

Systematic review and meta-analysis on outcome differences among patients with TICI2b versus TICI3 reperfusions: Success Revisited

ONLINE SUPPLEMENT

Supplementary Tables: 7

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Supplementary Tables

Supplementary Table I – TICI scale overview

	oTICI ¹	mTICI ²	eTICI ^{3,4}	oTICI2c according to Liebeskind et al ⁵ (HERMES collaboration)	
0	No perfusion or antegrade flow beyond the site of occlusion				
1	Contrast penetration beyond the initial obstruction but with no or minimal reperfusion of the initially occluded territory				
2a	Substantial antegrade reperfusion with distal branch filling and capillary blush of less than 2/3 of the initially occluded target territory	Substantial antegrade reperfusion with distal branch filling and capillary blush of less than 1/2 of the initially occluded target territory			
2b	Substantial antegrade reperfusion with distal branch filling and capillary blush of at least 2/3 of the initially occluded target territory	Substantial antegrade reperfusion with distal branch filling and capillary blush of at least 1/2 of the initially occluded target territory	<p>- TICIo2b: Substantial antegrade reperfusion with distal branch filling and capillary blush of 50-66% of the initially occluded target territory</p> <p>- TICIm2b: Substantial antegrade reperfusion with distal branch filling and capillary blush of 67-89% of the initially occluded target territory</p>		
2c	-	-	Near-complete reperfusion except for slow flow in a few distal cortical vessels or presence of small distal cortical emboli	Near-complete reperfusion except for slow flow in a few distal cortical vessels or presence of small distal cortical emboli = 90-99% reperfusion	'Successful reperfusion'
3	Complete reperfusion with normal and timely filling	Complete reperfusion with normal and timely filling	Complete reperfusion with normal and timely filling	Complete reperfusion with normal and timely filling (100%)	

Supplementary Table II - Search Strategy PubMed

<p>Population / Patient (problem, disease, coexisting problems)</p>	<p>“Stroke” [Mesh]</p> <p>OR</p> <p>Cerebrovascular event[Title/Abstract] OR Stroke[Title/Abstract] OR apoplex[Title/Abstract] OR CVA[Title/Abstract] OR cerebrovascular accident[Title/Abstract] OR brain vascular accident[Title/Abstract] OR brain isch*[Title/Abstract] OR brain infarc*[Title/Abstract] OR cerebral infarc*[Title/Abstract] OR cerebral isch* OR cerebral vessel occlusion[Title/Abstract] OR large vessel occlusion[Title/Abstract] OR intracranial isch*[Title/Abstract] OR intracranial infarction[Title/Abstract] OR intracranial vessel occlusion [Title/Abstract] OR brain vessel occlusion [Title/Abstract]</p>
<p>AND</p>	
<p>Intervention I (Therapy)</p>	<p>Thrombectomy [Mesh]</p> <p>OR</p> <p>Thrombectomy[Title/Abstract] OR thrombectomie*[Title/Abstract] OR mechanical[Title/Abstract] OR endovascular[Title/Abstract] OR embolectomy[Title/Abstract] OR intracranial intervention[Title/Abstract] OR Stent-retriever[Title/Abstract] OR stentretriever[Title/Abstract] OR preset[Title/Abstract] OR solitaire[Title/Abstract] OR trevo[Title/Abstract] OR catch[Title/Abstract]</p>
<p>AND</p>	
<p>Outcome / Biomarker</p>	<p>TICI [Title/Abstract] OR Thrombolysis in cerebral infarction [Title/Abstract] OR mTICI [Title/Abstract] OR oTICI [Title/Abstract] OR eTICI [Title/Abstract]</p>
<p>AND</p>	
<p>Comparison</p>	<p>complete [Title/Abstract] or partial [Title/Abstract] or near-complete [Title/Abstract] or 2b [Title/Abstract] or 2c [Title/Abstract] or 3 [Title/Abstract] or success [Title/Abstract] or refining [Title/Abstract] or rethinking [Title/Abstract] or defining [Title/Abstract] or comparison [Title/Abstract] or different [Title/Abstract] or difference [Title/Abstract]</p>
<p>Filters: no filters</p> <p>Articles found: 505, October 18</p>	

Supplementary Table III – Search Strategy Web of Science

- Science Citation Index Expanded (SCI-EXPANDED) --1945-present
- Conference Proceedings Citation Index- Science (CPCI-S) --1990-present
- Book Citation Index– Science (BKCI-S) --2005-present

<p>Population / Patient (problem, disease, coexisting problems)</p>	<p>TS=(Cerebrovascular event OR Stroke OR apoplex OR CVA OR cerebrovascular accident OR brain vascular accident OR brain isch* OR brain infarc* OR cerebral infarc* OR cerebral isch* OR cerebral vessel occlusion OR large vessel occlusion OR intracranial isch* OR intracranial infarction OR intracranial vessel occlusion OR brain vessel occlusion)</p>
AND	
<p>Intervention I (Therapy)</p>	<p>TS=(Thrombectomy OR thrombectomie* OR mechanical OR endovascular OR embolectomy OR intracranial intervention OR Stent-retriever OR stentretriever OR preset OR solitaire OR trevo OR catch)</p>
AND	
<p>Outcome / Biomarker</p>	<p>TS=(TICI OR Thrombolysis in cerebral infarction OR mTICI OR oTICI OR eTICI)</p>
AND	
<p>Comparison</p>	<p>TS=(complete or partial or near-complete or 2b or 2c or 3 or success or refining or rethinking or defining or comparison or different or difference)</p>
<p>Filters: no</p> <p>Articles found: 626, October 18</p>	

Supplementary Table IV – Discrepancies during the eligibility process

Discrepancies	Rater 1	Rater 2	Final Decision	Reason
Humphries et al ⁶	Yes	No	Yes	Primary Outcome reported in table 3
Dargazanli et al ⁷	Yes	No	No	Overlap with Dargazanli et al ⁸
Marks et al ⁹	Yes	No	Yes	Primary outcome provided in figure 1
Massari et al ¹⁰	Yes	No	Yes	Primary outcome is calculable from data provided in table 1
Linfante et al ¹¹	No	Yes	Yes	Primary outcome is calculable from data provided in table 2

Supplementary Table V – Frequency of outcome reporting

<u>Primary Outcomes</u>	<u>Reporting frequency (studies)</u>	<u>Total n patients</u>	<u>Quantitative analysis performed</u>	<u>Semi-quantitative/qualitative analysis performed</u>	<u>Adjusted estimates available</u>
- mRS at day 90 ≤ 2	14/14	2379	√	-	√ (5/14)
<u>Secondary Outcomes</u>					
- mRS at day 90 ≤ 1	8/14	1344	√	-	√ (3/14)
- mRS shift at day 90	1/14	125	-	√	√ (1/14)
- mortality	9/14	1839	√	-	√ (2/14)
- sICH	7/14	1316	√	-	√ (2/14)
- any ICH	3/14	646	√	-	√ (2/14)
- final infarct volume	2/14	224	-	√	√ (1/14)

Supplementary Table VI – additional information on include studies

Study	Symptom onset to reperfusion (min, mean+/-SD or median, IQR)				Overall rate of IV tPA	IV tPA rate per group				Devices used
	TICI3	TICI2b	TICI2c	p		TICI3	TICI2b	TICI2c	p	
<i>Dargazanli et al.</i>	285 (225-340)	310 (260-361)	-	0.021	61.7% (150/222)	64.6%	70.6%	-	0.34	ADAPT with 5Max ACE (Penumbra, Alameda, California) or Stent-retriever (Solitaire, Covidien, Irvine, California) or Trevo (Styker, Kalamazoo, Michigan)
<i>Almekhlafi et al.</i>	204.5 (151)	308 (209)	233 (198)	N/A	55.5% (55/99)	58.6%	51.9%	59%	N/A	Stent-retriever (not further specified)
<i>Yoo et al.</i>	N/A	N/A	N/A	N/A	59.1% (176/298)	N/A	N/A	N/A	N/A	Intra-arterial treatment (not further specified)
<i>Carvalho et al.</i>	316 +/-106	366+/- 165	-	0.055	68.5% (122/178)	70.0%	66.2%	-	0.594	Most cases with Stent-retriever (Trevo), few cases with spiration (Penumbra)
<i>Kaesmacher et al.</i>	253 (190-320)	271 (233-335)	256 (205-311)	0.331	66.7% (164/246)	66.7%	66.7%	66.7%	1.000	stent-retriever based endovascular treatment with or without aspiration thrombectomy (devices not specified)
<i>Chamorro et al.</i>	267 (201-338)	332 (229-422)	-	0.012	79/125	62%	65%	-	0.772	All cases with stent-retrievers (exact device not specified)
<i>Linfante et al.</i>	N/A	N/A	N/A	N/A	42.9% (100/234)	N/A	N/A	N/A	N/A	All patients were treated with the Solitaire FR as the only device for restoration of blood flow
<i>Rangaraju et al.</i>	291+/- 18*	258+/- 18*	-	0.23*	N/A	N/A	N/A	N/A	N/A	N/A
<i>Schmütz et al.</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	61 received intra-arterial rtPA only, 82 MERCI device, 40 Penumbra

										aspiration, 5 stent retrievers, and 52 other devices or at least two different devices in the same patient (see IMSIII)
Humphries et al.	N/A	N/A	N/A	N/A	44.8% (47/105)	N/A	N/A	N/A	N/A	Solitaire FR or Trevo
Massari et al.	N/A	N/A	N/A	N/A	42.9% (18/42)	56.5% (13/23)	27.8% (5/18)	-	N/A	Trevo XP or ProVue (Stryker) or Solitaire (Covidien)
Marks et al.	N/A	N/A	N/A	N/A	53.0% (53/100)	N/A	N/A	N/A	N/A	Mostly Merci Retriever and Penumbra Suction Thrombectomy +/- intra-arterial tPA
Goyal et al.	240 (176-311)	223 (157-318)	-	0.850	53.4% (222/416)	56%	51%	-	0.425	N/A
Liebeskind et al.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	See publication of the randomized controlled thrombectomy trials (HERMES): up-to-date stent-retrievers
*time from symptom-onset to groin puncture (time to reperfusion was not available).										

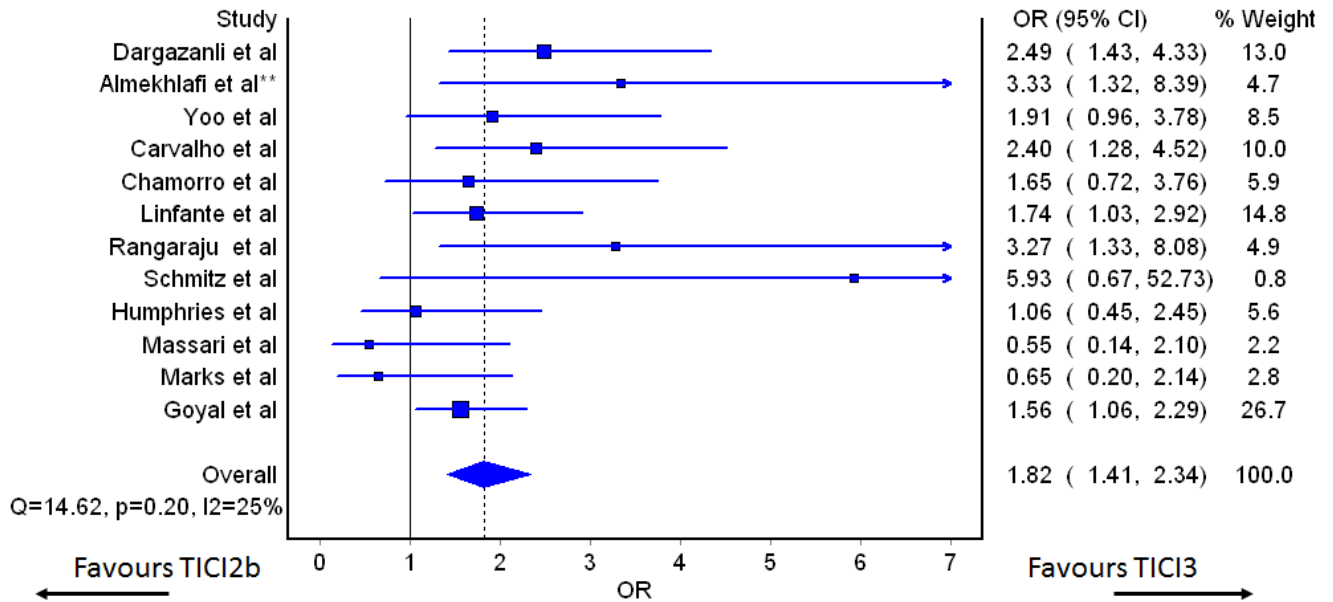
Supplementary Table VII – Risk of bias and quality assessment

	Bias	Quality
	High risk of bias	Available
	Low Risk of bias	Not reported / not available
	Unknown risk of bias	

	Dargazani et al	Almekhlafi et al	Yoo et al	Carvalho et al	Kaesmacher et al	Chamorro et al	Linfante et al	Ranganath et al (abstract)	Schnitz et al	Humphries et al	Massari et al	Marks et al	Goyal et al (abstract)	Liebeskind et al (abstract)
Cochrane risk of bias (adapted)	Random sequence generation	-	-	-	-	-	-	-	-	-	-	-	-	-
	Blinding of participants and personnel (performance bias)	+	?	?	-	+	+	?	-	+	-	+	?	+
	Blinding of outcome assessment (detection bias)	+	?	?	?	?	+	?	?	?	?	+	?	+
	Incomplete outcome data (defined as ≥10%, attrition bias)	+	?	+	+	-	-	?	?	+	+	+	+	?
	Selective reporting (Reporting bias)	+	+	-	+	+	-	?	-	-	-	+	+	?
specific quality criteria	Inclusion criteria specified	+	+	-	+	+	+	-	+	+	+	+	-	(+)*
	Baseline characteristics with strata of TIC12b vs TIC13	+	+	-	+	+	+	-	+	-	-	-	-	+
	Adjusted analyses	+	-	-	+	+	+	-	+	-	-	-	-	+
	Corelab TIC1	-	-	-	-	-	-	-	-	+	-	+	?	+
*included in each study (HERMES)														

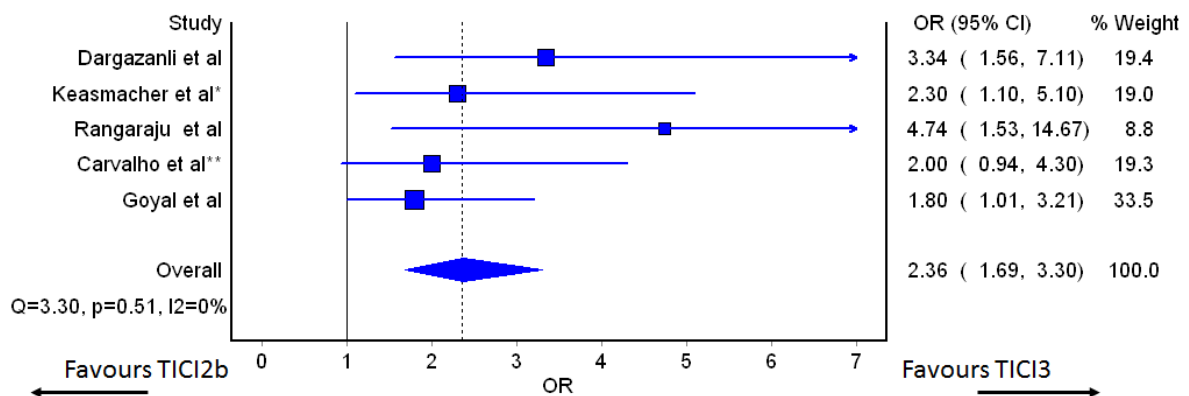
Supplementary Figures

Supplementary Figure I – Summary Odds Ratio TICI3 vs TICI2b for d90 mRS ≤ 2 (mTICI only)



**only mTICI analysis included

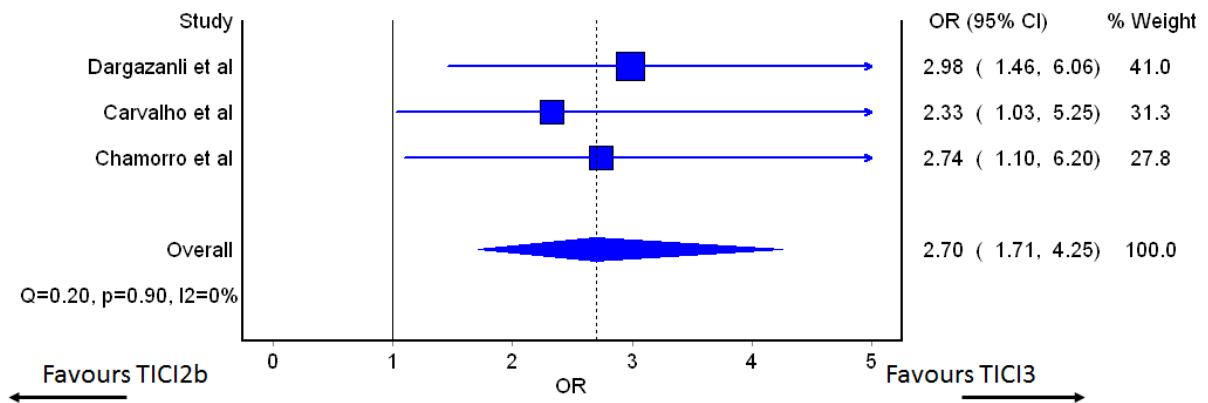
Supplementary Figure II - Summary of adjusted Odds Ratio TICI2c/3 vs TICI2b for d90 mRS ≤ 2



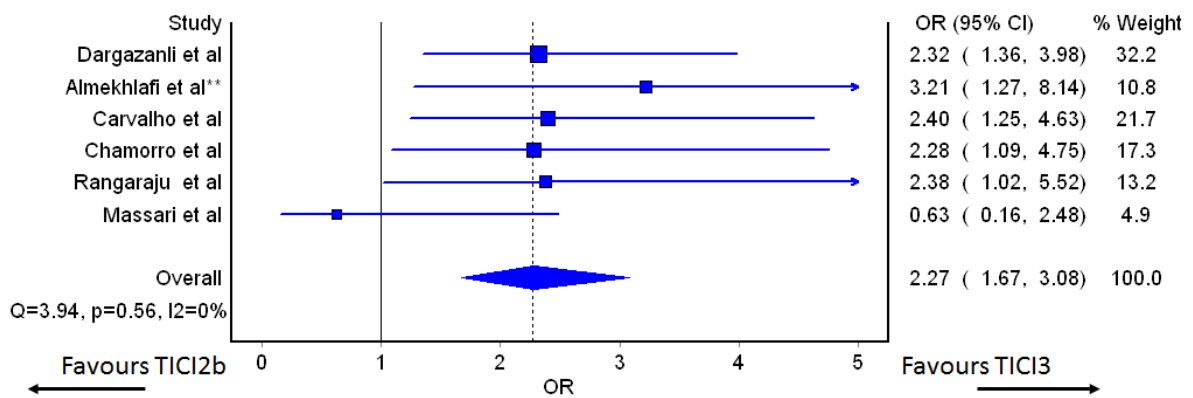
* used eTICI scale with TICI2c; TICI2c and TICI3 were subsumed under TICI3

** contact with author

Supplementary Figure III - Summary of adjusted Odds Ratio TICI3 vs TICI2b for d90 mRS ≤ 1 (mTICI only)

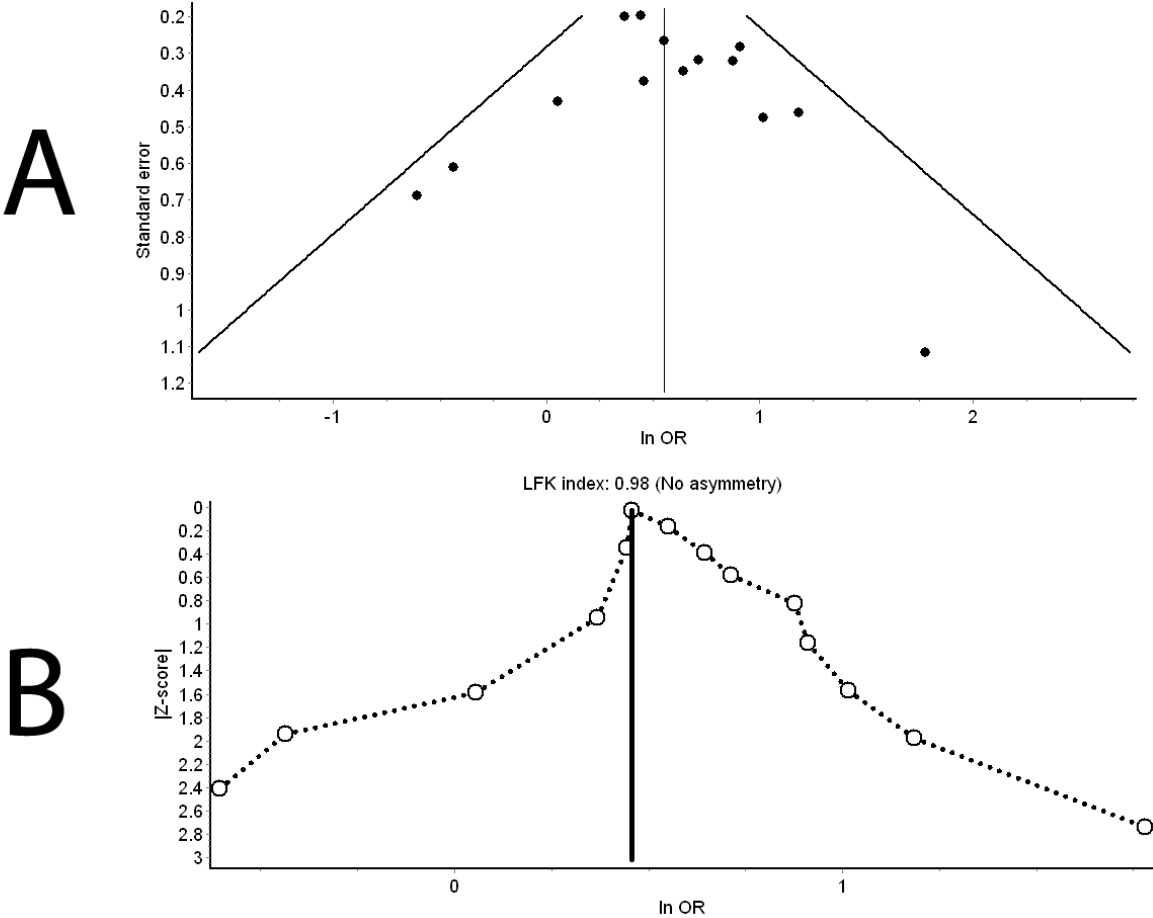


Supplementary Figure IV – Summary Odds Ratio TICI3 vs TICI2b for d90 mRS ≤ 1 (mTICI only)



**only mTICI analysis included

Supplementary Figure V – Evaluation of asymmetry for the primary endpoint (d90 mRS ≤ 2)



A, funnel plot; B, doi plot (see methods); LFK index: 0.98 indicative of no asymmetry

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