



Should All CTOs Be Opened ?

PRO

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Darmstadt

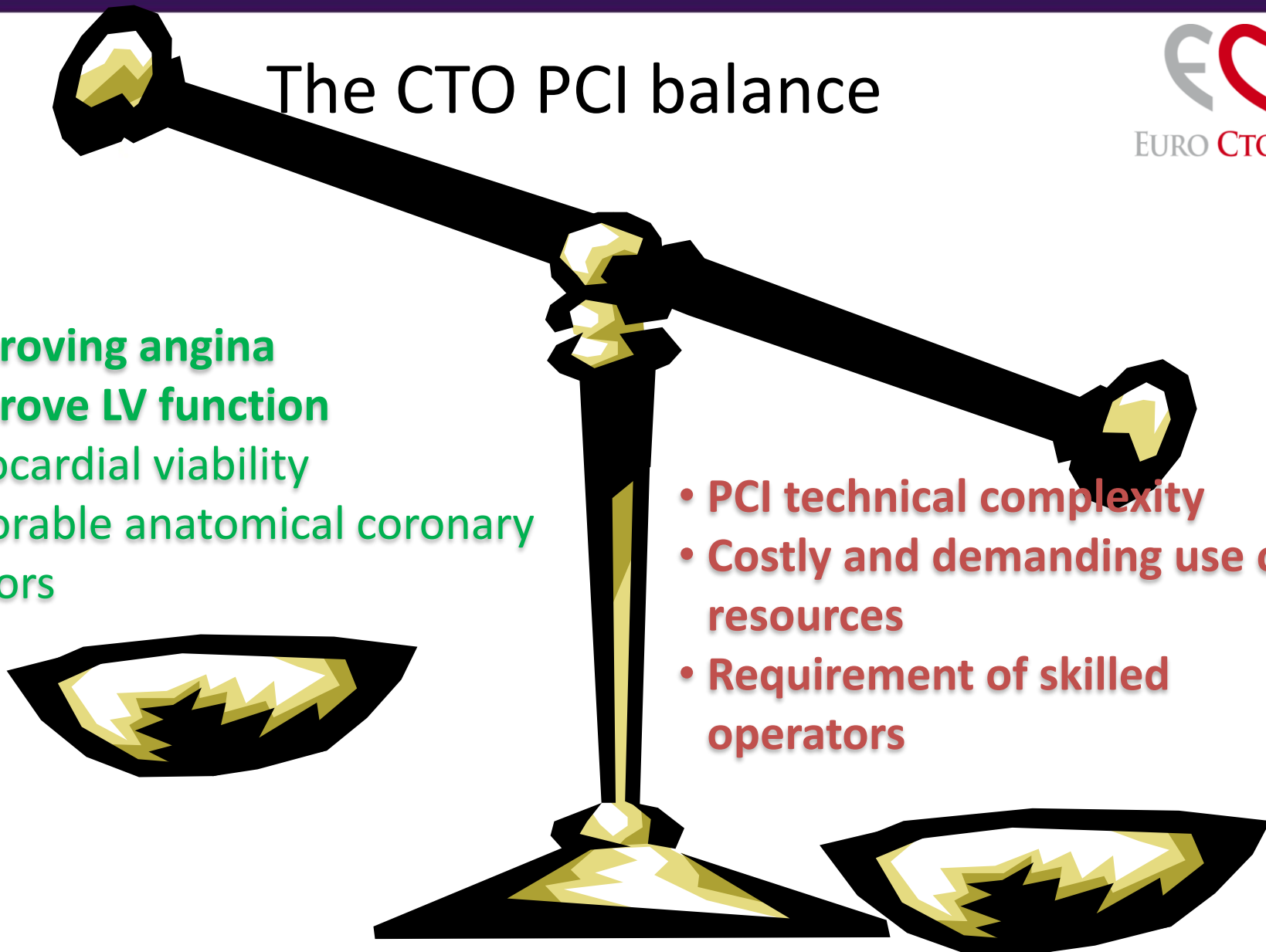


Conflict of interest



- I, Gerald S. Werner, MD, have no conflict of interest to declare with regard to the following presentation

The CTO PCI balance



- Improving angina
- Improve LV function
- Myocardial viability
- Favorable anatomical coronary factors

- PCI technical complexity
- Costly and demanding use of resources
- Requirement of skilled operators

Do it

Don't do it

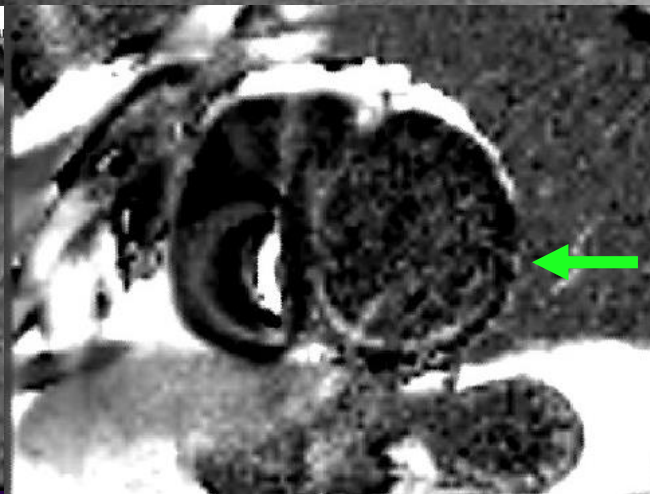
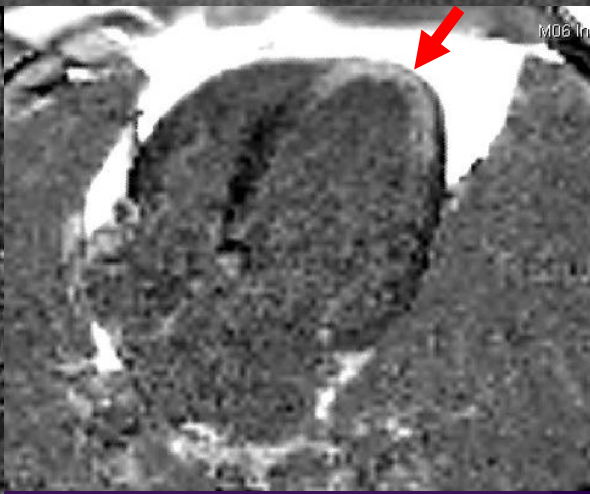
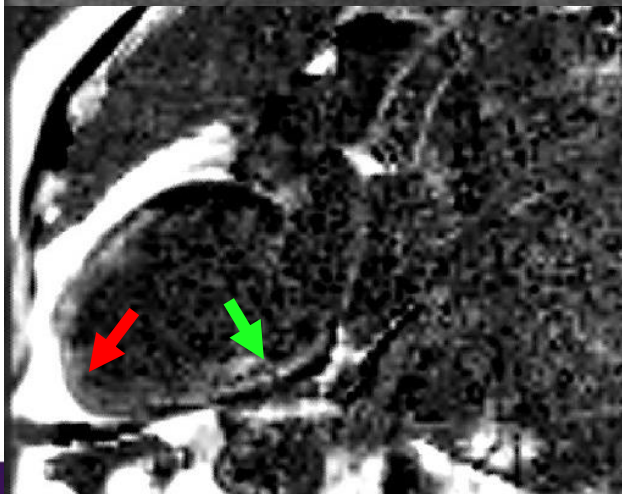
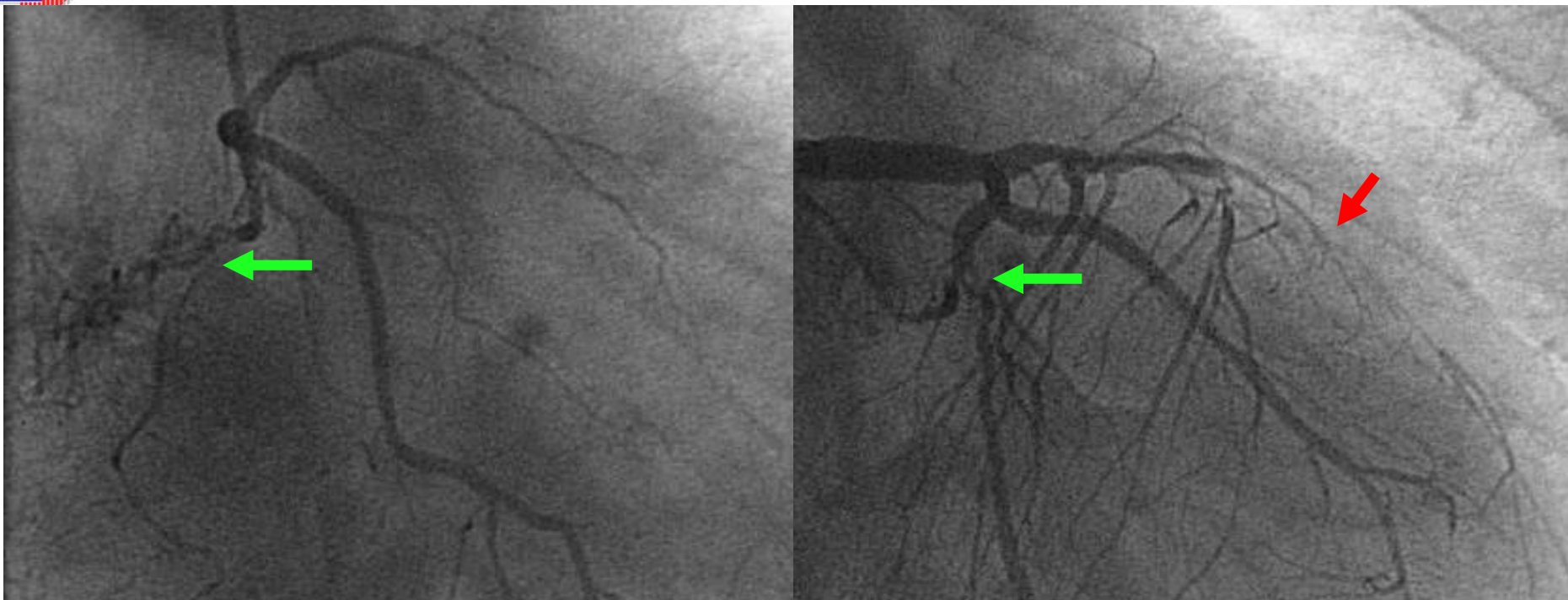


There is never a PRO without exceptions



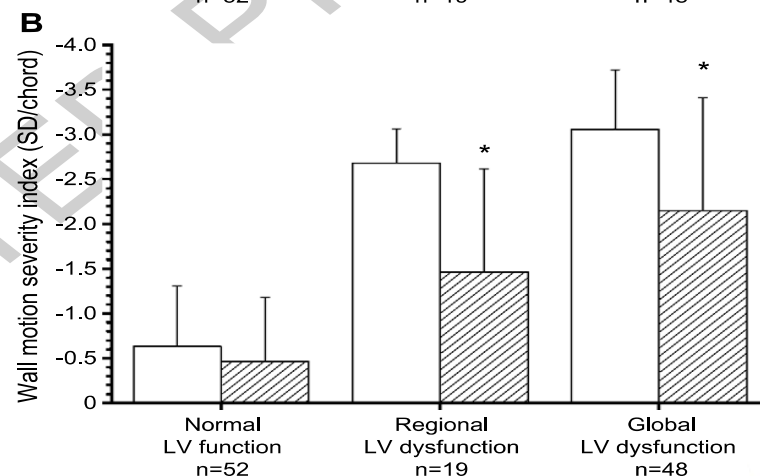
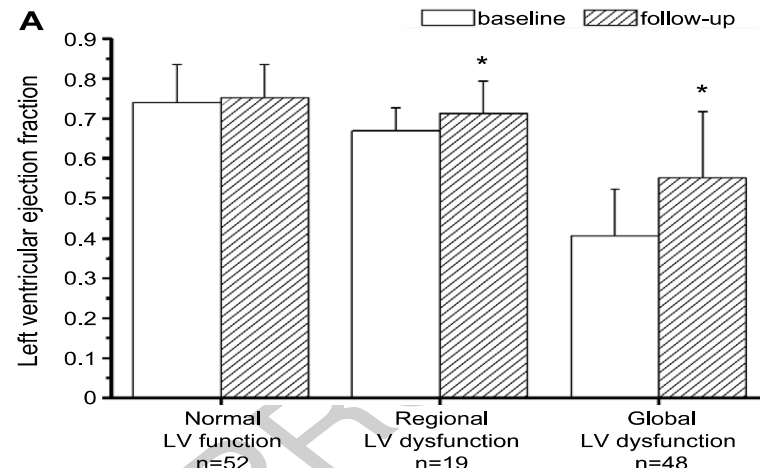
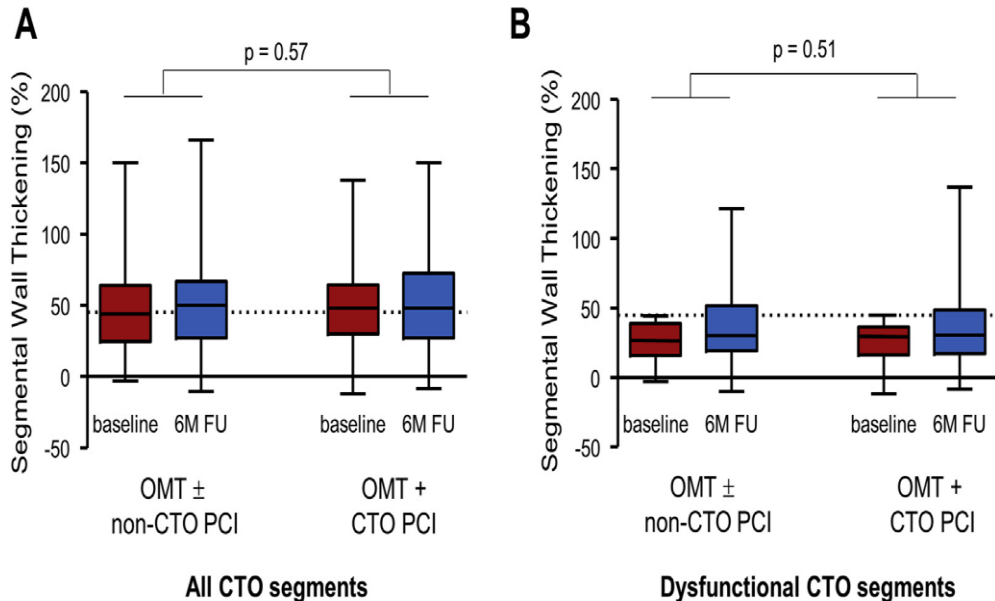
- What we need for the indication is proof of viability
- What we need is a positive balance between the patient's impairment by the lesion and the risk of the procedure

Good collaterals, but mixed viability in 3-VD





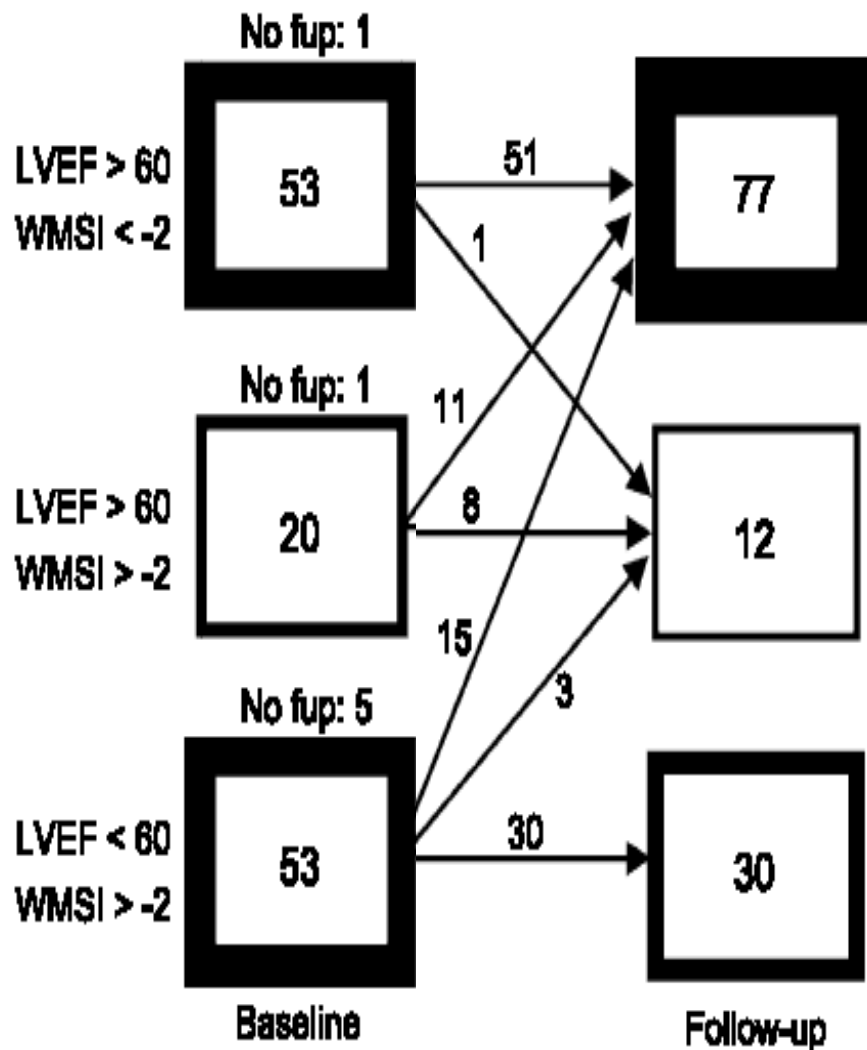
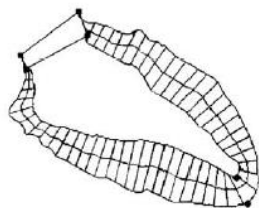
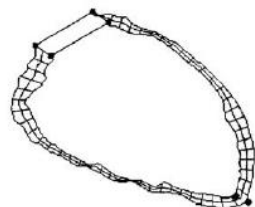
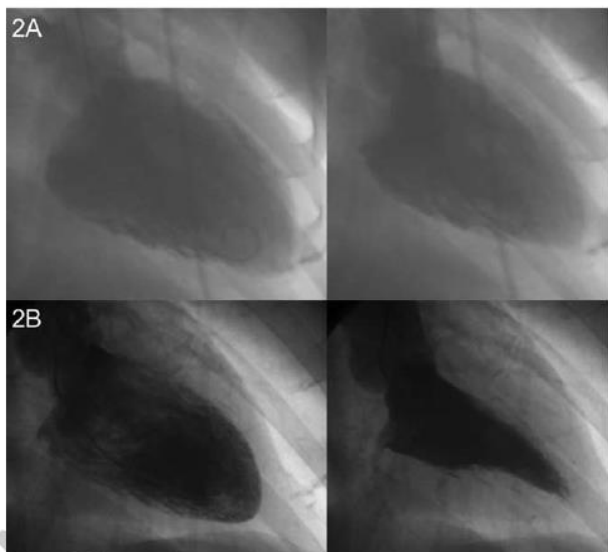
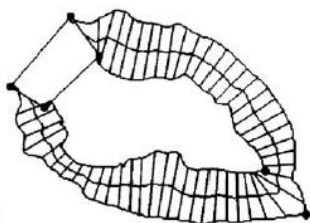
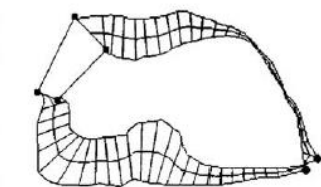
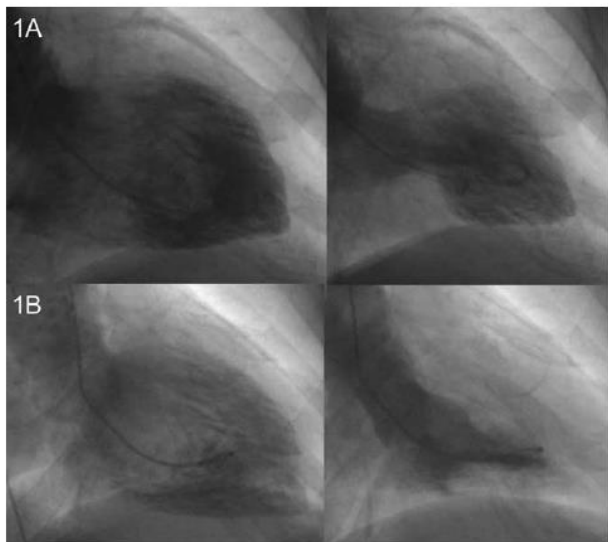
What about the REVASC Study ?



The REVASC Study showed no Improvement of LV function, **but the baseline EF was normal !!!**

LVEF (%)	OMT ± non-CTO PCI	OMT + CTO PCI	p-value
Baseline	59.6 (45.8 to 64.3)	54.7 (42.9 to 65.1)	0.48
6-month follow-up	61.0 (51.3 to 66.8)	57.0 (45.0 to 65.5)	0.21
Change in LVEF	0.7 (-1.0 to 3.7)	0.9 (-1.3 to 4.1)	0.79

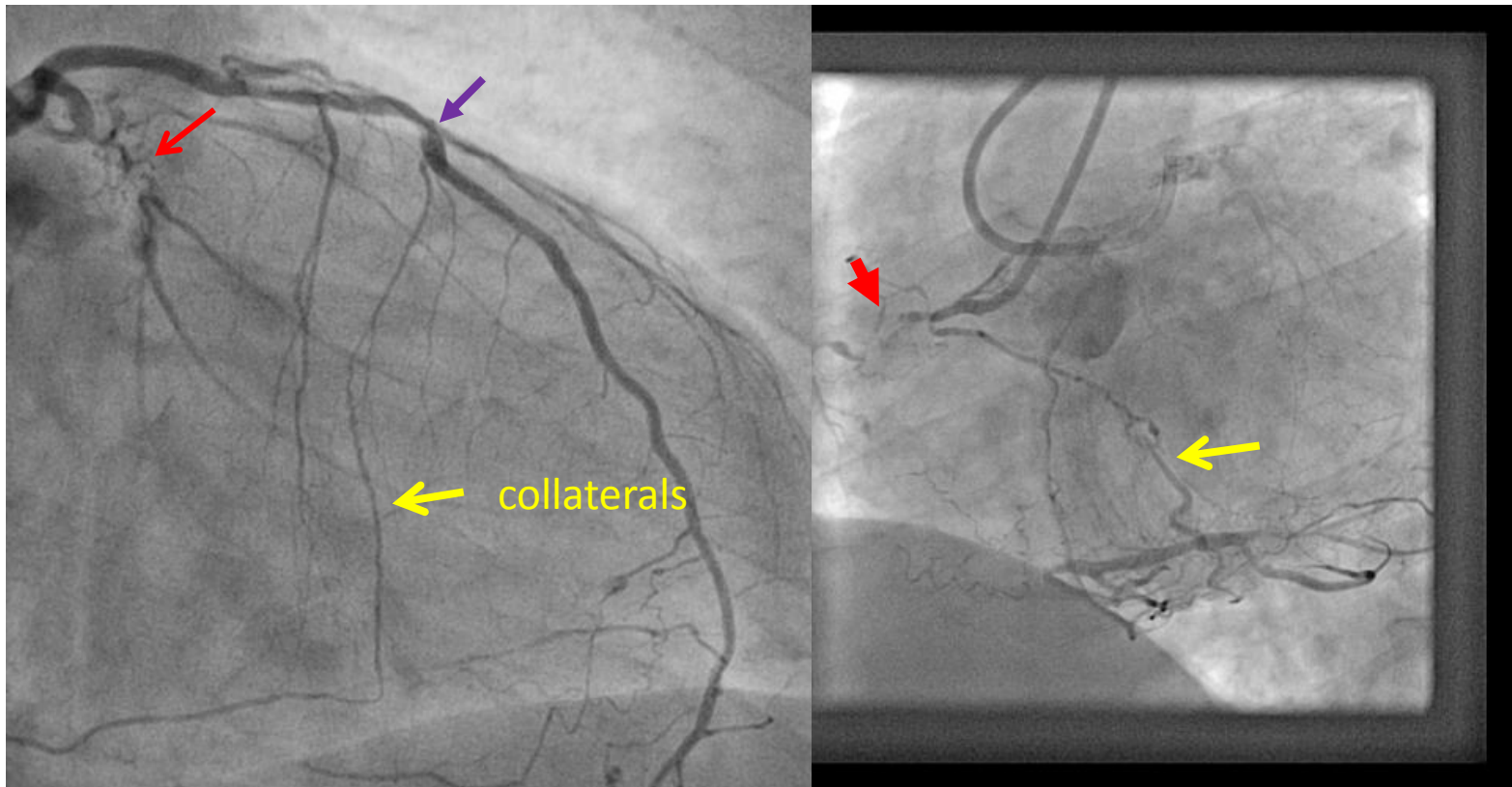
When to leave a CTO alone ?





Is a CTO harmless because there are collaterals?

- Stable symptoms in a 55 year old: limited physical ability, occasional tightness in his breast





Why should we open a CTO

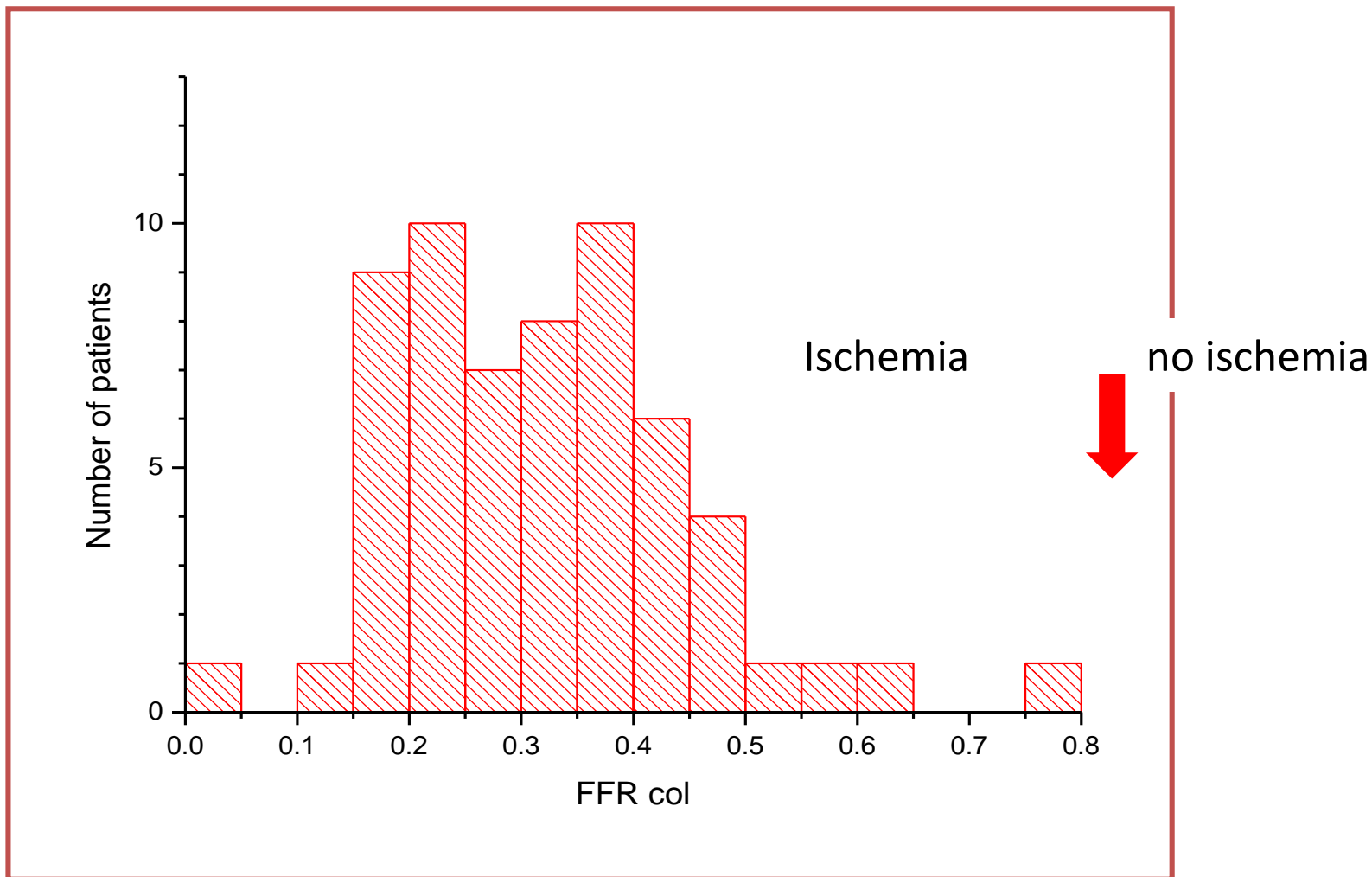


- **To let people lead a symptom-free and unaffected life ?!**



Can collaterals prevent ischemia ?

FFR in CTOs



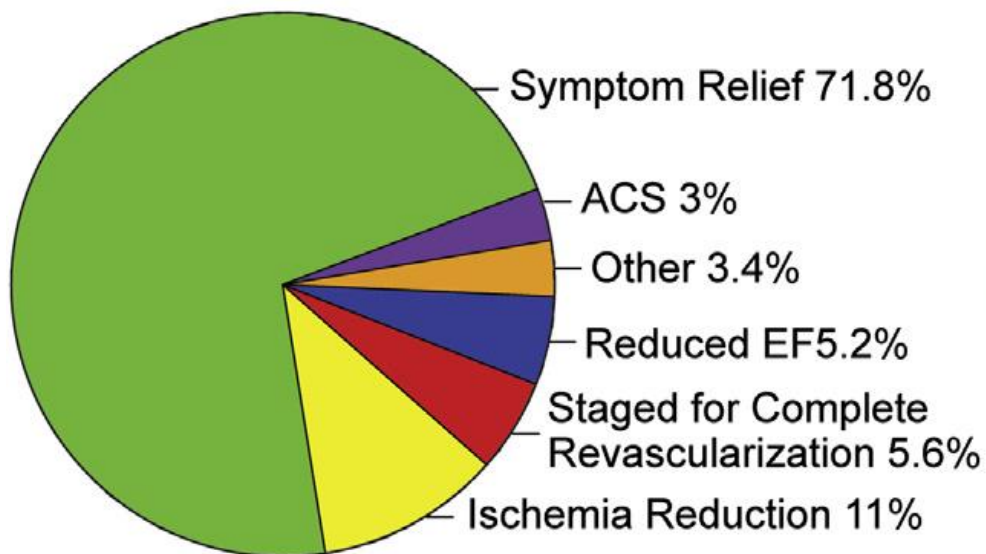


Quality of Life in OPEN-CTO

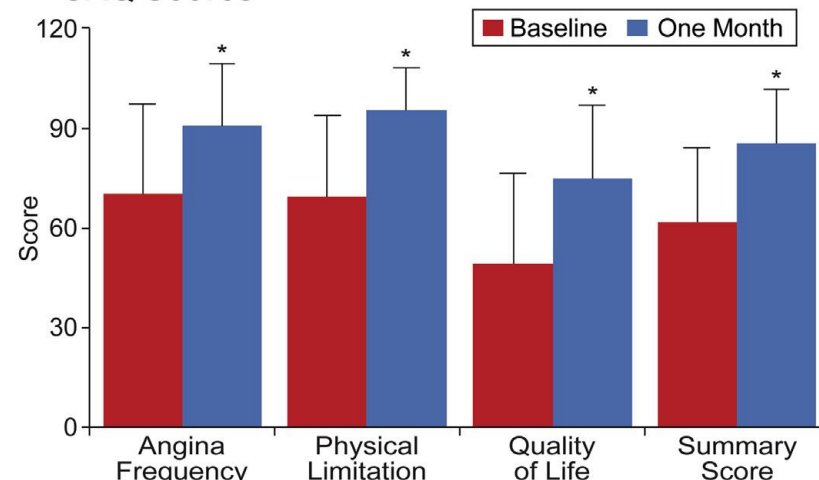


US Register with 1000 consecutive patients and at least one CTO

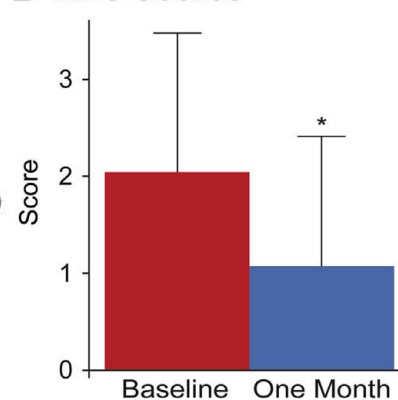
A CTO Indications



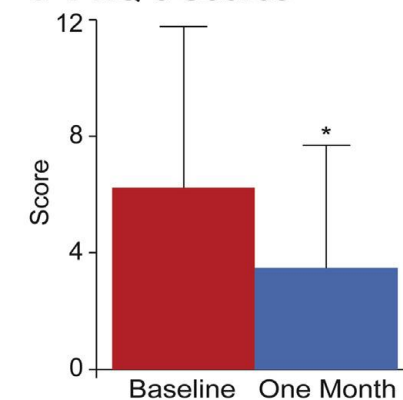
A SAQ Scores



B RDS Scores



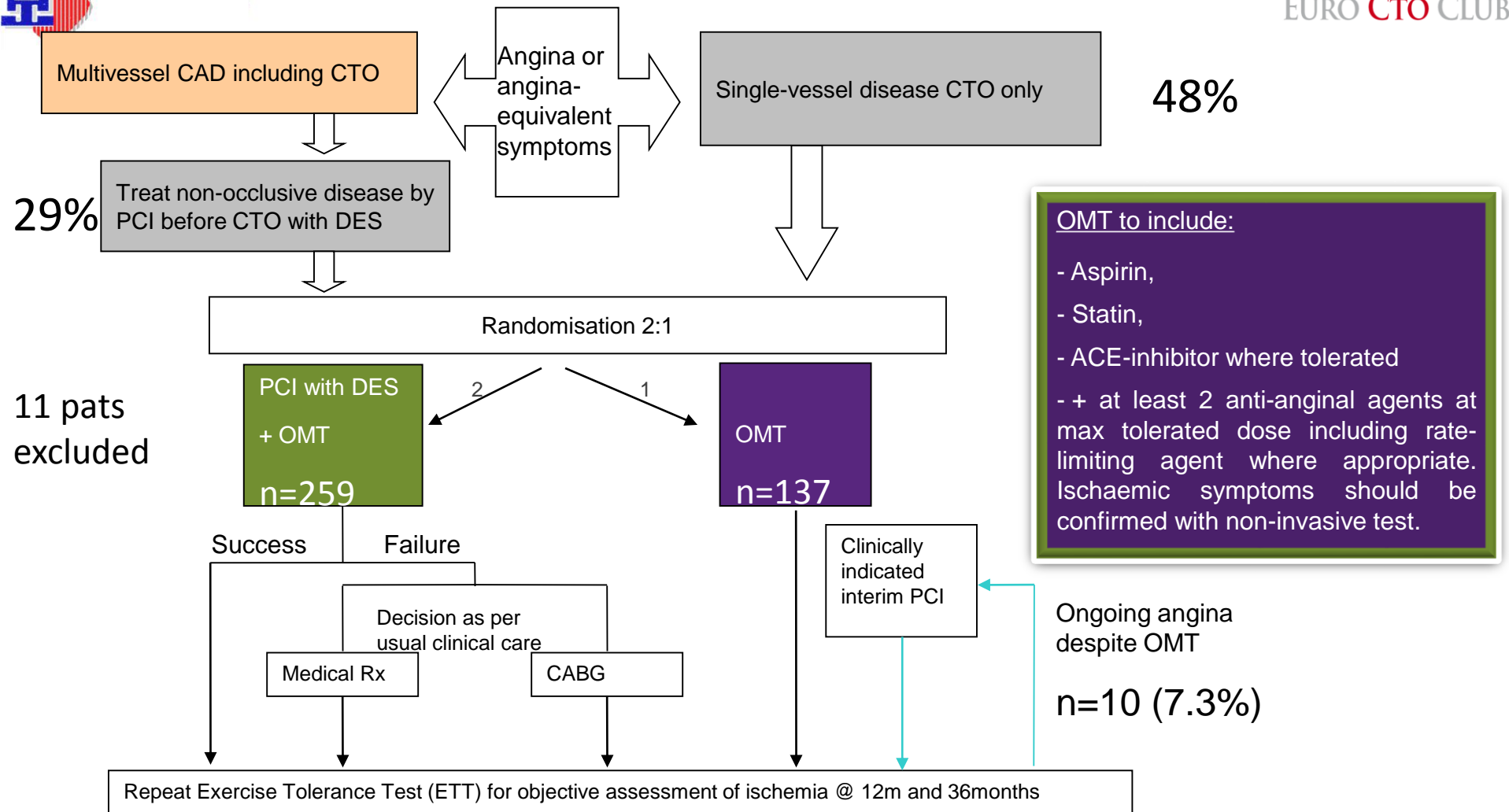
C PHQ-8 Scores



*p<0.01 vs. Baseline



EURO-CTO Trial: Study flow chart



OMT to include:

- Aspirin,
- Statin,
- ACE-inhibitor where tolerated
- + at least 2 anti-anginal agents at max tolerated dose including rate-limiting agent where appropriate. Ischaemic symptoms should be confirmed with non-invasive test.

Ongoing angina despite OMT
n=10 (7.3%)

Efficacy: Health status @ 12 and 36 months
Safety: Death, non-fatal myocardial infarction (ITT, PP) @ 36 months



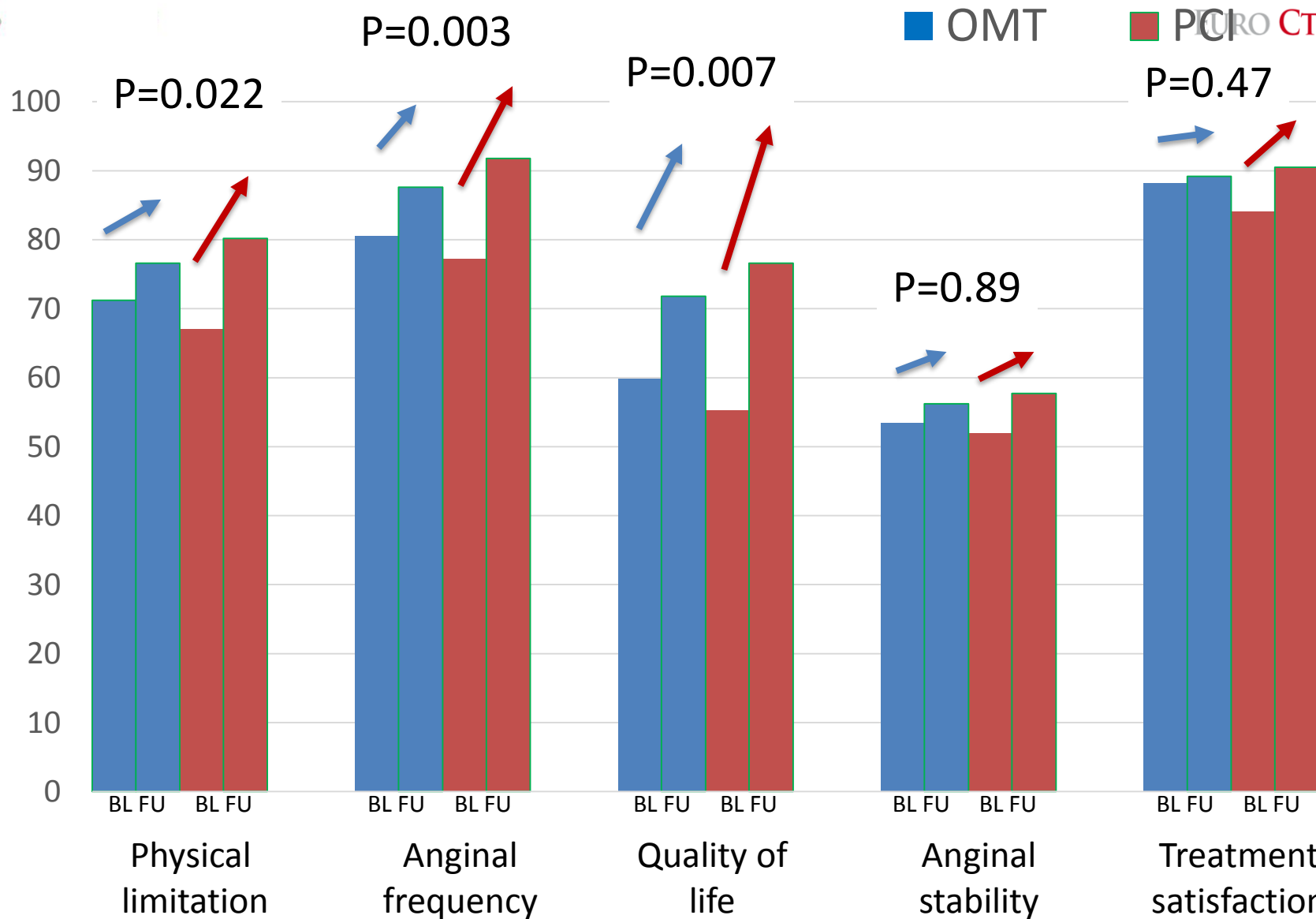
Primary Endpoint reached (ITT)



■ OMT

■ PCI

CTO CLUB

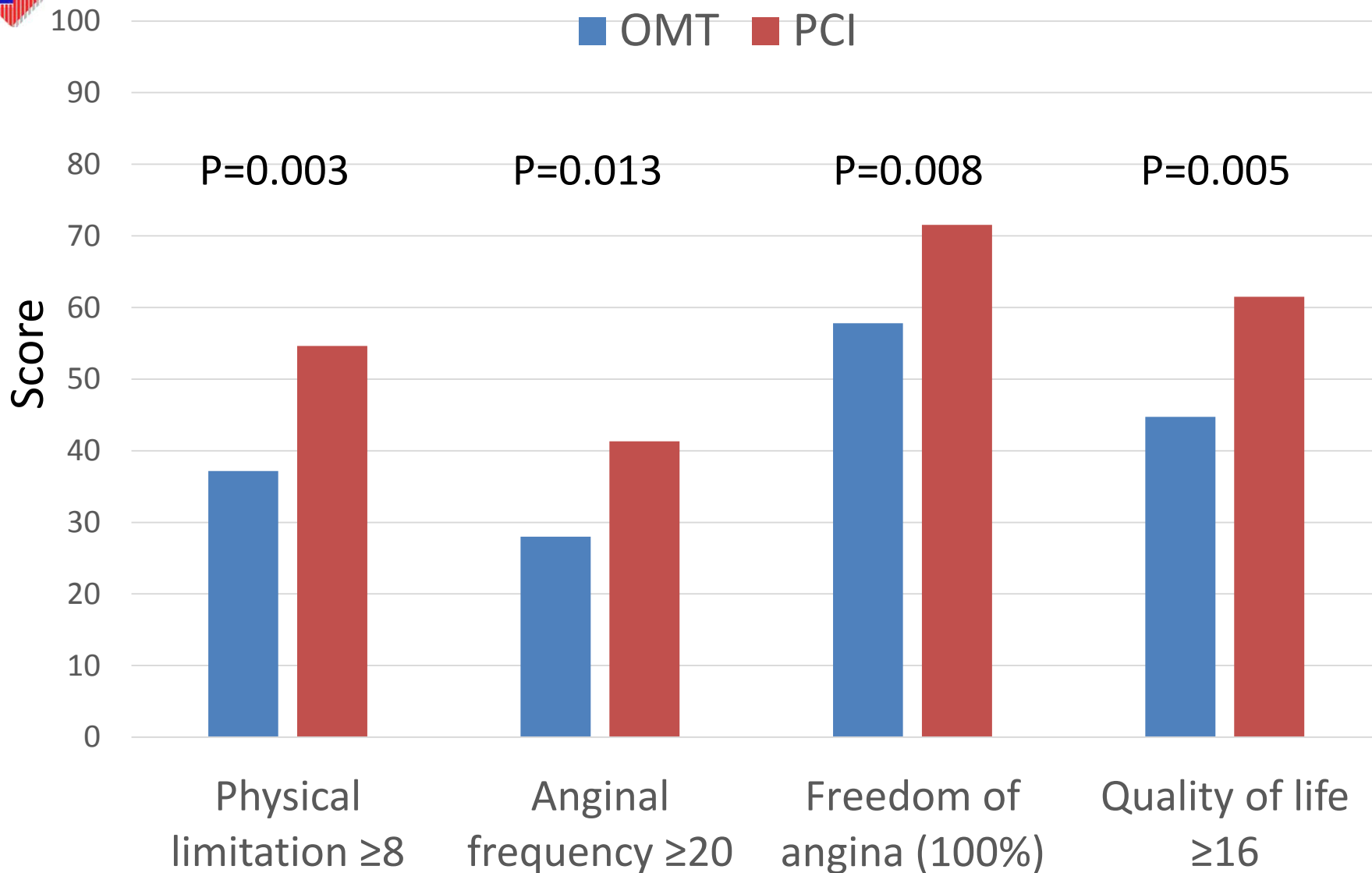


For multiple testing the significance level is 0.01

Eur Heart J 2018 in press



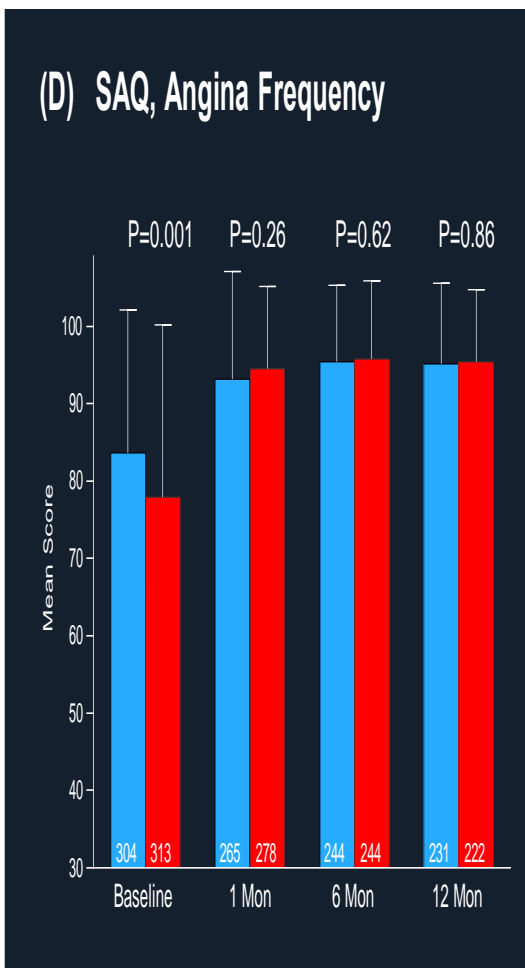
More patients were free of angina, had better quality of life and improved physical capacity



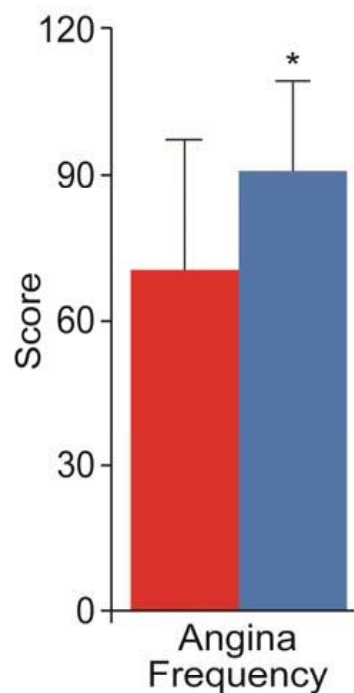
*) Spertus et al. JACC 1995;25:333-41



Even in DECISION-CTO symptoms were improved



OPEN-CTO Registry



Baseline	82 vs 77	71
FUP	87 vs 92 Δ 5 vs 15	92 Δ 21

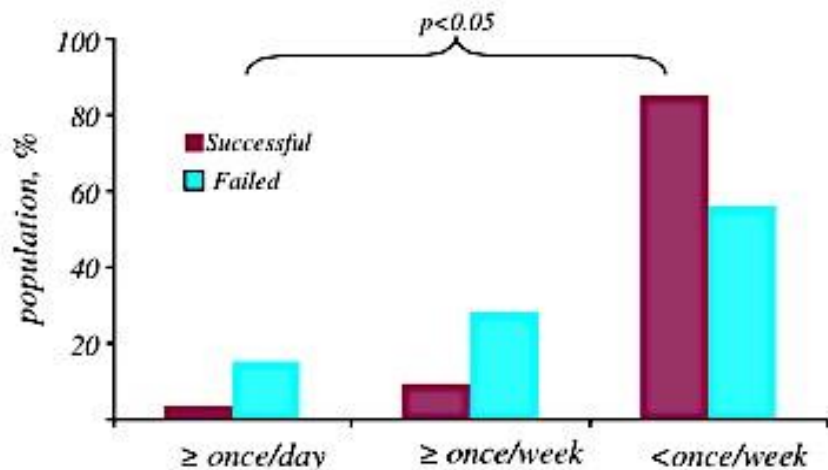
What would a medical approach achieve ?

Antianginal medication: Betablocker, Nitrates, Ca-Antagonists are not without side effects
And medication needs to go on forever....

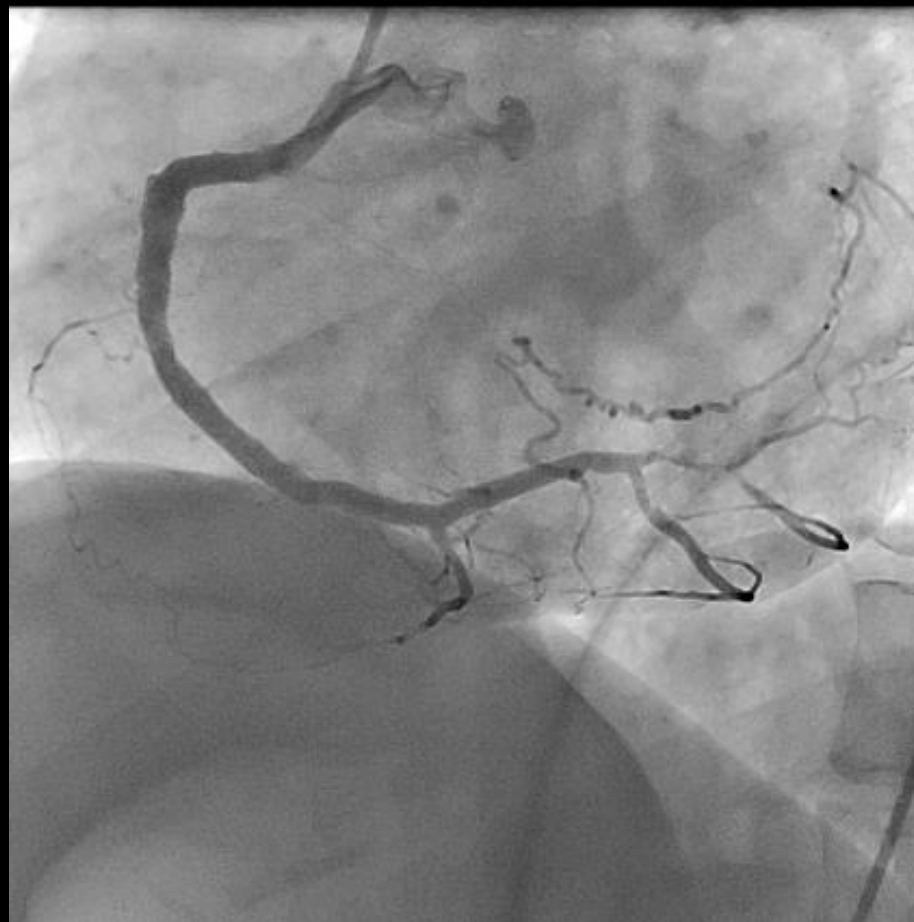
Angina Frequency (attacks/week)

Mean	3.3	2.5	2.1
<i>p-value vs placebo</i>	—	0.006	< 0.001
	252	262	244
	3.1	2.1	1.8
	—	0.016	< 0.001

Angina frequency during routine activity after CTO-PCI



But can we change the fate with a successful PCI ?





Why should we open a CTO

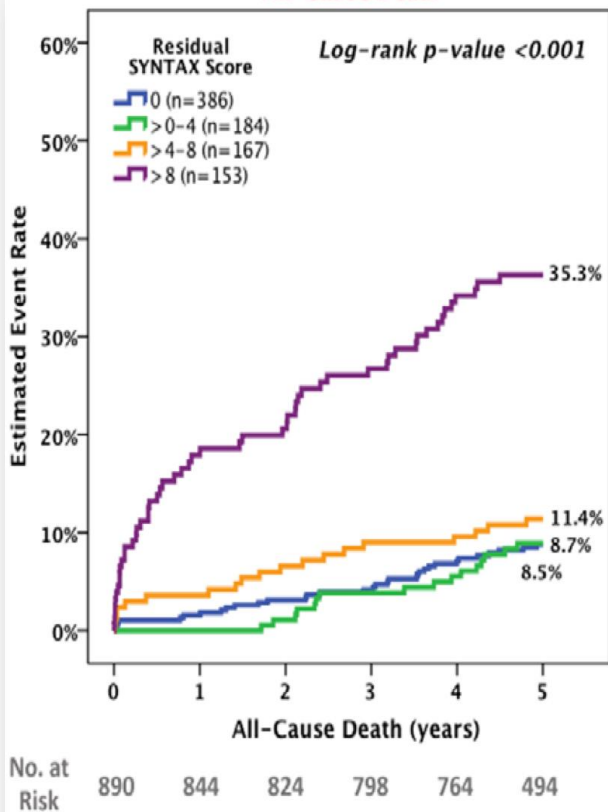


- **To let people lead a symptom-free and unaffected life ?!**
- **To make people live longer ?!**

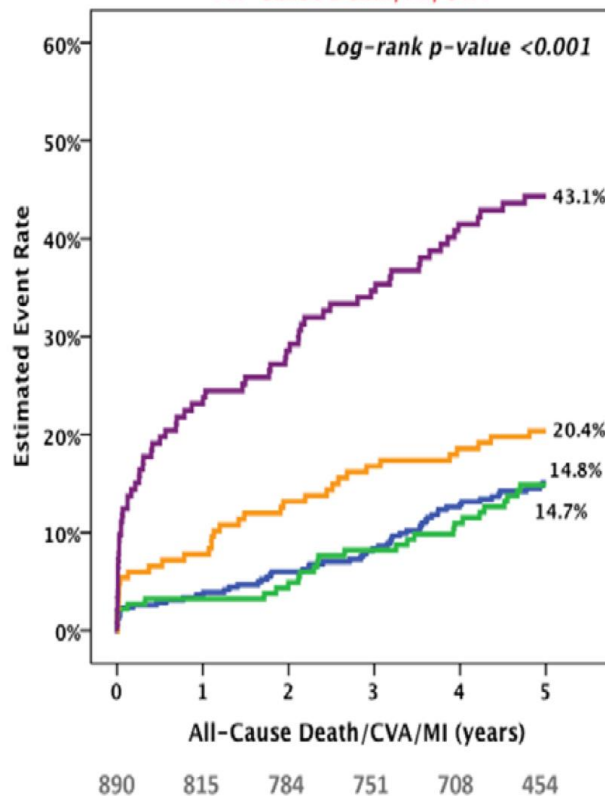


rSS and outcome after PCI

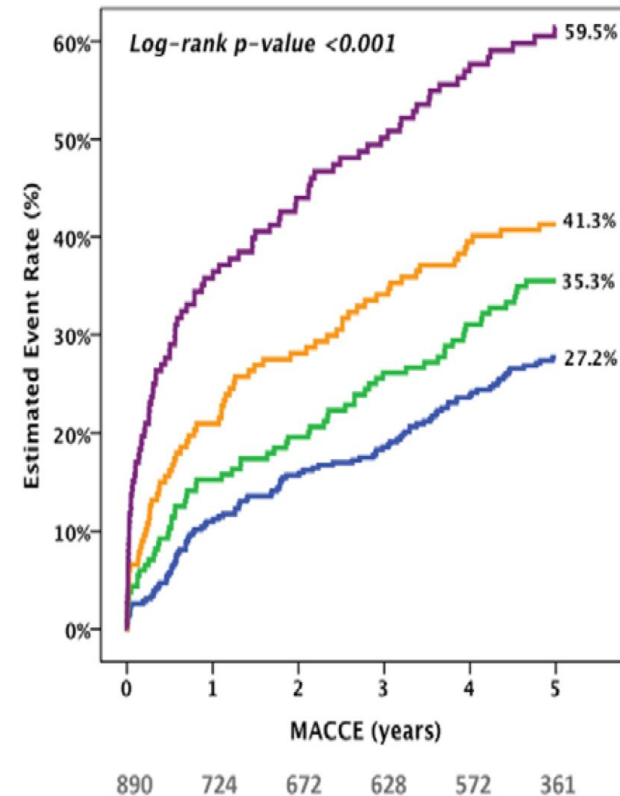
All-Cause Death



All-Cause Death/MI/CVA

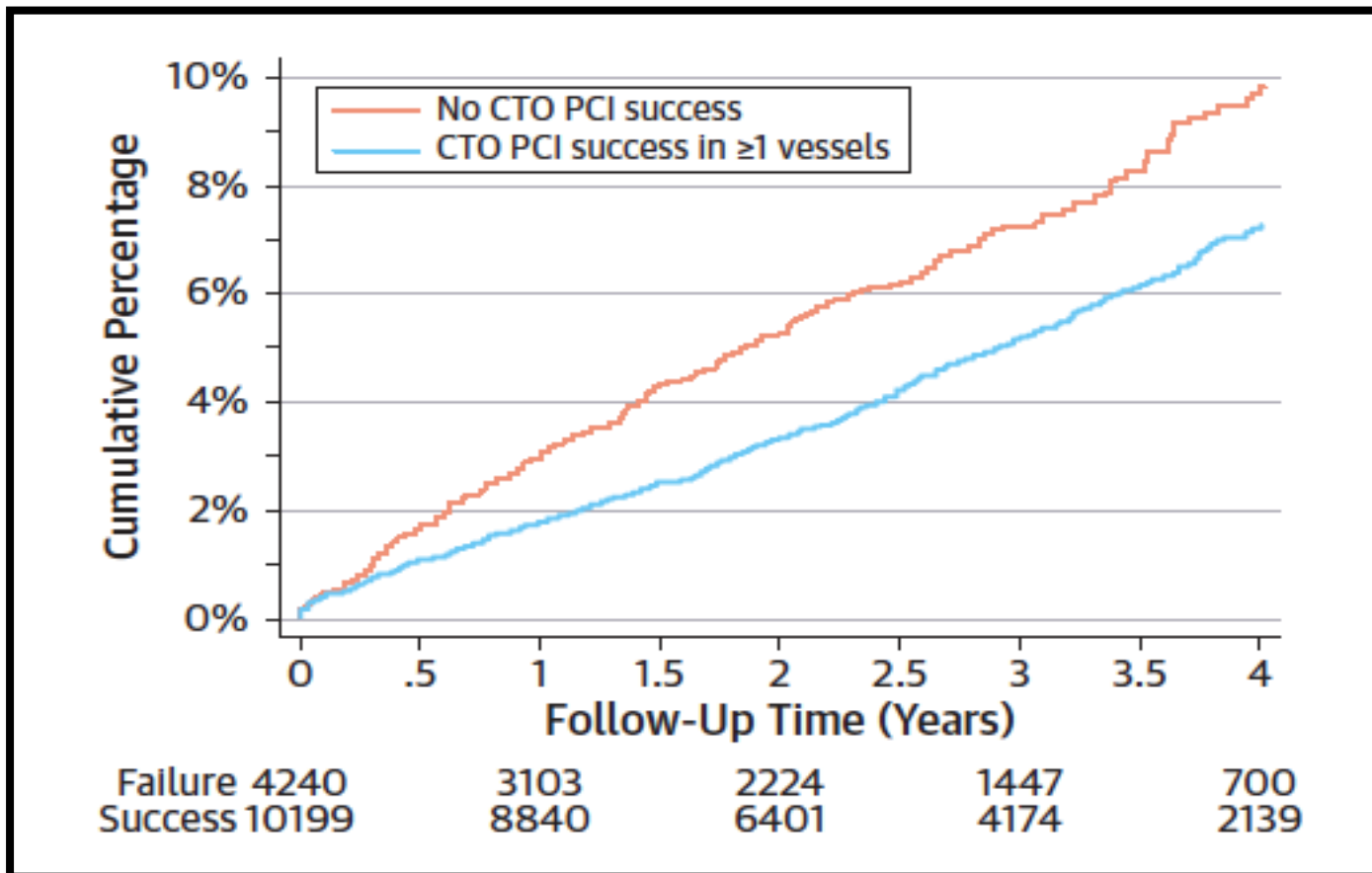


MACCE



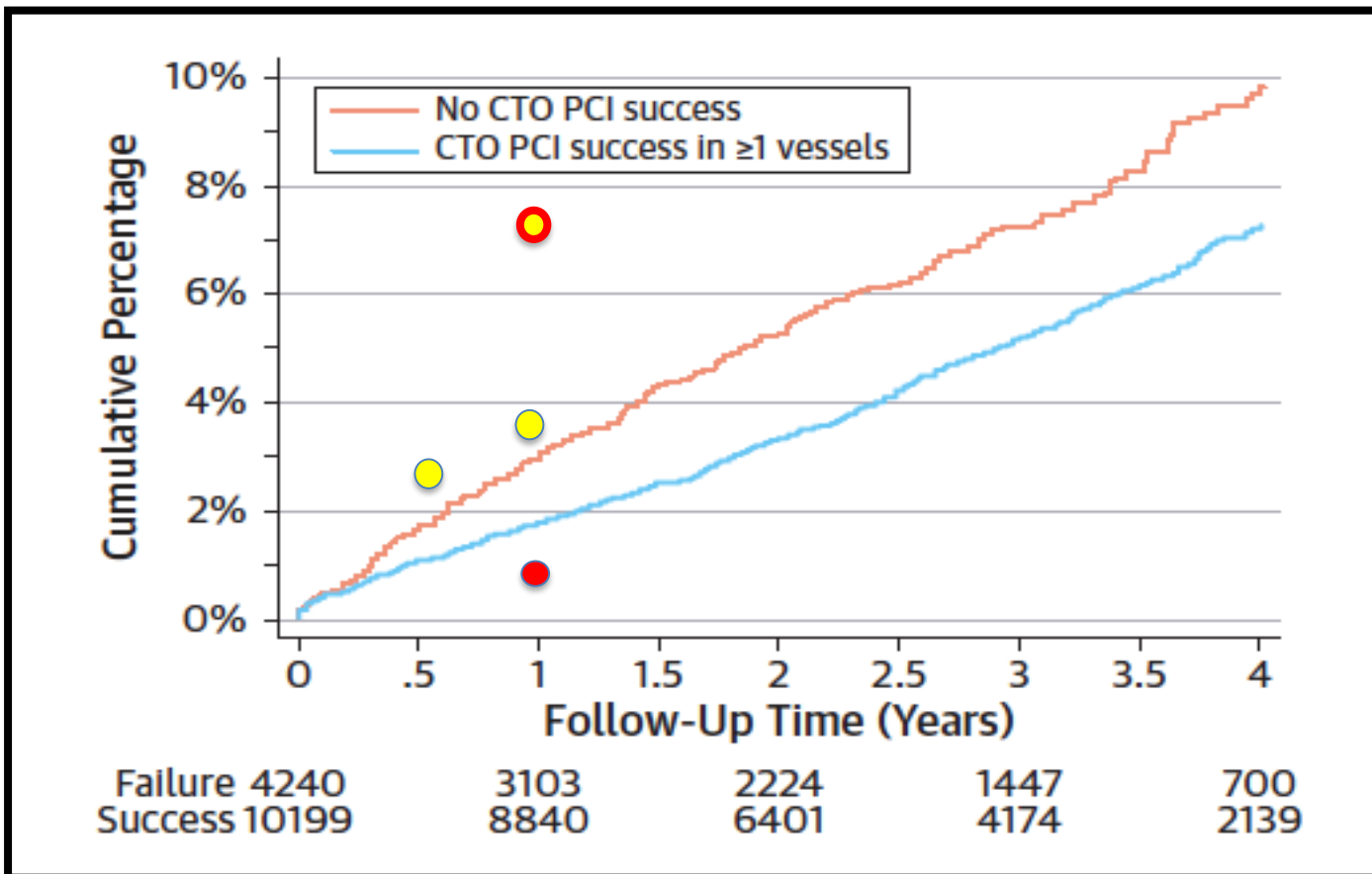


Mortality and CTO-PCI: BCIS





Mortality and CTO-PCI: BCIS



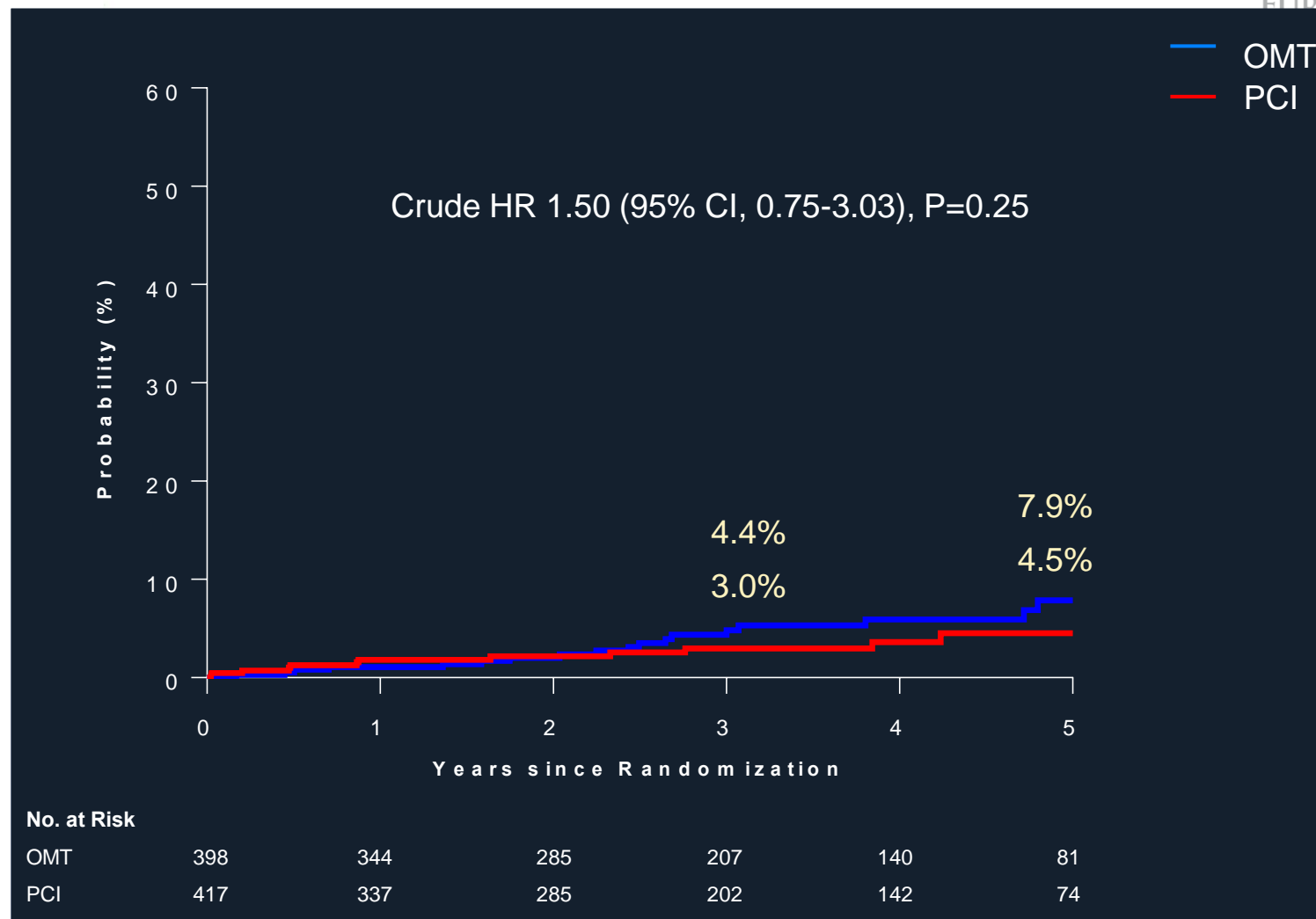
Mortality in
OPEN CTO
DECISION CTO
EURO CTO



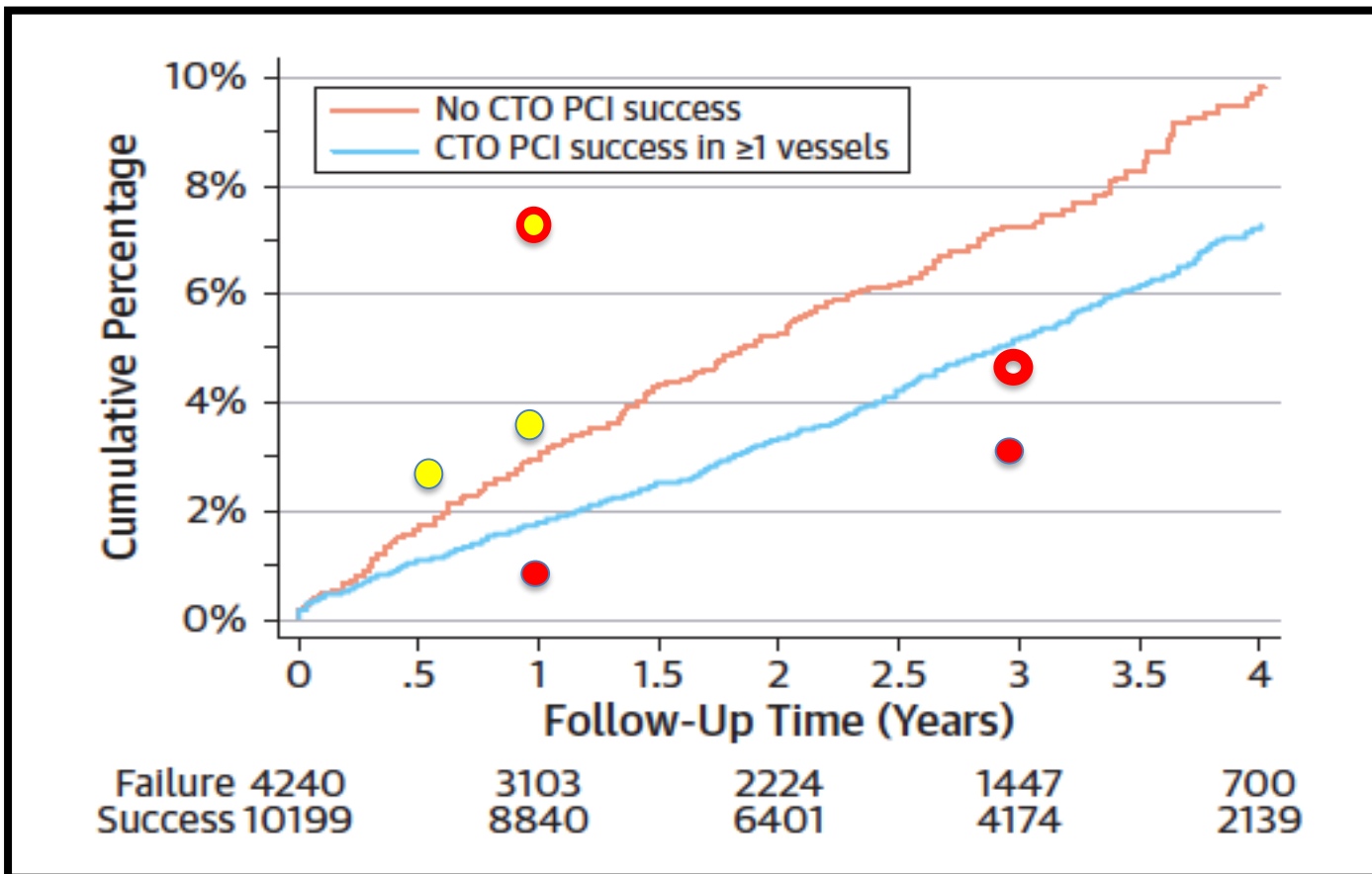
Mortality in DECISION-CTO



EURO CTO CLUB



Mortality and CTO-PCI: BCIS



Mortality in

- OPEN CTO
- DECISION CTO
- EURO CTO



Why should we open a CTO



- **To let people lead a symptom-free and unaffected life ?!**
- **To make people live longer ?!**

Constitution of the World Health Organization: Principles

- Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.
- The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.



The question is when ***not*** to open a CTO?

- CTO without viable myocardium
- CTO in a small territory of ischemia without related symptoms
- CTO in a patient with severe comorbidity and limited life expectancy



EURO CTO CLUB
Berlin 2019

11th Euro CTO “Live”

5–6 Live Cases per day

SAVE THE DATE

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