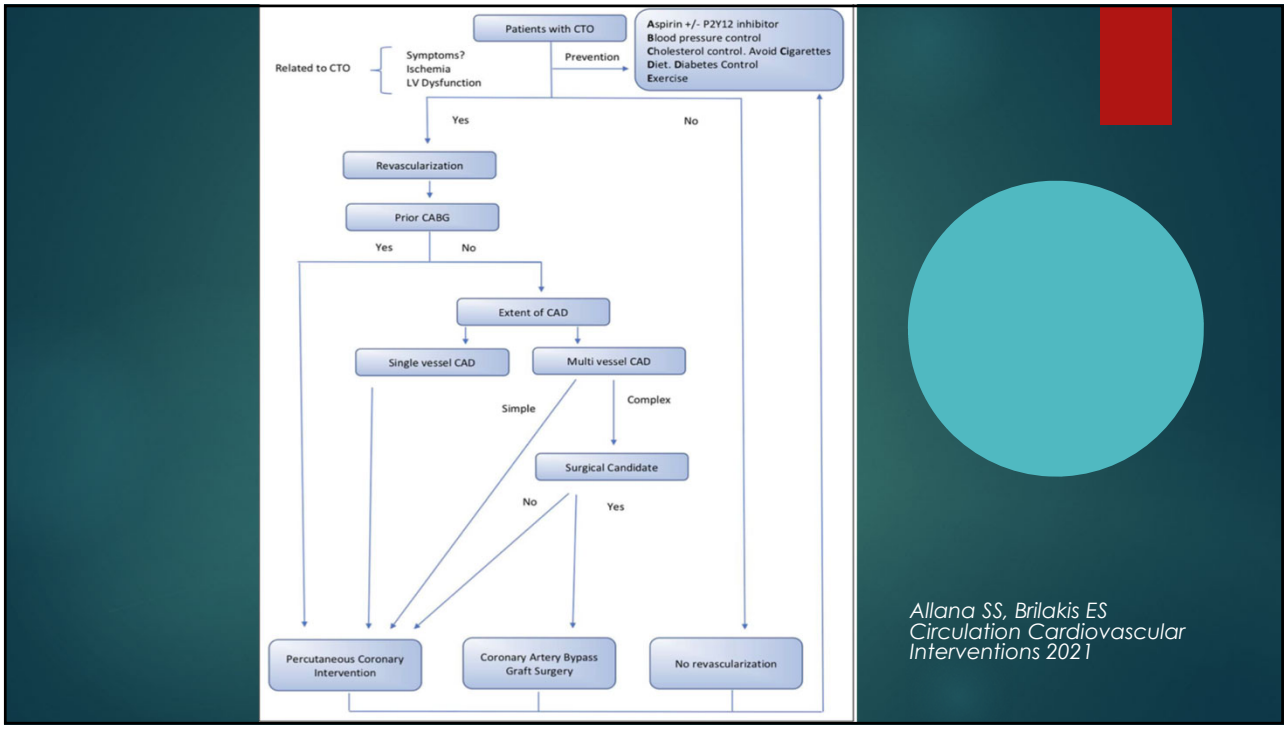

Allana SS, Brilakis ES Circulation Cardiovascular Interventions 2021

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Guidelines for Coronary revascularization

Percutaneous revascularization of CTOs should be considered in patients with angina resistant to medical therapy or with a large area of documented ischaemia in the territory of the occluded vessel.[629,659–663]	IIa	B

COR	LOE	RECOMMENDATION
2b	B-R	1. In patients with suitable anatomy who have refractory angina on medical therapy, after treatment of non-CTO lesions, the benefit of PCI of a CTO to improve symptoms is uncertain (1-4).

Neumann, FJ et al EHJ 2018, ESC guidelines

Lawton JS et al. JACC 2021, ACC/AHA/SCAI guidelines

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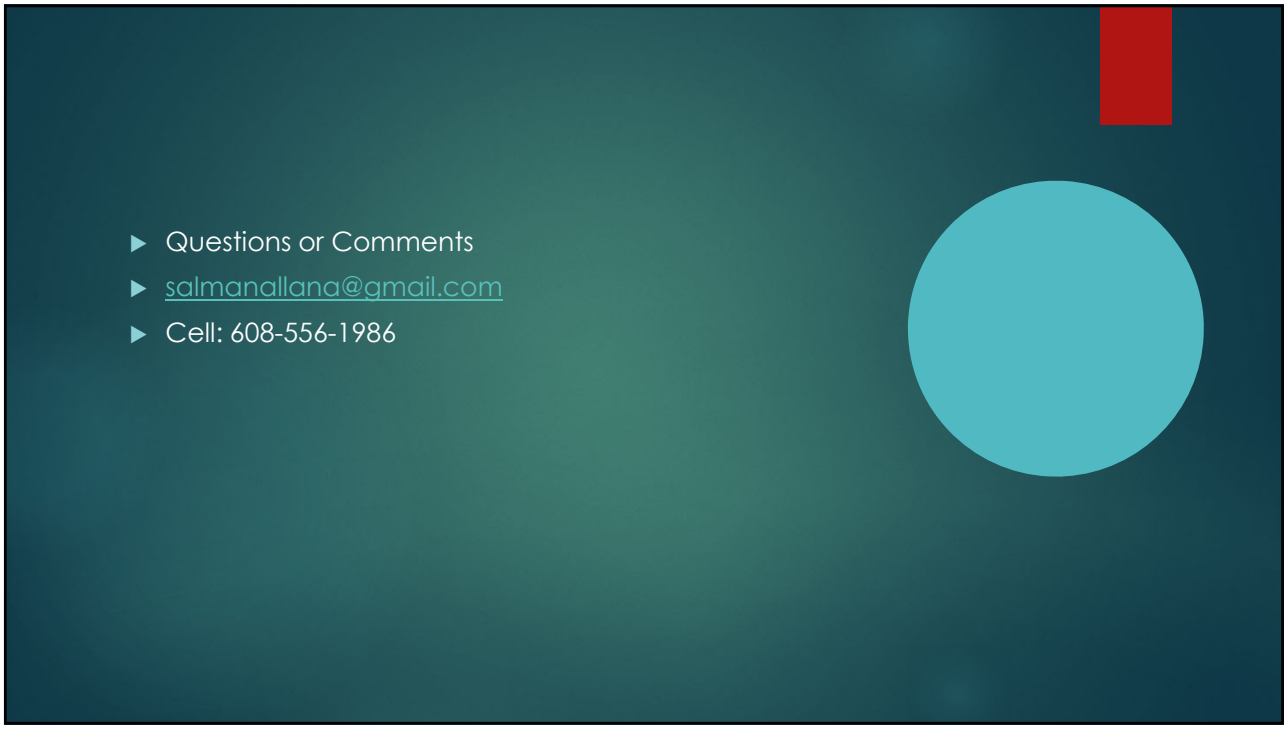
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Post-Shock Asystole and Inappropriate Shocks in Patients Dying Out-of-Hospital While Wearing a Defibrillator

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Heart Rhythm Science Center, Minneapolis Heart Institute Foundation, Minneapolis, MN

1

Disclosures

- None

2

Background & Objective

- Wearable cardioverter defibrillator is used in patients with a temporary risk of sudden cardiac death but are not implantable cardioverter-defibrillator(ICD) candidates
- The LifeVest® wearable cardioverter-defibrillator(LWD) by Zoll ® was introduced in 2001 and current model has been available since 2009
  - Provides therapeutic shocks for ventricular fibrillation (VF) & ventricular tachycardia (VF)
  - However, unlike ICD, does not provide back up pacing for post shock asystole or post shock bradycardia
- Objective was to determine if this limitation impacted clinical outcomes in patient dying out of hospital while wearing a LifeVest® wearable cardioverter-defibrillator
- Also looked at incidence and clinical consequences of inappropriate shocks

3

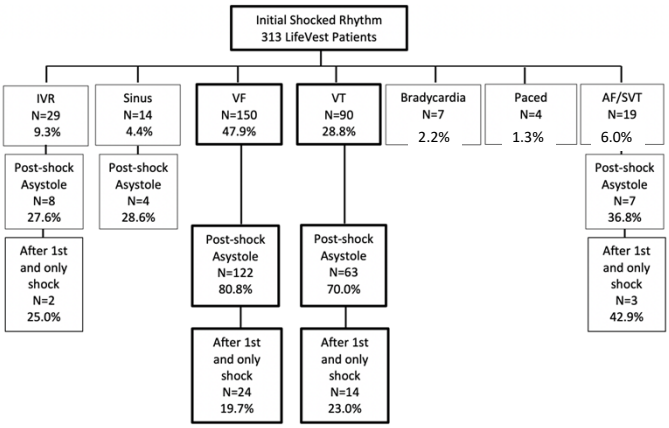
Methods

- Queried the U.S. FDA Manufacturers and User Facility Device Experience (MAUDE) database for deaths reported from January 2017-April 2022 in patients wearing a LifeVest® wearable cardioverter-defibrillator.
- Exclusion Criteria:
  - Patients who were hospitalized at the time of the event
  - Patients who did not receive a shock
  - Patient in asystole or CPR artifact when first shock delivered

4

Results

- 313 patients received an initial LWD shock
  - VF n=150 (47.9%)
  - VT n=90 (28.8%)
  - Non-VF/VT rhythms n=73 (23.3%)
- Post-shock asystole
  - n=204 (65.2%)
- Post-shock bradycardia
  - n=111 (35.5%)
- 85 (41.7%) post-shock asystole patients also had post-shock bradycardia



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Results

- Most post-shock asystole patients (n=185, 90.7%) had initial rhythm of VF or VT
  - VF n=122 (80.8% of those shocked for VF)
  - VT n=63 (70.0% of those shocked for VT)
- Asystole occurred after the 1st shock in 118 patients (63.8%)
- Asystole occurred after shocks 1-3 in 159 patient (85.9%)

6

Results

- 7 patients had post shock heart block
- 8 patients had pacemakers
  - 1 became non-functional after 1 shock
  - 7 Exhibited non-capture

7

Results

- 174 patients (55.6%) received 1 or more inappropriate shock
- 23 patients died in asystole after receiving inappropriate shocks for
  - AF n=9
  - SVT n=5
  - NSR/ST n=5
  - IVF n=3
  - Paced rhythm n=1

8

Discussion

- Our study suggests post-shock asystole occurs frequently in LWD patients who die out of hospital
  - 38 patients in the VT/VF subgroup who died in asystole after a single successful shock
- It is unknown if transcutaneous pacing would affect clinical outcomes
- Studies have shown that post shock pacing is common in ICD patients
- 8 pacemakers were damaged by shocks
  - Suggests LWD should be used cautiously in pacemaker dependent patients

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Limitations

- MAUDE reports provide no patient specific or prescriber information or data.
- Thus, we do not know the demographics or clinical characteristics of our study population or how clinical risk factors, or decision-making may have impacted the results.
- As is true of all MAUDE studies we do not know the incidence of adverse events because the denominator is not known

10

Conclusion

- Post-shock asystole and post-shock bradycardia were common in patients who died out of hospital after receiving appropriate LWD shocks.
- Most patients received one or more inappropriate shocks, and some appeared to be lethal.
- Whether back-up pacing, and better rhythm and noise discrimination could improve outcomes warrants further investigation.

11

Acknowledgements

This study was funded by the Joseph F. Novogratz Family Heart Rhythm Center at the Minneapolis Heart Institute Foundation.

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For more information or questions

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Use of Subintimal Tracking And Re-entry Technique in Chronic Total Occlusion Percutaneous Coronary Intervention

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Disclosure Statement of Financial Interest

I, [Judit Karacsonyi] DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.

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3

Background

There is limited data on use of the Subintimal Tracking And Re-entry (STAR) technique for Chronic Total Occlusion (CTO) Percutaneous Coronary Intervention (PCI).

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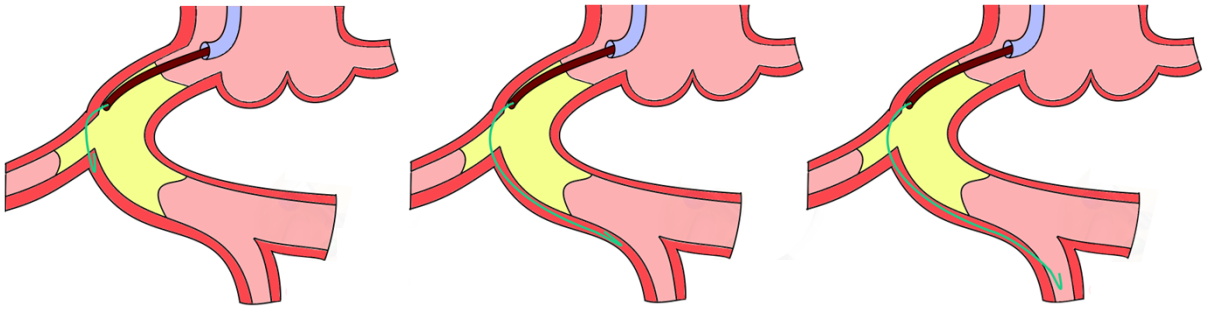
Subintimal Tracking And Re-entry Technique (STAR)



A

Guidewire enters extraplaque space

B

Knuckle guidewire tracks extraplaque space along the vessel course

C

Guidewire spontaneously re-enters into distal true lumen. Confirm wire position with contralateral injection

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Objective

We sought to analyze the frequency of use and outcomes of STAR in CTO PCIs performed with antegrade dissection and re-entry (ADR) in the PROGRESS-CTO Registry.

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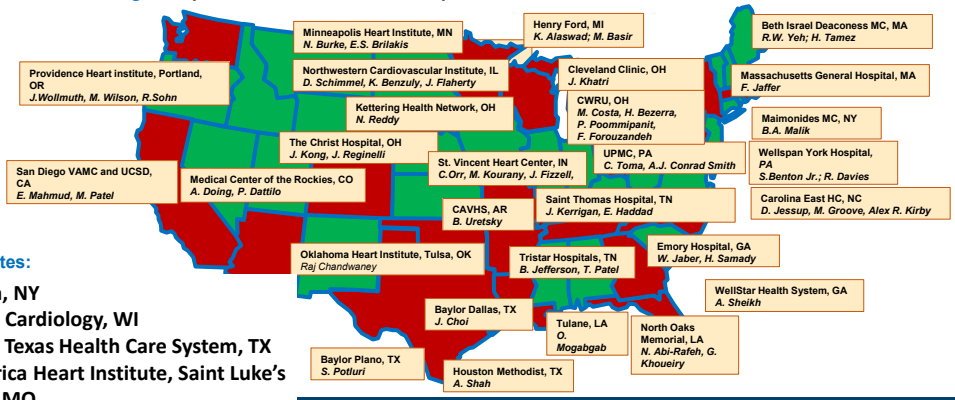
Methods

Global Coordinating Center: Chairman/PI: E. S. Brilakis; **Global Director:** B.V. Rangan;
Database Managers: Judit Karacsonyi, Spyridon Kostantinis, Bahadir Simsek, Athanasios Rempakos
Operational Support: Olga Mastrodemos
Project Impact: Data from 12,099 cases at 66 participating centers,
Resulting in 91 publications, 139 conference presentations

NCT02061436

USA Sites



Historical Sites:

- Columbia, NY
- Appleton Cardiology, WI
- VA North Texas Health Care System, TX
- MidAmerica Heart Institute, Saint Luke's Hospital, MO
- Peace Health Cardiology, WA
- Piedmont Heart Institute, GA
- Torrance Memorial, CA

Funding: Abbott Northwestern Hospital Foundation
Joseph F. and Mary M. Fleischacker Foundation

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NCT02061436

PROGRESS-CTO International Sites (OUS)

- **Meshalkin Novosibirsk Research Institute, Russian Republic**
  O. Krestyaninov, D. Khelimskii
- **Red Cross Hospital, Greece**
  Y. Tsiafoutis
- **Henry Dunant Hospital Center, Greece**
  V. Tzifos, A. Kolyviras, D. Dimitris
- **London Health Sciences Center, Canada**
  L. Ybarra, R. Bagur
- **St. Boniface General Hospital, Canada**
  B. Elbarouni, M. Love
- **Health Sciences Center, Eastern Health Newfoundland, Canada**
  A. Hall, M.Almutawa

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PROGRESS-CTO MENATA (**M**iddle **E**ast, **N**orth **A**frica, **T**urkey & **A**sia) **CHAPTER**

NCT02061436

ACTIVE SITES

1. Al Zahraa Hospital University Medical Center, Beirut, Lebanon; Site PI: Ali Amine El Sayed, MD
2. Aswan Heart Center, Magdi Yacoub Foundation, Egypt; Site PI: Ahmed El Guindy
3. Kocaeli Acibadem Hospital,Izmit, Turkey; Site PI: Sevket Gorgulu MD
4. Marmara University School of Medicine, Istanbul, Turkey; Site PI: Kursat Tigen, MD
5. Mohammed Bin Khalifa Cardiac Centre, Royal Medical Services of the Bahrain Defence Force, Kingdom of Bahrain; Site PI: Husam Noor
6. Ondokuz Mayis University Medical Faculty, Samsun, Turkey; Site PI: Korhan Soylu, MD
7. Selcuk University, Konya, Turkey; Site PI: Nazif Aygul, MD
8. St. George Hospital University Medical Center, Beirut, Lebanon; Site PI: Assaad Maalouf, MD
9. The Promed Hospital, Chennai, India; Site PI: Arun Kalyanasundaram, MD
10. Memorial Bahcelievler Hospital, Istanbul,Turkey; Site PI: Omer Goktekin, MD
11. Dar Al Fouad Hospital, Cairo, Egypt; Site PI: Raouf Shaaban, MD
12.National Heart Institute, Cairo, Egypt; Site PI: Yasser Sadek, MD

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Methods

- Study population

2,353 patients undergoing CTO PCI between 2012 and June 2022 at 41 international centers.

- Analyses

All statistical analyses were performed with JMP 11.0 (SAS Institute; Cary, North Carolina).

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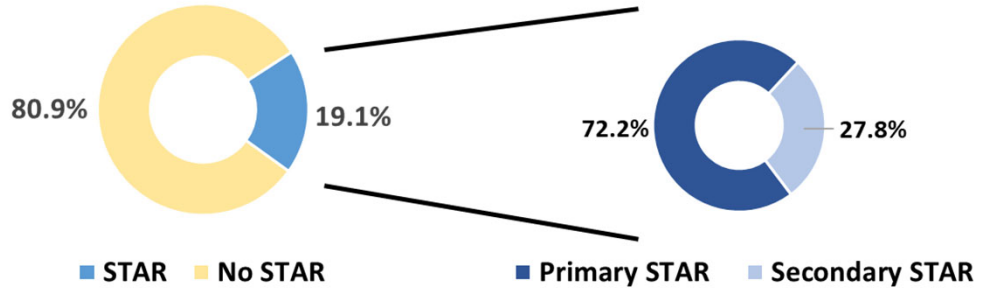
Results

Figure 1. Frequency of use of Subintimal Tracking And Re-entry (STAR) technique



The Stingray system was used in 1048 (44.5%), Limited Antegrade Subintimal Tracking (LAST) in 177 (7.5%), and contrast-guided STAR in 31 (1.3%) of re-entry cases.

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Results- Baseline clinical characteristics of the study patients

Variable	STAR used (n= 433)	STAR not used (n= 1876)	P value
Age (years)[a]	65.7 ± 9	65.2 ± 10	0.283
Men	345 (85.8%)	1494 (86.0%)	0.922
BMI (kg/m^2)[a]	30.3 ± 6	30.5 ± 6	0.678
Diabetes Mellitus	164 (41.7%)	714 (42.5%)	0.774
Hypertension	368 (93.4%)	1525 (90.1%)	0.044
Dyslipidemia	360 (90.5%)	1568 (92.2%)	0.241
LVEF (%)[a]	50 ± 12	50 ± 13	0.923
Congestive Heart Failure	115 (29.5%)	464 (28.4%)	0.659
Prior Myocardial Infarction	180 (48.0%)	732 (45.7%)	0.426
Prior CABG	165 (41.3%)	597 (34.1%)	0.007
Prior CVD	43 (11.1%)	157 (9.5%)	0.349
Prior PVD	60 (15.3%)	255 (15.5%)	0.934

BMI: body mass index; LVEF: left ventricular ejection fraction; CAD: coronary artery disease; CABG: coronary artery bypass grafting; CVD: cerebrovascular disease; PVD: peripheral vascular disease; [a] mean ± standard deviation

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Results- Baseline angiographic characteristics of the study patients.

Variable	STAR used (n= 433)	STAR not used (n= 1876)	P value
CTO Target Vessel			<0.001
▪ Right coronary artery	240 (56.9%)	1137 (61.9%)	
▪ Left anterior descending coronary artery	70 (16.6%)	405 (22.1%)	
▪ Left circumflex	101 (23.9%)	276 (15.0%)	
▪ Left main	1 (0.2%)	5 (0.3%)	
▪ Other	10 (2.4%)	14 (0.8%)	
Calcification (moderate/severe)	249 (55.3%)	984 (51.7%)	0.166
Proximal vessel tortuosity (moderate/severe)	187 (41.6%)	625 (32.8%)	<0.001
Proximal cap ambiguity	189 (49.0%)	691 (43.2%)	0.041
Side branch at the proximal cap	223 (57.9%)	908 (57.5%)	0.872
In-stent restenosis	50 (12.2%)	241 (13.5%)	0.469
Vessel diameter (mm)[b]	3.0 (2.5, 3.0)	3.0 (2.5, 3.0)	0.450
Occlusion length (mm)[b]	30 (20, 50)	30 (20, 50)	0.340

[b] median (interquartile range)

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Results- Baseline angiographic characteristics of the study patients.

Variable	STAR used (n= 433)	STAR not used (n= 1876)	P value
J-CTO score [a]	3.05 ± 1.08	2.87 ± 1.14	0.002
Progress CTO score [a]	1.58 ± 1.14	1.20 ± 1.04	<0.001
First Crossing Strategy			<0.001
▪ Antegrade wiring	325 (72.2%)	1351 (71.1%)	
▪ Retrograde	64 (14.2%)	167 (8.8%)	
▪ Antegrade dissection and re-entry	61 (13.6%)	381 (20.1%)	
Successful Crossing Strategy			<0.001
▪ Antegrade wiring	22 (4.9%)	143 (7.5%)	
▪ Retrograde	15 (3.3%)	343 (18.1%)	
▪ Antegrade dissection and re-entry	333 (74.0%)	1055 (55.6%)	
▪ None	80 (17.8%)	355 (18.7%)	
Retrograde crossing strategy	210 (46.7%)	854 (44.9%)	0.493

J-CTO: Japan chronic total occlusion score, PROGRESS-CTO score: Prospective Global Registry for the Study of Chronic , [a] mean ± standard deviation

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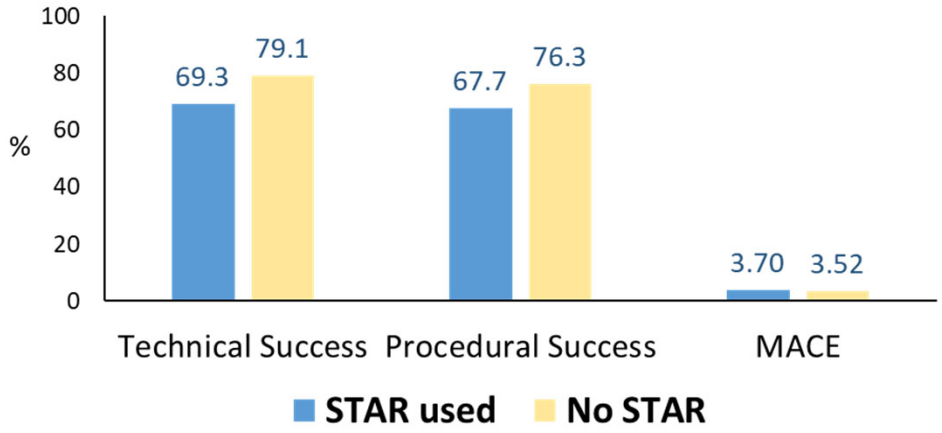
Results- Outcomes

Technical, procedural success and major cardiac events (MACE) classified according to use of the Subintimal Tracking And Re-entry (STAR) technique



p	<0.001	<0.001	0.858

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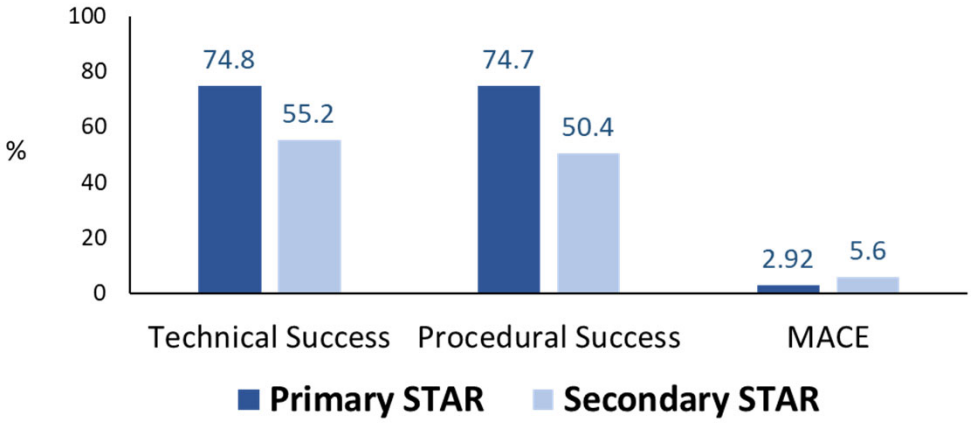
Results- Outcomes

Technical, procedural success and major cardiac events (MACE) classified according to use of primary versus secondary STAR technique



p	<0.001	<0.001	0.181

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Results- Outcomes and complications

Variable	STAR used (n= 433)	STAR not used (n= 1876)	P value
Procedural time (min)[b]	154 (115, 208)	155 (109, 208)	0.613
Fluoroscopy time (min)[b]	64 (46, 88)	60 (39, 87)	0.103
AK radiation dose (Gray) [b]	2.80 (1.64, 4.59)	2.93 (1.80, 4.65)	0.276
Contrast volume (mL) [b]	250 (174, 350)	260 (194, 364)	0.067
MACE	16 (3.70%)	66 (3.52%)	0.858
Death	3 (0.69%)	10 (0.53%)	0.689
Acute Myocardial Infarct	6 (1.39%)	18 (0.96%)	0.431
Re-PCI	0 (0.00%)	9 (0.48%)	0.149
Stroke	1 (0.23%)	4 (0.21%)	0.943
Emergency CABG	0 (0.00%)	2 (0.11%)	0.497
Pericardiocentesis	9 (2.08%)	33 (1.76%)	0.654
Perforation	52 (12.0%)	138 (7.4%)	0.002
Dissection/Thrombus of Donor Artery	4 (0.92%)	17 (0.91%)	0.972

Re-PCI: repeated percutaneous coronary intervention , CABG: coronary artery bypass grafting; [b] median (interquartile range)

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Study limitations

- Procedures were performed by experienced CTO operators, limiting extrapolation of the study results to less experienced centers and operators
- Observational registry without adjudication of clinical events by an independent committee
- No QCA analyses

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Conclusions

- STAR is used in 19.1% of antegrade re-entry CTO PCI cases
- associated with higher angiographic complexity
- lower technical and procedural success rates
- similar major complication rates compared to ADR cases that did not use STAR

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Thank you for your attention!

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Clinical Characteristics, Risk Factors, and Medication Use of Patients Under 50 Presenting with STEMI

Ayman Haq MD

American Heart Association.

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Background

- While hospitalizations for acute myocardial infarction has been decreasing in older individuals, data suggests that hospitalizations for acute myocardial infarction in younger individuals may be increasing.
- One reason for this may be the increasing rates of obesity at younger ages and earlier exposure to cardiometabolic risk factors.
- Another may be a lack of adherence to preventative therapies in younger individuals compared to older individuals.

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Methods

- We utilized the Level 1 database to identify all patients aged 50 or younger from March 2003 to June 2021 who presented with STEMI.
- STEMI was defined as ST elevation or new-LBBB on ECG with anginal symptoms or equivalent.
- Patient demographics, risk factors, comorbidities, medications use, illicit drug use, and lipid panel were collected and analyzed.

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Results: Age and Cardiovascular History

	Overall, N = 908	Male, N = 724	Female, N = 184	p-value
Age	45 (41, 48)	45 (41, 48)	45 (41, 48)	0.850
< 21	9 (1.0%)	8 (0.5%)	1 (0.5%)	
21-30	30 (3.3%)	26 (3.6%)	4 (2.2%)	
31-40	179 (19.7%)	144 (19.9%)	35 (19%)	
41-50	690 (76.0%)	546 (75.4%)	144 (78.2%)	
CV History				
Prior CAD	127 (14%)	98 (14%)	29 (16%)	0.407
Prior PCI	93 (10%)	74 (10%)	19 (10%)	0.958
Prior MI	95 (10%)	70 (9.7%)	25 (14%)	0.117
Prior CABG	11 (1.2%)	8 (1.1%)	3 (1.6%)	0.472
Prior Stroke/TIA	17(1.9%)	12 (1.7%)	5 (3.8%)	0.350

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Results: Risk Factors and Illicit Drug Use

Risk Factor	Overall, N = 908	Male, N = 724	Female, N = 184	p-value
BMI	29 (26, 34)	29 (26, 33)	30 (25, 35)	0.156
Smoking	625 (69%)	502 (69%)	123 (67%)	0.727
Family History of CAD	425 (47%)	344 (48%)	81 (45%)	0.448
Hyperlipidemia	367 (40%)	298 (41%)	69 (38%)	0.395
Hypertension	336 (37%)	266 (37%)	70 (38%)	0.705
Type 2 Diabetes	116 (13%)	80 (11%)	36 (20%)	0.002
Coagulopathy	19 (2.3%)	12 (1.9%)	7 (4.2%)	0.086
Illicit Drug Use				
Marijuana	17 (1.9%)	15 (2.1%)	2 (1.1%)	0.547
Cocaine	21 (2.3%)	14 (1.9%)	7 (3.8%)	0.165
Methamphetamine	27 (3.0%)	22 (3.0%)	5 (2.7%)	0.819

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Results: Medication use by Risk Factor

	Overall, N = 908	Male, N = 724	Female, N = 184	p-value
ACE Inhibitor/ARB				
Overall	118 (15%)	92 (14%)	26 (16%)	0.596
History of HTN	100 (34%)	79 (34%)	21 (33%)	0.887
Aspirin				
Overall	139 (20%)	110 (20%)	29 (20%)	0.935
History of CAD	64 (71%)	51 (73%)	13 (65%)	0.467
Statin				
Overall	107 (16%)	86 (16%)	21 (15%)	0.681
History of HLD	93 (36%)	78 (37%)	15 (31%)	0.416

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Results: Lipid Profile by Statin Use

	Male			Female		
Statin Use	Yes, N = 86	No, N = 452	p-value	Yes, N = 21	No, N = 123	p-value
TC	158 (132, 191)	184 (158, 211)	<0.001	156 (142, 185)	169 (150, 195)	0.28
HDL	34 (30, 39)	34 (30, 41)	0.54	34 (30, 38)	38 (32, 46)	0.093
LDL	89 (72, 105)	113 (90, 137)	<0.001	92 (73, 110)	99 (84, 119)	0.197
TG	148 (104, 210)	144 (106, 215)	0.713	131 (118, 346)	122 (87, 168)	0.134

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Conclusions

- Smoking is the most prevalent modifiable risk factor risk in younger individuals with STEMI.
- Hyperlipidemia (TC > 200 mg/dl), diabetes and illicit drug use are less prevalent in this population.
- The use of preventative medications is low in this cohort, particularly the use of statins.

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Questions?
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