

CSA Medical Director Report

July 2011

From the Journal Stroke

Publish-Ahead-of-Print Contents for 9 Jun 2011

Subtherapeutic International Normalized Ratio in Warfarin-Treated Patients Increases the Risk for Symptomatic Intracerebral Hemorrhage After Intravenous Thrombolysis

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Background and Purpose—There is uncertainty whether warfarin-treated patients (despite international normalized ratio <1.7) have increased risks of symptomatic intracerebral hemorrhage after intravenous thrombolysis.

Methods—Vascular risk factors, stroke subtype, and outcome measures were compared between warfarin- and nonwarfarin-treated patients undergoing acute thrombolysis within 3 hours of symptom onset.

Results—From 212 patients (mean age, 74 ± 14 years; 50% men) studied, 14 (6.5%) had prior warfarin use. After adjusting for age, baseline National Institutes of Health Stroke Scale, and stroke subtype, warfarin-treated patients had significantly increased risks of developing symptomatic intracerebral hemorrhage (adjusted OR, 14.7; 95% CI, 1.3 to 54.3). A trend for poorer stroke recovery and increased mortality was observed in warfarin-treated patients on univariate, but not on multivariable, analyses.

Conclusions—Warfarin-treated patients with stroke have increased risks of symptomatic intracerebral hemorrhage after thrombolytic treatment. These data raise safety concerns of thrombolytic treatment in warfarin-treated patients with subtherapeutic international normalized ratio. (*Stroke*. 2011;42:00-00.)

Key Words: INR ■ intracerebral hemorrhage ■ ischemic stroke ■ warfarin

From the Article

Table 2. Odds Ratios (95% CIs)

Outcomes	Unadjusted	<i>P</i>	Adjusted*	<i>P</i>	Adjusted†	<i>P</i>
Any intracerebral hemorrhage	4.61 (1.49–14.3)	0.004	5.29 (0.98–19.5)	0.054	5.49 (0.92–33.6)	0.094
Symptomatic intracerebral hemorrhage	6.67 (2.52–15.5)	<0.001	9.17 (2.32–24.4)	0.025	14.7 (1.3–54.3)	0.044
Poor functional recovery	2.76 (0.84–9.09)	0.083	3.42 (0.75–15.6)	0.112	3.25 (0.71–14.9)	0.130
In-hospital mortality	2.37 (0.75–7.46)	0.131	1.90 (0.42–8.62)	0.404	1.41 (0.44–9.17)	0.370

NIHSS indicates National Institutes of Health Stroke Scale; CI, confidence interval.

*Adjusted for age and baseline NIHSS.

†Adjusted for age, baseline NIHSS and stroke subtype.

Comparing the CSA Experience with the Article

	Seet, et al			CSA		
	Baseline Warfarin Use	No Baseline Warfarin Use	P	Baseline Warfarin Use	No Baseline Warfarin Use	P
n	14	198		38	873	
Age, mean(SD)	79 (9)	74 (14)	0.142	77 (11)	69 (15)	0.001
Initial NIHSS score, median (IQR)	13 (7-16)	13 (6-17)	0.49	13 (8-17)	11 (6-17)	0.6
Symptomatic ICH	5 (36%)	11 (6%)	0.001	1 (2.6%)	42 (4.8%)	0.535
INR, median (IQR)	1.15 (1.02-1.48)	1.00 (0.90-1.10)	0.001	1.23 (1.00-1.42)	1.00 (1.00-1.10)	0.0001
Comparing Outcomes						
	Unadjusted	Adjusted*		Unadjusted	Adjusted*	
Sx ICH: OR (95% CI), P value	6.67 (2.52-15.5), 0.001	9.17 (2.32-24.4), 0.025		0.95 (0.22-4.04), 0.94	0.93 (0.21-4.07), 0.043	
*Adjusted for age and baseline NIHSS						

Note: CSA data is from Feb 2011 download and is limited to patients treated at "this hospital" with IV tPA only