The Efficacy of Intracranial Thrombectomy for Acute Ischemic Stroke in Posterior Circulation

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BACKGROOUND / PURPOSE

- Despite recent breakthroughs in the treatment of ischemic stroke, patients with posterior circulation (PC) occlusion were excluded from randomized controlled trials.
- The AHA/ASA guidelines state that there is uncertainty about the benefit of thrombectomy in basilar artery occlusion (BAO).
- We investigated the outcome of acute phase mechanical thrombectomy (MT) involving PC.

METHOD

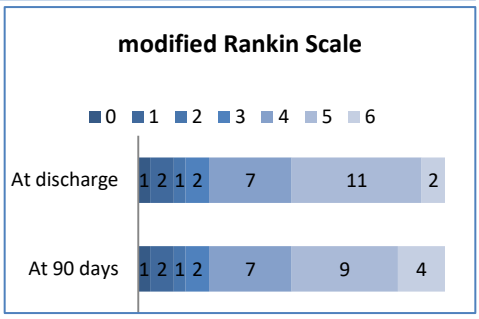
- We performed a retrospective analysis of all patients who underwent MT for acute ischemic stroke involving PC at our institution from January 2011 to May 2017.
- MT was indicated for patients who were transferred within 24 hours after onset, without an extensive irreversible impairment in the brain stem.
- We evaluated the clinical outcome using modified Rankin scale (mRS) at 90 days. Patients with a mRS score of 0 to 3 were regarded as achieving a '***favorable outcome***', and those with an mRS score of 4 to 6 as showing a '***poor outcome***'.

Patients characteristics and outcome		n = 26
Background	Age, mean (SD)	76.2 ± 10.1
	Male, n (%)	13 (50.0)
	pre-NIHSS*1 score, mean (SD)	26.2 ± 8.1
Occlusion vessel	Basilar artery, n (%)	23 (88.5)
	Vertebral artery, n (%)	3 (11.5)
Subtype	CE*2, n (%)	16 (61.5)
	ATBI*3, n (%)	5 (19.2)
	Other, n (%)	5 (19.2)
Laboratory data	Cr, mean (SD)	0.8 ± 0.2
	HbA1c (NGSP), mean (SD)	6.8 ± 1.8
Time-course	O2D*4, median (quartile)	360 (170 - 765)
	D2P*5, median (quartile)	104 (56 - 139)
	P2R*6, median (quartile)	52 (34 - 86)
Treatment	IV-tPA	5 (19.2)
	Stent-retriever, n (%)	11 (42.3)
	Penumbra, n (%)	20 (76.9)
	IA-Urokinase, n (%)	7 (26.9)
	Merci, n (%)	4 (15.4)
Reperfusion status	TICI*7 2B, n (%)	9 (34.6)
	TICI 3, n (%)	15 (57.7)
Clinical outcome	24hr NIHSS score, mean (SD)	16.6 ± 10.6
	mRS*8 0-3 at discharge, n (%)	6 (23.1)
	mRS 0-3 at 90 days, n (%)	**6 (23.1)**
	Death at 90 days, n (%)	4 (15.4)

*1: NIH Stroke Scale Score, #2: Cardiogenic cerebral embolism, #3: Atherothrombosis, *4 :Onset-to-door time, *5: Door-to-puncture time, *6: Puncture-to-reperfusion time *7: Thrombolysis in Cerebral Infarction , #8: Modified rankin scale score

	Favorable outcome (mRS 0-3) n = 6	Poor outcome (mRS 4-6) n = 20	P-value
Age, median (quartile)	78.5 (68.3 - 79.8)	81.0 (74.0 - 84.0)	N.S.
Male, n (%)	4 (66.7)	9 (45.0)	N.S.
Pre-operativel NIHSS*1, mean (SD)	18.5 (11.0 - 26.8)	29.0 (24.5 - 33.0)	**0.03**
PC-ASPECTS*2, median (quartile)	8 (6 - 8.5)	7 (7 - 8.5)	N.S.
Basilar artery occlusion, n (%)	4 (66.7)	19 (95.0)	N.S.
Vertebral artery occlusion, n (%)	1 (16.7)	2 (10.0)	N.S.
PCA*3 occlusion, n (%)	1 (16.7)	0 (0.0)	N.S.
Cardiogenic embolization, n (%)	4 (66.7)	12 (60.0)	N.S.
ATBI*4, n (%)	0 (0.0)	5 (25.0)	N.S.
Other type, n (%)	2 (33.3)	3 (15.0)	N.S.
eGFR, median (quartile)	75.5 (62.8 - 79.3)	68.5 (57.3 - 87.5)	N.S.
HbA1c (NGSP), median (quartile)	6.2 (6.1 - 6.5)	6.7 (5.7 - 8.0)	N.S.
O2D*5, median (quartile)	500.5 (153.5 - 831.5)	360.0 (170.0 - 703.0)	N.S.
D2P*6, median (quartile)	76.0 (60.5 - 114.0)	107.0 (53.0 - 138.5)	N.S.
P2R*7, median (quartile)	46.5 (34.5 - 78.0)	52.0 (32.8 - 87.8)	N.S.
Stent-retriever, n (%)	5 (83.3)	6 (30.0)	0.054
Penumbra, n (%)	5 (83.3)	15 (75.0)	N.S.
IA-urokinase, n (%)	1 (16.7)	6 (30.0)	N.S.
Merci, n (%)	0 (0.0)	4 (20.0)	N.S.
IV-tPA, n (%)	1 (16.7)	4 (20.0)	N.S.
TICI*8 ≧ 2B, n (%)	6 (100.0)	18 (90.0)	N.S.
NIHSS ar 24hr, median (quartile)	3.5 (1.5 - 4.8)	21.0 (13.0 - 25.0)	**0.03**
NIHSS at discahtge, median (quartile)	1.0 (0.0 - 1.0)	7.0 (2.0 - 11.0)	N.S.

*1: NIH Stroke Scale Score, #2: posterior circulation alberta stroke program early CT score, *3: posterior cerebral artery, *4 Atherothrombosis, *5 :Onset-to-door time, *6: Door-to-puncture time, *7: Puncture-to-reperfusion time, *8: : Thrombolysis in Cerebral Infarction



	Present study	Singer et al.	Mokin et al.	Espinosa et al.
Case number (n)	**26**	148	100	18
Age (yr)	**76**	71	64	68
NIHSS	**26**	20	19	20
Onset-to-Puncture (min)	**360**	na	562	366
TICI 2B-3 (%)	**92**	79	80	94
Favorable outcome (%)	**23 mRS 0-3**	42 mRS 0-3	35 mRS 0-2	50 mRS 0-2
Mortality (%)	**15**	35	30	22

COI Disclosure

The Author have no financial conflicts of interest to disclose.

SUMMERY OF THE RESULTS

- A total of 26 patients including 23 BAO and 3 vertebral artery occlusion were enrolled during the study period.
- Successfully recanalization was achieved in 24 patients (92.3%). Although 4 patients (15.4%) died, six of 26 patients (23.1%) were favorable outcome at 90 days.
- Compared to poor outcome group, the patients in favorable outcome group were significantly lower pre-operative NIHSS (18.5 vs 29.0, P = 0.03) and NIHSS at 24 hours (3.5 vs 21.0, P = 0.03).

DISCUSSION

- Acute BAO has been associated with a high case fatality rate and morbidity. (Fatality rates 20 - 70%)
- MT involving PC may alleviate the mortality even though among the elderly patients with severe symptom.

Harts et al. Lancet Neurol, 2014

- Time to the start procedure is an important predictor of clinical success after thrombectomy in patients with PC strokes.

Maxim et al. Stroke, 2016

- The most important patient-related factors determining clinical outcome are initial stroke severity and collateral status.

Singer et al. Ann Neurol, 2015

- Scoring systems (BATMAN score, PC-ASPECTS score) were reported as a useful marker for predicting clinical outcome.

Alemseged et al. Stroke, 2017 Tei et al. J Neurol, 2010

CONCLUSION

- MT may contribute reduction of the mortality and relief of symptom among the patients with acute vertebrobasilar occlusion.
- Further studies were required to establish the efficacy of MT for patients with PC occlusion.