LV Functional Recovery after CTO PCI.

Serial CMR substudy of the Explore trial.
CTO PCI after STEMI

On behalf of the EXPLORE Trial investigators

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Disclosure Statement of Financial Interest

Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation/Financial Relationship

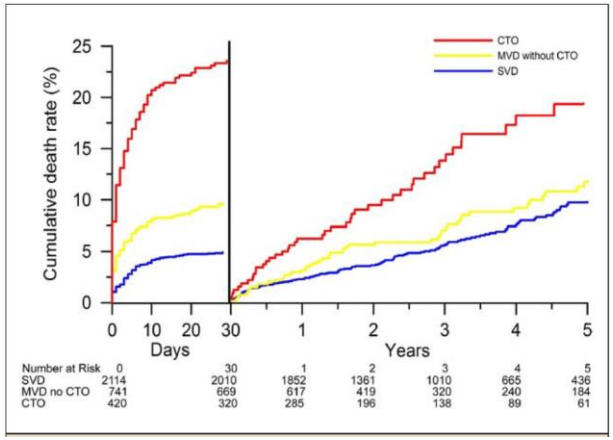
- Grant/Research Support

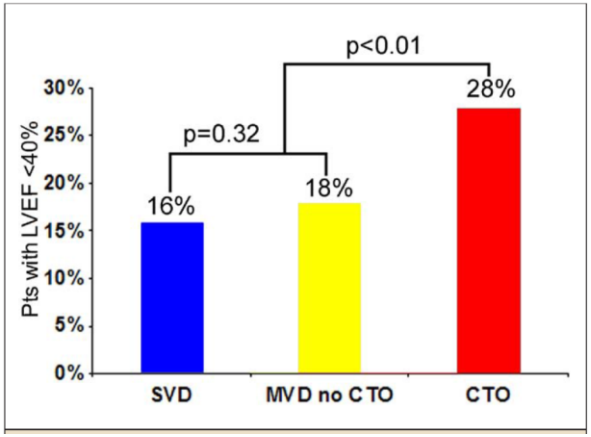
Company

- Abbott Vascular
- Abiomed Inc
- Biotronik
- BBraun

Background

- CTO in non-IRA in 10% of STEMI patients
- Excess mortality in MVD patients mainly driven by presence of CTO
- Reduced LV function in MVD patients mainly driven by presence of CTO





Van der Schaaf et al, *Heart*, 2006
Claessen et al. *JACC: Cardiovascular Interventions*, 2009

EXPLORE Trial design

- **Patients**

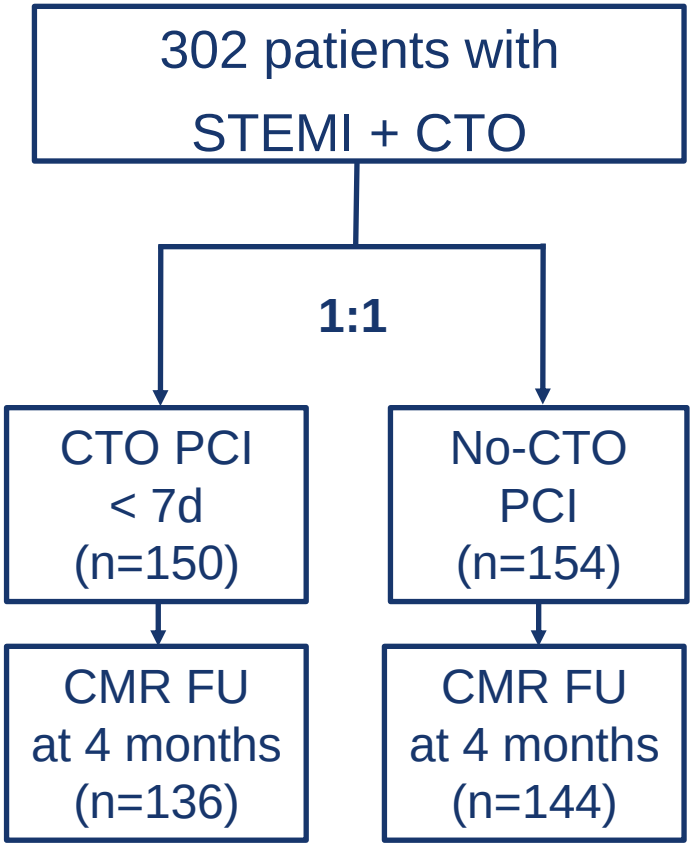
  300 Patients with STEMI treated with pPCI and with a non-infarct related CTO.

- **Design**

  Global, multi-center, randomized, prospective two-arm trial with either PCI of the CTO or no CTO intervention after STEMI. Blinded evaluation of endpoints

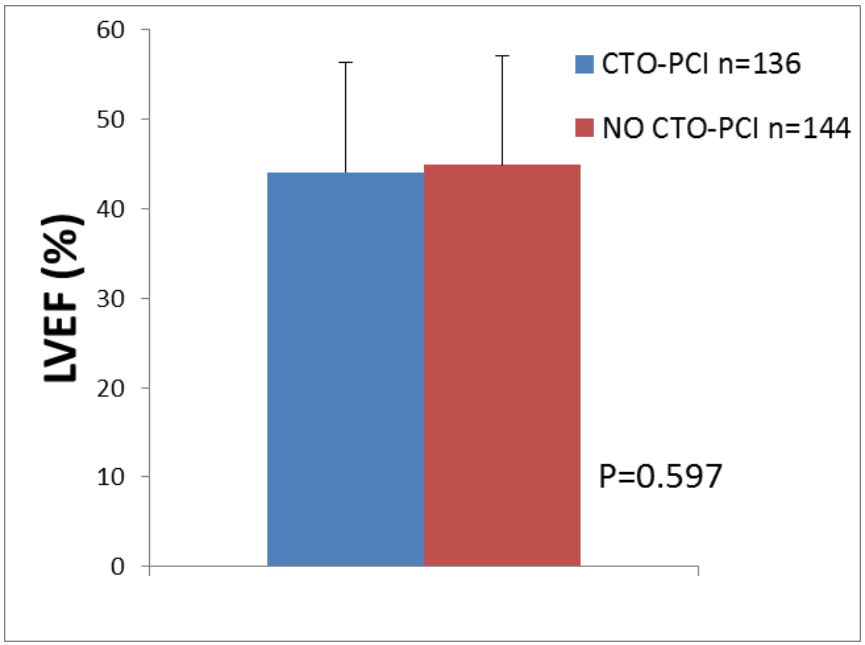
- **Objective**

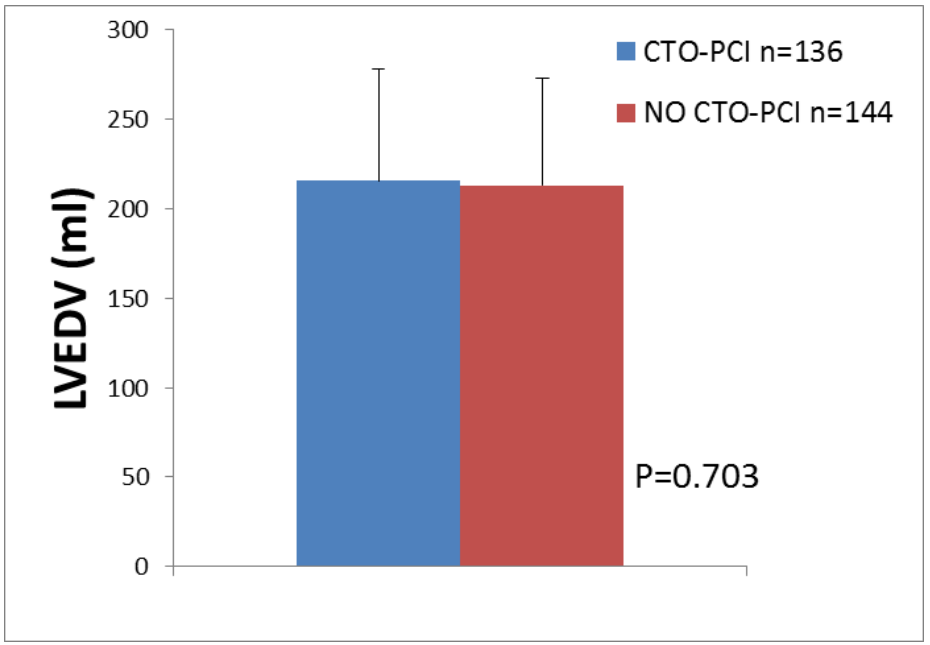
  To determine whether PCI of the CTO within seven days after STEMI results in a higher LVEF and a lower LVEDV assessed by CMR at 4 months



EXPLORE Trial Outcome

- **Early CTO-PCI :**
  - **not associated with higher LVEF and lower LVEDV @ 4 months**





CTO-PCI in the LAD was associated with higher LVEF @ 4 months
47.2±12.3% vs. 40.4±11.9%, p=0.02

Henriques et al, *JACC*, 2016

EXPLORE serial CMR substudy - Objectives

GLOBAL LVF

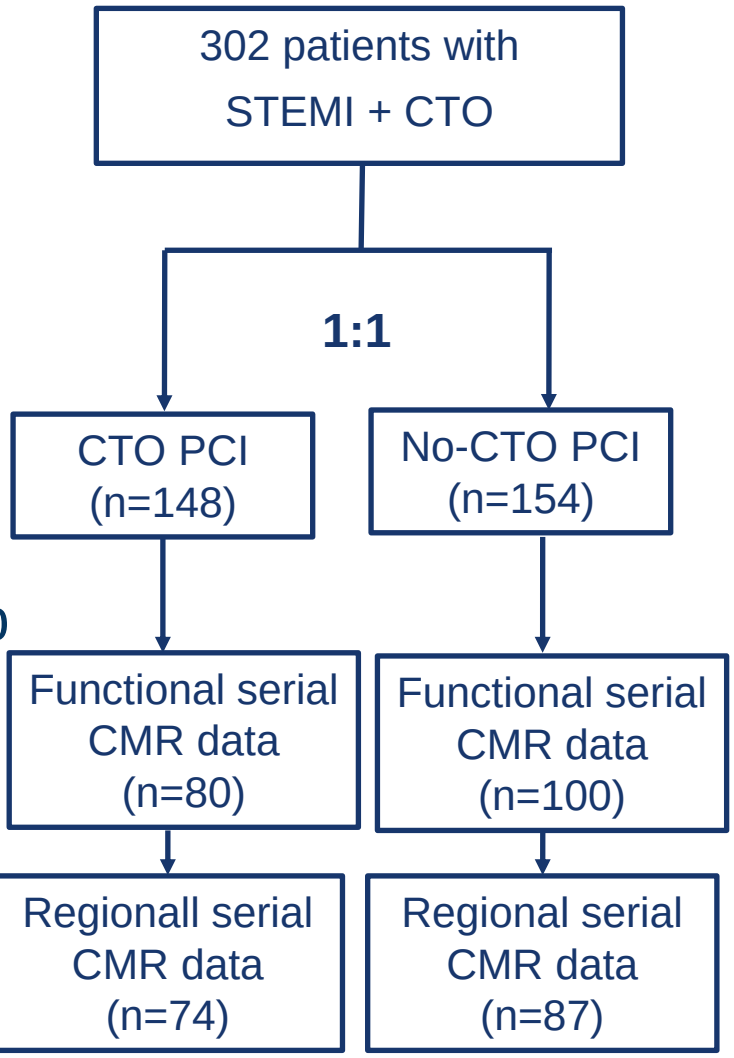
- In-depth analysis of global functional recovery
- In-patient analysis serial CMR analysis allows to correct for possible baseline differences
- Impact of CTO Location

REGIONAL LVF

- On regional level lower %dysfunctional segments/patient after CTO PCI vs. no-CTO PCI at 4 months FU
  - (58 ±27% versus 62 ±27%, p= 0.30)
- However, no quantitative analysis in single segments performed

Serial CMR data

- CMR core laboratory
- CMR allows analysis of regional segmental outcome (segmental wall thickening (SWT))
- Dysfunctional segm= SWT<45%
- Serial: Baseline to 4 month FU



Functional recovery

Variable	CTO-PCI (n=80)	No CTO-PCI (n=100)	P-value
LVEF@Baseline	40.6 (11.8)	41.7 (12.1)	0.55
LVEF @ FUP	45.3 (11.6)	45.5 (11.8)	0.87
Δ LVEF	4.6 (8.3)	3.8 (8.1)	0.52
LVEDV@Baseline (ml)	210.1 (53.4)	209.5 (55.1)	0.95
LVEDV @ FUP	215.6 (54.6)	212.5 (53.9)	0.71
Δ LVEDV	5.5 (32.4)	3.0 (25.7)	0.57

Serial global functional CMR data available in 180 pts
Patients with and without serial CMR were comparable

Impact of CTO location

	CTO LAD			CTO non-LAD		
	CTO-PCI (n=36)	No CTO-PCI (n=39)	P-value	CTO-PCI (n=112)	No CTO-PCI (n=115)	p-value
Age (years, mean, SD)	64(9)	60(12)	0.13	58(10)	60(10)	0.33
Male gender (%)	83	74	0.41	90	84	0.23
Infarct related artery			1.0			0.22
RCA (%)	75	74		17	16	
CX (%)	22	23		20	30	
LAD (%)	3	3		63	55	
3-VD (%)	47	36	0.36	40	46	0.42
MI SYNTAX score II	30(7)	30(11)	0.38	25(9)	26(9)	0.86
LVEF at baseline (mean, SD)*	44(11)	38(14)	0.07	39(11)	43(12)	0.05

Global LV recovery

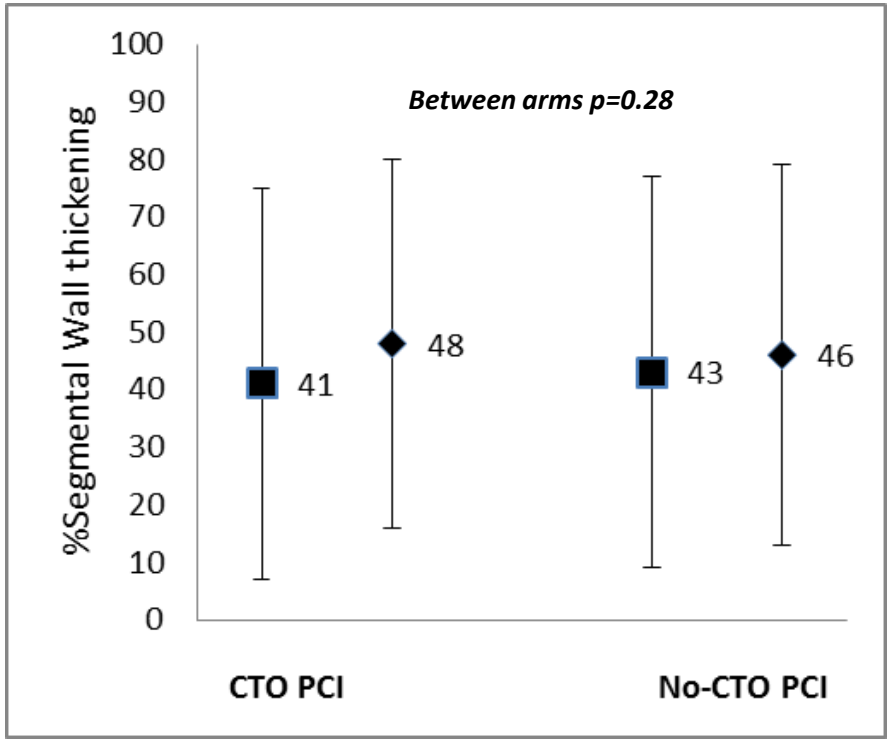
	CTO LAD			CTO non-LAD		
Variable	CTO-PCI (n=25)	No CTO-PCI (n=22)	P-value	CTO-PCI (n=55)	No CTO-PCI (n=78)	P-value
LVEF (%)						
Baseline	44.5 (11.6)	36.7 (13.5)	0.04	38.9 (11.6)	43.1 (11.4)	0.04
4 months FU	48.4 (10.5)	40.6 (12.6)	0.03	43.8 (11.9)	46.9 (11.2)	0.13
Δ LVEF	3.9 (9.2)	3.8 (7.3)	0.97	5.0 (7.9)	3.8 (8.4)	0.44
LVEDV (ml)						
Baseline	197.1 (57.4)	231.1 (64.8)	0.06	216.0 (51.0)	203.4 (50.8)	0.16
4 months FU	203.4 (64.0)	227.1 (70.7)	0.23	221.1 (49.4)	208.4 (48.0)	0.14
Δ LVEDV	6.3 (23.6)	-4.0 (29.6)	0.19	5.1 (35.9)	5.0 (24.3)	0.98

Success rate CTO-PCI: 80.6% versus 71.2% (p=0.27)

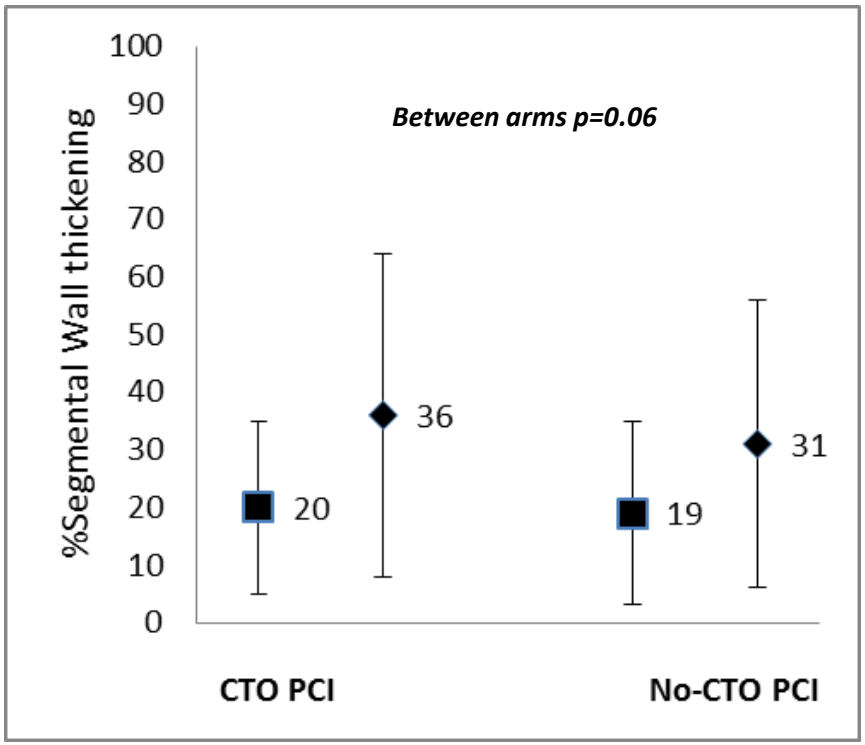
Regional segmental recovery

Change in % SWT (baseline to 4 months)

All segments (s= 2576)



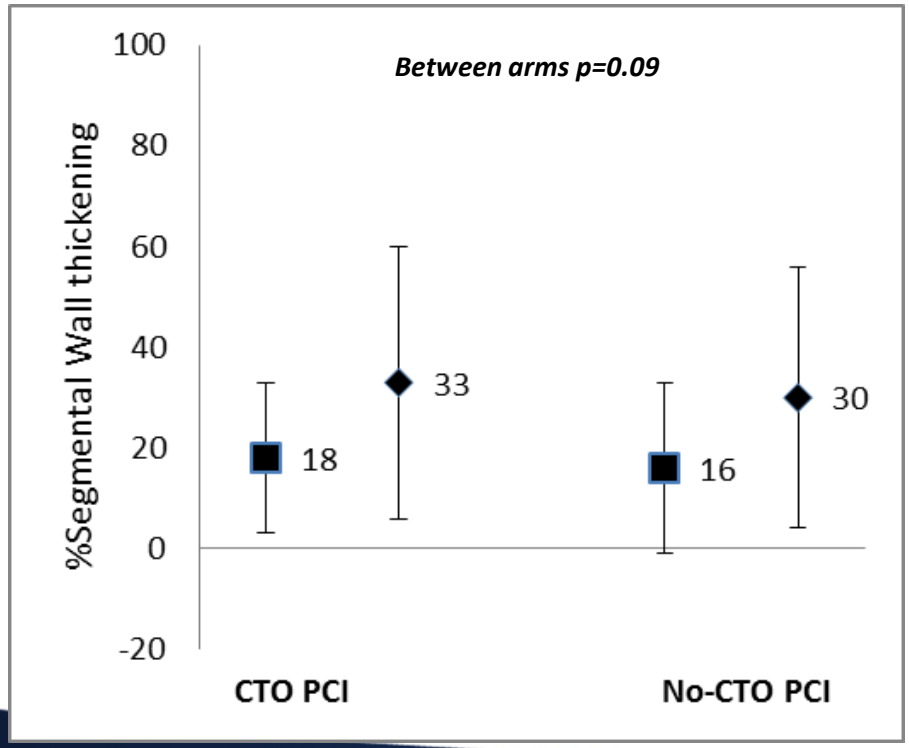
Dysfunctional segments SWT<45% (s=1511)



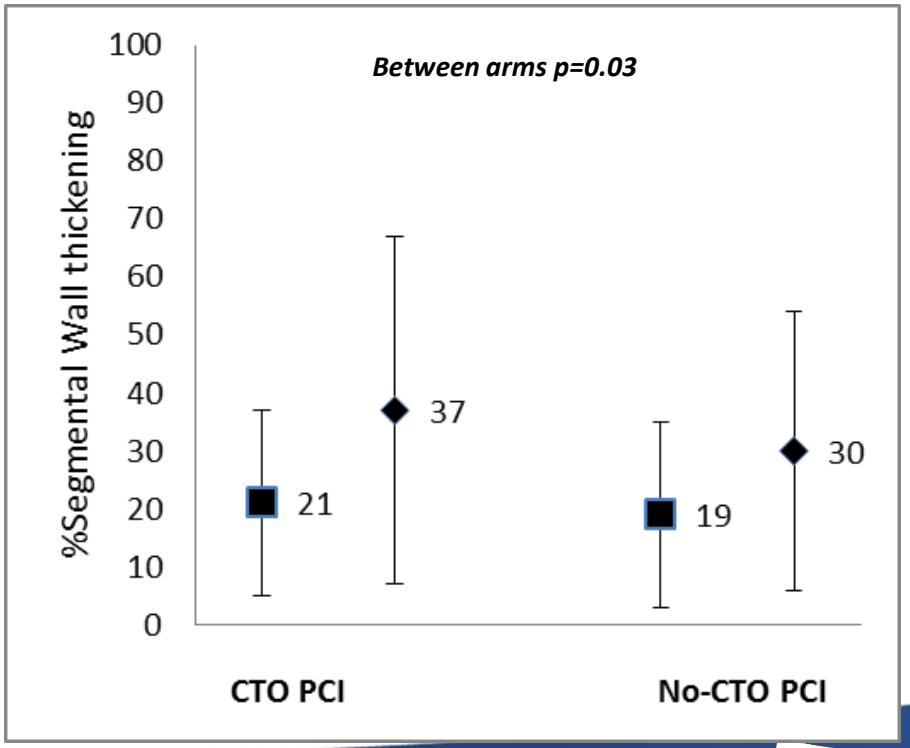
Recovery in CTO territory

- **Change in %SWT (baseline to 4 months) in CTO territory**

All segments (s= 845)

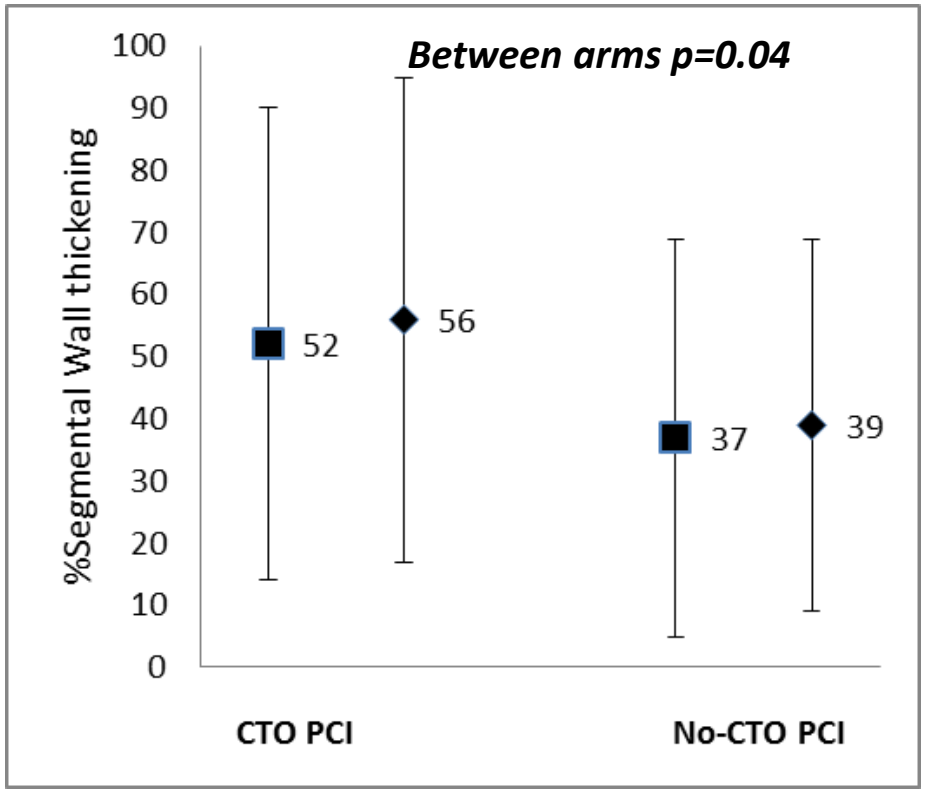


Dysfunctional segments (s=501)

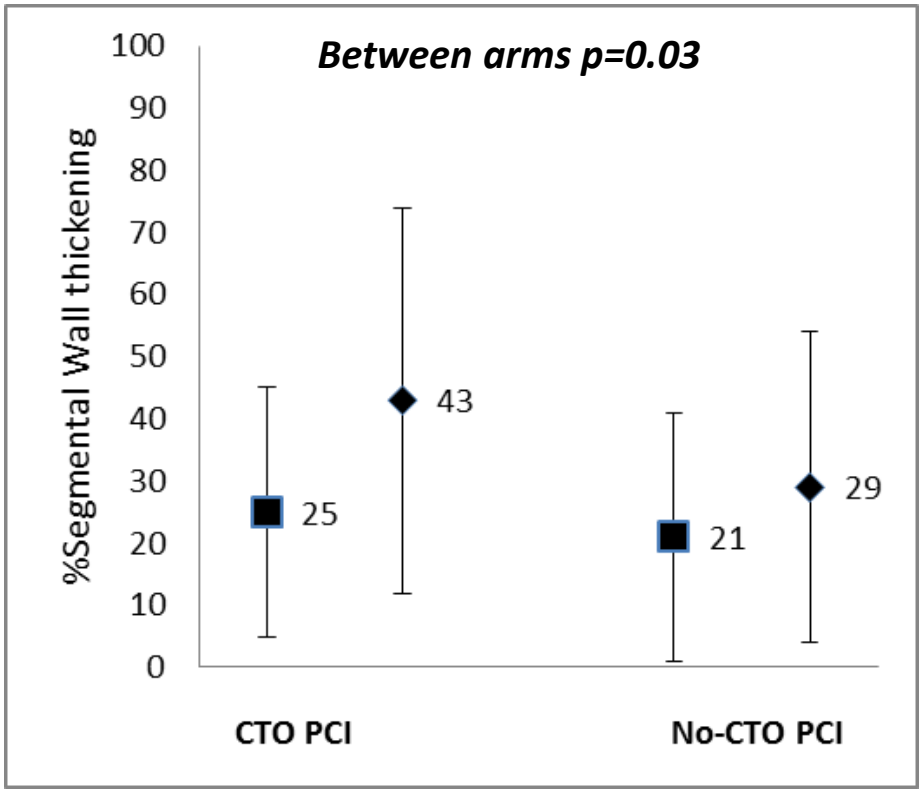


Impact of location – CTO LAD

all segments (s=640)

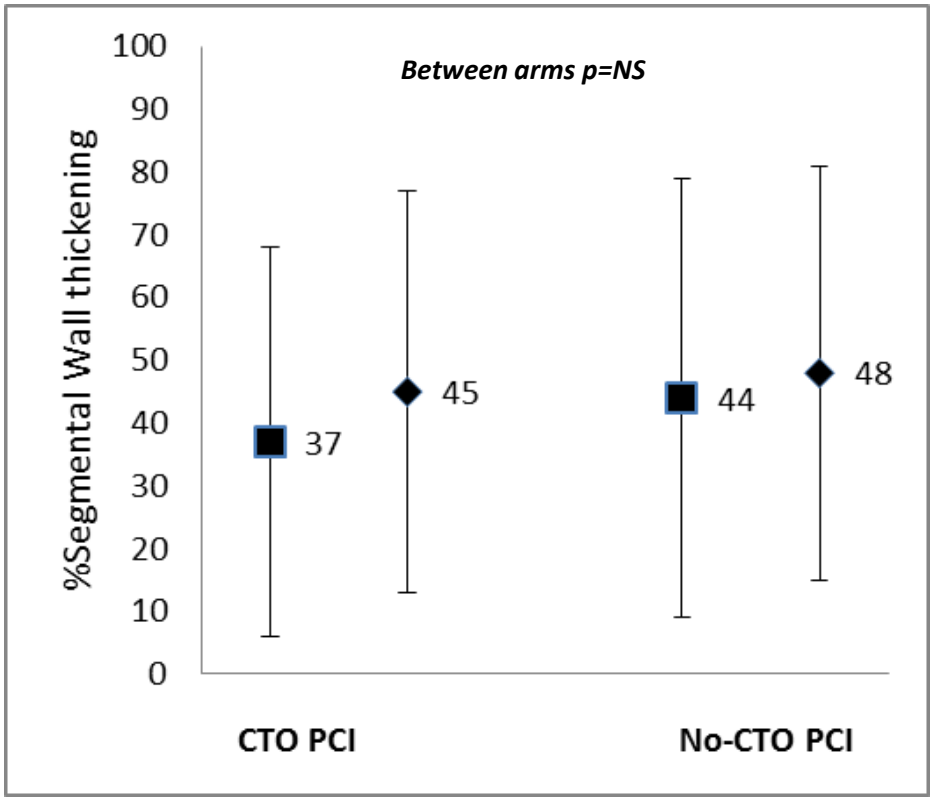


dysfunctional segments (s=374)

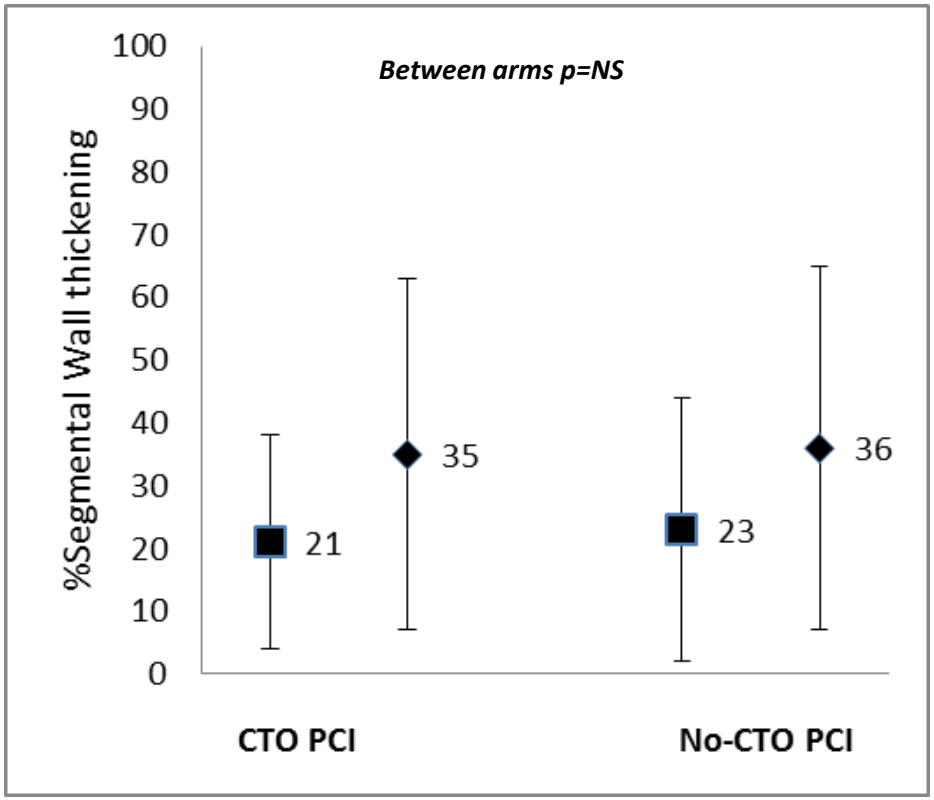


Impact of location – CTO nonLAD

all segments (s=1936)

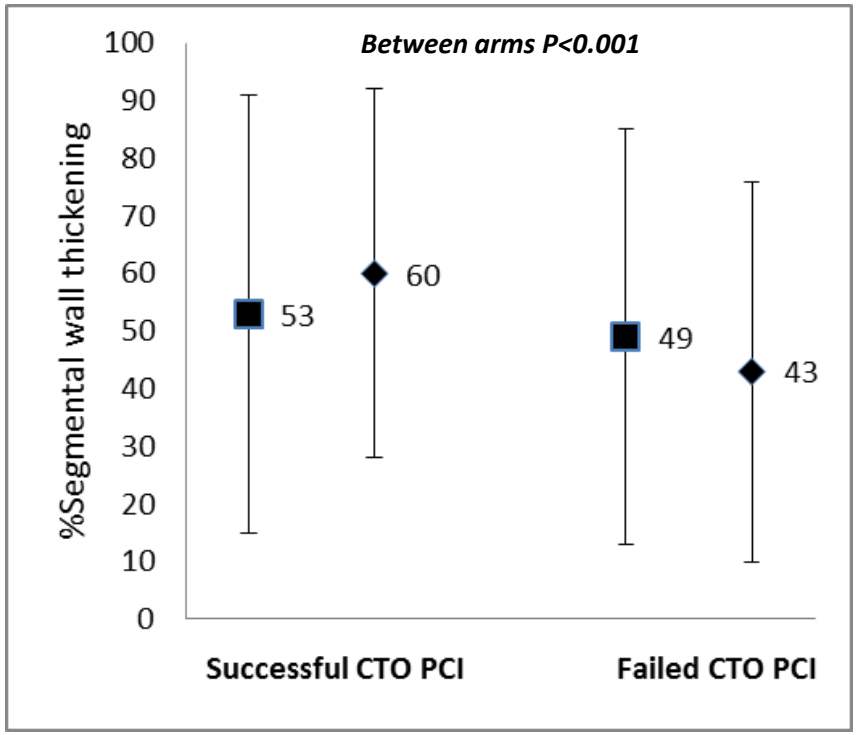


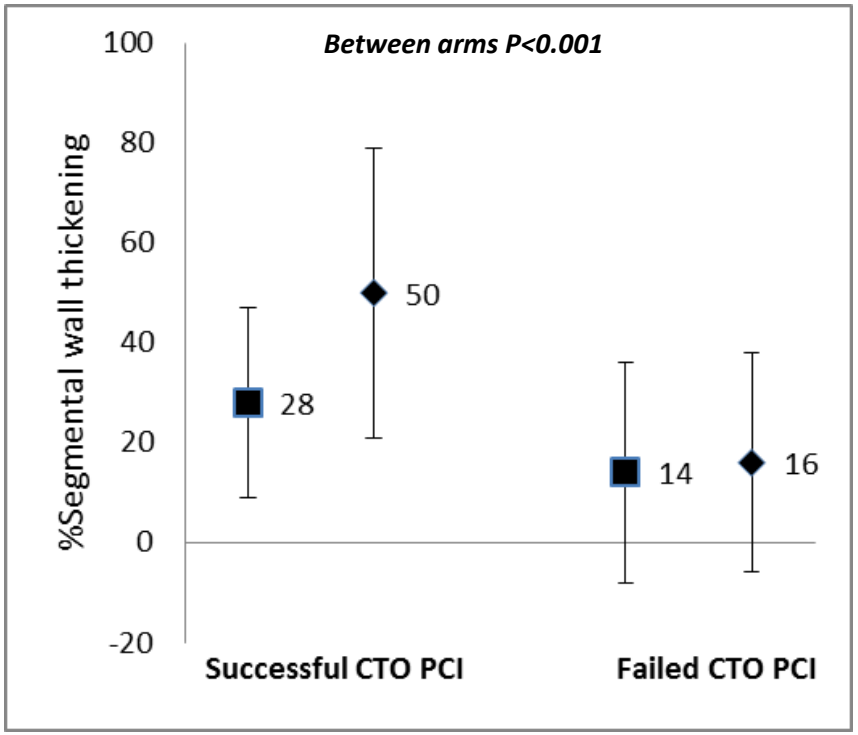
dysfunctional segments (s=1210)



Impact of success in CTO LAD vs CTO non-LAD

- **LAD: all segments (s=352) and dysfunctional segments (s=173)**





Limitations

- Small sample size
- Relatively low number of analyzable segments
- Baseline LVEF was different in the different subgroups
- Baseline CMR was not performed in all patients

- However, largest paired CMR dataset in the CTO field

Conclusion

- Serial CMR confirm primary endpoints of Explore trial on global LV
- However, baseline characteristics in the subgroups differed significantly
- CTO PCI compared with no-CTO PCI associated with a greater recovery of regional segmental outcome, especially in the CTO territory
- The positive effect of CTO PCI on regional segmental outcome did not lead to a significant effect on global functional outcome

- No data on the effect of recovery of regional myocardial function and its impact on myocardial electrical stability and the translation to clinical outcome
- Further research is needed to understand the effect of CTO PCI on regional segmental recovery and its clinical impact

Submitted

STILL A LOT TO XPLORE

www.exploretrial.com