

Adjunctive Endovascular Thrombolysis After Full Dose Intravenous Thrombolysis is Safe

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PURPOSE/BACKGROUND

➤ Though studies evaluating the safety of adjunctive intra-arterial (IA) thrombolysis after “bridging doses” (e.g. 0.6 mg/kg) of systemic thrombolysis have established safety of this regimen, the risk of intracranial hemorrhage (ICH) with IA tPA after full dose (0.9 mg/kg) intravenous (IV) tissue plasminogen activator (tPA), the current standard of care for acute ischemic stroke (AIS), is unknown.

OBJECTIVES

➤ The risk of intracranial hemorrhage (ICH) with full dose IV tPA and adjunctive intra-arterial (IA) tPA is unknown.

DESIGN/METHODS

➤ We reviewed our institutional database over the past 3 years for patients presenting with AIS within 3 hours who had clinical signs referable to a hemispheric syndrome, or who had confirmed LAO, and divided them into the following categories: those treated with combined full dose IV tPA and adjunctive IA tPA (group A), patients presenting within 3 hours but receiving only IA tPA (group B), and those receiving sole IV tPA (group C). Descriptive statistics were performed to determine mean ages, baseline and 1 week or hospital discharge National Institutes of Health Stroke Scale scores (NIHSS), and pre and post-treatment thrombolysis in myocardial infarction (TIMI) scores (where these data were available). Rates of ICH amongst all groups were also recorded. Symptomatic hemorrhages were defined as that seen on subsequent computed tomography and determined to be responsible cause for clinical worsening. All statistics were performed using Statistical Package for the Social Sciences, Version 16.0 (Chicago, IL).

RESULTS

➤ Fifteen patients in group A, 9 in group B, and 10 in group C were identified. Mean ages (years) were 69 +/- 16 (group A), 65 +/- 9 (group B), and 66 +/- 15 years (group C).

➤ Male patients numbered 5/15 (group A); 4/9 (group B); and 4/10 (group C).

➤ Mean baseline NIHSS were as follows: 17 +/- 7 (group A), 15 +/- 9 (group B), 14 +/- 11 (group C). Mean 1 week or discharge NIHSS were 9 +/- 8 (group A), 9 +/- 11 (group B), 10 +/- 14 (group C).

➤ Mean times (minutes) from symptom onset to initiation of tPA were 105 +/- 41 (group A) versus 152 +/- 40 (group C), **p=0.009**. Mean doses of IV tPA were 67 +/- 22 mg (group A) versus 61 +/- 13 (group C).

➤ Mean doses of IA tPA were 5.1 +/- 3.7 mg (group A) versus 4.8 +/- 4.2 mg (group B).

➤ Mean TIMI scores were 1 +/- 1 at baseline versus 2 +/- 1 at procedure end in both groups A and B. (TIMI scores were not routinely collected in patients receiving only IV tPA).

➤ There were two incidences of asymptomatic ICH each in groups A and B and one in group C. There were no incidences of symptomatic ICH.

CONCLUSION/ IMPLICATIONS FOR PRACTICE

➤ Full dose IV tPA followed by adjunctive IA tPA appears safe for suitable candidates. Future prospective comparisons may further validate this.

RESULTS TABLE

Age, sex	Time to needle (minutes from symptom onset)	Time to puncture (minutes from symptom onset)	ICH	Initial NIHSS score	7-10 day NIHSS score	Initial TIMI score	Final TIMI score	Dose of IV tPA (mg)	Dose of IA tPA	Reason for IV or IA exclusion
Group A: combined Intraarterial and Intravenous treatment										
67, M	98	310	No	17	16	1	2	68	3	N/A
84, F	80	195	No	22	5	2	2	55	6.5	N/A
90, F	52	359	No	11	5	1	3	6.9 (incomplete) ¹	1	N/A
39, F	110	121	No	18	5	0	2	72	3.5	N/A
79, M	165	200	No	29	31	0	0	90	2	N/A
66, M	65	155	No	11	6	0	0	90	2	N/A
54, M	155	210	No	16	5	0	0	65	2	N/A
78, M	150	185	No	7	6	0	3	86	6	N/A
70, F	131	157	Asymptomatic	26	20	0	2	90	6	N/A
34, F	90	140	No	7	4	0	3	63	9	N/A
75, F	32	365	No	11	5	1	1	90	1	N/A
87, F	90	150	No	17	4	0	2	48	6	N/A
68, F	107	320	No	14	5	1	2	72	6	N/A
73, F	160	205	No	29	12	0	2	61	7.5	N/A
58, F	85	120	Asymptomatic	14	3	0	2	49	15	N/A
Group B, Intraarterial treatment										
41, F	N/A	266	No	14	4	2	3	N/A	3	Recent surgery
53, M	N/A	270	No	4	1	2	2	N/A	1	Recent stroke ²
84, F	N/A	242	No	27	12	0	2	N/A	8	Recent surgery
76, F	N/A	240	No	5	3	0	2	N/A	4	Delay in IV
63, M	N/A	245	Asymptomatic	21	37	0	2	N/A	2	Recent stroke
82, F	N/A	225	No	6	3	3	3	N/A	0.5	INR > 1.7
61, F	N/A	220	Asymptomatic	28	12	0	2	N/A	4.5	Recent stroke
71, M	N/A	125	No	17	8	2	3	N/A	14	Recent surgery
54, M	N/A	460	No	11	5	0	2	N/A	6	Improving exam
Group C, Intravenous treatment										
77, F	135	N/A	No	28		N/A	N/A		N/A	ANL renal fxn
50, M	140	N/A	Asymptomatic	12	0	N/A	N/A	77	N/A	Matched LAO
76, F	87	N/A	No	4	0	N/A	N/A	50	N/A	ANL renal fxn
64, M	180	N/A	No	7	1	N/A	N/A	73	N/A	Clinical discretion
64, F	103	N/A	No	5	26	N/A	N/A	46	N/A	Matched LAO ³
34, M	180	N/A	No	1	0	N/A	N/A	78	N/A	Low NIHSS score
74, F	160	N/A	No	25	29	N/A	N/A		N/A	Clinical discretion
61, F	129	N/A	No	17	7	N/A	N/A	51	N/A	ANL renal fxn
60, M	190	N/A	No	8	0	N/A	N/A	50	N/A	Clinical discretion
90, F	215	N/A	No	34	31	N/A	N/A	53	N/A	Refused IA

Abbreviations: ICH, Intracerebral hemorrhage; NIHSS, National Institutes of Health Stroke Scale; TIMI, Thrombolysis in Myocardial Infarction; IV, intravenous; IA, intraarterial; N/A, not applicable or not available; ANL, abnormal; fxn, function; LAO, large artery occlusion.

¹ This patient received the bolus dose of IV tPA but was not administered the remainder dose due to administration error

² This patient had evidence of age indeterminate ischemia on baseline imaging, concerning for recent stroke correlating with clinical symptoms

³ This patient had anterior cerebral artery occlusion, presumed to be a completed event, though subsequent imaging did show further infarct extension