Mechanical Thrombectomy in the Post-MR RESCUE Era: Modern Technology Improves Outcomes. A Single Center Experience.

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Introduction

Acute ischemic cerebral infarction is the 5th leading cause of death in the United States. In the post-MR RESCUE trial era, the pursuit of interventions which improve patient outcome in ischemic stroke continue to be at the forefront of clinical inquiry.

Methods

A single-institution retrospective record review was conducted to evaluate clinical outcome of patients who have undergone magnetic resonance imaging (MRI) prior to endovascular recanalization therapy since 2013 in the post-MR RESCUE era. From January 1, 2013 to July 1, 2016, all patients over the age of 18 who were treated with endovascular thrombectomy were screened. 87 patients were identified. Inclusion criteria identified patients with anterior circulation large vessel occlusion who met criteria for mechanical thrombectomy, and were included regardless of whether or not they had received IV-tPA. 2 patients were excluded who had previous infarctions, 3 were excluded for posterior circulation thrombi, 3 were excluded for being treated with angioplasty alone, and 19 were excluded if treated outside of the 8-hour post-infarction window. 60 patients were included for analysis.

Demographics Associated with NIHSS and mRS

Demographic	NIHSS72h (P-value)	mRS90days (P-value)
Hypertension	0.069	0.433
Smoking	0.918	0.412
Race	0.741	0.995
Sex	0.291	0.280
Myocardial Infarction	0.791	0.644
Congestive Heart Failure	0.370	0.431
Atrial Fibrillation	0.215	0.141
Diabetes Mellitus	0.106	0.245
Hyperlipidemia	0.021	0.139
Alcohol	0.893	0.877
tPA given	0.850	0.825
Artificial Heart Valve	0.036	0.010
Endocarditis	0.307	0.142
Patent Foramen Ovale	0.631	0.443

Method: Nonparametirc Mann-Whiteny U Test

Correlation of Age with NIHSS at 72 hours

			age	NIHSS72h
Spearman's rho	age	Correlation Coefficient	1.000	.348**
		Sig. (2-tailed)	.	.007
		N	60	58
	NIHSS72h	Correlation Coefficient	.348**	1.000
		Sig. (2-tailed)	.007	.
		N	58	58

**. Correlation is significant at the 0.01 level (2-tailed).

Correlation of Age with mRS

			age	mRS90days
Spearman's rho	age	Correlation Coefficient	1.000	.289*
		Sig. (2-tailed)	.	.033
		N	60	55
	mRS90days	Correlation Coefficient	.289*	1.000
		Sig. (2-tailed)	.033	.
		N	55	55

*. Correlation is significant at the 0.05 level (2-tailed).

TICI Score Cross Tabulation

			TICIGROUP		
			POST	PRE	Total
TICISCORE	0	Count	20	60	80
		% within TICISCORE	25.0%	75.0%	100.0%
	1	Count	39	0	39
		% within TICISCORE	100.0%	0.0%	100.0%
Total		Count	59	60	119
		% within TICISCORE	49.6%	50.4%	100.0%

P-value for the Fisher-Exact analysis is .000.

Results

60 patients were analyzed. 54 had MCA thrombi and 6 had ICA terminus thrombi. 28 underwent thrombectomy with stent-retriever devices, 14 were treated with aspiration, and 13 underwent combined stent-retriever/aspiration treatment. 5 patients were treated with microwire agitation. 40 (67%) of the patients treated achieved a TICI score of 2b or 3 post intervention. The average pre-procedure NIHSS was 16. The average NIHSS at 72 hours was 8. The mean follow-up modified Rankin Score was 2.5, with 30 (50%) of patients achieving a modified Rankin Score 0-2. There were 2 (3%) symptomatic hemorrhages.

There was a statistically significant association between increasing age and worse outcomes, both early outcomes based on NIHSS at 72 hours, and late follow up based on mRS.

Hyperlipidemia was associated with worse NIHSS at 72 hours, but not at mRS.

Worse outcomes as based on NIHSS at 72 hours and mRS is associated with artificial heart valves.

Conclusions

In our single-institution experience, the utilization of MRI screening coupled with modern techniques in performing mechanical thrombectomy has allowed for significant immediate success objectively with 67% of patients achieving a TICI 2b or 3 score, and a long term success with 50% of patients with a modified Rankin Score of 0-2. Improved outcomes based on NIHSS at 72h and mRS were observed in younger patients with TICI scores of 2b or 3. Worse outcomes were observed in patients with hyperlipidemia at 72 hours but not at long-term follow up. This study suggests that rapid sequence MRI and new endovascular techniques allow for the continued improvement in clinical outcomes in this patient population. Further prospective studies are needed.

Learning Objectives

By the conclusion of this session, participants should be able to 1) identify criteria for aggressively pursuing mechanical thrombectomy in ischemic stroke patients; 2) recognize that new technology has helped to improve outcomes in ischemic stroke patients; 3) re-evaluate the importance and utility of using MRI to directly guide patient care with regards to stroke management