Predictors of Death at 90 days After Mechanical Thrombectomy for Large Vessel Occlusions

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Introduction

In recent years, mechanical thrombectomy (MT) has emerged as the new standard of care for large vessel ischemic stroke. However, despite significant advantages over medical therapy in rates of revascularization and favorable functional outcome, 90-day mortality rates following MT are still high in large series (9–21%). We sought to identify patient-level factors associated with mortality after MT.

Methods

267 consecutive stroke patients who underwent MT for large vessel occlusions at a single center between January 2015 and November 2017 were retrospectively identified. Information from their electronic medical records including demographic features, medical comorbidities, stroke characteristics, procedural outcomes and complications were collected and compared between patients who survived and those who died before 90 days. A multivariate regression model was built to assess factors that predicted death at 90-days post-thrombectomy.

Results

219 patients (mean age 71 [SD 15], female 129 [59%]) met inclusion criteria. Among them, 139 patients (63.5%) survived and 79 patients (36.1%) had died at 90-day follow-up. Factors independently associated with death at 90 days included older age (odds ratio [OR] 1.061, 95% confidence interval [95% CI] 1.030–1.094, p<0.0001), symptomatic hemorrhage (OR 3.858, 95% CI 1.254–11.864, p=0.019), and a higher post-procedural NIHSS score (OR 1.178, 95% CI 1.118–1.242, p<0.0001).

Conclusions

In patients who underwent mechanical thrombectomy for acute ischemic stroke, factors found to be independently associated with mortality included older age, incidence of symptomatic hemorrhage, and a higher post-procedural NIHSS score. These data may help inform discussions with patients and their surrogate decision-makers regarding expectations after mechanical thrombectomy for large vessel occlusions.

Learning Objectives

Identify risk factors associated for mortality following mechanical thrombectomy for large vessel occlusion in acute ischemic stroke patients.

Table 1. Demographics

Vital Status at 90-Day Follow-Up, n (%)	All 219	Alive 139 (63.5)	Deceased 79 (36.1)	P-Values (T-Test & X²)
Demographics, n				
Age (SD)	71 (15)	67 (15)	77 (12)	<0.0001
Female (%)	129 (59)	82 (59)	47 (59)	0.942
BMI (SD)	28 (6)	28 (6)	28 (6)	0.776
Comorbidities n (%)				
Atrial Fibrillation	107 (49)	64 (46)	42 (55)	0.512
Coronary Artery Disease	48 (22)	31 (22)	17 (22)	0.893
Congestive Heart Failure	51 (23)	32 (23)	19 (24)	0.863
Diabetes Mellitus	61 (28)	35 (25)	25 (32)	0.304
Hyperlipidemia	98 (45)	61 (44)	37 (47)	0.674
Hypertension	158 (72)	98 (71)	59 (75)	0.509
Myocardial Infarction	15 (7)	10 (7)	5 (6)	0.808
Obesity	67 (51)	40 (29)	27 (34)	0.406
Smoking	94 (43)	68 (49)	26 (33)	0.001
Stroke/TIA	36 (16)	22 (16)	13 (17)	0.903
Medications n (%)				
Aspirin	96 (44)	60 (43)	35 (44)	0.871
Coumadin	27 (12)	12 (9)	14 (18)	0.047
NOAC	25 (11)	15 (11)	10 (13)	0.676
Plavix	20 (9)	12 (9)	8 (10)	0.715
Treatment n (%)				
Alteplase Administration	119 (54)	77 (55)	38 (48)	0.300
Immediate and Post-Procedural NIHSS, n (SD)				
Initial NIHSS	16 (7)	15 (7)	18 (6)	0.009
Post Procedure NIHSS	12 (10)	15 (8)	19 (6)	<0.0001
Site of Occlusion n (%)				
Supraclinoid ICA / T-occlusion	36 (16)	16 (12)	20 (25)	0.008
M1	113 (52)	75 (54)	38 (48)	0.406
M2	27 (12)	17 (12)	10 (13)	0.927
Distal MCA	4 (2)	3 (2)	1 (1)	0.637
Tandem	15 (7)	11 (8)	4 (5)	0.424
Vertebrobasilar	23	17 (12)	6 (8)	0.284
Final TICI Scores n (%)				
0-2a	52 (24)	29 (21)	23 (29)	0.169
2b-3	167 (76)	110 (79)	56 (71)	
Post 72hr Outcomes n (%)				
Death	15 (7)	0 (0)	15 (19)	<0.0001
Acute Ischemic Stroke	8 (3)	3 (2)	5 (6)	0.142
Perforation Hemorrhage	5 (2)	1 (1)	4 (5)	0.059
Symptomatic Reperfusion Hemorrhage	23 (11)	8 (6)	15 (19)	0.002
Discharge Disposition n(%)				
Home	38 (17)	28 (28)	0 (0)	<0.0001
STR/Acute Rehab/SNF	108 (49)	88 (63)	19 (24)	<0.0001

Table 2. Binomial Univariate Logistic Regression Analysis

Risk Factor	Odds Ratio [95% Confidence Interval]	P-Value
Age	1.057 [1.033–1.082]	<0.0001
Smoking	0.512 [0.288–0.910]	0.023
Pre-Coumadin	2.279 [0.997–5.212]	0.051
Discharge Disposition	2.459 [1.977–3.058]	<0.0001
Initial NIHSS Score	1.052 [1.009–1.097]	0.018
Last Available NIHSS	1.169 [1.121–1.220]	<0.0001
Symptomatic Hemorrhage	4.574 [1.955–10.702]	<0.0001
T Occlusion	2.606 [1.260–5.391]	0.010

Table 3: Binomial Logistic Regression Analysis

Risk Factor	Odds Ratio [95% Confidence Interval]	P-Value
Age	1.061 [1.030–1.094]	<0.0001
Symptomatic Hemorrhage	3.858 [1.254–11.864]	0.019
Post-Procedural NIHSS Score	1.178 [1.118–1.242]	<0.0001