

Should the Rapidly improving patient with significant vessel occlusion be treated?

YES!

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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

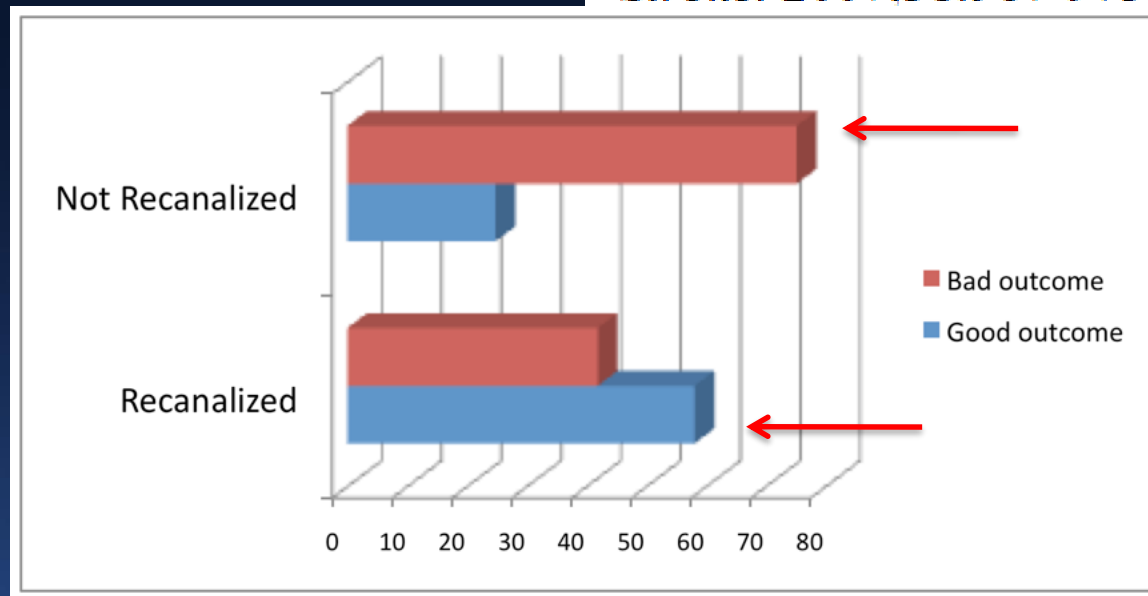
Company

- Toshiba – Honorarium
- Medtronic - Honorarium

Recanalization equals better outcomes

- Meta-analysis from 1985 – 2002 assessing recanalization
 - 53 studies
 - Total 2066 patients

Stroke. 2007;38:967-973:



Conclusion: Recanalization (by any means) is strongly associated with improved functional *outcomes and reduced mortality*

***What is the natural history of strokes
that are mild or have rapidly
improving symptoms?***

Outcome of Stroke With Mild or Rapidly Improving Symptoms

Krassen Nedeltchev, MD; Benjamin Schwegler, BSc; Tobias Haefeli, MD; Caspar Brekenfeld, MD; Jan Gralla, MD; Urs Fischer, MD; Marcel Arnold, MD; Luca Remonda, MD; Gerhard Schroth, MD; Heinrich P. Mattle, MD

Stroke 2007

TABLE 2. Clinical Outcome 3 Months After Stroke

mRS Score	Favorable		Unfavorable				
	0	1	2	3	4	5	6
Number (%)	72 (44)	50 (31)	26 (16)	10 (6)	2 (1)	0 (0)	2 (1)

TABLE 4. Variables Predicting Clinical Outcome at 3 Months by Multivariate Analysis

Variable	Odds Ratio	95% CI	P Value
NIHSS scale on admission ≥ 10	16.9	1.8–159.5	0.013
Proximal vessel occlusion	7.13	1.1–45.5	0.038

TABLE 3. Variables Predicting Clinical Outcome at 3 Months by Univariate Analyses

Variable, n (%)	mRS 0 to 1 (n=122)	mRS 2 to 6 (n=40)	<i>P</i> Value
Male sex	83 (68)	27 (67)	0.71
Age, mean (SD)	62 (13)	65 (13)	
Vascular risk factors			
Hypertension	73 (60)	26 (65)	0.37
Diabetes mellitus	11 (9)	7 (18)	0.41
Current smoking	34 (28)	13 (33)	0.37
Hypercholesterolemia	79 (65)	25 (63)	0.56
Coronary artery disease	49 (40)	16 (40)	0.37
History of transient ischemic attack	25 (21)	7 (18)	0.30
History of amaurosis fugax	3 (3)	1 (3)	0.99
NHSS scale on admission ≥ 10	1 (1)	5 (13)	0.001
Stroke etiology			
Large artery arteriosclerosis	24 (20)	11 (28)	0.30
Small artery disease	29 (24)	6 (15)	0.24
Cardioembolism	32 (26)	12 (30)	0.64
Other determined etiology	8 (7)	1 (3)	0.33
Unknown etiology	25 (20)	9 (23)	0.80
Multiple causes	4 (3)	1 (3)	0.80
Brain imaging			
Early CT signs of cerebral ischemia	16 (17*)	9 (29†)	0.15
Dense artery sign	3 (3*)	0 (0)	0.32
Diffusion-weighted image–perfusion-weighted image mismatch	8 (15‡)	4 (17§)	0.47
Proximal vessel occlusion	11 (9)	7 (18)	0.14

***What happens to patients with LVO
and low NIHSS?***

CME Early MRI and outcomes of untreated patients with mild or improving ischemic stroke

V. Rajajee, MD; C. Kidwell, MD; S. Starkman, MD; B. Ovbiagele, MD; J.R. Alger, PhD; P. Villablanca, MD; F. Vinuela, MD; G. Duckwiler, MD; R. Jahan, MD; A. Fredieu, MD; S. Suzuki, MD; and J.L. Saver, MD

AAN 2006

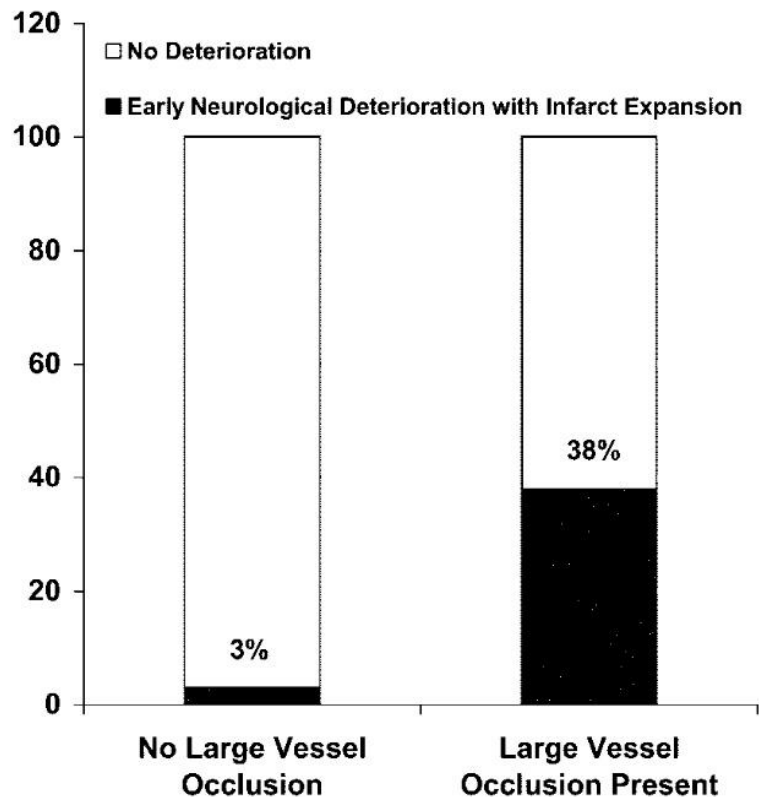


Figure 1. Impact of presence of large-vessel occlusion on MR angiography on incidence of subsequent early neurologic deterioration with infarct expansion in ischemic stroke patients presenting within 6 hours of symptom onset.

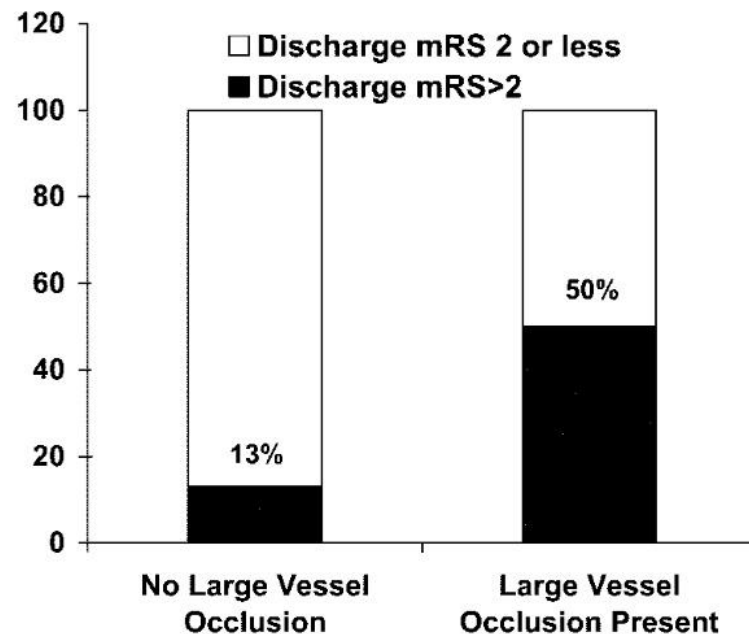


Figure 2. Impact of presence of large-vessel occlusion on MR angiography on incidence of subsequent poor functional status (modified Rankin Scale score of >2) at discharge among patients with ischemic stroke presenting within 6 hours of symptom onset.

***How do patients do with
thrombolysis and endovascular
therapies?***

Outcome of patients with occlusions of the internal carotid artery or the main stem of the middle cerebral artery with NIHSS score of less than 5: comparison between thrombolysed and non-thrombolysed patients

Mirjam R Heldner,¹ Simon Jung,^{1,2} Christoph Zubler,² Pasquale Mordasini,² Anja Weck,¹ Marie-Luise Mono,¹ Christoph Ozdoba,² Marwan El-Koussy,² Heinrich P Mattle,¹ Gerhard Schroth,² Jan Gralla,² Marcel Arnold,¹ Urs Fischer¹

BMJ 2015

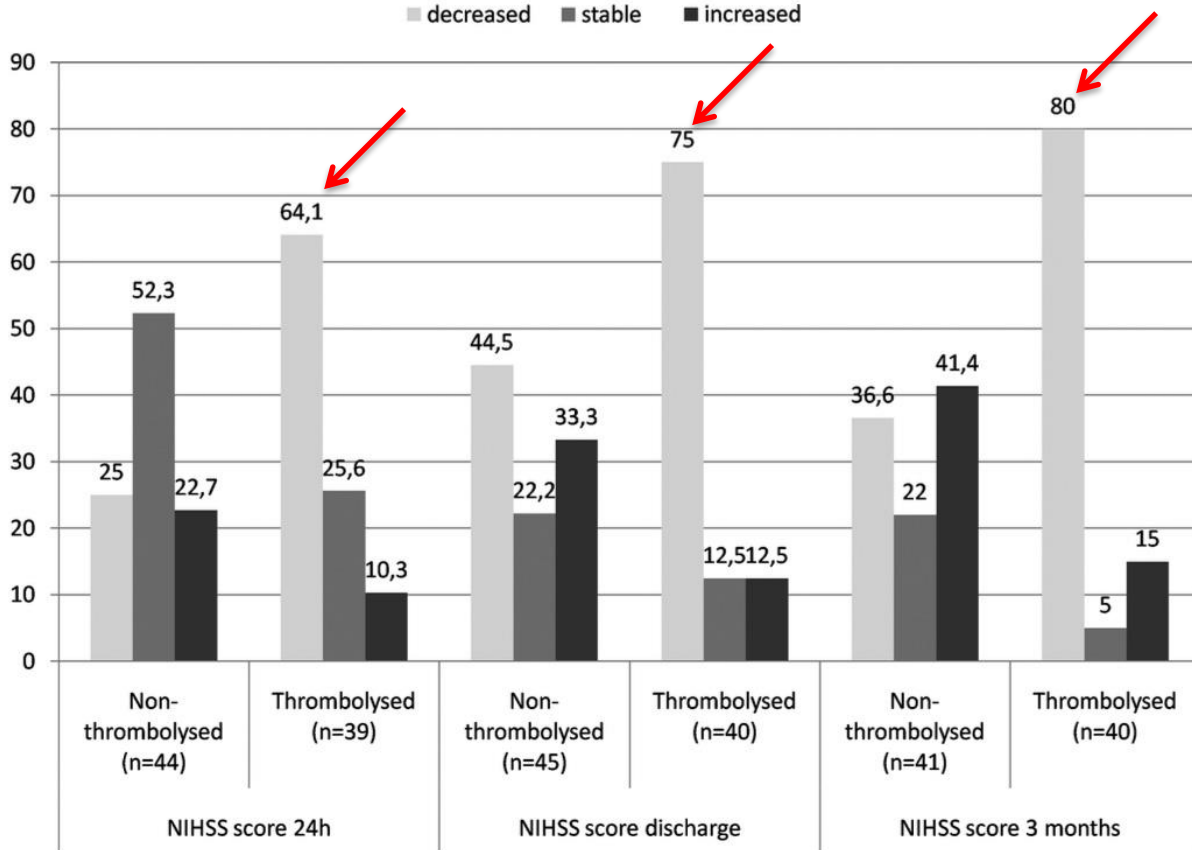
Table 1 Baseline characteristics and outcome of 88 patients, n (%) if not indicated otherwise

	Non-thrombolysed patients	Thrombolysed patients	p Value comparing the two groups
N	47	41	
Age, years (SD)	68 (14.1)	66.3 (12.9)	0.831
Women	14/47 (29.8)	19/41 (46.3)	0.110
Vascular risk factors			
Diabetes mellitus	10/47 (21.3)	9/41 (22)	0.939
Arterial hypertension	29/47 (61.7)	25/41 (61)	0.944
Current smoking	13/47 (27.7)	9/39 (23.1)	0.628
Hypercholesterolaemia	31/47 (66)	27/41 (65.9)	0.992
Coronary artery disease	8/47 (17)	7/41 (17.1)	0.995
Atrial fibrillation	8/40 (20)	14/37 (37.8)	0.083
Previous stroke	1/47 (2.1)	2/41 (4.9)	0.478
Cervical artery dissection	8/47 (17)	2/41 (4.9)	0.073
Family history of stroke	10/29 (34.5)	6/32 (18.8)	0.163
Aetiology according to TOAST criteria			0.086
Large artery disease	17/47 (36.2)	9/41 (22)	0.214
Cardioembolic	8/47 (17)	16/41 (39)	0.021
Other determined	9/47 (19.2)	3/41 (7.3)	0.107
Undetermined	3/47 (6.4)	5/41 (12.2)	0.344
Unknown	5/47 (10.6)	6/41 (14.6)	0.572
More than one potential cause	5/47 (10.6)	2/41 (4.9)	0.319
Minutes from symptom onset to hospital admission, median	258	101	<0.001
Improving symptoms before admission	22/47 (46.8)	18/40 (45)	0.866
Fluctuating symptoms before admission	15/47 (31.9)	9/40 (22.5)	0.327
Baseline NIHSS score, median (range)	3 (5)	4 (3)	<0.001
Imaging parameters			
Location of vessel occlusion			<0.001
ICA occlusion	35/47 (74.5)	12/41 (29.3)	
M1 occlusion	12/47 (25.5)	29/41 (70.7)	
MR mismatch	27/35 (77.1)	30/30 (100)	0.005
Thrombolysis type			
Intravenous rt-PA	–	15*/41 (36.6)	
Endovascular therapy	–	19/41 (46.3)	
Bridging (intravenous rt-PA followed by endovascular therapy)	–	7/41 (17.1)	

Table 2 Outcome of 88 patients, n (%) if not indicated otherwise

	Non-thrombolysed patients	Thrombolysed patients	p Value comparing the two groups
N	47	41	
Initial recanalisation TIMI 2–3 (DSA)	–	22/28 (78.6)	
Initial reperfusion TIC1 2b-3 (DSA)	–	17/28 (60.7)	
Recanalisation TIMI 2–3 after 24 h (MRA/CTA)	4/38 (10.5)	30/38 (78.9)	<0.001
NIHSS score after 24 h			
Median NIHSS score change (range)	0 (25)	–2 (36)	<0.001
Increased	10/44 (22.7)	4/39 (10.3)	0.002
Stable	23/44 (52.3)	10/39 (25.6)	
Decreased	11/44 (25)	25/39 (64.1)	
NIHSS score at discharge			
Median NIHSS score change (range)	0 (43)	–2.5 (43)	<0.001
Increased	15/45 (33.3)	5/40 (12.5)	0.015
Stable	10/45 (22.2)	5/40 (12.5)	
Decreased	20/45 (44.5)	30/40 (75)	
NIHSS score at 3 months			
Median NIHSS score change (range)	0 (43)	–3 (43)	<0.001
Increased	17/41 (41.4)	6/40 (15)	<0.001
Stable	9/41 (22)	2/40 (5)	
Decreased	15/41 (36.6)	32/40 (80)	
mRS 0–1 at 3 months	20/45 (44.4)	25/40 (62.5)	0.096
mRS 0–2 at 3 months	30/45 (66.7)	34/40 (85)	0.050
Survival at 3 months	42/45 (93.3)	37/40 (92.5)	0.881
Symptomatic haemorrhage (PROACT)	0/45 (0)	2/41 (4.9)	0.134
Asymptomatic haemorrhage (PROACT)	3/43 (7)	5/41 (12.2)	0.415

Figure 1 Percentage of decreased, stable and increased National Institutes of Health Stroke Scale score after 24 h, at discharge and after 3 months.



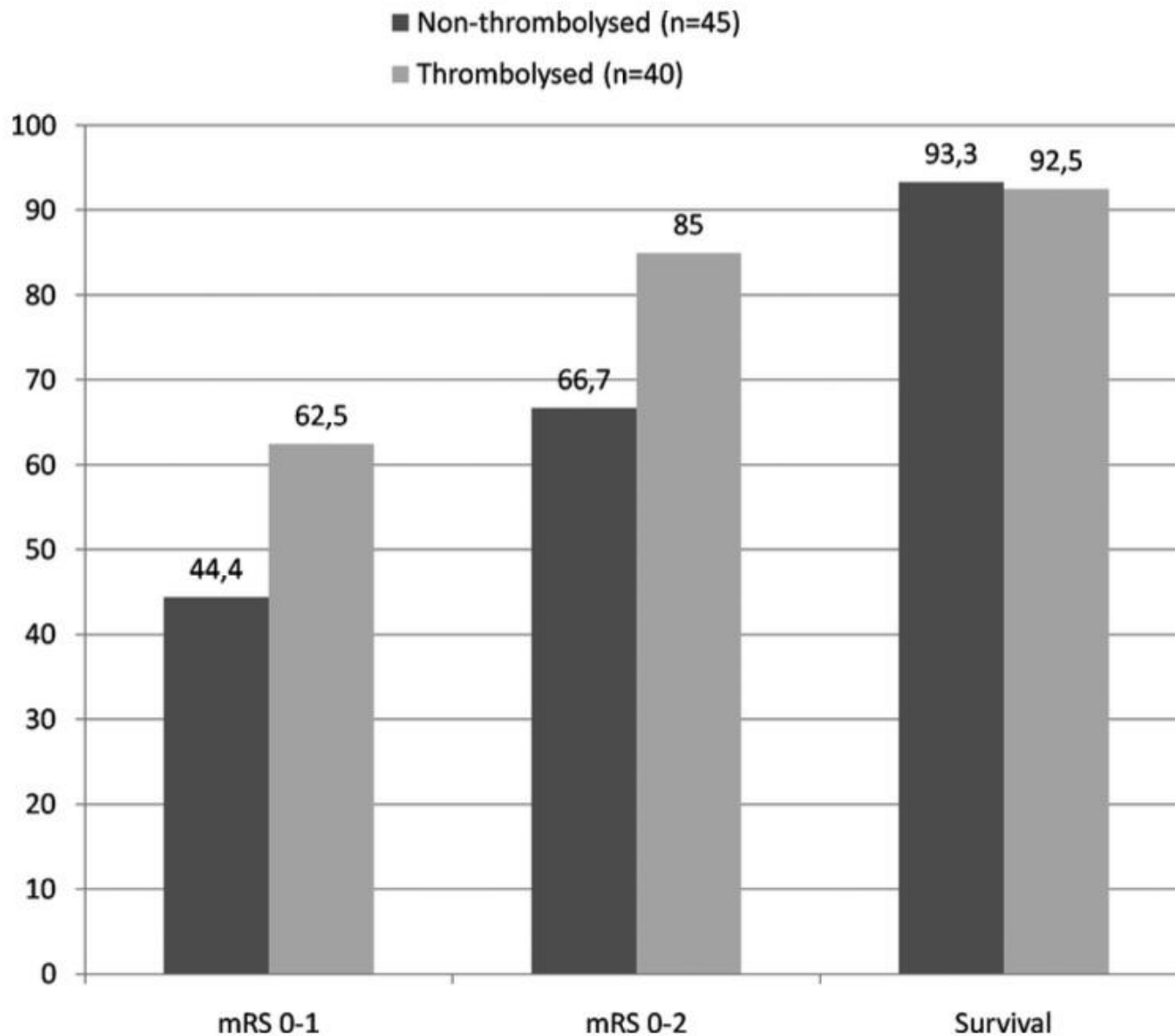


Figure 2 Percentage of survival and excellent/favourable outcomes at 3 months.

Table 4 Outcome of 47 patients with ICA occlusions, n (%) if not indicated otherwise

	Non-thrombolysed patients	Thrombolysed patients	p Value comparing the two groups
N	35	12	
NIHSS score after 24 h			
Median NIHSS score change (range)	0 (25)	-1 (11)	0.058
Increased	7/32 (21.9)	1/11 (9.1)	0.261
Stable	16/32 (50)	4/11 (36.4)	
Decreased	9/32 (28.1)	6/11 (54.5)	
NIHSS score at discharge			
Median NIHSS score change (range)	0 (43)	-2 (42)	0.055
Increased	11/33 (33.3)	2/12 (16.7)	0.496
Stable	6/33 (18.2)	2/12 (16.7)	
Decreased	16/33 (48.5)	8/12 (66.6)	
NIHSS score at 3 months			
Median NIHSS score change (range)	0 (43)	-2.5 (43)	0.042
Increased	13/30 (43.3)	3/12 (25)	0.206
Stable	6/30 (20)	1/12 (8.3)	
Decreased	11/30 (36.7)	8/12 (66.7)	

Table 5 Outcome of 41 patients with M1 occlusions, n (%) if not indicated otherwise

	Non-thrombolysed patients	Thrombolysed patients	p Value comparing the two groups
N	12	29	
NIHSS score after 24 h			
Median NIHSS score change (range)	0 (9)	-2 (36)	0.004
Increased	3/12 (25)	3/28 (10.7)	0.012
Stable	7/12 (58.3)	6/28 (21.4)	
Decreased	2/12 (16.7)	19/28 (67.9)	
NIHSS score at discharge			
Median NIHSS score change (range)	0 (40)	-3 (42)	0.001
Increased	4/12 (33.3)	3/28 (10.7)	0.023
Stable	4/12 (33.3)	3/28 (10.7)	
Decreased	4/12 (33.3)	22/28 (78.6)	
NIHSS score at 3 months			
Median NIHSS score change (range)	0 (40)	-3 (42)	0.001
Increased	4/11 (36.4)	3/28 (10.7)	0.007
Stable	3/11 (27.2)	1/28 (3.6)	
Decreased	4/11 (36.4)	24/28 (85.7)	

Do the risks outweigh the potential benefits of intervening?

ORIGINAL RESEARCH
INTERVENTIONAL

Mechanical Thrombectomy in Patients with Acute Ischemic Stroke and Lower NIHSS Scores: Recanalization Rates, Periprocedural Complications, and Clinical Outcome

 J. Pfaff,  C. Herweh,  M. Pham,  S. Schönenberger,  S. Nagel,  P.A. Ringleb,  M. Bendszus, and  M. Möhlenbruch



AJNR 2016

- 484 patients were reviewed, 33 patients met criteria of NIHSS < 8 who underwent intervention
- Median post procedure NIHSS 5
- Onset to groin puncture time 320 minutes
- Recanalization of TICl 2b or 3 achieved in 79%
- 2 symptomatic ICH
- mRS 0-2 63%, mRS 0-3 in 91%

Table 1: Baseline characteristics of patients with minor to mild stroke who received mechanical thrombectomy

	Patients (n = 33)
Age (yr) (mean) (SD)	68 (16)
Male (%)	14 (42.4)
Hypertension (%)	21 (63.6)
Diabetes mellitus (%)	4 (12.1)
Atrial fibrillation (%)	13 (39.4)
Coronary artery disease (%)	7 (21.2)
Congestive heart failure (%)	3 (9.1)
Hypercholesterolemia (%)	8 (24.2)
Previous stroke (%)	0
History of smoking (%)	8 (24.2)
Prestroke mRS	
0 (%)	28 (84.8)
1 (%)	2 (6.1)
2 (%)	1 (3)
3 (%)	2 (6.1)
Initial NIHSS score (median) (IQR)	5 (4–7)
CT	n = 18
MR imaging	n = 15
ASPECTS ^a (median) (IQR)	
CT	10 (9–10)
MR imaging	8 (7–9) ^b
Time from stroke onset to imaging (min) (median) (IQR)	175 (72–279)
Intravenous tPA (%)	22 (66.7)
Time from stroke onset to intravenous tPA ^c (min) (median) (IQR)	156 (94–238)
Time from stroke onset to groin puncture (min) (median) (IQR)	320 (237–528)
Occlusion site	
ICA (excluding carotid T) (%)	4 (12.1)
Tandem occlusion (cervical ICA and carotid T/M1)	3 (9.1)
Carotid T (%)	2 (6.1)
M1 (%)	17 (51.5)
M2 (%)	7 (21.2)
Collateral status	
0 (%)	0
1 (%)	2 (6.1)
2 (%)	7 (21.2)
3 (%)	24 (72.7)
Thrombus length (mm)	12 (10–16)

Patients with large vessel occlusion and improving NIH can get worse over the next 48 hours, thus early intervention is recommended with low NIHSS patients with LVO.

***Thank you!
Questions?***

