Proximal LAD CTO With Nice Collaterals - *Not to Treat*

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Disclosure Statement of Financial Interest

Advisory board/Honoraria- Abbott Vascular, Boston Scientific, Biotronik, Amgen, Pfizer, Viatris

I am a Director of CTO Program and proctor cases around the world……

How I really feel about this debate……

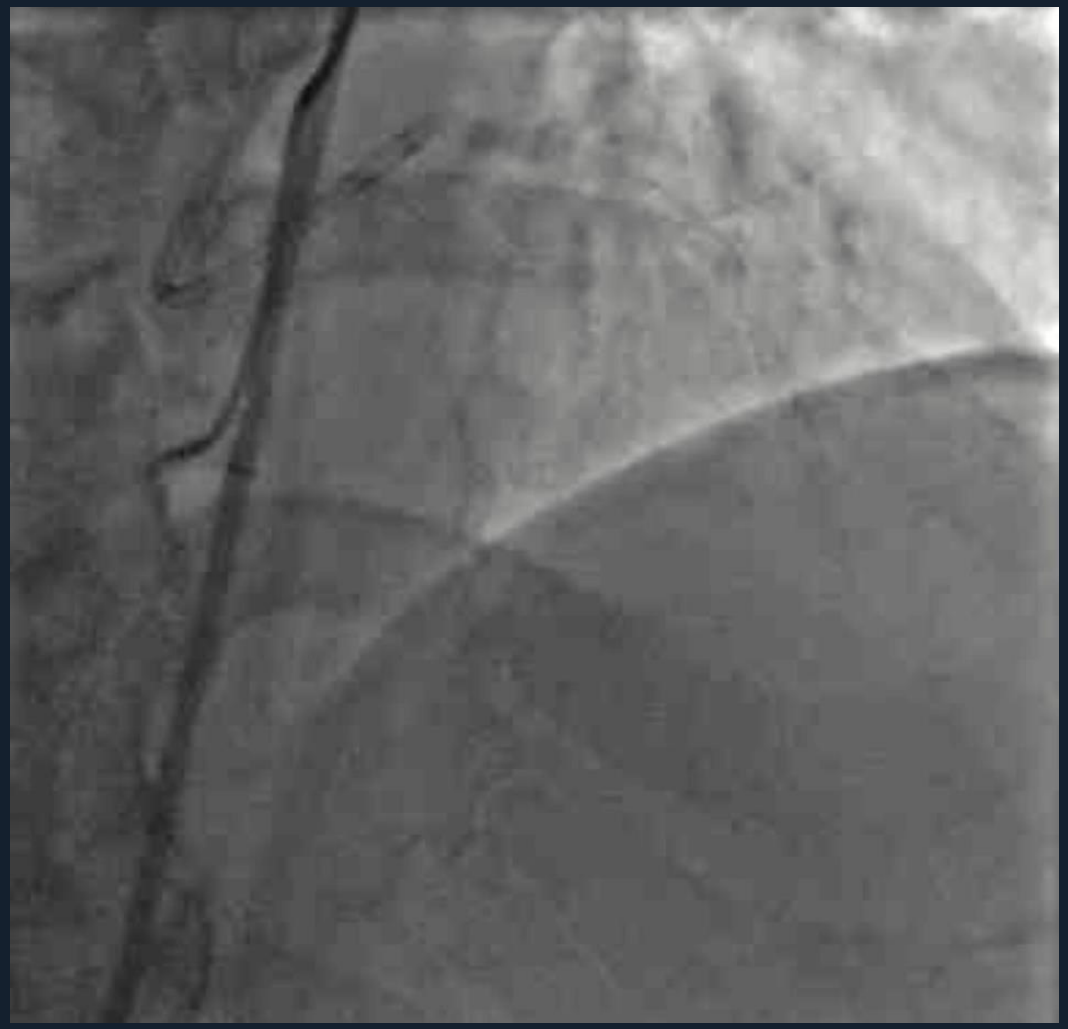
Mashayekhi vs. Bangalore

70 y/o male with angina

- Hx of HTN, HLD, prior MI s/p BMS to LAD in 2010 now with angina on walking 3-4 blocks- responds to rest and SL NTG. Pain ongoing for 6 months.
- Echo: EF 60%
- Meds: Aspirin, Atorvastatin 40 mg, Metoprolol 100 mg, Amlodipine 5 mg, imdur 60 mg

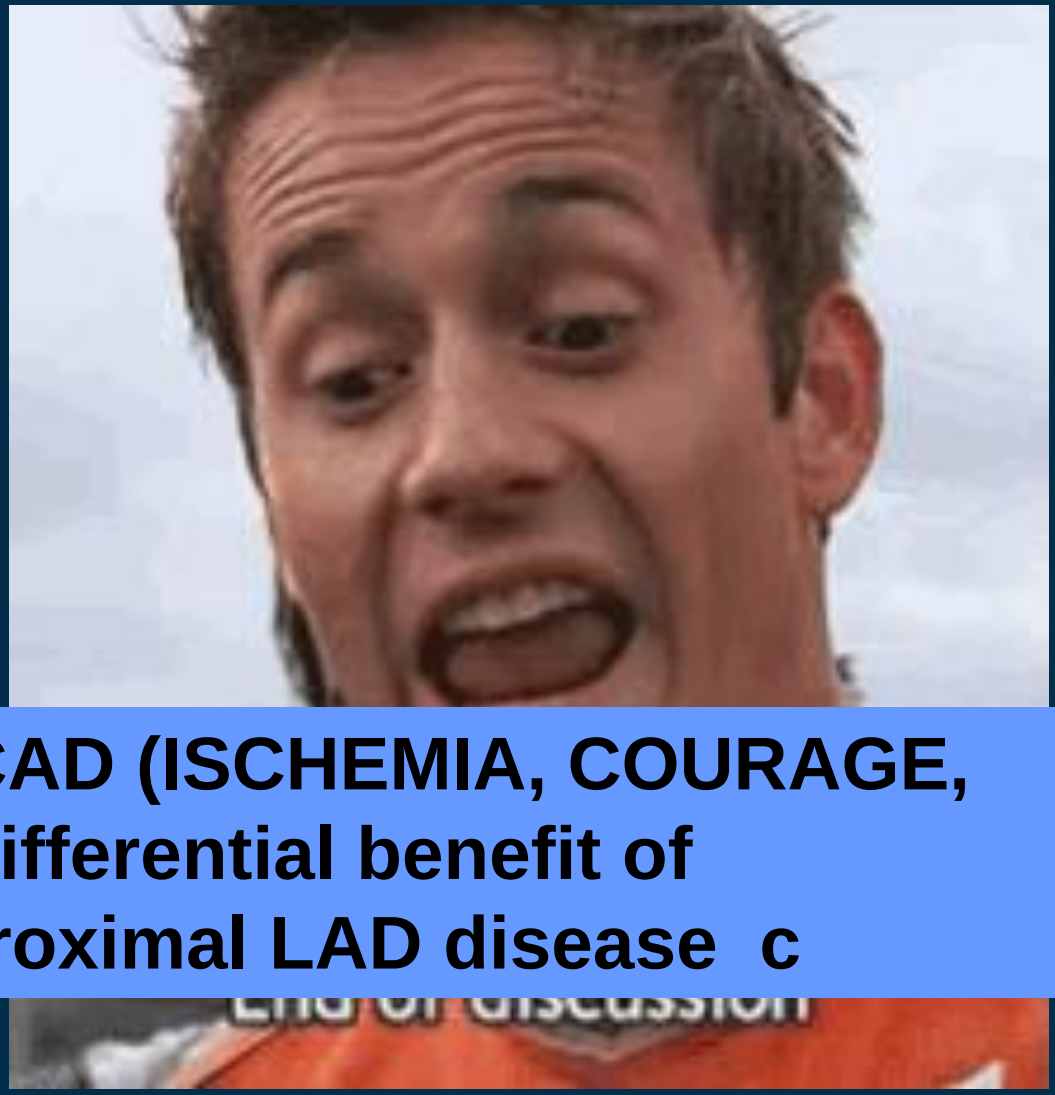
70 y/o male with stable angina

Cardiac Cath



- CTO of LAD (ISR)
- Proximal cap blunt
- Distal cap clear with a branch
- Long occlusion but intrastent
- Septal collaterals (Grade 3)

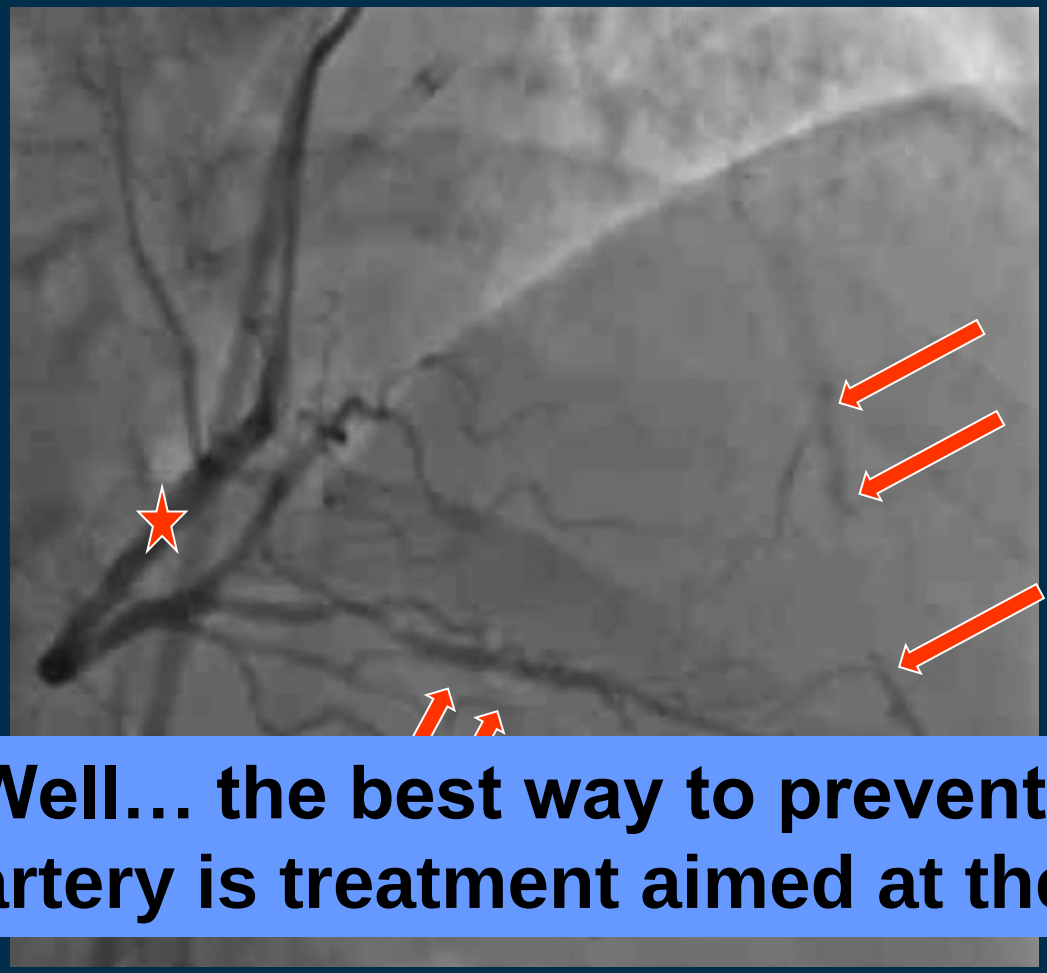
CTO PCI of the LAD is Indicated Because…..



No contemporary trial of stable CAD (ISCHEMIA, COURAGE, BARI 2D, FAME 2) has shown a differential benefit of revascularization in those with proximal LAD disease c

CTO PCI of the LAD is Indicated Because…..

Double Jeopardy



Plaque rupture in the donor artery will result in an MI in that territory and in the collateral territory it supplies

Well… the best way to prevent plaque rupture in the donor artery is treatment aimed at the donor artery (GDMT/PCI)

There is nothing “vulnerable” in a CTO lesion

CTO PCI is Indicated Because…..

- CTO PCI will improve survival
- CTO PCI will improve other cardiovascular events
- CTO PCI will improve symptoms

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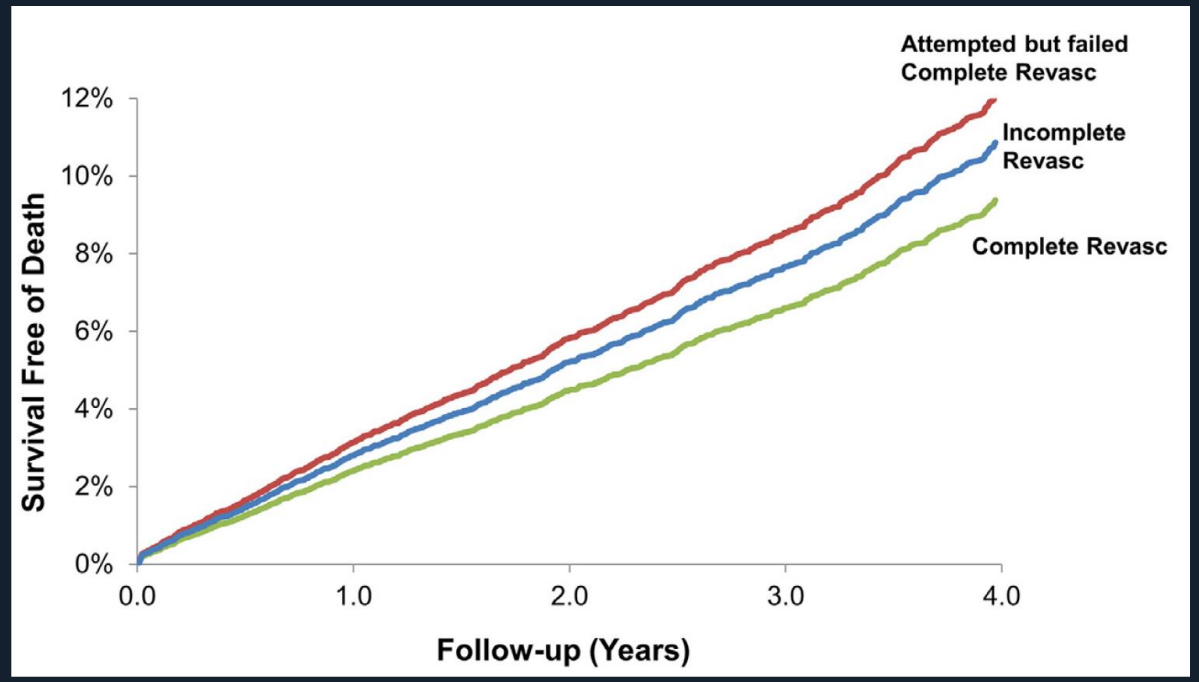
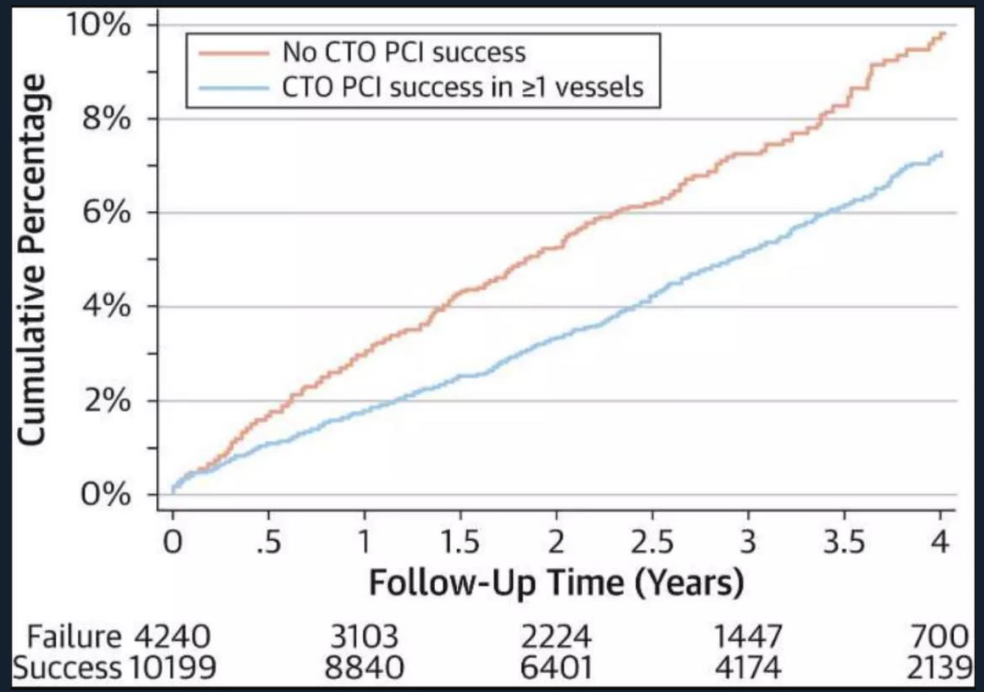
Observational Studies of CTO PCI Show Lower Mortality

15,046 patients with MVD who underwent PCI with EES from the NYS registry



Bangalore et al. Am J Cardiol 2020;125:362−369

UK Central audit database



George S et al. J Am Coll Cardiol. 2014

CTO PCI and Outcomes

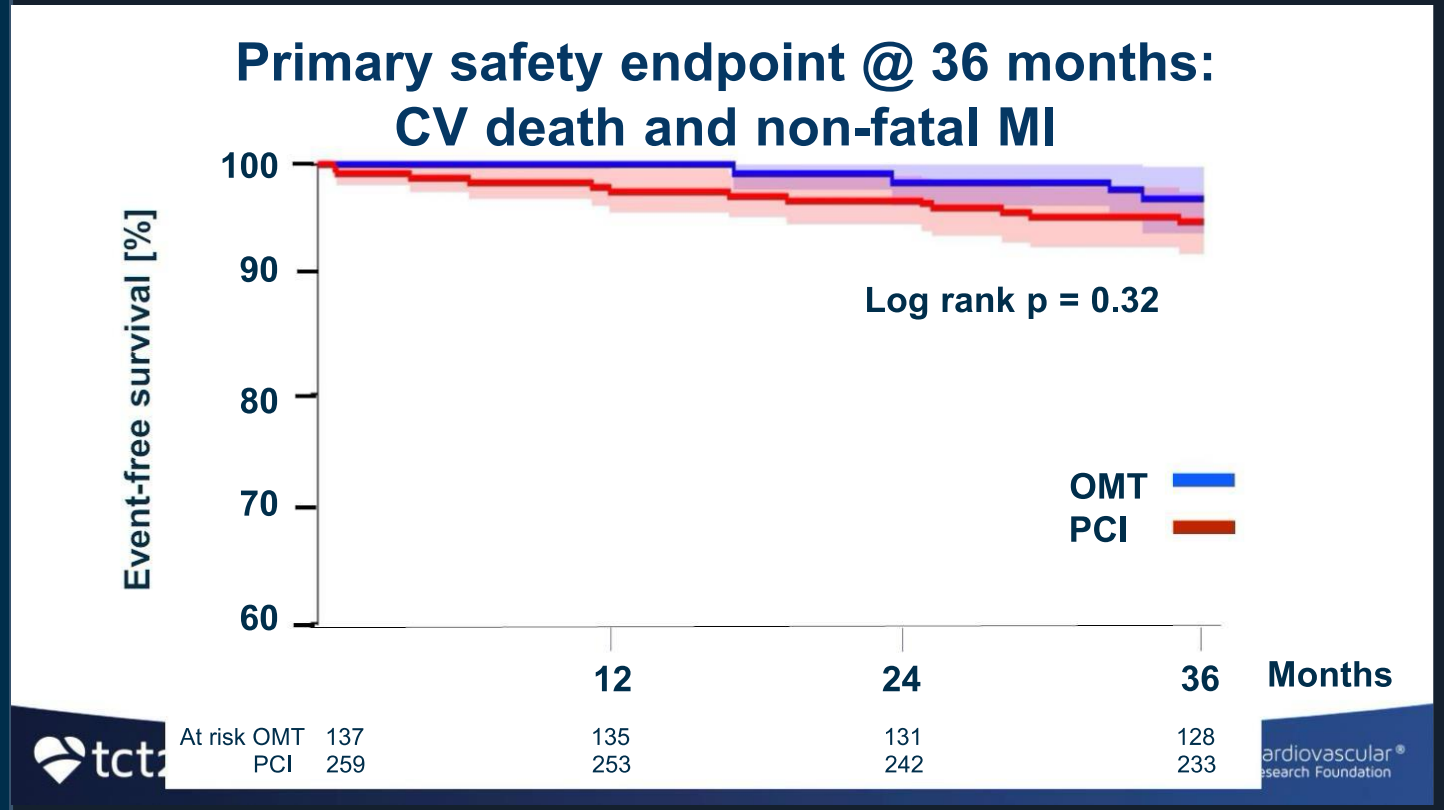
Limitations of Observational Studies

- Selection bias
  - Confounding by indication
  - Immortal time bias/lead time bias
- Performance bias
- Detection bias
- Attrition bias

EURO-CTO Trial

No difference in clinical endpoints

396 (of original 600 planned) patients randomized 2:1 to PCI vs. OMT (87% success rate)



3-year CV death (PCI vs. OMT)= 2.7% vs. 1.5%; P=0.42

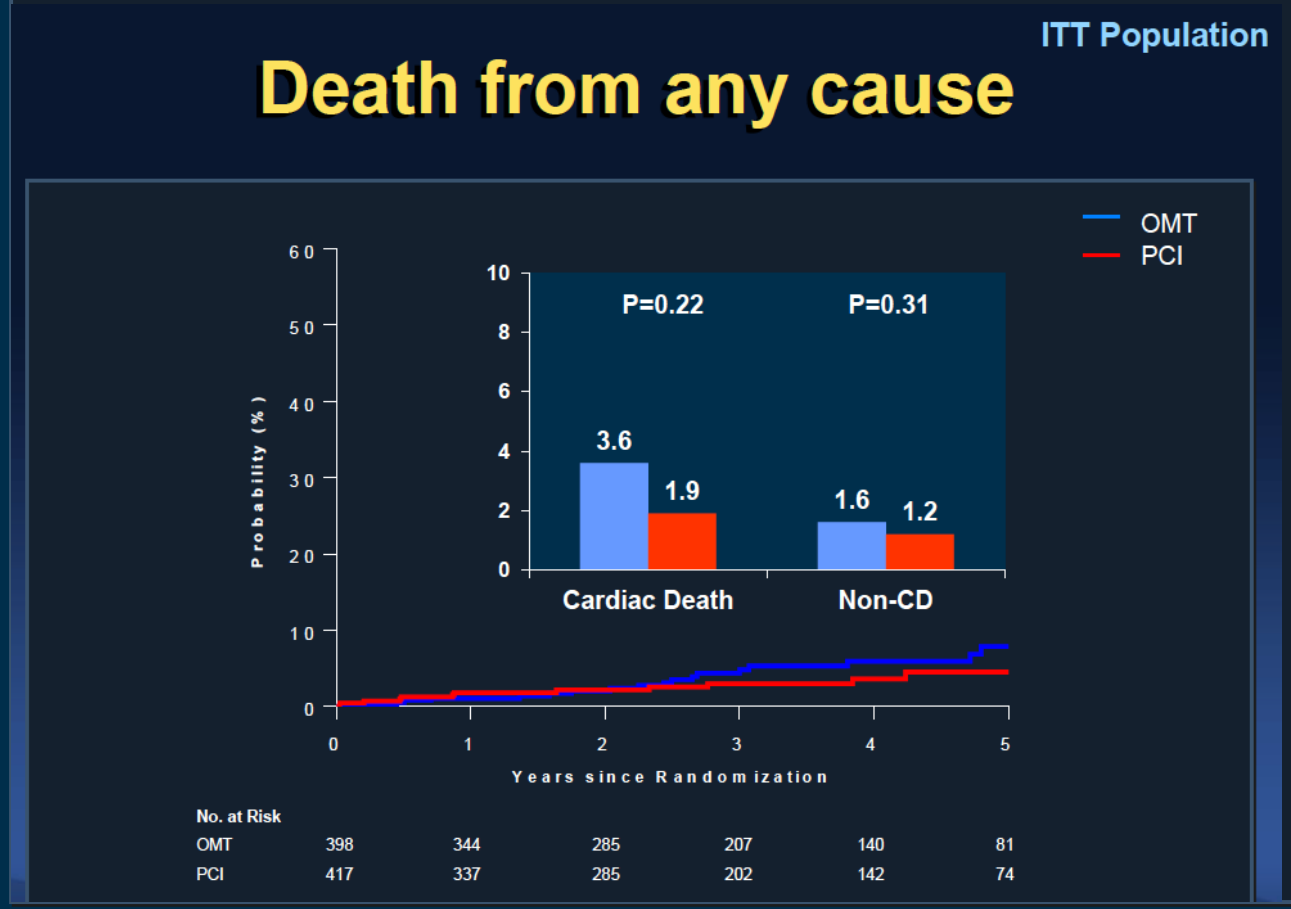
CV death rate in the OMT arm 0.5%/year

Werner GS et al. European Heart Journal (2018) 39, 2484–2

DECISION-CTO Trial

No difference in clinical endpoints

834 patients (of planned 1284 patients) randomized 1:1 to PCI vs. OMT (91% success rate)



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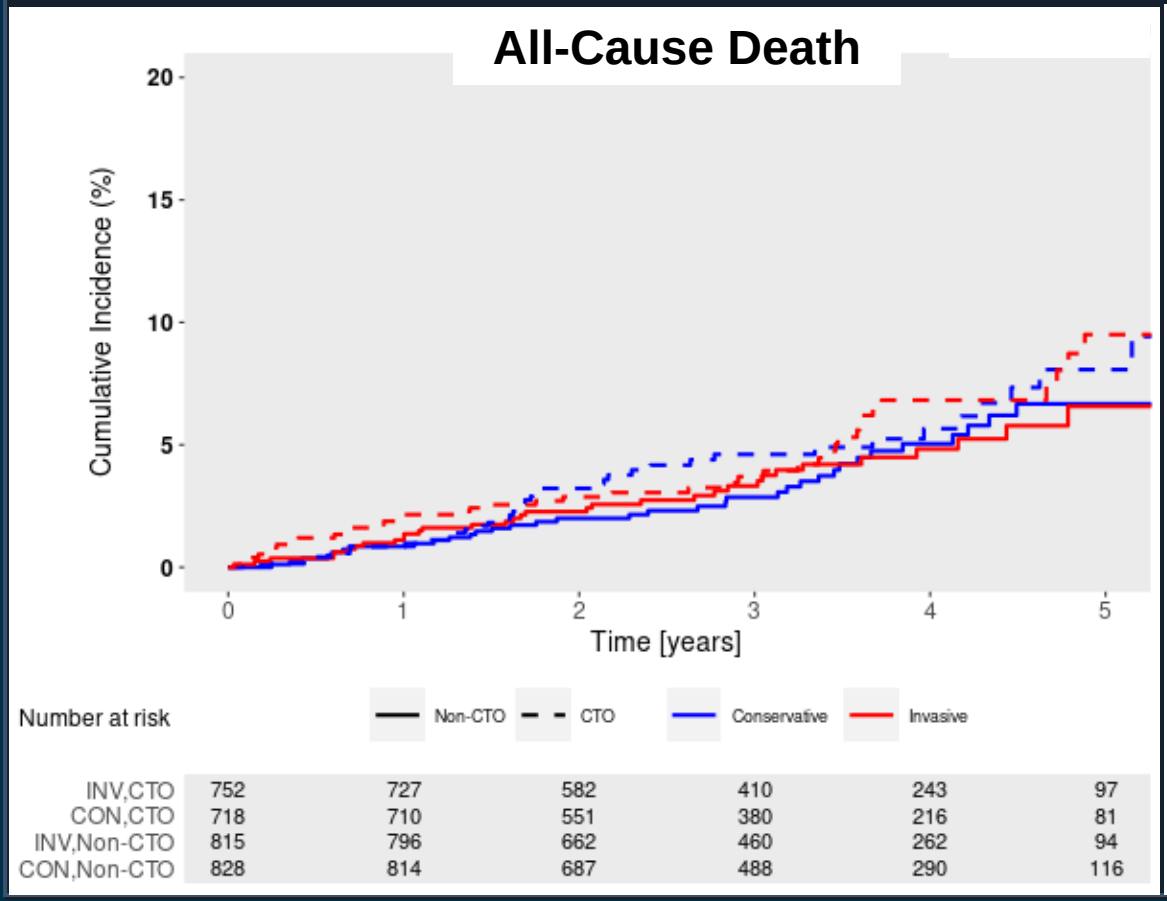
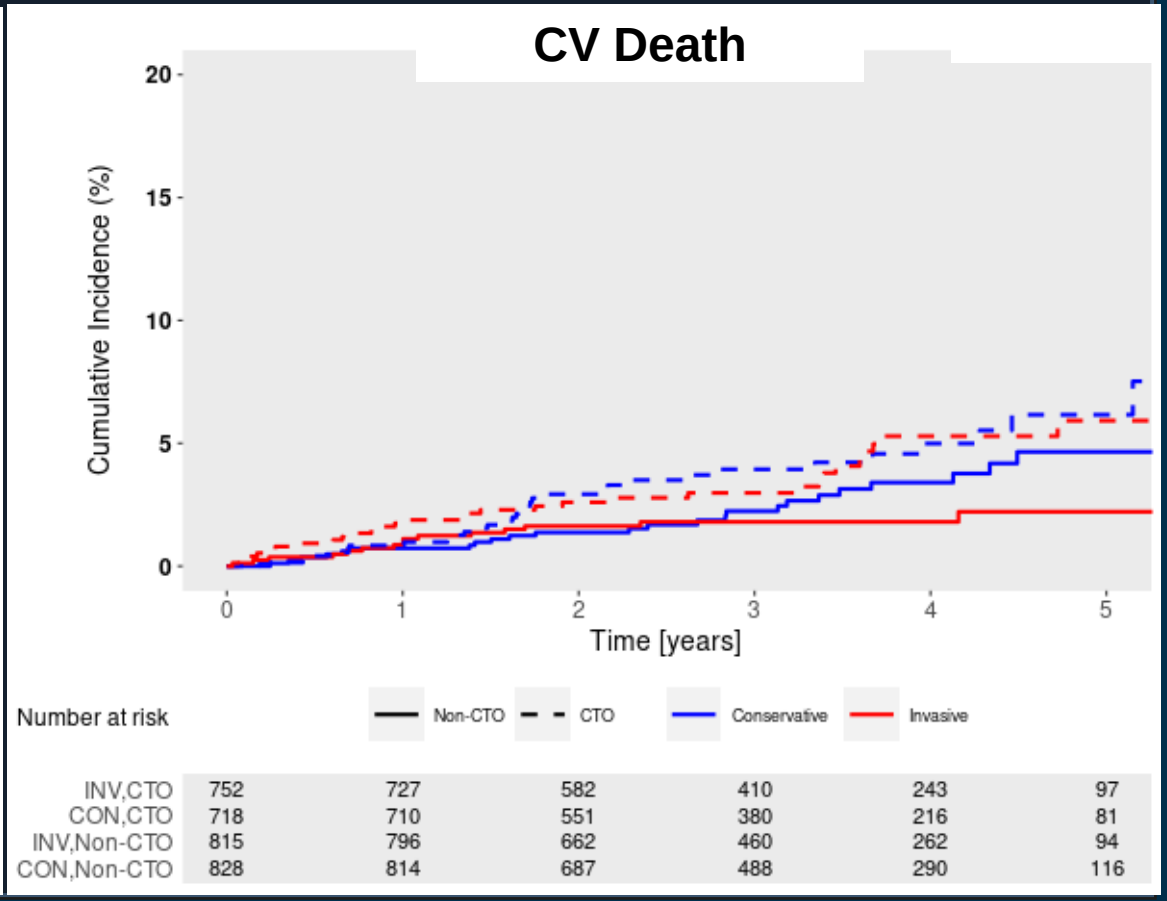
Lee SW et al. Circulation. 2019;139:1674–1683

ISCHEMIA CTO Subgroup

No difference in death or CV death

1470 patients with one or more CTOs randomized to INV vs. CON





Bangalore S. AHA 2020

CTO PCI is Indicated Because…..

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- CTO PCI will improve other cardiovascular events
- CTO PCI will improve symptoms

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EURO-CTO Trial

Reduction in ischemia driven revascularization

396 (of original 600 planned) patients randomized 2:1 to PCI vs. OMT (87% success rate)

MACCE @ 36 months of follow-up

	OMT (N=137)	PCI (N=259)	P-value
Patients with any adverse event	27 (20.1)	27 (10.7)	0.019
Cardiovascular death	2 (1.5)	7 (2.7)	0.42
Non-fatal MI	2 (1.5)	6 (2.3)	0.56
Ischemia-driven revascularization	25 (18.2)	19 (7.3)	0.0035
Cerebrovascular event	1 (0.7)	5 (1.9)	0.27
Stent thrombosis	0	1 (0.4)	

Number of patients (%)

Werner GS et al. European Heart Journal (2018) 39, 2484–2

DECISION-CTO Trial

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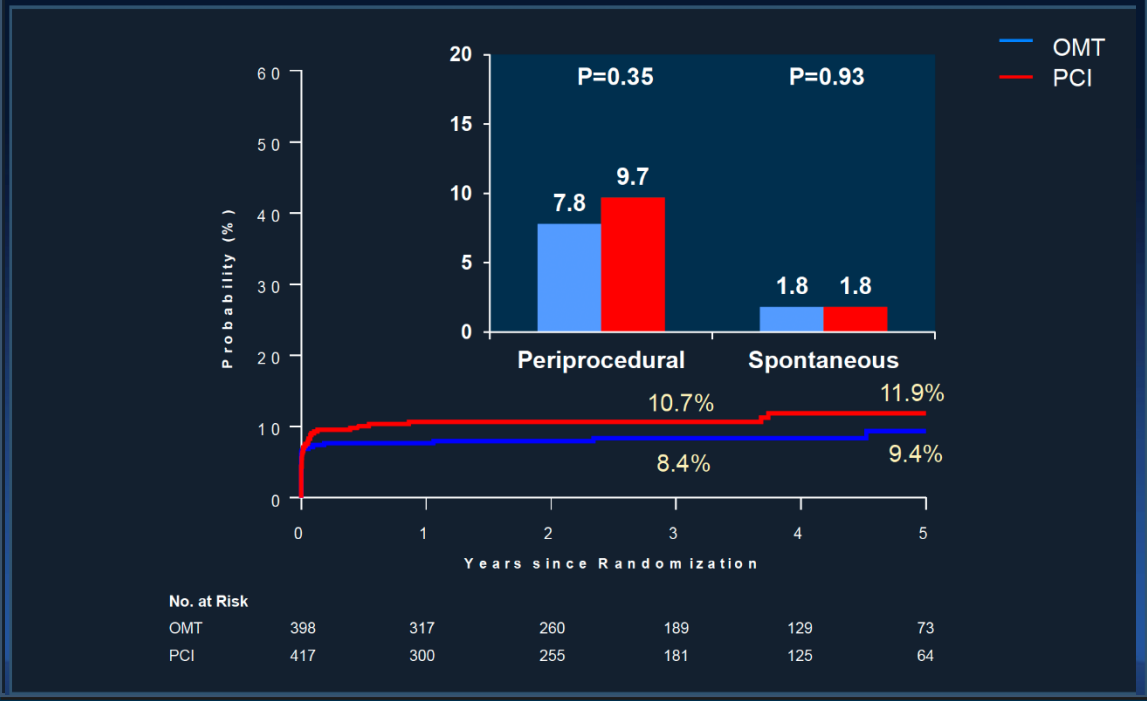
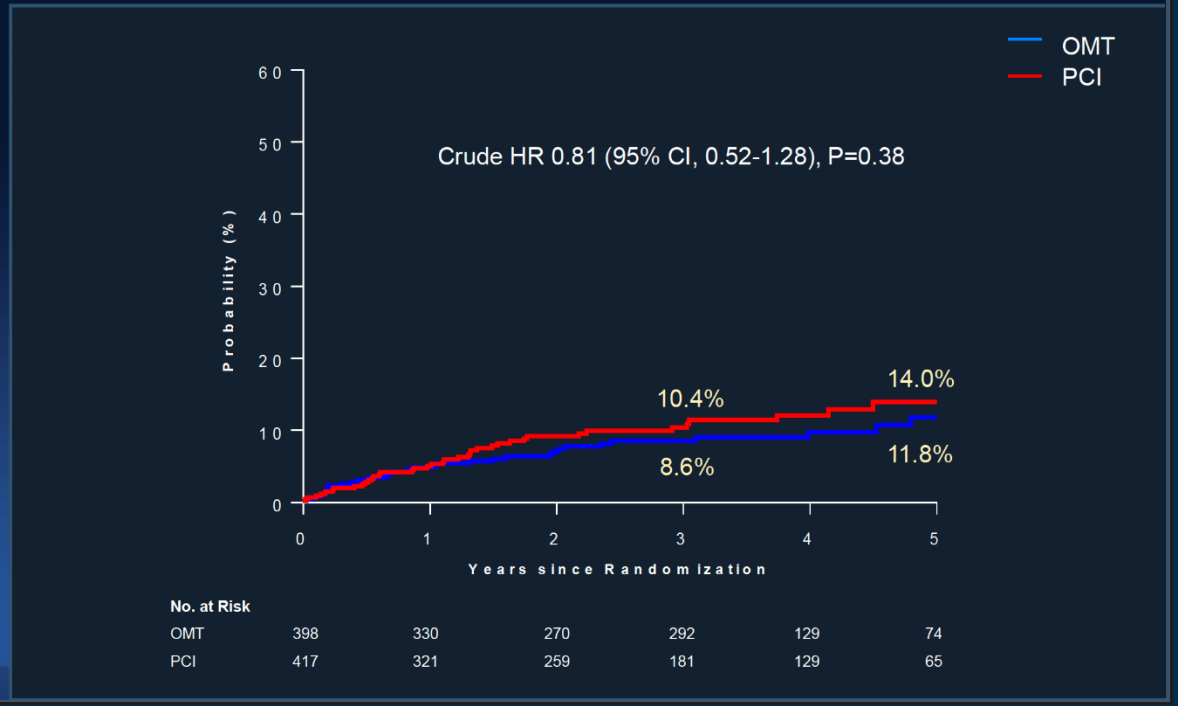
Myocardial Infarction



Repeat Revascularization



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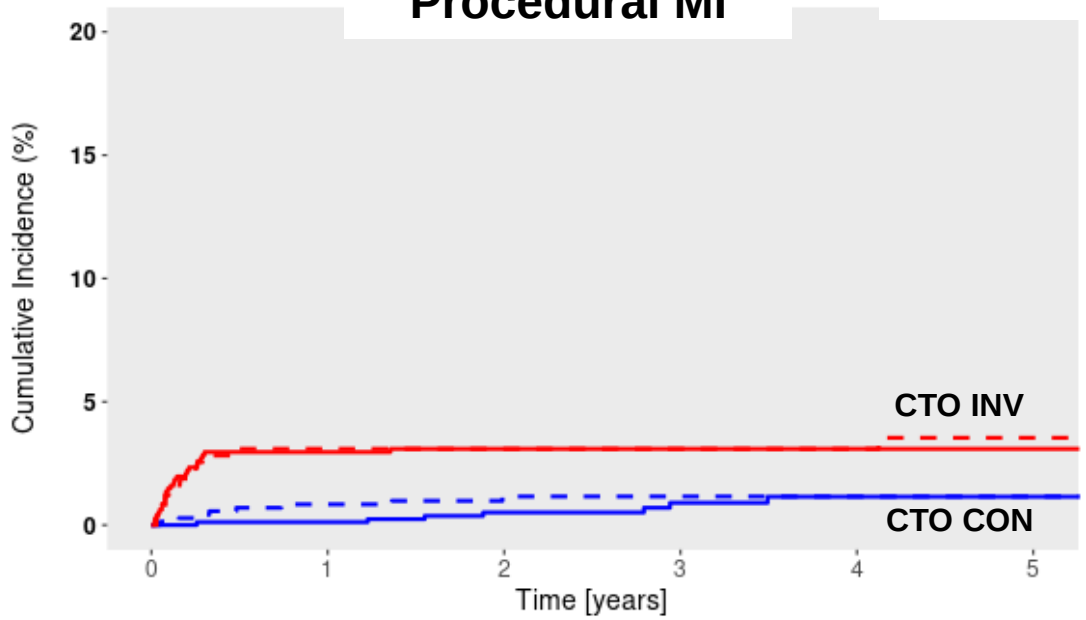
ISCHEMIA CTO Subgroup

Increase in Procedural MI; Decrease in Spontaneous MI

1470 patients with one or more CTOs randomized to INV vs. CON

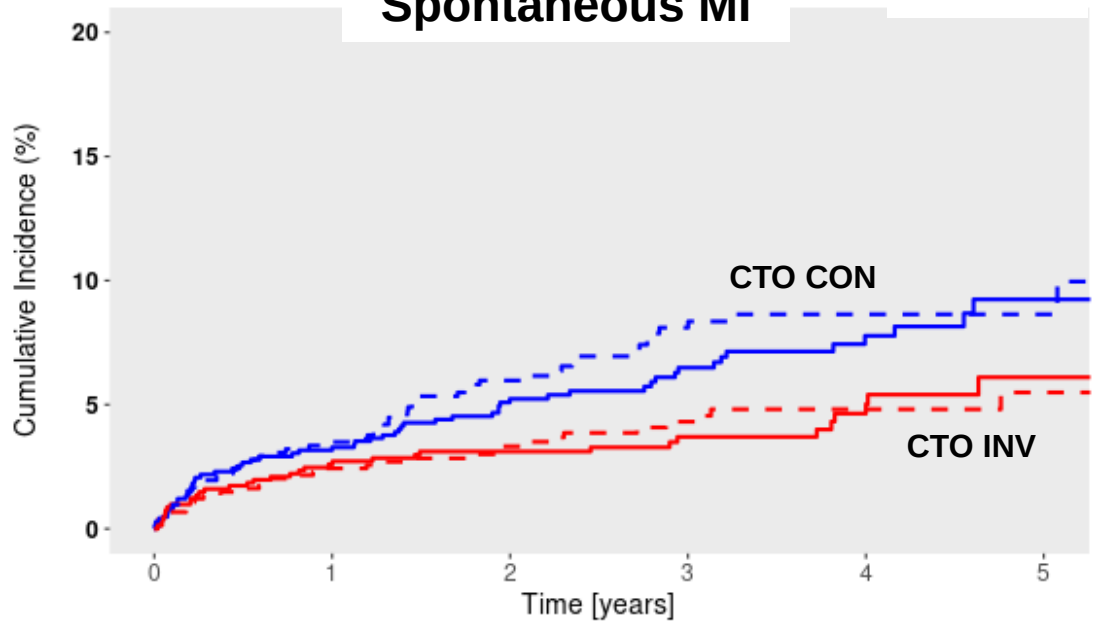
Procedural MI



Number at risk — Non-CTO, CTO, Conservative, Invasive

INV,CTO	752	699	561	388	230	92
CON,CTO	718	702	540	373	208	77
INV,Non-CTO	815	770	642	444	252	89
CON,Non-CTO	828	811	679	480	285	114

Spontaneous MI



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INV,Non-CTO	815	772	640	437	242	87
CON,Non-CTO	828	788	652	455	263	103

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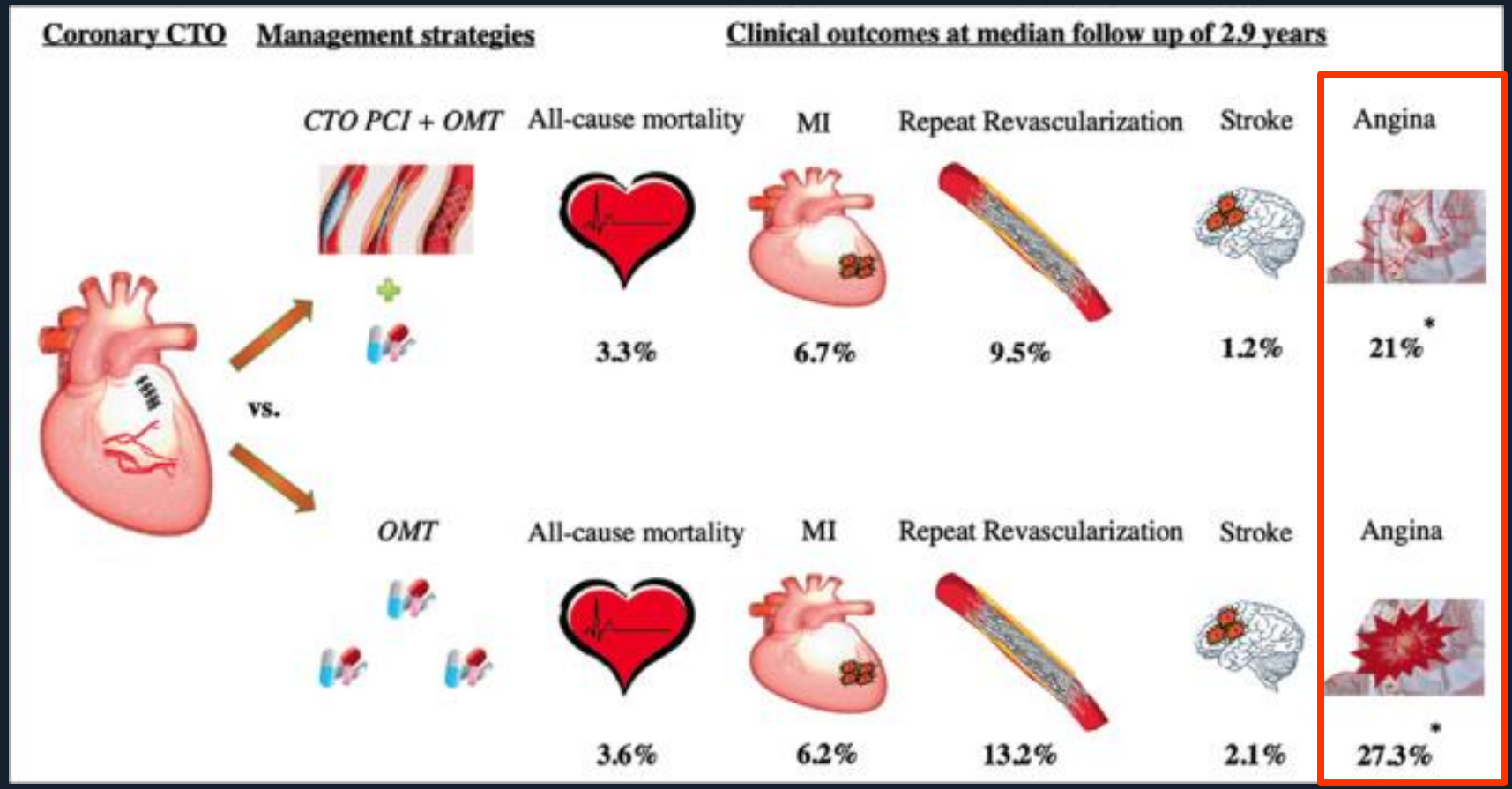
Meta-analysis of RCTs

No difference in clinical outcomes except angina

5 Trials and 1790 patients with CTO randomized to CTO PCI vs. OMT (Follow-up 2.9 years)



Ibrahem et al. Heart Views. 2023 Apr-Jun; 24(2): 104–108

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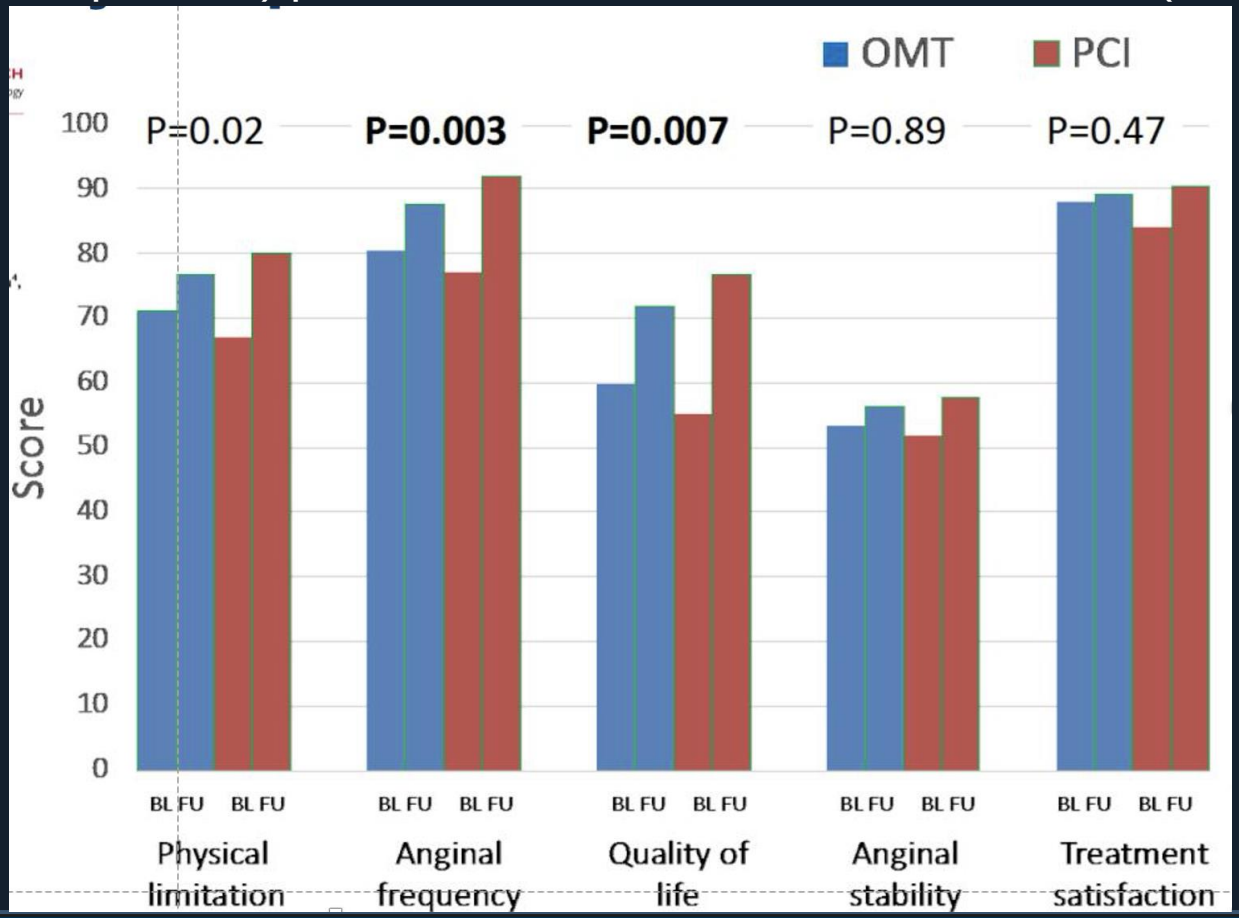
EURO-CTO Trial

Improvement in Anginal Related QoL

396 (of original 600 planned) patients randomized 2:1 to PCI vs. OMT (87% success rate)



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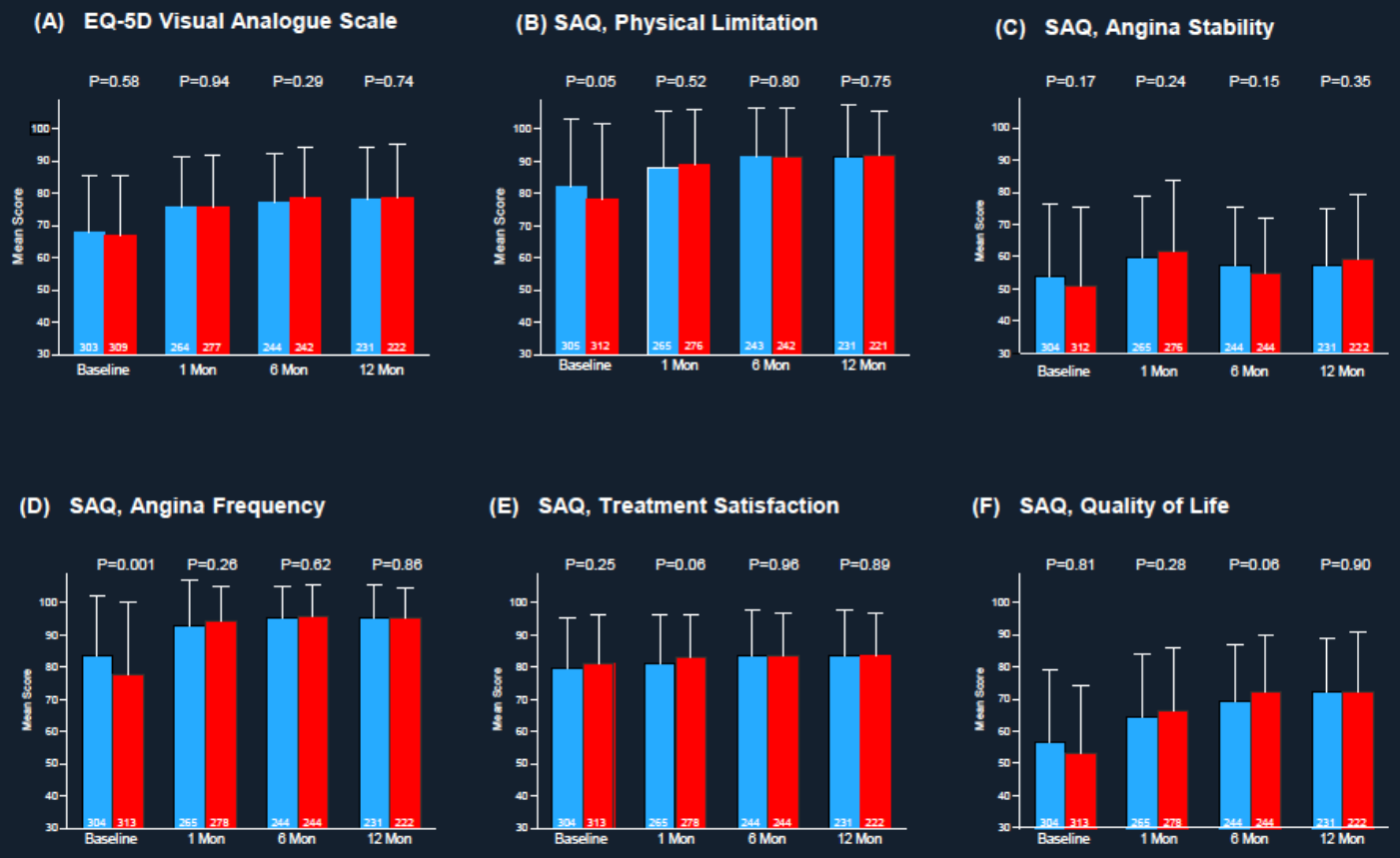

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Improvement in Angina Related QoL in Symptomatic Patients

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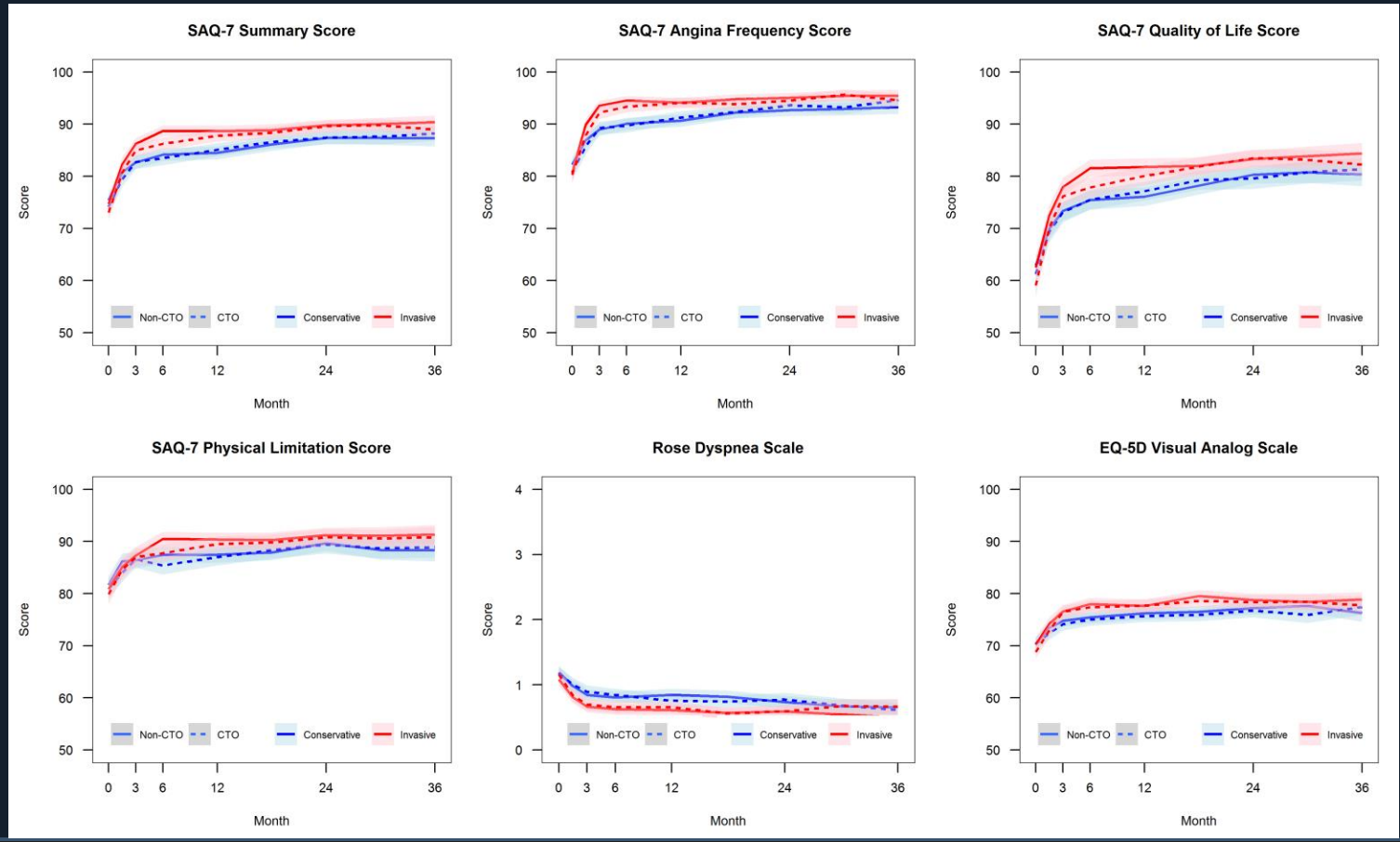

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- CTO PCI will improve other cardiovascular events. *Potential reduction in spontaneous MI.*
- CTO PCI will improve symptoms. *Improvement in angina related QoL in symptomatic patients*

Guideline Recommendations

2021 ACC/AHA/SCAI Revascularization Guidelines

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

Prox LAD: Usefulness of revasc to improve survival is uncertain

Lawton JS, Tamis-Holland JE, Bangalore S, et al. J Am Coll Cardiol. 2021

My final thoughts….

Proximal LAD CTO With Nice Collaterals – To Treat or Not to Treat. Answer depends on:

- If symptomatic: Consider revascularization
  - Improves symptoms and potentially reduces spontaneous MI
- If not symptomatic: Treat with maximal GDMT

70 y/o male with stable angina

PCI AWE and CrossBoss

- Miracle 6 over Turnpike LP
- Cross Boss and bossd through closer to distal cap
- Pilot 200 for distal entry
- Swapped to WH wire

70 y/o male with stable angina

PCI AWE and CrossBoss

- 2.0 balloon distally beyond stent segment at 8 ATM
- Stent dilated with 2.0 and then a 3.0 wolverine
- IVUS with well opposed stent with neo intimal hyperplasia and distally with diffuse fibrofatty plaque

70 y/o male with stable angina

PCI