Is There Still A Role For Aspiration Thrombectomy In STEMI (Practice And Guidelines)

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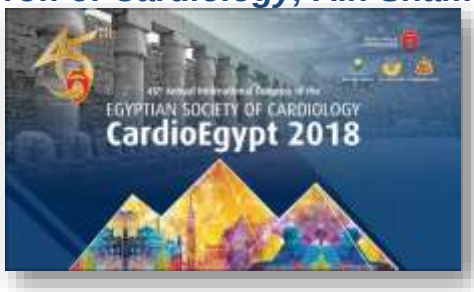
Prof. of Cardiology; Ain Shams

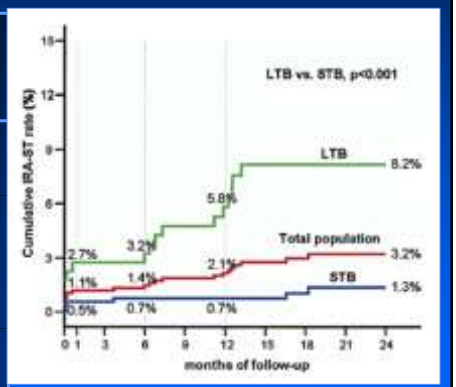


Impact of Thrombus Burden

798 STEMI patients treated with DES

	Small Thrombus	Large Thrombus
Final TIMI 3	94.9%	83.6%*
TMPG-3	53.2%	35.4%*
No-reflow	0.5%	4.0%*
Distal embolization	3.5%	17.3%*

P<0.001



↑risk stent thrombosis

Sianos G. JACC 2007;50:573-83

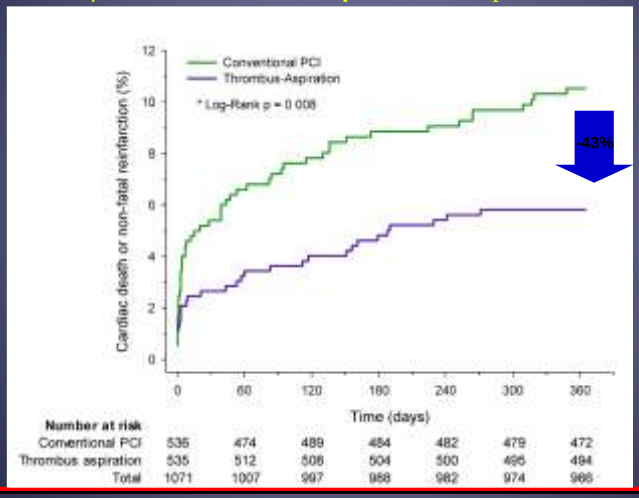
Rationale for Thrombectomy

Major Limitation of Primary PCI:
Distal Embolization and Reduced Flow

Hypothesis: Aspiration thrombectomy may reduce embolization and improve clinical outcomes

TAPAS Study: Clinical Events

*Sig. reduction of **cardiac death or non-fatal MI** in Aspiration Group at 1 year*



. Vlaar et al (TAPAS): a 1-year follow-up study, Lancet 2008; 371: 2008; 1915-20

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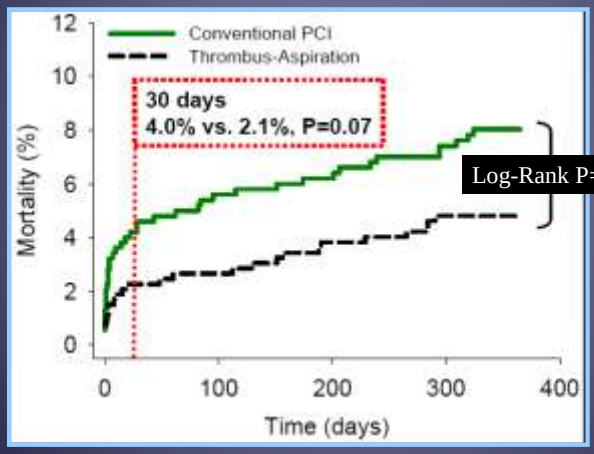
TAPAS Study: Clinical Events

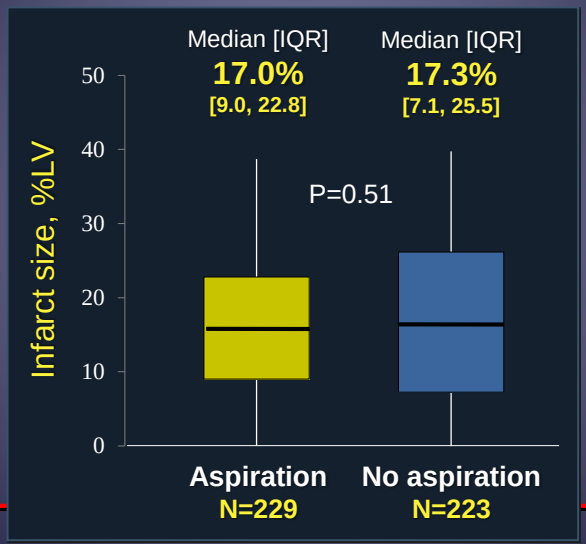
Mortality



Svilaas T et al. N Engl J Med 2008
Vlaar PG et al. Lancet 2008

INFUSE-AMI

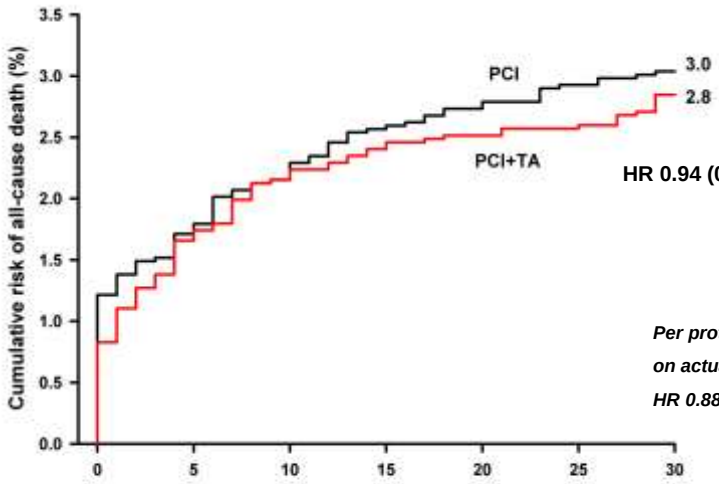
- Primary powered endpoint -



N=452
All anterior M
Sx-hosp <4 h
TIMI 0-2

Stone GW et al. JAMA 2012;307:1817-26

All-cause mortality at 30 days

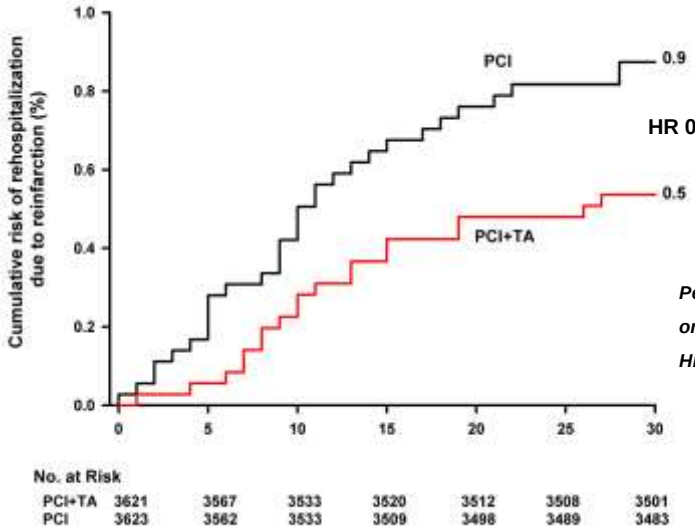


HR 0.94 (0.72 - 1.22), P=0.63

Per protocol analysis based on actual treatment: HR 0.88 (0.66 - 1.17), P=0.38

TASTE

Reinfarction at 30 days



HR 0.61 (0.34 - 1.07), P=0.09

Per protocol analysis based on actual treatment: HR 0.67 (0.36 - 1.20), P=0.19

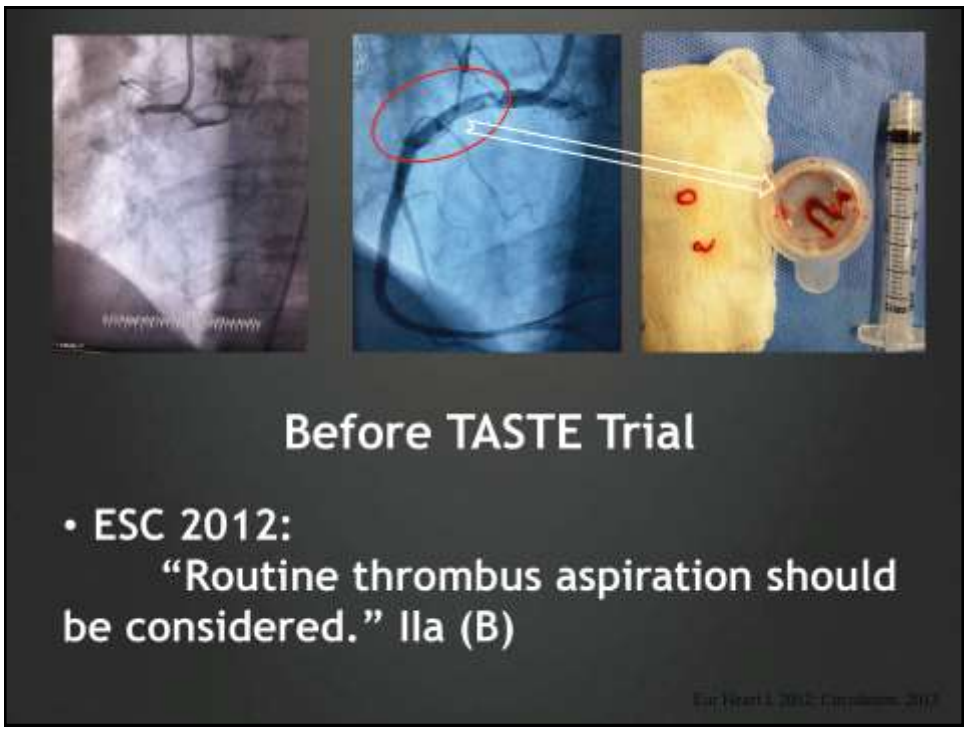
TASTE

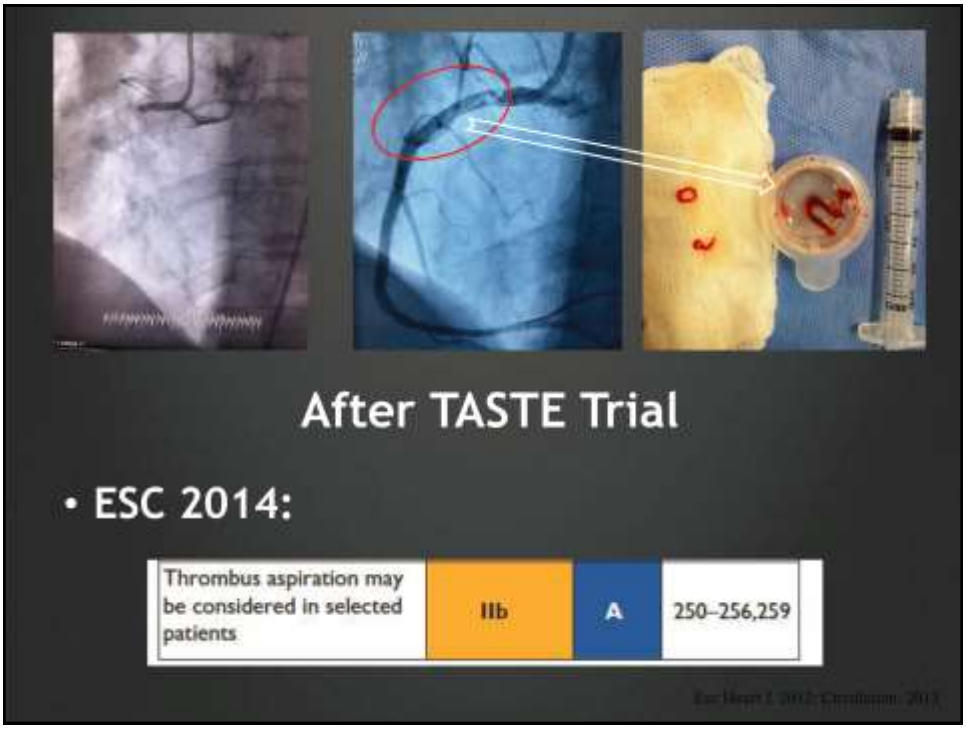
Additional results

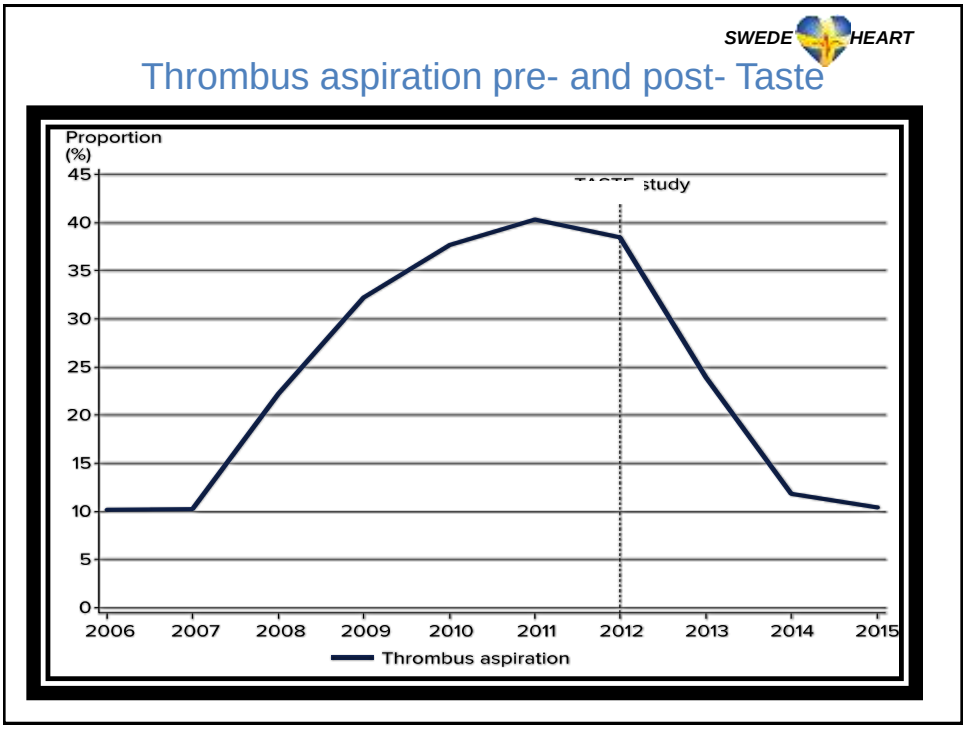
	Randomized in *TASTE*				Not randomized in *TASTE*	
	PCI Only	Thrombus Aspiration	Point Estimate (95% confidence interval)	P Value	PCI Only	Thrombus Aspiration
30 days						
All cause death or myocardial infarction - no. (%)	140 (3.9)	121 (3.3)	HR 0.86 (0.67 - 1.10)	0.23	398 (11.6)	134 (11.8)
Stent thrombosis - no. (%)	19 (0.5)	9 (0.2)	HR 0.47 (0.20 - 1.02)	0.06	18 (0.5)	5 (0.4)
Target vessel revascularization - no. (%)	76 (2.2)	63 (1.8)	HR 0.83 (0.59 - 1.15)	0.27	80 (2.3)	30 (2.6)
Target lesion revascularization - no. (%)	57 (1.6)	43 (1.2)	HR 0.75 (0.51 - 1.12)	0.16	64 (1.8)	25 (2.2)
Index hospitalization						
Stroke or neurological complication - no. (%)	18 (0.5)	19 (0.5)	OR 1.06 (0.55-2.02)	0.87	32 (0.9)	12 (1.0)
Perforation or tamponade - no.(%)	14 (0.4)	13 (0.4)	OR 0.93 (0.44-1.98)	0.85	13 (0.4)	7 (0.6)
Heart failure - no.(%)	234 (6.5)	245 (6.8)	OR 1.05 (0.87-1.27)	0.60	353 (10.0)	125 (10.8)
Left ventricular function - no. (%)				0.33		
Moderately reduced, LVEF 30-39%	495 (13.7)	526 (14.5)			523 (14.8)	190 (16.4)
Severely reduced, LVEF <30%	157 (4.3)	137 (3.8)			255 (7.2)	102 (8.8)

TASTE

SWEDE HEART




After TASTE Trial
• ESC 2014:
Thrombus aspiration may be considered in selected patients
IIb
A
250–256,259

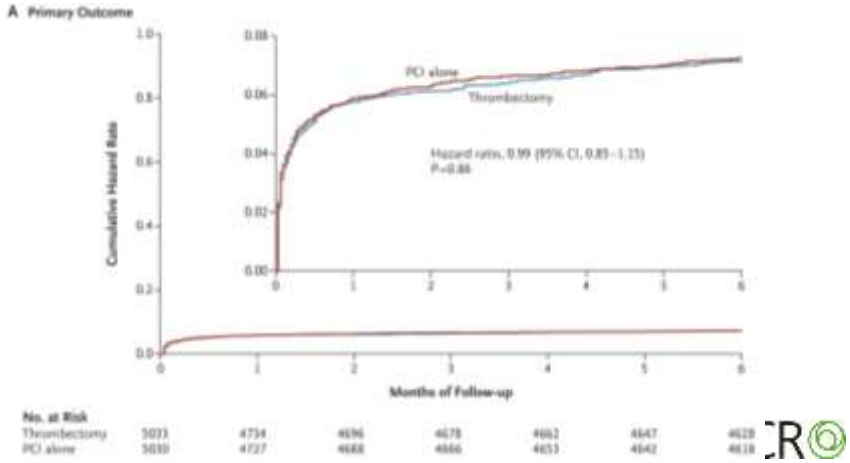

SWEDEHEART
Thrombus aspiration pre- and post- Taste
Proportion (%)
45
40
35
30
25
20
15
10
5
0
study
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Thrombus aspiration

TOTAL

TOTAL, N=10.732

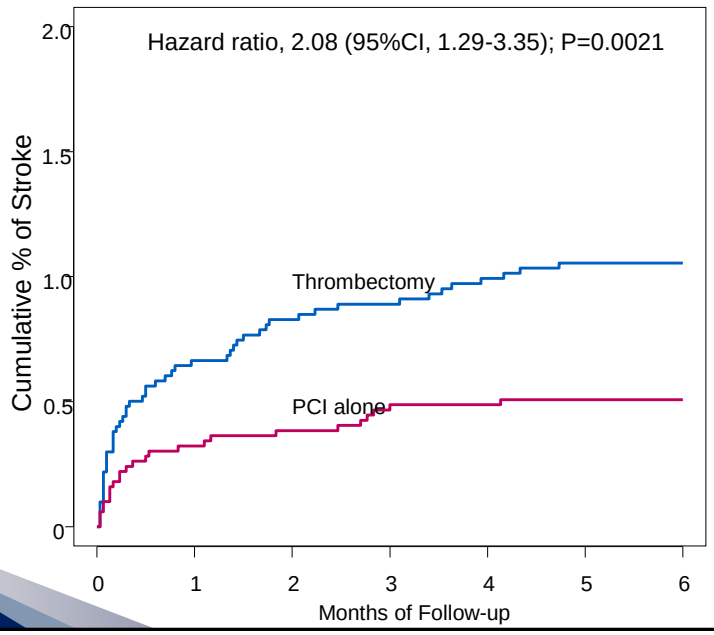
Primary outcome

-CV death, MI, cardiogenic shock, or NYHA class IV heart failure



N Engl J Med; Volume 372(15):1389-1398, 2015

Time to Stroke

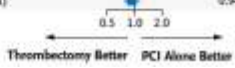


TOT AL

TOTAL

TOTAL, N=10.732

Subgroup	No. of Patients	Thrombectomy	PCI Alone	Hazard Ratio (95% CI)	P Value for Interaction
		no. of events/total no. (%)			
Overall	10,063	347/5033 (6.9)	351/5030 (7.0)	0.99 (0.85–1.15)	
TIMI thrombus grade					0.26
≥3	9,052	322/4571 (7.0)	329/4481 (7.3)	0.96 (0.82–1.12)	
<3	998	24/460 (5.2)	21/538 (3.9)	1.35 (0.75–2.43)	
TIMI thrombus grade					0.52
≥4	7,943	280/3960 (7.1)	300/3983 (7.5)	0.97 (0.82–1.14)	
<4	2,107	57/1071 (5.3)	50/1036 (4.8)	1.11 (0.76–1.62)	
Symptom onset					0.66
<6 hr	8,375	274/4159 (6.6)	278/4216 (6.6)	1.00 (0.84–1.18)	
6–12 hr	1,665	70/862 (8.1)	71/803 (8.8)	0.92 (0.66–1.28)	
Initial TIMI flow					0.22
0–1	7,443	273/3699 (7.4)	291/3744 (7.8)	0.95 (0.80–1.12)	
2–3	2,319	72/1282 (5.6)	58/1237 (4.7)	1.21 (0.85–1.70)	
Site PCI volume					0.66
Lower third	2,450	90/1229 (7.3)	97/1221 (7.9)	0.92 (0.69–1.22)	
Middle third	2,139	78/1077 (7.2)	69/1062 (6.5)	1.12 (0.81–1.55)	
Upper third	5,474	179/2727 (6.6)	185/2747 (6.7)	0.97 (0.79–1.20)	
Myocardial infarction type					0.77
Anterior	4,016	176/1961 (9.0)	188/2055 (9.1)	0.98 (0.80–1.20)	
Nonanterior	6,037	171/3066 (5.6)	162/2971 (5.5)	1.02 (0.82–1.27)	
Age					0.36
≤65 yr	6,662	156/3354 (4.7)	143/3308 (4.3)	1.08 (0.86–1.35)	
>65 yr	3,401	191/1679 (11.4)	208/1722 (12.1)	0.94 (0.77–1.14)	



UCR

Thrombus Aspiration in ST-Segment–Elevation Myocardial Infarction

An Individual Patient Meta-Analysis: Thrombectomy Trialists Collaboration

CONCLUSIONS: Routine thrombus aspiration during PCI for ST-segment–elevation myocardial infarction did not improve clinical outcomes. In the high thrombus burden group, the trends toward reduced cardiovascular death and increased stroke or transient ischemic attack provide a rationale for future trials of improved thrombus aspiration technologies in this high-risk subgroup.

WILEY CLINICAL

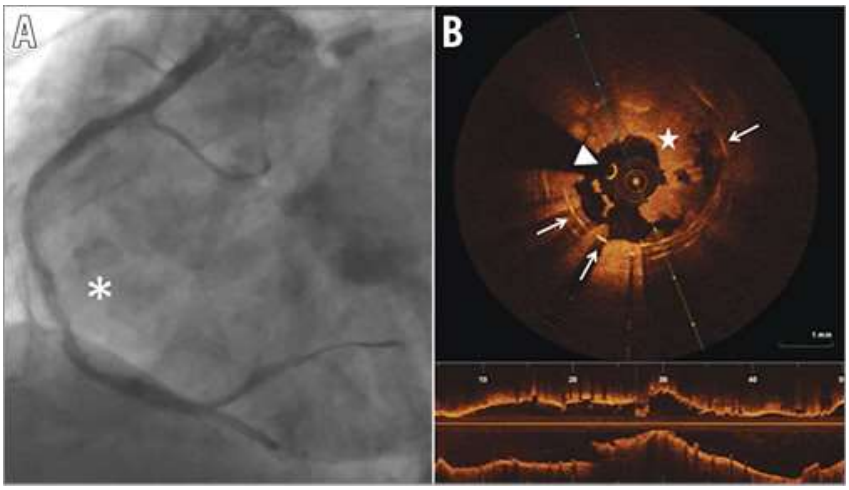
REVIEWS

Long-term outcomes with aspiration thrombectomy for patients undergoing primary percutaneous coronary intervention: A meta-analysis of randomized trials

Akram Y. Elgendy[1] | Islam Y. Elgendy[2] | Ahmed N. Mahmoud[2] | Anthony A. Bavry[2,3]

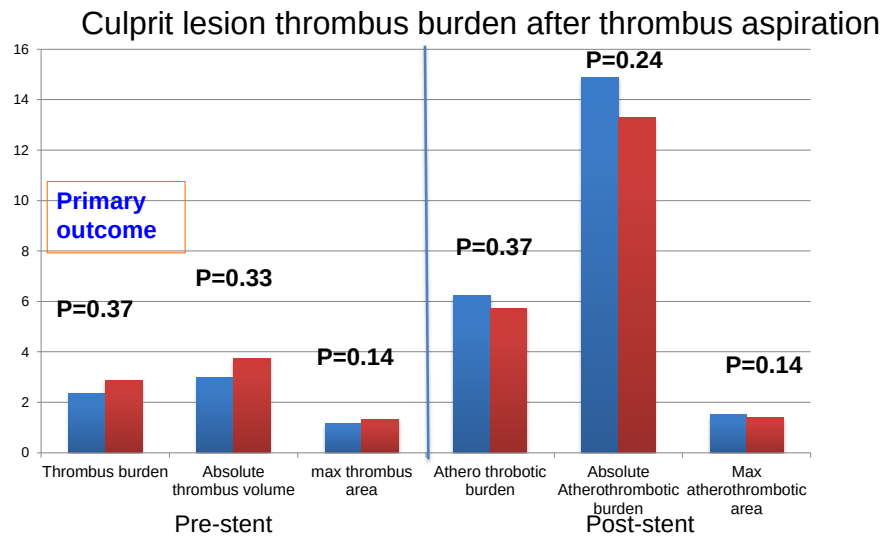
Randomized clinical trials that examined long-term clinical outcomes of routine aspiration thrombectomy prior to primary percutaneous coronary intervention (PCI) in patients with acute ST-segment elevation myocardial infarction have yielded different results. We hypothesized that the routine use of manual thrombus aspiration prior to primary PCI lacks long-term clinical benefits. Electronic databases were searched for randomized trials comparing routine aspiration thrombectomy and conventional PCI. We included only trials that reported clinical outcomes beyond 6 months. The primary outcome was all-cause mortality, and the secondary outcomes included major adverse cardiovascular events, re-infarction, cardiovascular mortality, and stent thrombosis (ST). A DerSimonian-Laird model was used to construct the summary estimates risk ratio (RR). We retrieved 18 trials with 20 641 ST-segment elevation myocardial infarction patients, of whom 10 331 patients underwent routine aspiration thrombectomy prior to primary PCI. At a mean follow-up of 12 months, there was no significant decrease in the risk of all-cause mortality (RR: 0.93, 95% confidence interval [CI]: 0.82-1.05, $P = 0.22$), major adverse cardiac events (RR: 0.95, 95% CI: 0.87-1.03, $P = 0.18$), re-infarction (RR: 0.95, 95% CI: 0.80-1.13, $P = 0.59$), cardiovascular mortality (RR: 0.80, 95% CI: 0.47-1.36, $P = 0.40$), or ST (RR: 0.80, 95% CI: 0.63-1.01, $P = 0.06$) with routine aspiration thrombectomy. Routine aspiration thrombectomy prior to primary PCI was not associated with a reduction in long-term mortality or clinical outcomes. Future randomized trials are warranted to further evaluate the role of aspiration thrombectomy in select patients and coronary lesions.

Residual thrombus burden



Johnson, Vizzi, Strange Baumbach
EuroIntervention 2014;10:167-168

TOTAL OCT-substudy



Bhindi et al European Heart Journal (2015) 36, 1892–1900

Guidelines

Title	Citation		Class	LOE
2012 ESC Guidelines ST-segment elevation myocardial infarction .	European Heart Journal 2012 Oct;33(20):2569-619	Routine aspiration should be considered	IIa	B
2014 ESC/EACTS guidelines on myocardial revascularization	Eur Heart J. 2014 Oct 1;35(37):2541-619	May be considered in selected patients	IIb	A
2015 ACC/AHA focused update PPCI	JACC	Routine thrombectomy not useful	III	A
2015 ACC/AHA focused update PPCI	JACC	Selective and bailout Thrombectomy not well established	IIb	C
2017 ESC Guidelines ST-segment elevation myocardial infarction	European Heart Journal 2017	Routine use of thrombus aspiration is not recommended.	III	A

Conclusions

The concept of thrombus aspiration prior to primary PCI in STEMI is intuitive and "feels right"

Data from two major RCT 18000 patients show that routine aspiration does not reduce infarct size, MI, stent thrombosis, heart failure or mortality

Routine thrombus aspiration is not beneficial in any investigated subgroup

Thrombus aspiration is associated with an increased risk of stroke

Routine aspiration should not be routine but may be to selectd patients