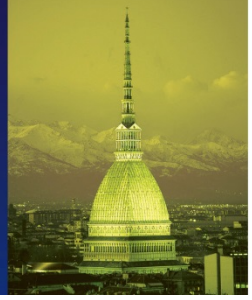
TURIN,
October
25th-27th
2018
Starhotels
Majestic

GIORNATE
CARDIOLOGICHE
TORINESI



UNIVERSITÁ DEGLI STUDI DI TORINO

AZIENDA OSPEDALIERO - UNIVERSITARIA
Città della Salute e della Scienza di Torino

Reopen the vessel, it is heart failure!

Jacopo Oreglia

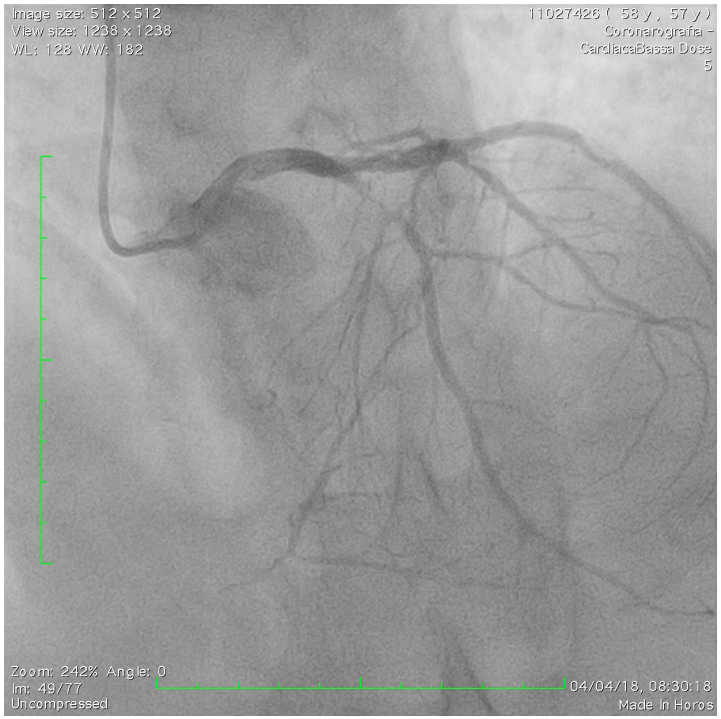
Milano

FONDAZIONE CENTRO CARDIOLOGIA
E CARDIOCHIRURGIA A. DE GASPERIS
Niguarda Ca' Granda

Clinical case # 1

- 55 y-o man
- Normal rest ECG
- hypokinesia of anterior wall, apex and anterior IV septum, EF 30%
- Elective coronary angiogram shows critical stenosis of the proximal LAD
- Revascularization or medical treatment?

Clinical case # 1



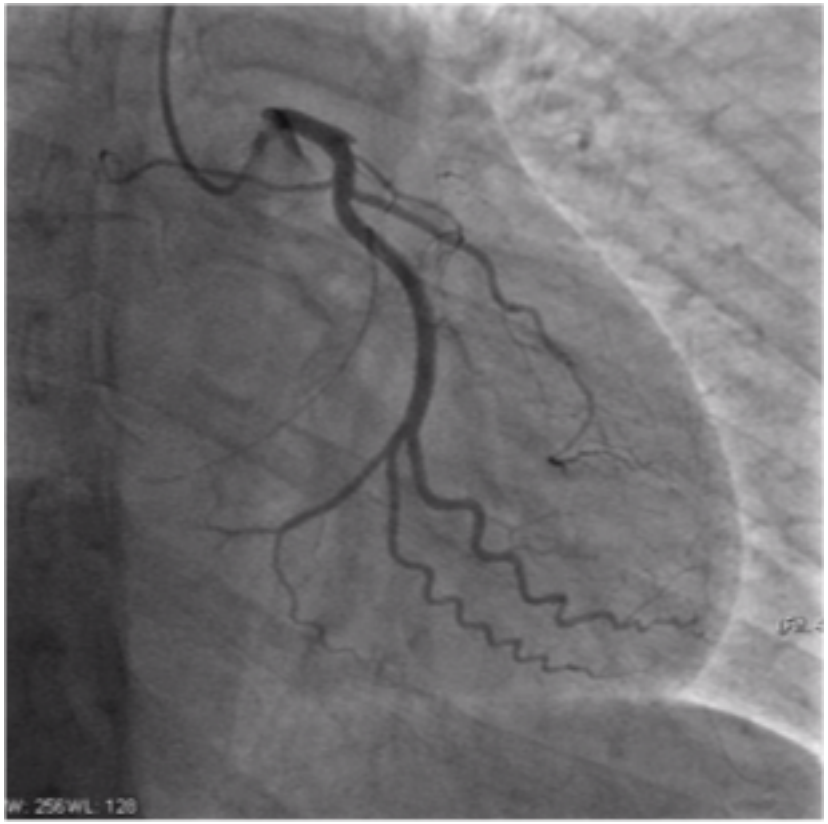
95% prox LAD stenosis

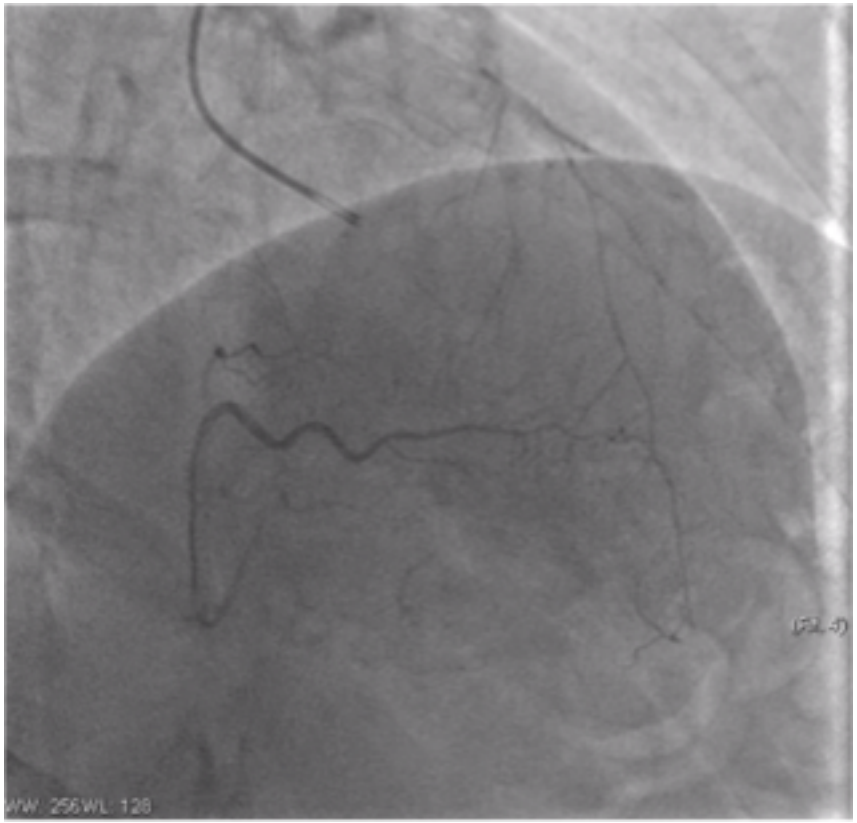
1 guiding catheter
1 guidewire
2 balloons
1 stent
Procedural time 20 minutes

Clinical case # 2

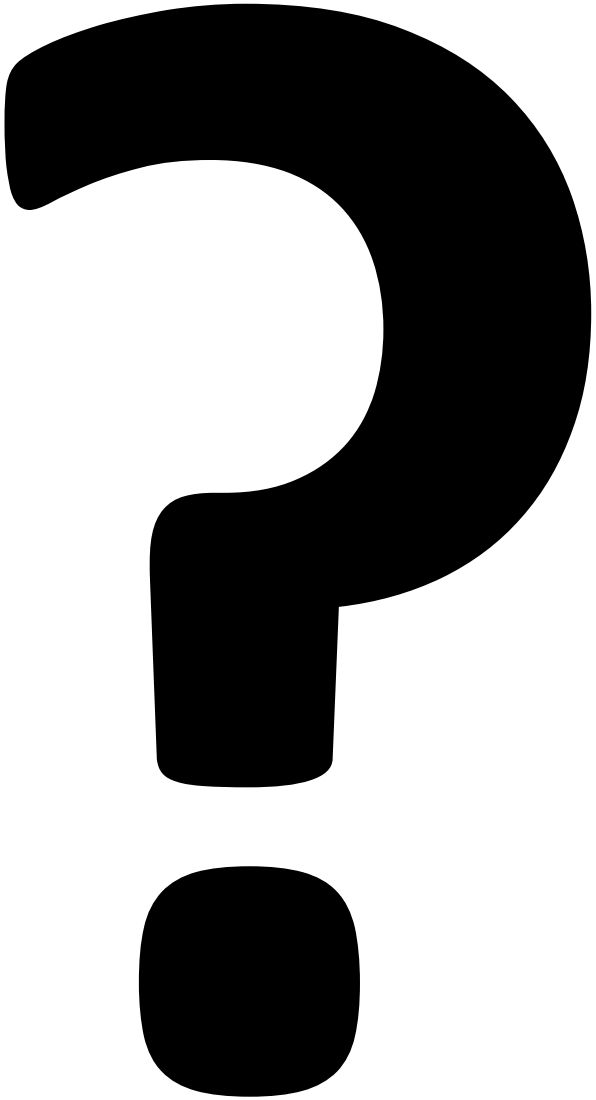
- 55 y-o man
- Normal rest ECG
- hypokinesia of anterior wall, apex and anterior IV septum, EF 30%
- Elective coronary angiogram shows critical stenosis of the proximal LAD
- Revascularization or medical treatment?

Clinical case # 2





Proximal LAD CTO



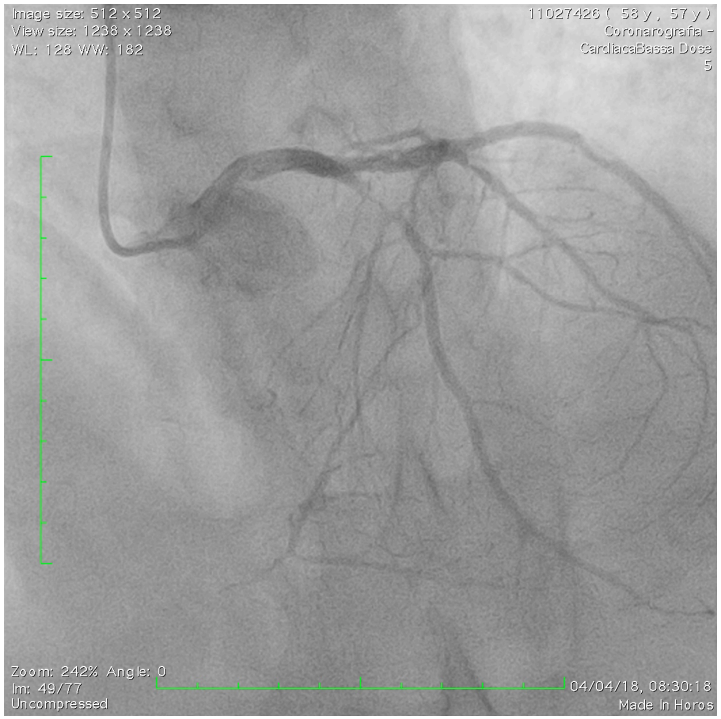
Clinical case # 1

- 55 y-o man
- Normal rest ECG
- hypokinesia of anterior wall, apex and anterior IV septum, EF 30%
- Elective coronary angiogram shows critical stenosis of the proximal LAD
- Revascularization or medical treatment?

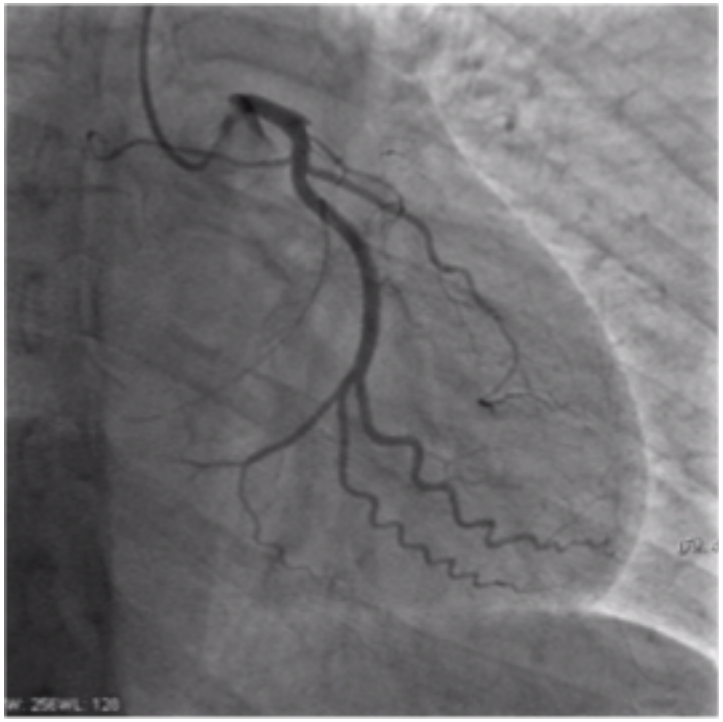
Clinical case # 2

- 55 y-o man
- Normal rest ECG
- hypokinesia of anterior wall, apex and anterior IV septum, EF 30%
- Elective coronary angiogram shows critical stenosis of the proximal LAD
- Revascularization or medical treatment?

The twins paradox

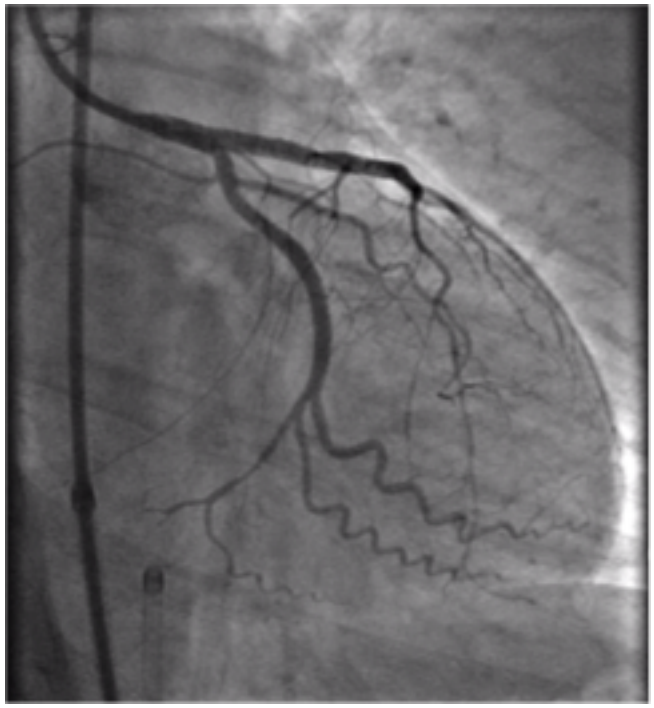


PCI, for sure!



Is there ischemia?
How are the symptoms?
Maybe medical treatment?
Or CABG?
PCI, yes, but complex….

No difference



Difference

1 guiding catheter
1 workhorse guidewire
2 balloons
1 stent
Procedural time 20 minutes

2 guiding catheter
4 dedicated guidewires
2 microcatheters
4 balloons
1 stent
Procedural time 130 minutes

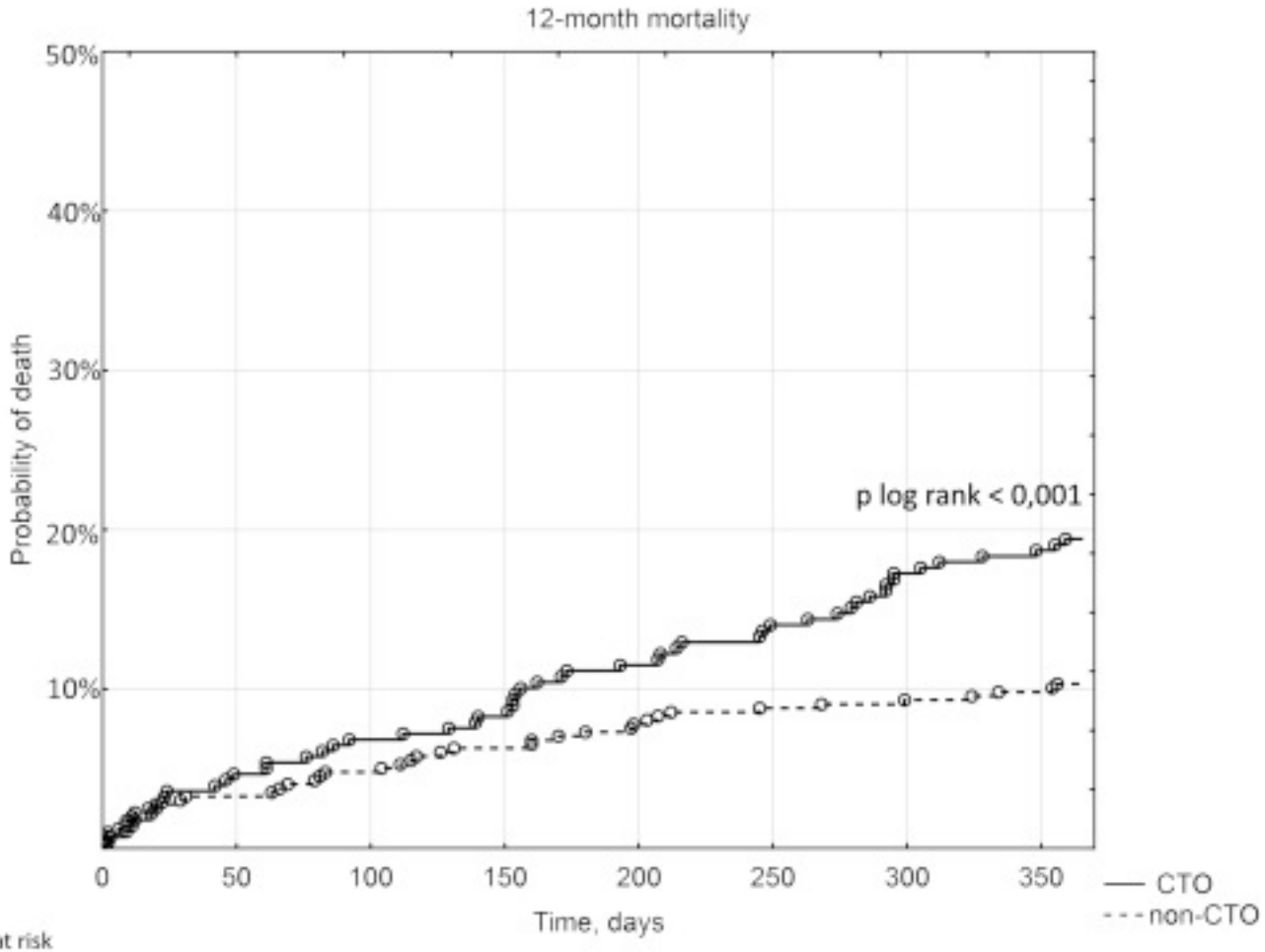
Reasons to reopen a chronically occluded coronary artery

- Symptoms relief
- Systolic function improvement
- Possible prognostic impact

The indications for the case do not change just because the lesion is “harder to treat”

Impact of Chronic Total Occlusion of the Coronary Artery on Long-Term Prognosis in Patients With Ischemic Systolic Heart Failure

Insights From the COMMIT-HF Registry



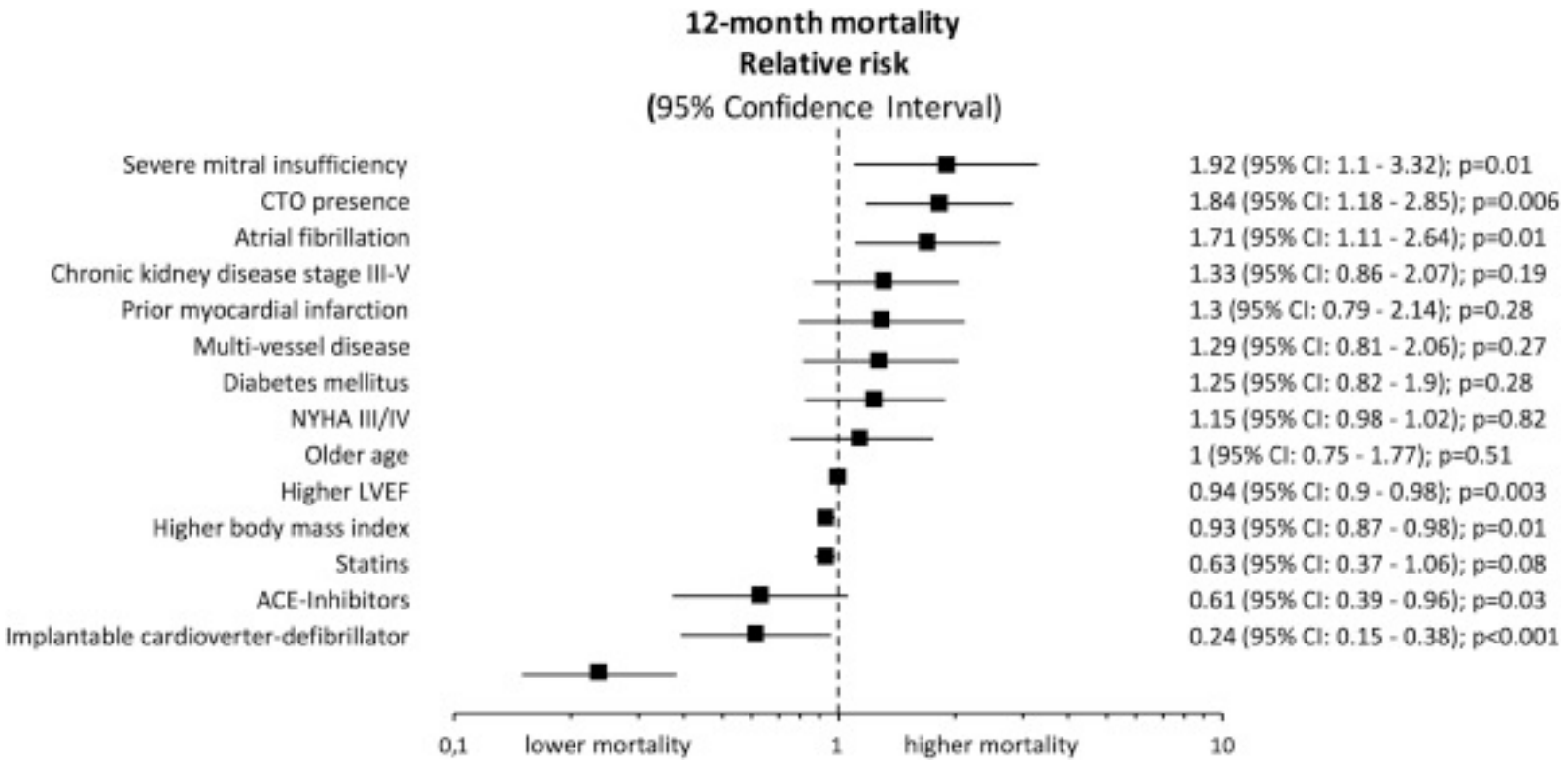
Patients at risk

CTO	278	259	246	230	224
Non-CTO	397	378	366	360	356

JACC Intv 2016;9:1790–7

Impact of Chronic Total Occlusion of the Coronary Artery on Long-Term Prognosis in Patients With Ischemic Systolic Heart Failure

Insights From the COMMIT-HF Registry

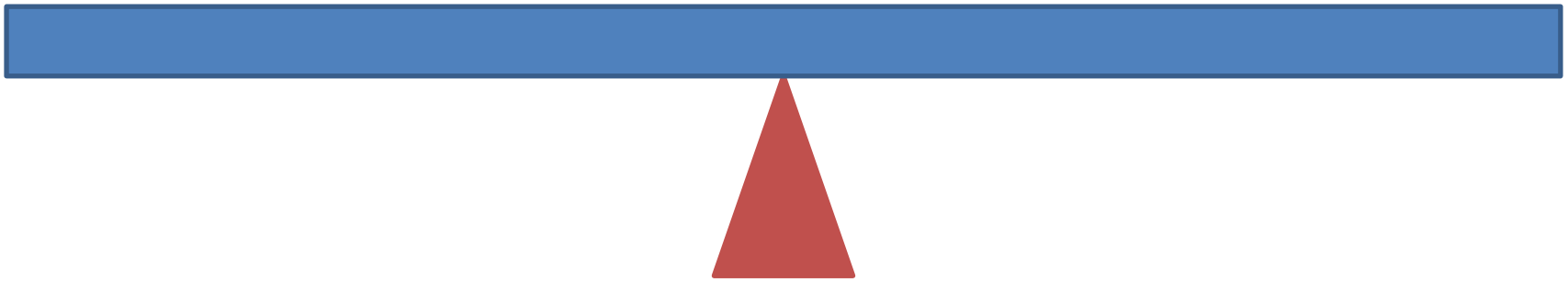


JACC Intv 2016;9:1790–7

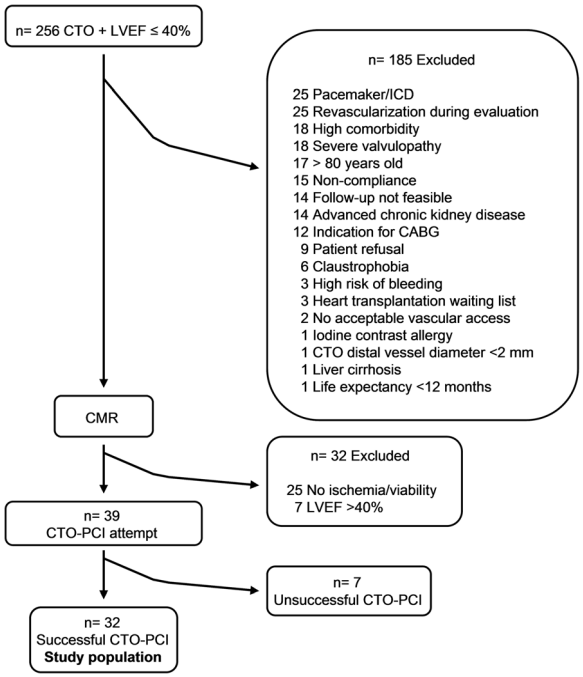
MESSAGE # 1

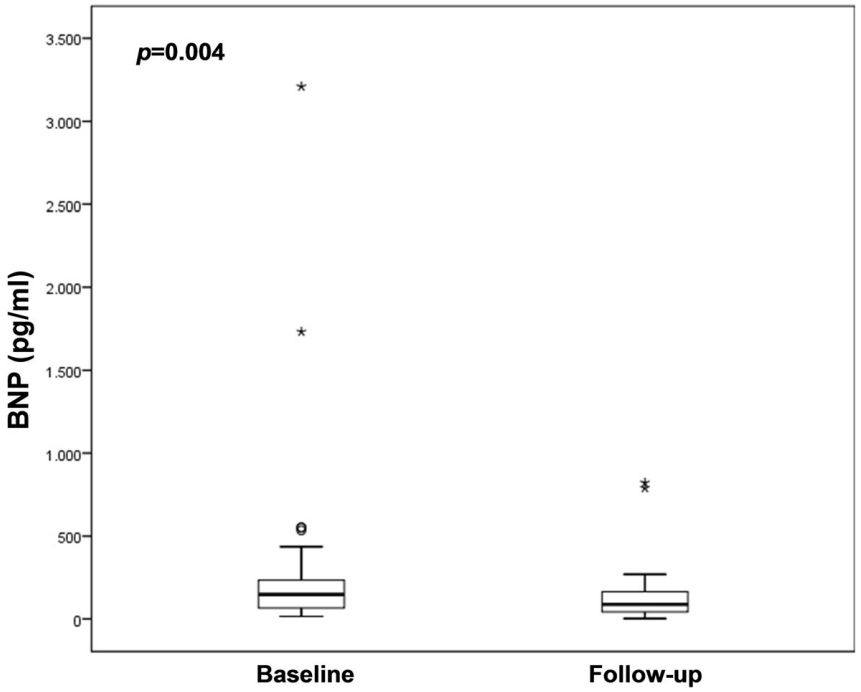
Heart Failure patients with a CTO have worse prognosis than heart failure patients without CTO

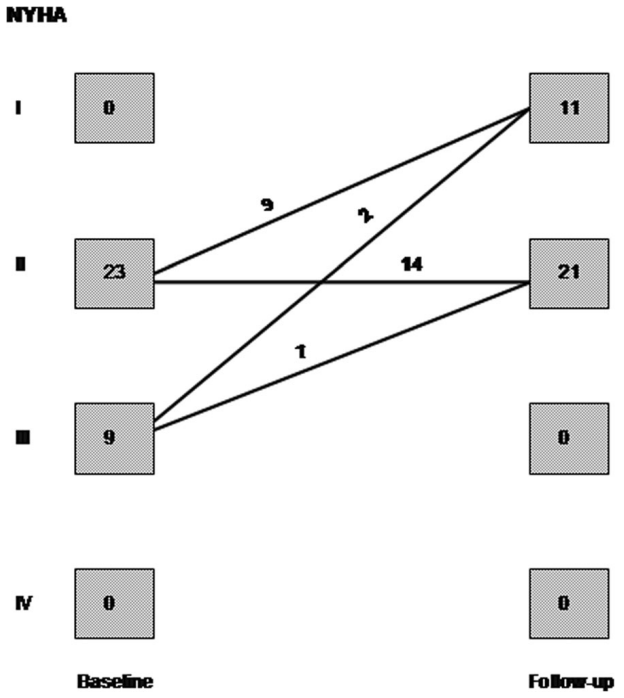
- Marker of disease severity?
- Cause of bad prognosis?



Benefits of chronic total coronary occlusion percutaneous intervention in patients with heart failure and reduced ejection fraction: insights from a cardiovascular magnetic resonance study







BNP reduction

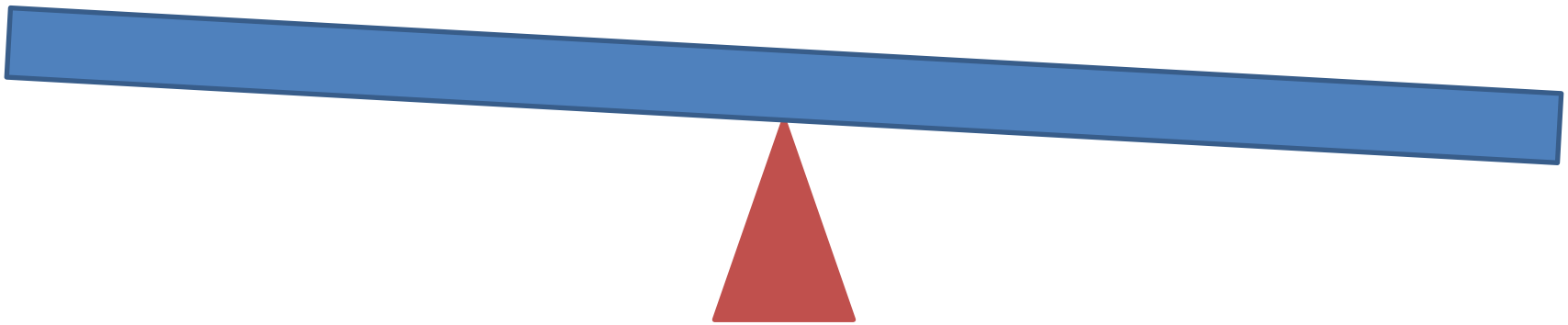
Symptoms improvement

Journal of Cardiovascular Magnetic Resonance 2016; 18:78

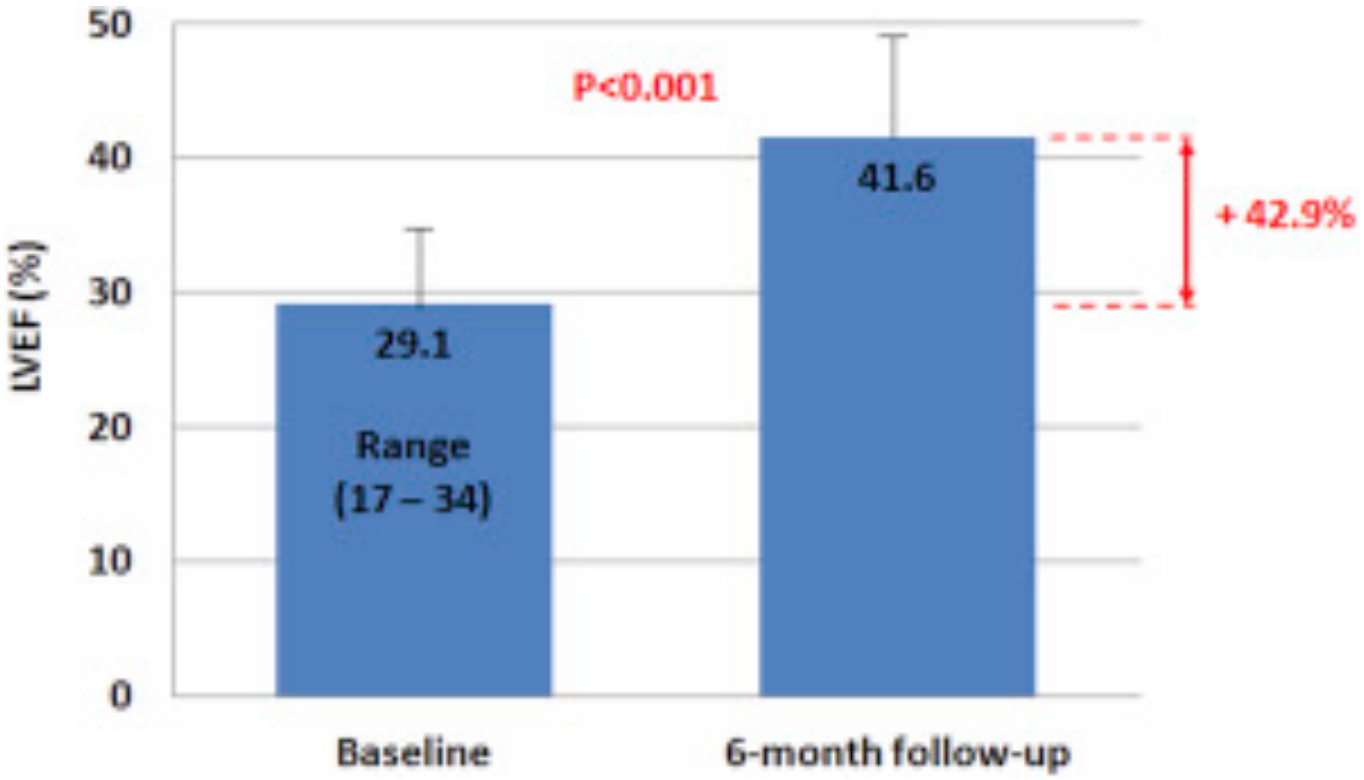
MESSAGE # 2

Heart Failure patients with a CTO improve their clinical condition (lower BNP, less symptoms) if they have their CTO reopened

- Marker of disease severity?
- Cause of bad prognosis?

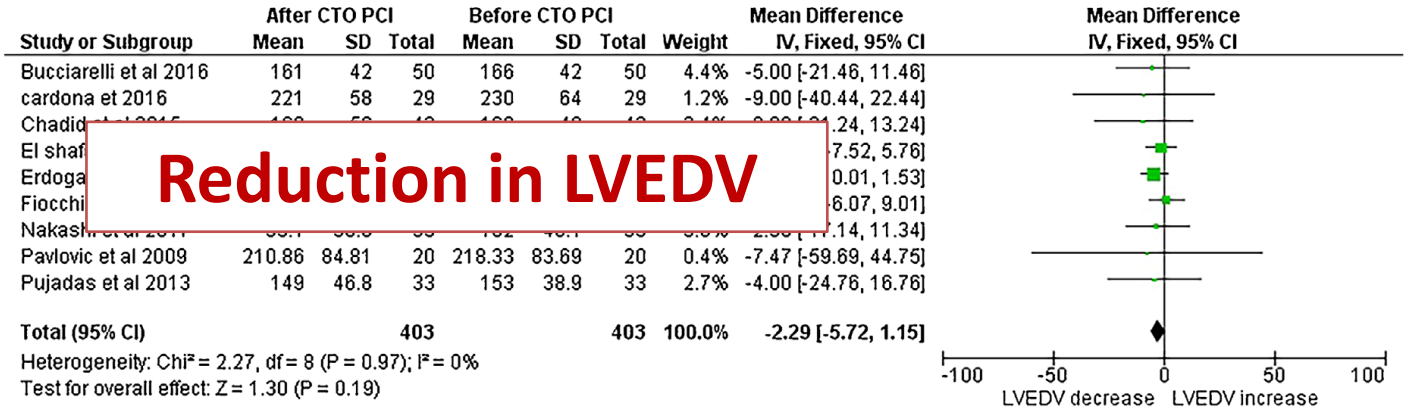


Percutaneous Coronary Intervention of Chronic Total Occlusions in Patients With Low Left Ventricular Ejection Fraction

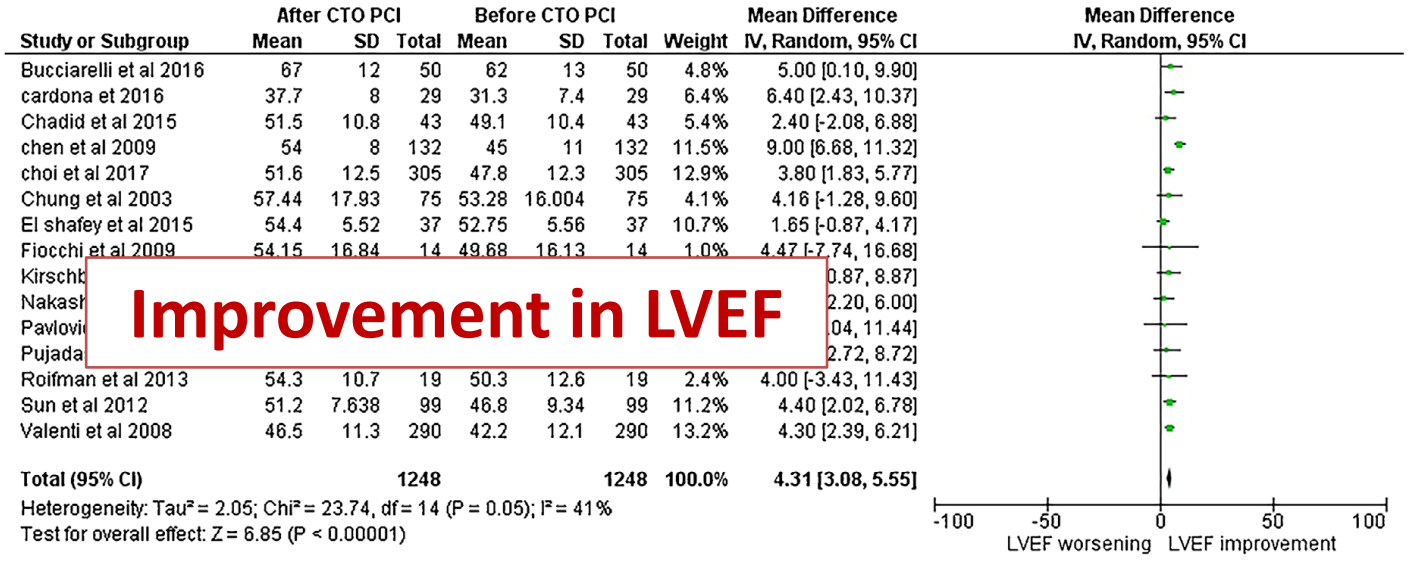


J Am Coll Cardiol Intv 2017;10:2158–70

Meta-analysis of the impact of successful chronic total occlusion percutaneous coronary intervention on left ventricular systolic function and reverse remodeling



Reduction in LVEDV



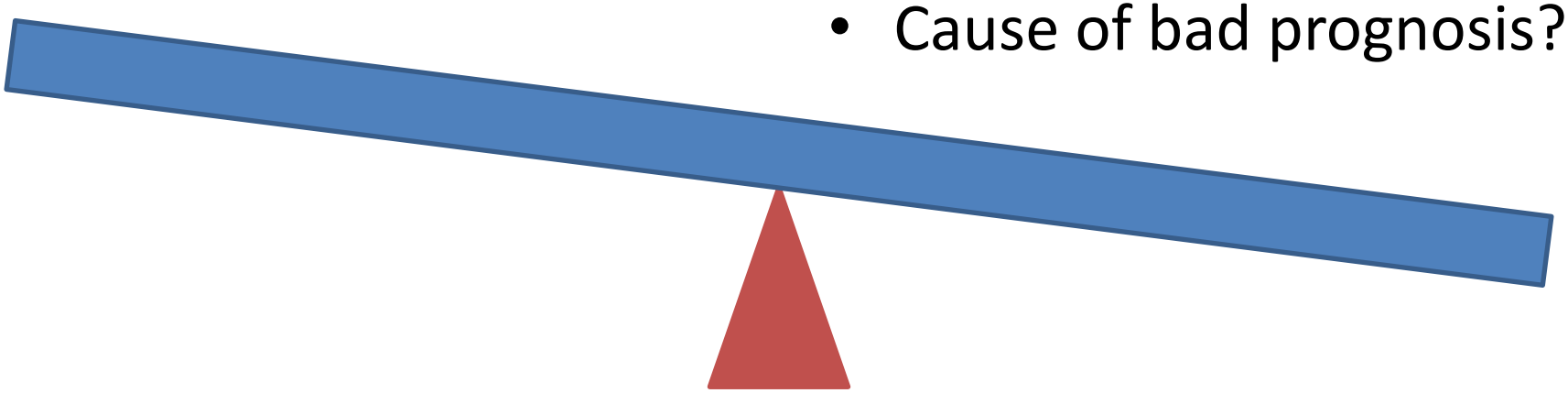
Improvement in LVEF

J Interv Cardiol. 2018;31:562–571

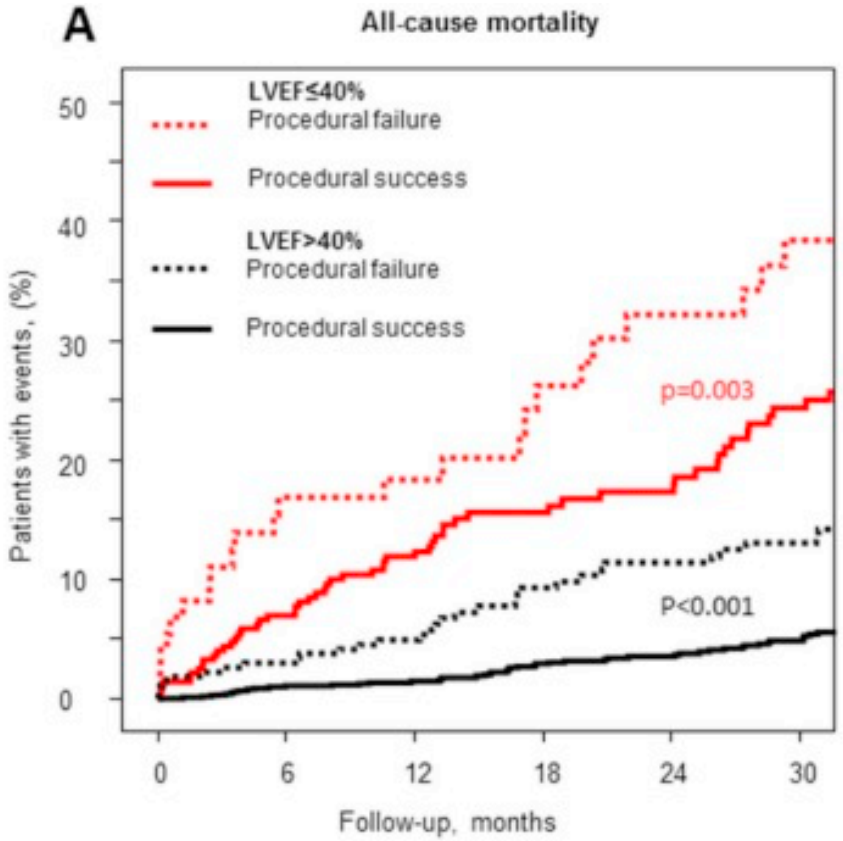
MESSAGE # 3

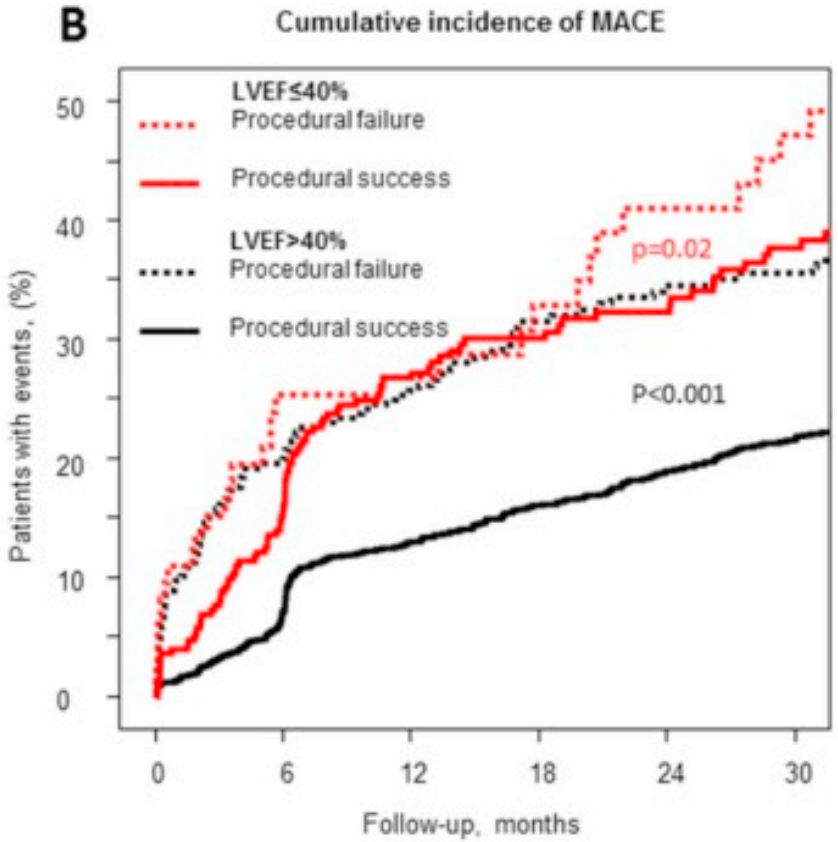
Heart Failure patients with a CTO improve their regional kinesis and the global EF if they have their CTO reopened

- Marker of disease severity?
- Cause of bad prognosis?



Comparison of Benefit of Successful Percutaneous Coronary Intervention for Chronic Total Occlusion in Patients With Versus Without Reduced (≤40%) Left Ventricular Ejection Fraction





No at risk

LVEF ≤ 40%						
Procedural failure	73	57	53	37	34	30
Procedural success	275	246	219	155	133	114
LVEF > 40%						
Procedural failure	267	254	238	178	164	154
Procedural success	1387	1353	1225	849	774	719

No at risk

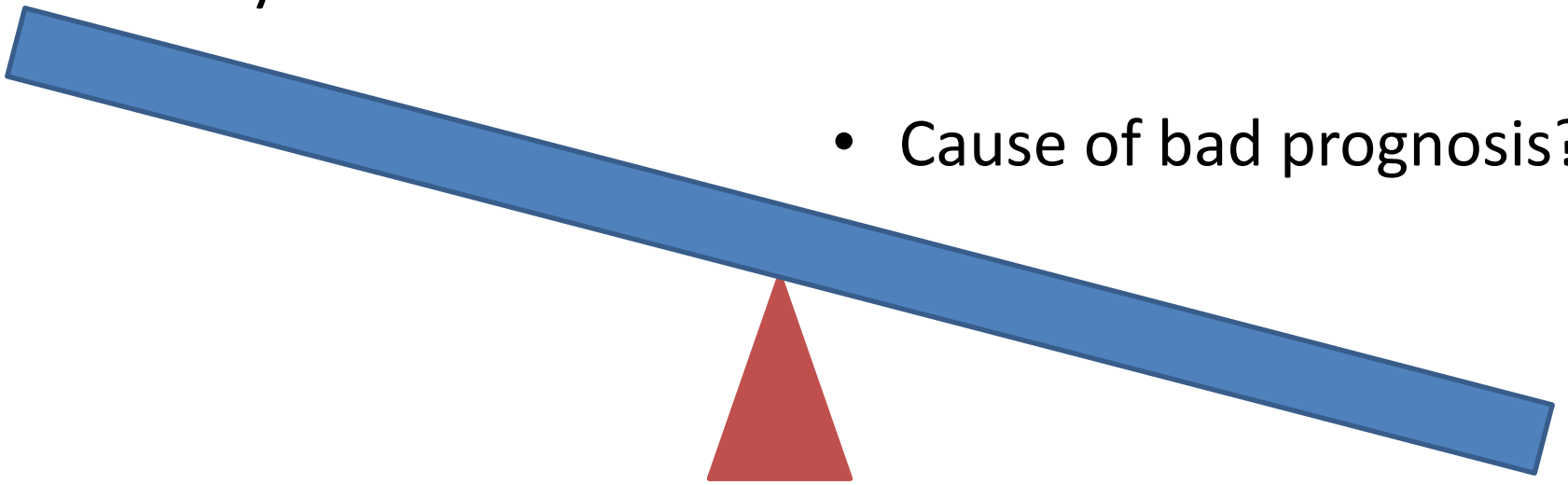
LVEF ≤ 40%						
Procedural failure	73	51	48	33	29	26
Procedural success	275	223	181	129	115	100
LVEF > 40%						
Procedural failure	267	210	186	138	128	124
Procedural success	1387	1269	1103	800	741	697

Am J Cardiol 2017;120:1780–1786

MESSAGE # 4

Heart Failure patients with a CTO survive longer if they have their CTO reopened

- Marker of disease severity?

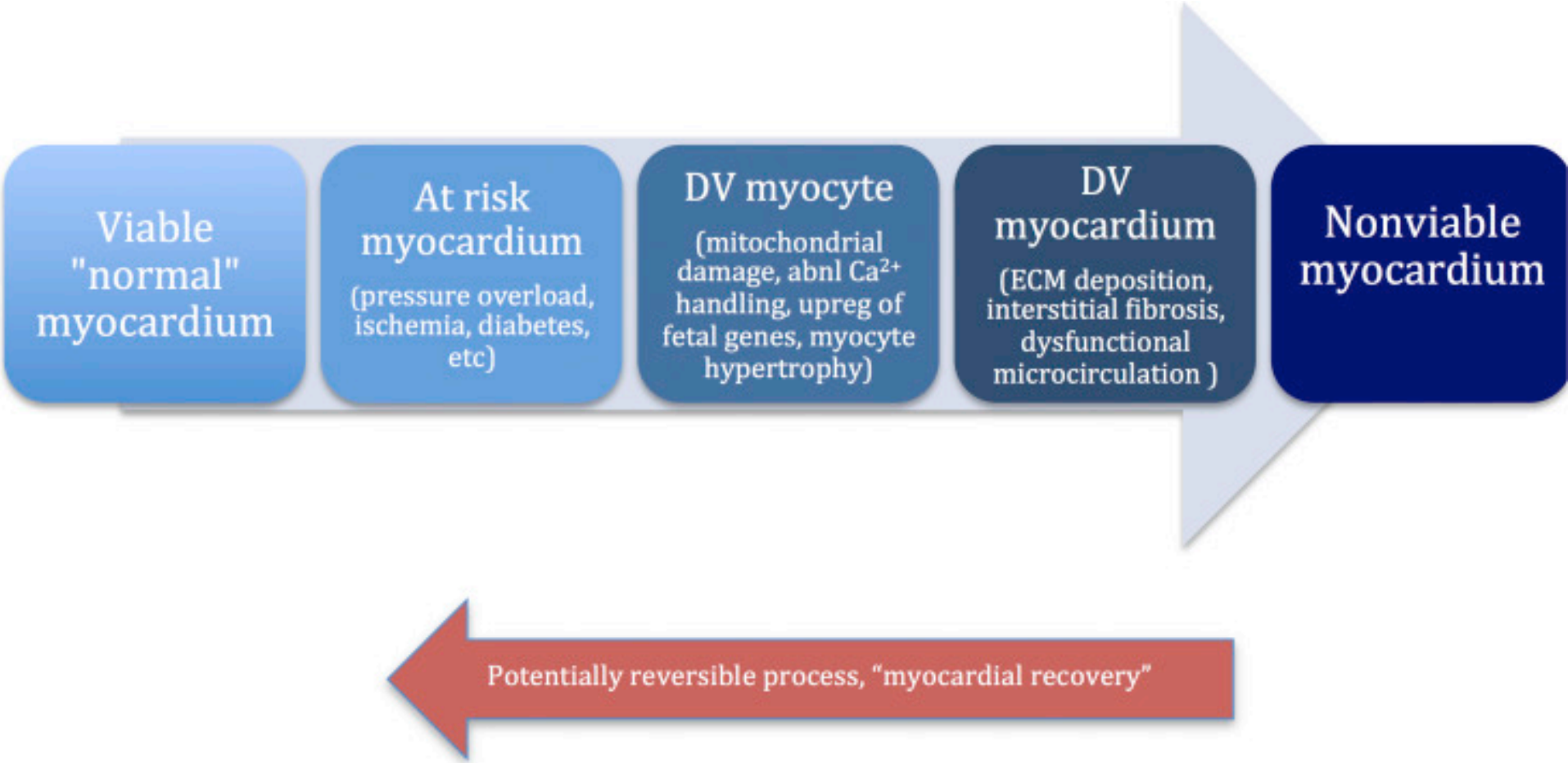


- Cause of bad prognosis?

MESSAGE # 5

If the CTO is a cause of bad prognosis its revascularization should be a treatment target

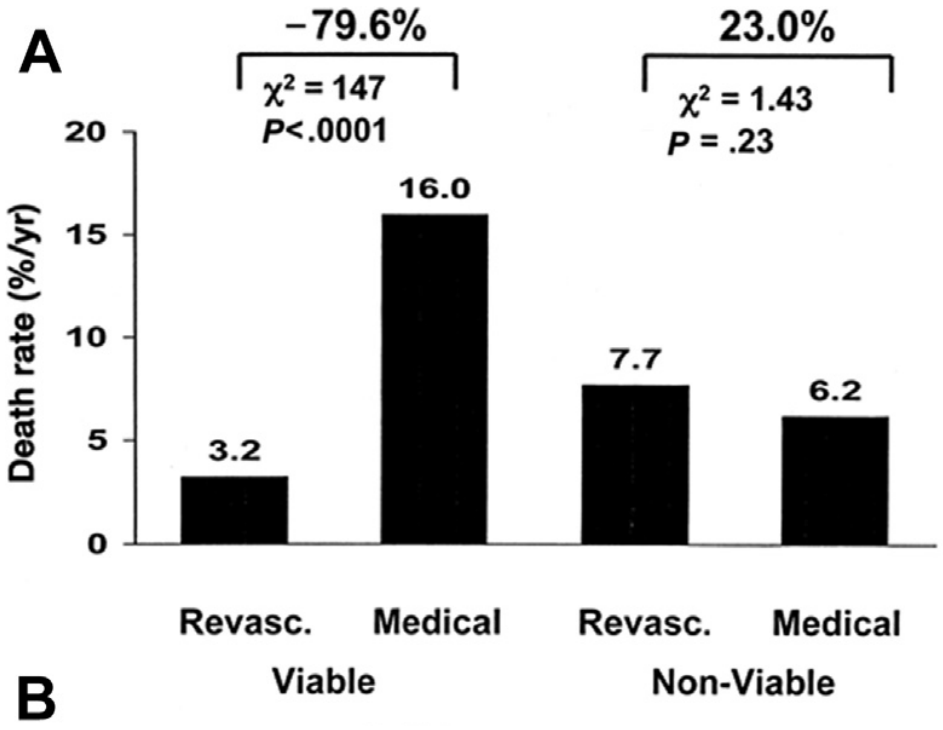
How to identify responders?



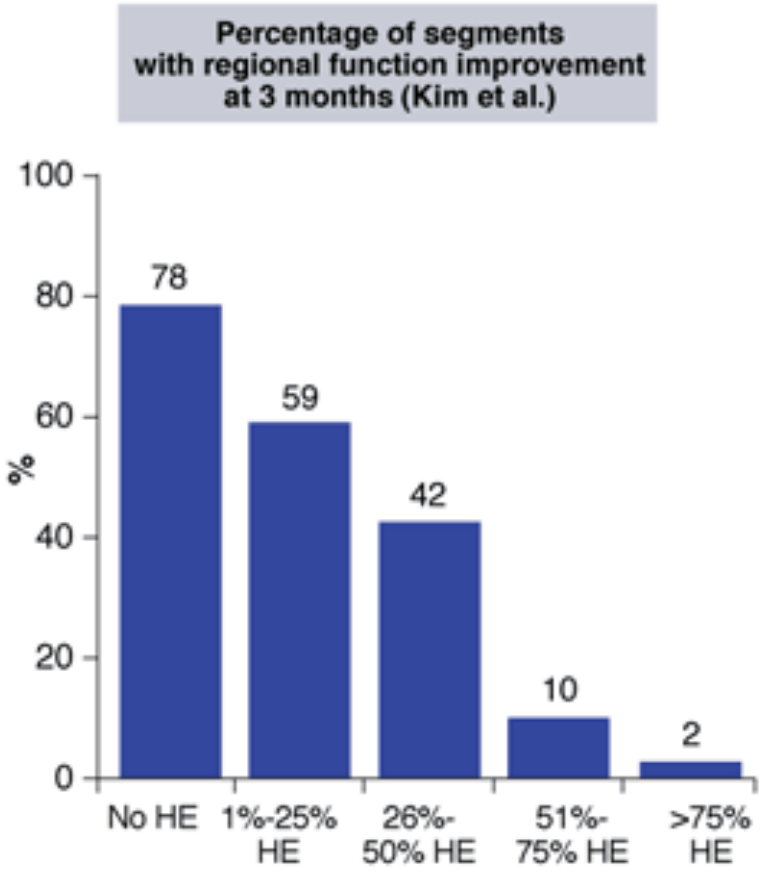
Viability is the answer

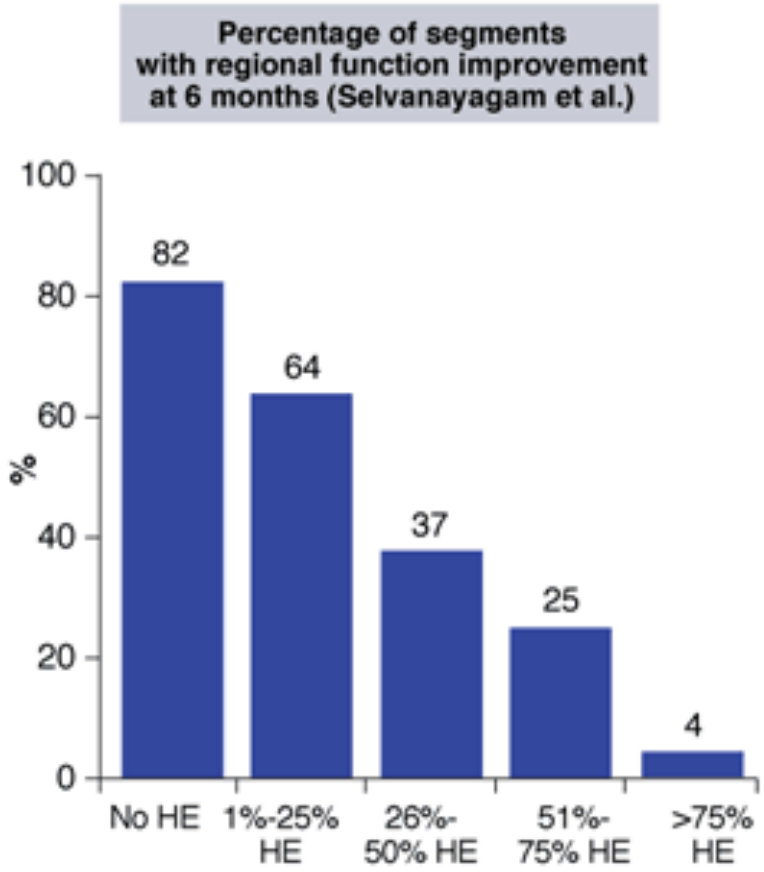
Myocardial Viability Testing to Guide Coronary Revascularization

Adrián I. Löffler, MD[a], Christopher M. Kramer, MD[a,b,*]

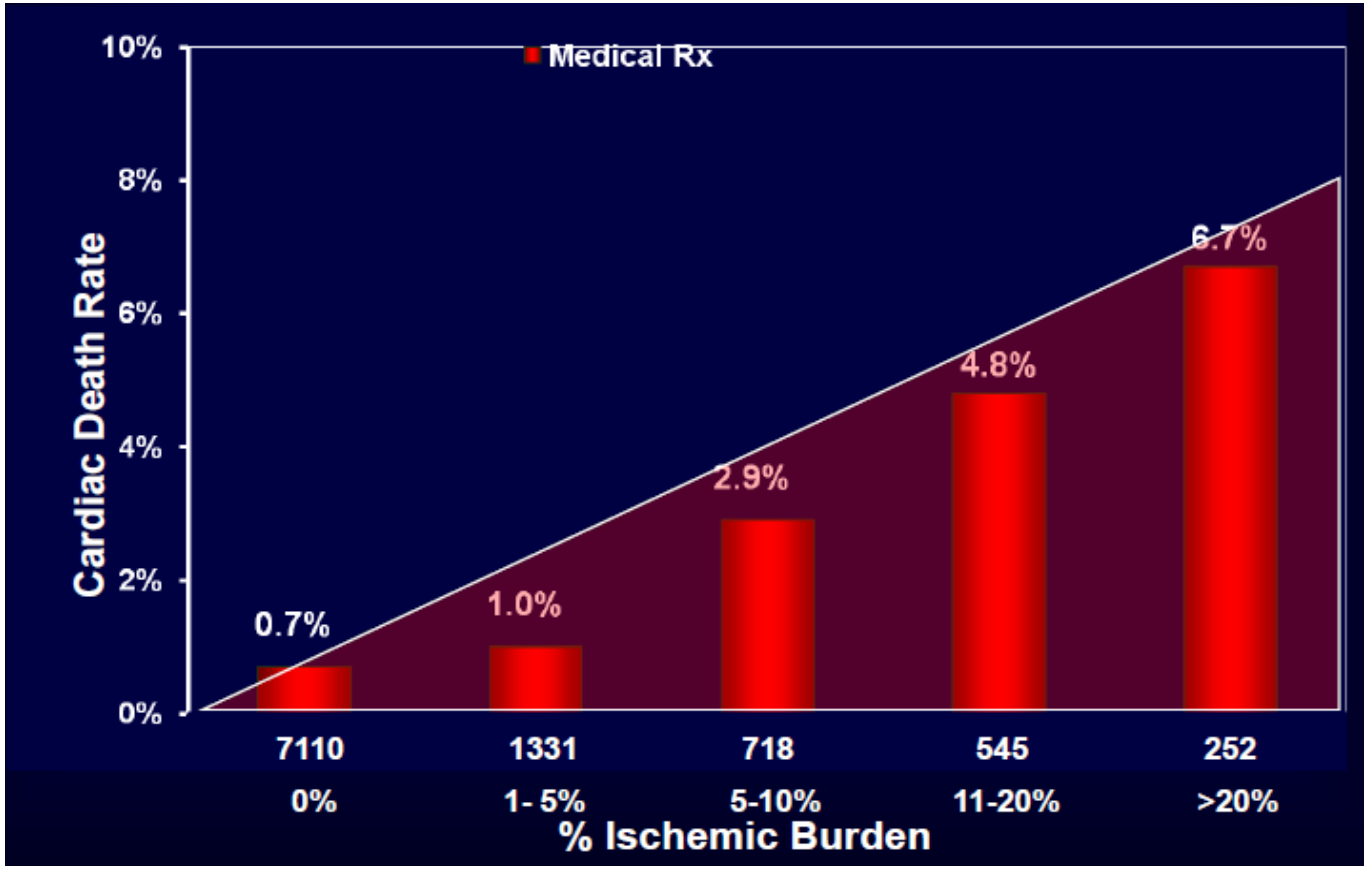


Intervent Cardiol Clin 2018; 7: 355–365

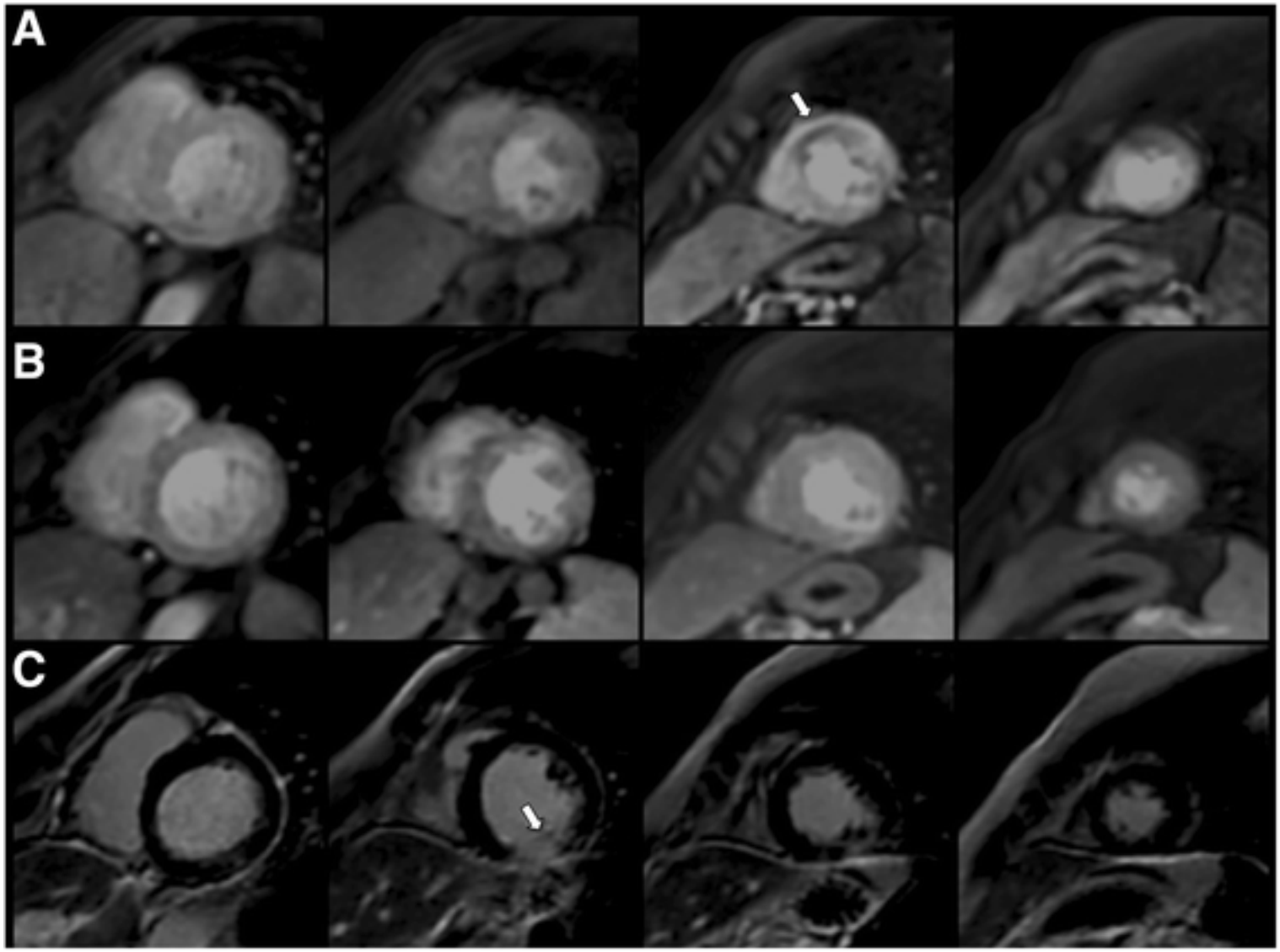

Percentage of segments with regional function improvement at 3 months (Kim et al.)
100
80
60
40
20
0
%
78
59
42
10
2
No HE
1%-25% HE
26%-50% HE
51%-75% HE
>75% HE


Percentage of segments with regional function improvement at 6 months (Selvanayagam et al.)
100
80
60
40
20
0
%
82
64
37
25
4
No HE
1%-25% HE
26%-50% HE
51%-75% HE
>75% HE

And what about ischemia?



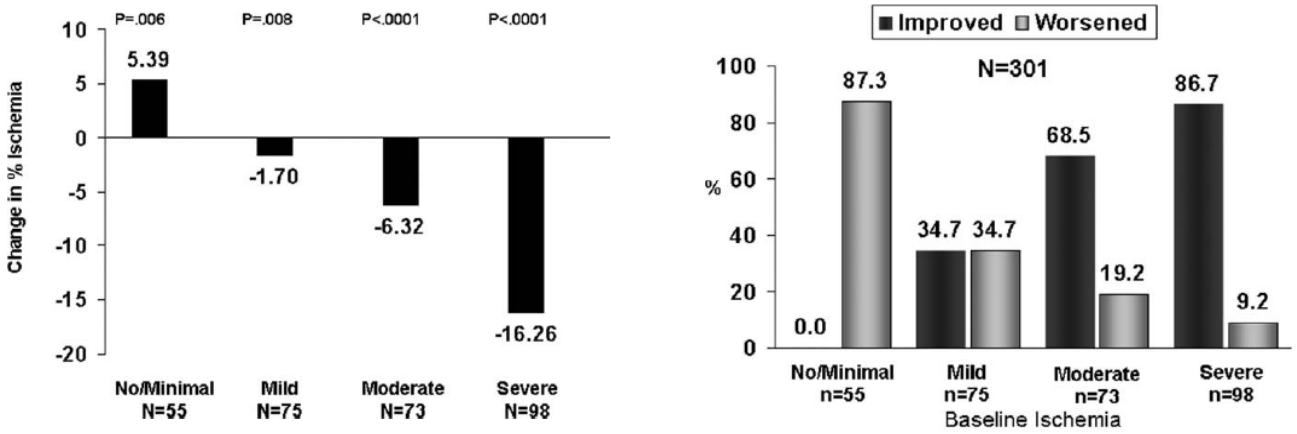
Hachamovitch / Circulation. 2003;107:2900-2906.


A
B
C

CTO PCI: Reduction of ischemic burden

301 patients undergoing SPECT/PET before and after CTO recanalization

Improvement with ischemic burden > 12%



- The mean reduction in myocardial ischemic burden after CTO PCI was 6.2% ± 6.0%
- **ischemic burden > 12.5% predictive of improvement in myocardial ischemic burden following CTO PCI**
- Ischemic burden < 6.25% predictive of worsening ischemia following CTO PCI
- **patients with 5% reduction in ischemic burden post-PCI experienced fewer clinical events, in particular death and TVR**

Safley et al, Cathet Cardiovasc Interv 2011;78:337–343

At what cost?

Complications? Success rate?

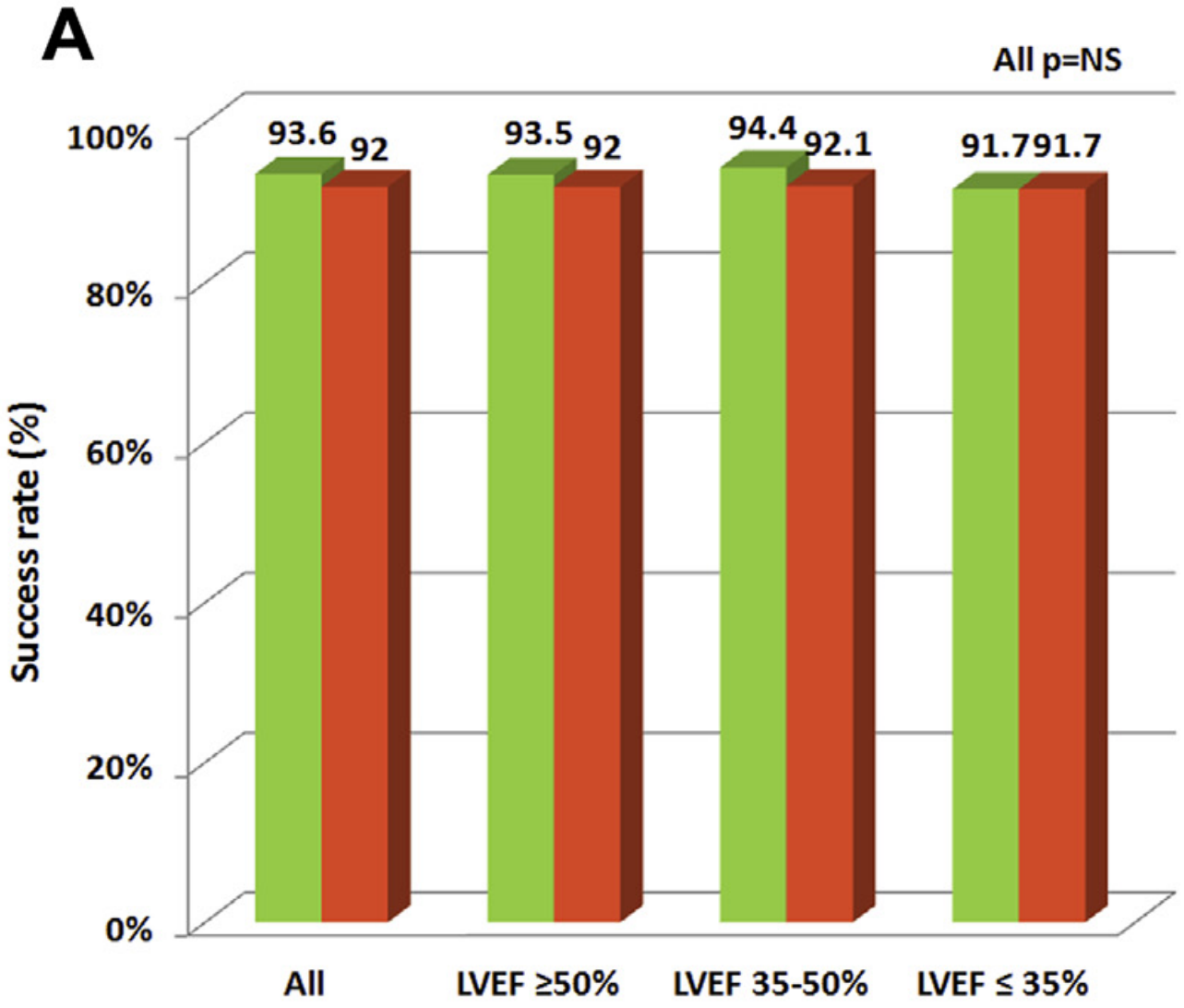
Complications

TABLE 4 Periprocedural Complications

	All CTO PCI (N = 839)	LVEF ≥50% CTO PCI (n = 552) (Group 1)	LVEF 35%-50% CTO PCI (n = 215) (Group 2)	LVEF ≤35% CTO PCI (n = 72) (Group 3)
Coronary perforation without tamponade	21 (2.5)	17 (4.5)	6 (2.8)	3 (4.2)
Coronary perforation with tamponade	13 (1.5)	8 (1.4)	5 (2.3)	0
Need for emergency CABG	1 (0.1)	1 (0.2)	0	0
Death	0	0	0	0
Non–Q-wave MI	7 (0.8)	3 (0.5)	4 (1.9)	0
Q-wave MI	2 (0.2)	2 (0.4)	0	0
Stent thrombosis	2 (0.2)	1 (0.2)	1 (0.5)	0
TVR	4 (0.5)	2 (0.4)	2 (0.9)	0
Stroke	0	0	0	0
Major bleeding	3 (0.4)	2 (0.4)	1 (0.5)	0

J Am Coll Cardiol Intv 2017;10:2158–70

Success rate



J Am Coll Cardiol Intv 2017;10:2158–70

Conclusions

- It was demonstrated that the presence of the chronic total occlusion of a coronary artery in patients with systolic ischemic heart failure resulted in a poorer long-term prognosis.
- The revascularization of coronary chronic total occlusions seems to be a promising treatment strategy in terms of long-term prognosis improvement in patients with heart failure.
- However, the strategy requires verification in further, well-designed and powered randomized trials.
- Viability is necessary to improve symptoms, systolic function and prognosis
- Complications and success rate in CTO PCI in patients with low EF are not signficantly different from those recorded in normal EF patients

CTO PCI in heart failure (with viability)