



Intravenous alteplase “drip-and-ship” treatment of large vessel occlusion stroke patients in a hub-and-spoke Telestroke model

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Introduction

- Randomized trials have questioned the role of intravenous alteplase for patients undergoing endovascular thrombectomy (EVT) for emergent large vessel occlusion (ELVO) stroke (Yang et al. 2020. NEJM. 382(21):1981-1993)
- However, these trials included primarily patients who presented directly to an EVT-capable hub center (ie. “mothership” model).

Purpose

- We aimed to compare outcomes for ELVO patients requiring transfer for EVT who were administered alteplase (i.e. “drip and ship” model) vs those who weren’t at spoke hospitals.

Methods

- Patients presenting to 25 spoke hospitals from 2018-2020 were retrospectively identified from a prospective Telestroke database.

- Spoke CTA-defined ELVO
- Spoke ASPECTS ≥ 6
- Transferred for EVT consideration

- We compared those who received intravenous alteplase at spokes and those who did not.

- Outcomes of interest included adequate reperfusion (TICI 2b-3), any intracerebral hemorrhage (ICH), hub discharge functional independence (mRS ≤ 2), and 90-day functional independence.

Results

	Total		Spoke Alteplase		No Spoke Alteplase		p
	Med/ Ct	IQR/ %	Med/ Ct	IQR/ %	Med/ Ct	IQR/ %	
Age	70	(60,81)	67	(58,81)	71	(61,81)	0.131
Female	129	50%	48	49%	81	51%	0.898
Black	9	4%	5	7%	4	3%	0.288
Hispanic	9	4%	1	1%	8	6%	0.161
Asian	6	3%	2	3%	4	3%	1.000
White	184	91%	66	90%	118	91%	1.000
Hypertension	162	63%	60	61%	102	64%	0.693
Diabetes	61	24%	21	21%	40	25%	0.549
Atrial Fibrillation	78	30%	23	24%	55	34%	0.070
Coronary Disease	44	17%	18	18%	26	16%	0.734
Prior Stroke/TIA	42	16%	14	14%	28	18%	0.603
Dyslipidemia	120	47%	45	46%	75	47%	0.898
Obesity/Overweight	89	35%	33	34%	56	35%	0.893
Renal Insufficiency	21	8%	9	9%	12	8%	0.645
Smoking	47	18%	23	24%	24	15%	0.098
Baseline mRS 3-5	14	8%	4	6%	10	10%	0.406
NIHSS	13	(6,19)	12	(6,19)	14	(6,18)	0.979
LKW-Telestroke Time	3.6	(1.5,9.6)	1.6	(1.1,2.6)	6.7	(3.9,11.7)	<0.0001
LKW-Hub Arrival Time	6.4	(4.1,12.0)	4.0	(3.3,5.1)	9.6	(6.4,14.6)	<0.0001
Hub EVT	113	44%	51	52%	62	39%	0.040
TICI 2b-3, N=107	93	87%	46	94%	47	81%	0.082
Any ICH	18	7%	7	7%	11	7%	1.000
Discharge mRS ≤ 2 , N=255	50	20%	28	29%	22	14%	0.005
90-Day mRS ≤ 2 , N=121	47	39%	29	56%	18	26%	0.001

- Median values with interquartile range (IQR) were reported for continuous variables.
- Percent and count were reported for categorical variables.
- Differences were assessed using nonparametric Wilcoxon rank-sum for continuous variables and Fisher’s Exact tests for categorical variables.
- Logistic regression analyses were performed to assess associations with dichotomous outcomes.
- Two-tailed P values <0.05 were interpreted as statistically significant.
- 258 ELVO patients met inclusion criteria at spokes, of which 98 were treated with alteplase at spokes and 113 were treated with EVT at the hub.

Univariable associations with spoke alteplase		
	OR (95%CI)	p
TICI 2b-3	3.589 (0.940,13.70)	0.062
Any ICH	1.042 (0.390,2.784)	0.935
Discharge mRS ≤ 2	2.509 (1.337,4.706)	0.004
90-Day mRS ≤ 2	3.572 (1.659,7.692)	0.001

Multivariable associations with discharge mRS ≤ 2		
	aOR (95%CI)	p
Spoke Alteplase	2.568 (1.159,5.686)	0.020
LKW-Telestroke Consult	0.983 (0.921,1.049)	0.602
NIHSS	0.847 (0.794,0.904)	<0.0001
Hub EVT	1.678 (0.778,3.619)	0.187

Multivariable associations with 90-day mRS ≤ 2		
	aOR (95%CI)	p
Spoke Alteplase	3.128 (1.021-9.584)	0.046
LKW-Telestroke Consult	0.864 (0.744,1.005)	0.058
NIHSS	0.857 (0.786,0.935)	0.001
Hub EVT	43.65 (4.101,464.6)	0.002

Conclusions

- Alteplase should not be withheld from ELVO patients who first present to a spoke hospital capable of administering intravenous alteplase but requiring transfer for EVT.
- Additional outcomes are the focus of ongoing work: Δ NIHSS, thrombus migration, and recanalization during transfer, and number of EVT passes.
- Additional studies are warranted to confirm benefits of spoke-administered alteplase and to understand the minimum distance and transfer time where benefit is likely.