

Prevalence and Predictors of Post-Stroke Spasticity after Mechanical Thrombectomy

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INTRODUCTION: Spasticity is a velocity-dependent increase in stretch reflexes and exaggerated tendon jerks. Spasticity is a disabling sequela of ischemic stroke that can impair recovery and quality of life. While mechanical thrombectomy is the standard of care for large vessel occlusion, the prevalence and predictors of post-thrombectomy spasticity remain poorly characterized. This study aimed to determine the rate of spasticity at 6 months following thrombectomy and to identify clinical factors associated with its development.

METHODS: We performed a retrospective review of 337 consecutive patients with acute ischemic stroke due to an anterior circulation LVO (M1, ICA, or tandem) who underwent mechanical thrombectomy at a single center between 2021 and 2025. For each patient, we collected the following data: demographics, stroke characteristics, neurologic status (pre and post procedure), initial hospital course, and spasticity outcome at six months. Spasticity was defined as either a documented clinical diagnosis of spasticity or use of antispastic treatments (oral baclofen or botulinum toxin) or noted hypertonicity on physical exam.

Patients were stratified into two groups based on 6-month spasticity status. We then compared the spasticity and non-spasticity groups on baseline and procedural variables. Statistical analysis included chi-square tests for categorical variables and t-test for continuous variables.

RESULTS: Of 337 patients, 147 Patients were excluded for lack of 6 6-month follow-up (either deceased or lost to follow-up). Of 189 patients with 6 months, 29 (15.9%) developed spasticity. Those who developed spasticity and those who did not had similar initial demographic and NIHSS scores. The spasticity group had higher NIHSS scores post-thrombectomy day 1, longer lengths of stay at the hospital, and higher NIHSS scores at the time of discharge (12.8 vs 8.9, 20.3 vs 11.85, 13.5 vs 5.9) (p<.001). A discharge NIHSS score of greater than 10 increased the odds of developing spasticity by nearly 14 times (p<.0015). Those who had a successful reperfusion (TICI≥2B) had a 64% reduction in their odds of developing spasticity.

DISCUSSION: Approximately one in six patients that survive at 6 months following mechanical thrombectomy for anterior circulation LVO developed spasticity requiring medical treatment. Spasticity was associated with greater severity of stroke symptoms immediately after thrombectomy and at discharge, as well as with a non-successful reperfusion and discharge to a facility. 42% of patients who are discharged with a NIHSS ≥10 will go on to develop spasticity by six months. These characteristics serve as a method to predict likelihood of post-stroke spasticity and offer earlier identification, more appropriate interventions quicker for patients, such as baclofen, botox, or more invasive options like hyper-selective neuroectomy. Some limitations of the study included the small sample of patients with spasticity and the lack of objective measurement of the severity of spasticity.

SIGNIFICANCE/RELEVANCE: This study identifies discharge NIHSS and reperfusion status as key predictors of post-stroke spasticity in thrombectomy patients. Early recognition of these high-risk patients may facilitate earlier targeted rehabilitation and early referral to peripheral nerve surgeons for targeted interventions (hyperselective neuroectomy, contralateral C7 transfer, etc.), potentially improving long-term functional outcomes.

TABLE:

		Spasticity	Non-Spasticity	p-value
Demographics				
Patients (%)		29 (15.9)	160 (84.1)	
Age, mean (SD)		56.7 (12.2)	62.6 (17.3)	
Sex				
	Male, n (%)	14 (48)	76 (47%)	
	Female, n (%)	15 (52)	84 (53%)	
NIHSS Score, mean (SD)		16.2 (6.6)	15 (6.9)	
Vessel (%)				
	ICA	4 (13.8)	27 (16.9)	
	M1	23 (79.3)	116 (72.5)	
	Tandem	2 (6.9)	17 (10.6)	
Initial Degree of Paresis				
	Upper Extremity, mean	2.97	2.59	0.165
	Lower Extremity, mean	2.83	2.28	0.037
Procedure				
TICI (%)				
	0	4 (13.8)	9 (5.6)	
	1	1 (3.4)	1 (0.63)	
	2a	2 (6.9)	9 (5.6)	
	2b	6 (20.7)	25 (15.6)	
	2c	7 (24.1)	29 (18.2)	
	3	9 (31)	85 (53.1)	
Post-Procedure Course				
NIHSS Score, Post Procedure Day 1, mean (SD)		12.8(6.1)	8.9 (6.2)	0.004
NIHSS Score, at time of discharge, mean (SD)		13.5(5.9)	5.9 (5.7)	4.47E-07
Length of stay in hospital, d (SD)		20.3 (14.4)	11.85 (12)	0.005
Discharged to (%)				
	Home	3 (10.3)	76 (47.8)	
	Rehab	19 (65.5)	56 (35.2)	
	SNF	7 (24.1)	28 (17.6)	

		Non-spas	OR	p-value
Succ. Reperfusion				
	TICI ≥ 2b	21	139	0.35881295
	TICI < 2b	8	19	26.90%
NIHSS POD1				
	NIHSS ≥ 10	21	62	5.080645161
	NIHSS < 10	6	90	6.25%
Discharge NIHSS				
	≥ 10	21	29	13.75862069
	< 10	6	114	5%
LOS				
	LOS ≥ 14	18	44	4.314049587
	LOS < 14	11	116	8.60%
Discharge				
	Home	3	76	0.12753
	Facility	26	84	21.80%

