Culprit lesion thrombus burden after manual aspiration thrombectomy or PCI alone in STEMI

The OCT Substudy of the TOTAL (ThrOmbecTomy versus PCI Alone) Trial

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On behalf of the TOTAL OCT Investigators

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Health Through Knowledge
PHRI

Disclosures

Speaker's name: Tej Sheth

☑ **I have the following potential conflicts of interest to report:**
- Honorarium: ST. JUDE MEDICAL
- Institutional grant/research support: ST. JUDE MEDICAL

- The TOTAL OCT Substudy was supported by grants from
- St. Jude Medical and McMaster University Division of Cardiology

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Background

Hypotheses for the lack of benefit of routine thrombectomy:
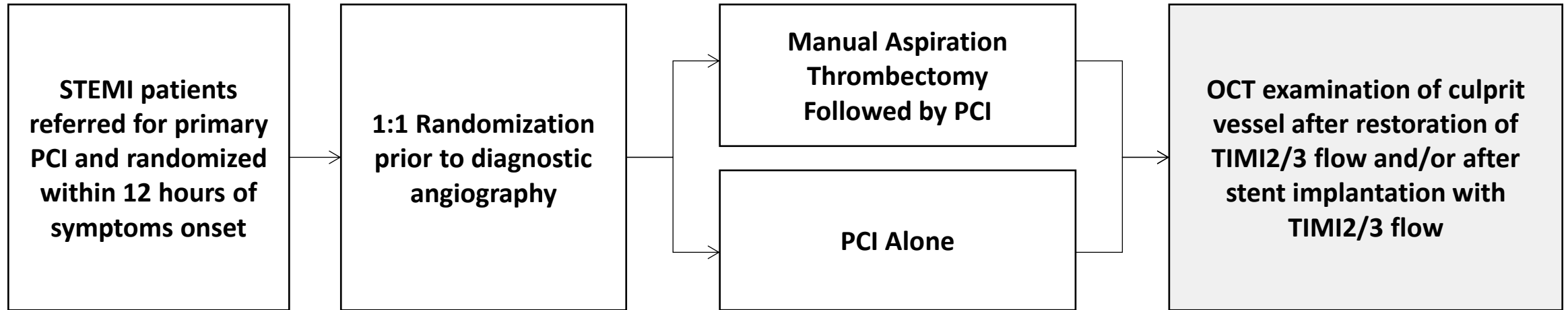
- **There is substantial residual thrombus left behind after thrombectomy**

- **The average culprit lesion thrombus can be treated with PCI alone and is not sufficiently large to require routine aspiration strategy**

PPCI without thrombectomy 5.27 ±4.20mm³
PPCI with thrombectomy 5.55 ±5.65mm³
P=0.75
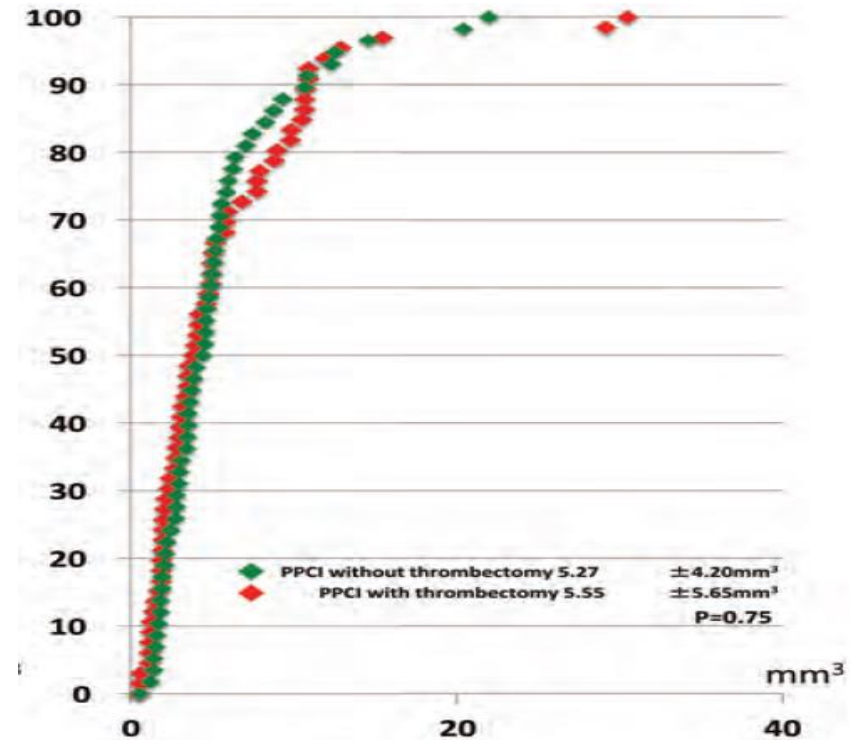
Impact of thrombectomy on thrombus measured prior to stent placement is unknown

Jolly SS et al. N Engl J Med 2015.
Onuma Y et al. Eur Heart J 2013.

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Design

- **OCT imaging was performed using the Ilumien™ OCT system and C7 Dragonfly™ catheter (St Jude Medical, Minnesota, USA)**

- **Enrolment in 13 sites in 5 countries**

- **A sample size of 200 patients would provide 84% power to detect a 30% reduction in a control thrombus burden of 12% assuming 80% of pre-stent OCTs were assessable**

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OCT Imaging Outcomes
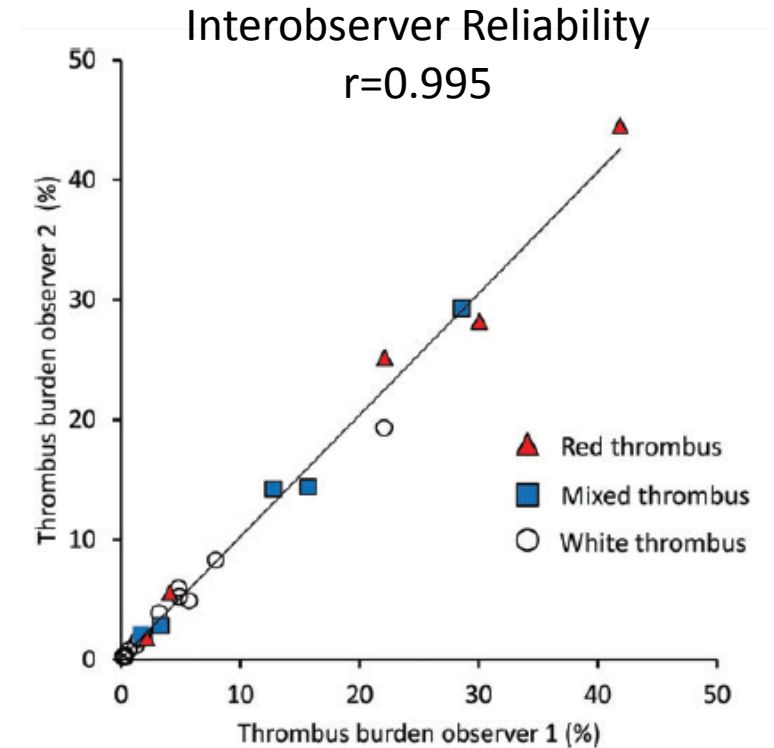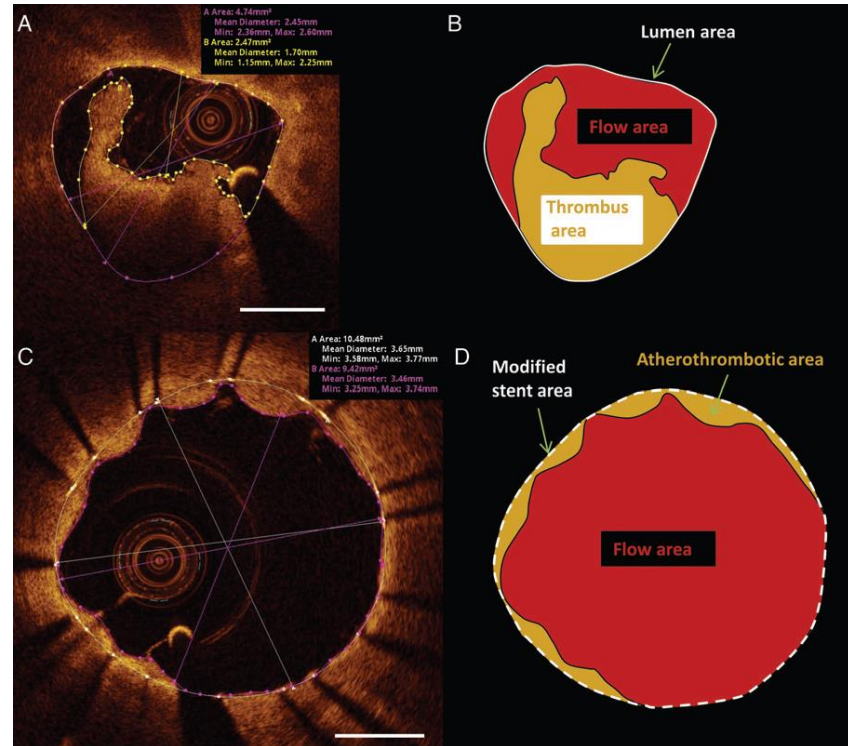
Primary Outcome

Pre-stent thrombus burden (%)

Key Secondary Outcomes

Pre-stent absolute thrombus volume (mm³)
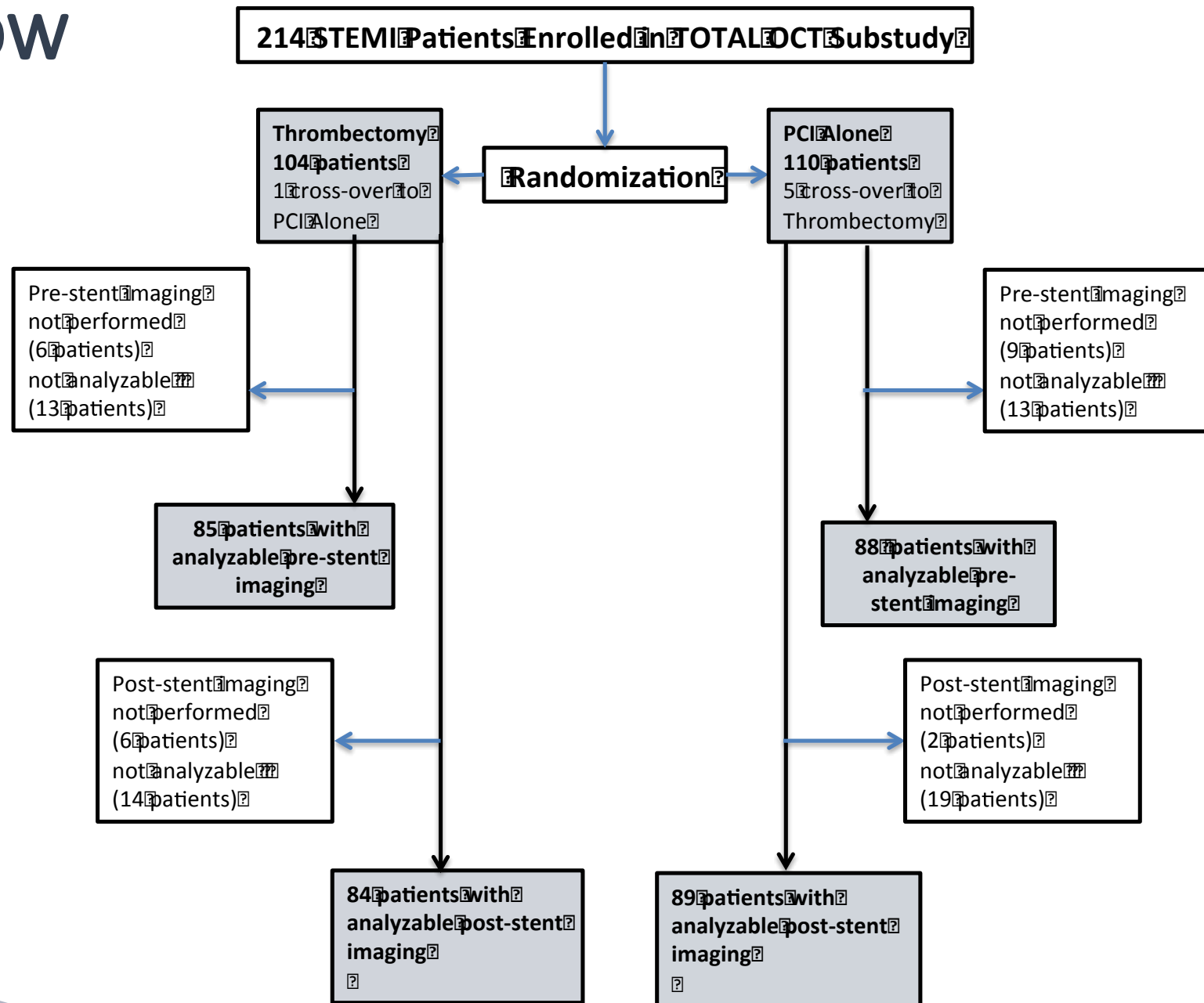
Pre-stent quadrants of thrombus

Post-stent atherothrombotic burden (%)

Post stent atherothrombotic volume (mm³)

OCT Core Lab: Tampere University Hospital, Tampere, Finland

Patient Flow

214 STEMI Patients Enrolled in TOTAL OCT Substudy

Randomization

Thrombectomy
104 patients
1 cross-over to PCI Alone

PCI Alone
110 patients
5 cross-over to Thrombectomy

Pre-stent imaging not performed (6 patients) not analyzable (13 patients)

Pre-stent imaging not performed (9 patients) not analyzable (13 patients)

85 patients with analyzable pre-stent imaging

88 patients with analyzable pre-stent imaging

Post-stent imaging not performed (6 patients) not analyzable (14 patients)

Post-stent imaging not performed (2 patients) not analyzable (19 patients)

84 patients with analyzable post-stent imaging

89 patients with analyzable post-stent imaging

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Baseline Characteristics

	Thrombectomy N=104	PCI alone N=110
Mean Age	60.2 years	61.6 years
Male	77%	82%
Anterior MI	38%	44%
Symptom onset to device time	150 min	163 min
Pre PCI TIMI 0/1 flow	64%	68%
Pre PCI TIMI thrombus grade ≥3	74%	71%
Post PCI TIMI 3 flow	91%	94%
PCI Procedure time	61 min	54 min

TOTAL

OCT Outcomes

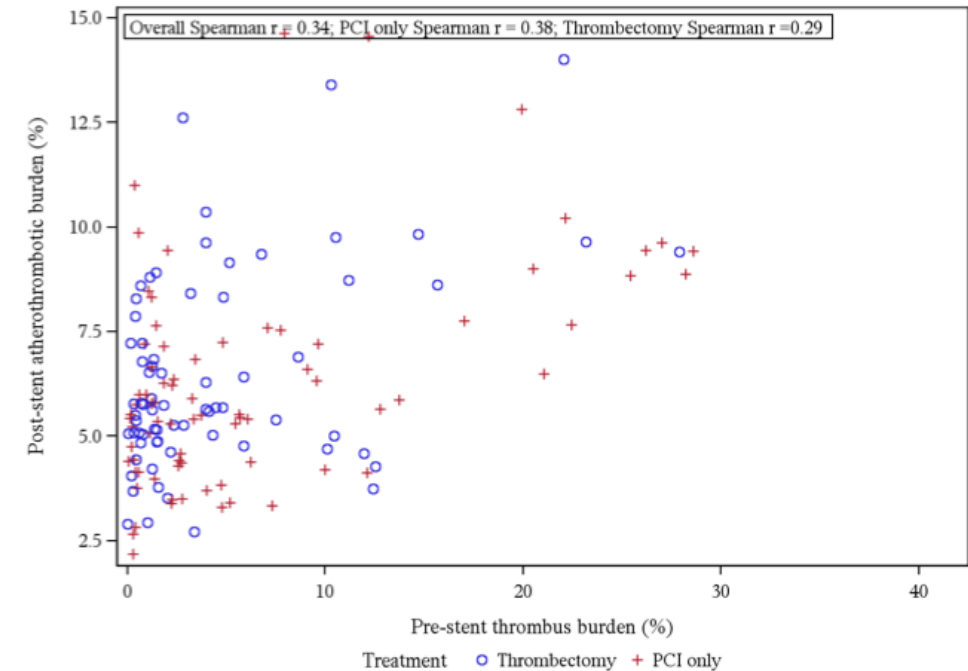|	Thrombectomy Mean (95% CI)	PCI alone Mean (95% CI)	p
Pre Stent	N=85	N=88	
Thrombus Burden (%)	2.36 (1.73-3.22)	2.88 (2.12 – 3.90)	0.37
Absolute Thrombus volume (mm^3)	2.99 (2.18 – 4.12)	3.74 (2.73 – 5.10)	0.33
Quadrants of thrombus (number)	26.88 (21.94-32.92)	29.69 (24.38-36.15)	0.49

Thrombus Burden (%)

Absolute Thrombus volume (mm^3)

TOTAL
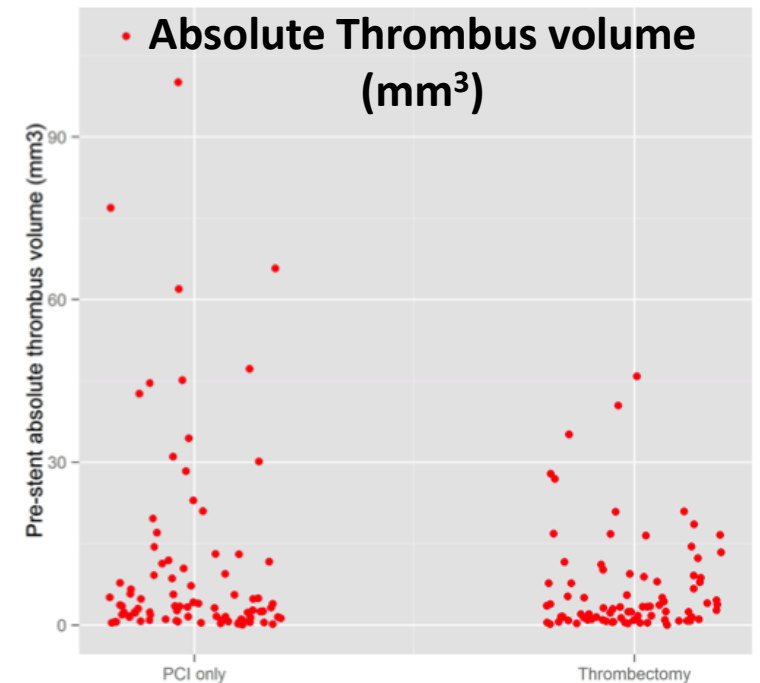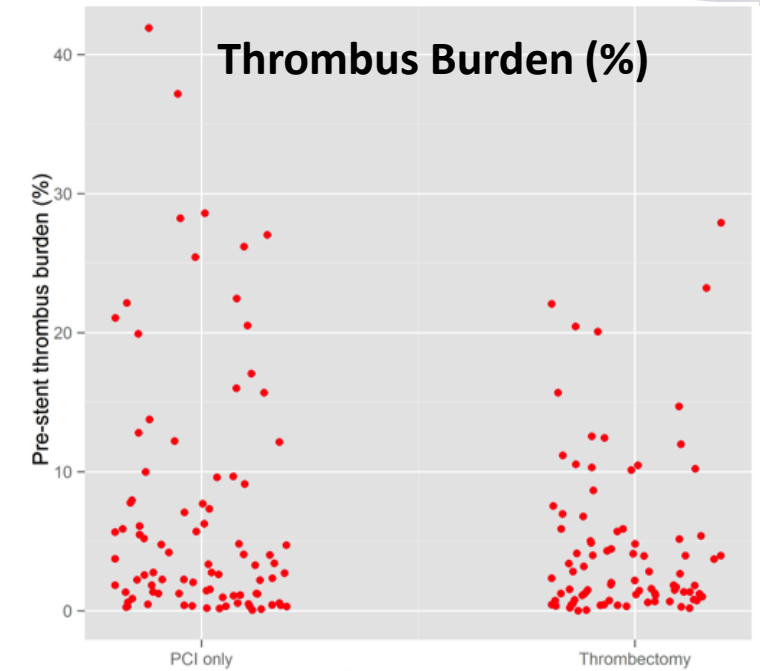
OCT Outcomes

	Thrombectomy Mean (95% CI)	PCI alone Mean (95% CI)	p
Post Stent	N=84	N=89	
Atherothrombotic Burden (%)	6.23 (5.74 – 6.76)	5.71 (5.27 – 6.18)	0.136
Absolute Atherothrombotic volume (mm3)	14.88 (12.98 – 17.06)	13.27 (11.63 – 15.16)	0.238

Pre-stent Thrombus Burden vs Post-stent Atherothrombotic Burden

r=0.34

Overall Spearman r = 0.34; PCI only Spearman r = 0.38; Thrombectomy Spearman r =0.29

Post-stent atherothrombotic burden (%)

Pre-stent thrombus burden (%)

Treatment ○ Thrombectomy + PCI only

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Limitations

- **We may have underestimated prevalence of high thrombus burden patients**
  - **High residual thrombus may have caused reocclusion or inability to clear blood**
  - **Passage of image device may have resulted in displacement of thrombus**
  - **Operators may not have enrolled patients with extreme thrombus burden**

- **Observed pre-stent OCT thrombus burden lower than anticipated, study may have been underpowered**

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Conclusion

- **Pre-stent thrombus burden and post-stent atherothrombotic burden were not different between thrombectomy and PCI alone.**

- **Thrombectomy and PCI alone resulted in a low average thrombus burden at the lesion site after the initial intervention to restore flow.**

- **Both strategies were effective in reducing thrombus burden at the culprit lesion site in most patients with STEMI**

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FASTTRACK **CLINICAL RESEARCH**

Culprit lesion thrombus burden after manual thrombectomy or percutaneous coronary intervention-alone in ST-segment elevation myocardial infarction: the optical coherence tomography sub-study of the TOTAL (ThrOmbecTomy versus PCI ALone) trial

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