

Thrombolytic Outcomes for Acute Ischemic Stroke in Patients with Primary Brain Tumors in the United States

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Introduction

- The incidence of acute ischemic stroke (AIS) in patients with primary brain tumors is about 1.3%
- Thrombolytic treatment is underutilized for AIS overall, partly as a result of extensive exclusion criteria used in earlier stroke trials
- Patients with primary brain tumors are generally perceived to have a higher risk of intracerebral hemorrhage (ICH) and worse outcomes, and therefore excluded from intravenous thrombolysis.
- Our aim was to compare the outcomes of thrombolysis in patients with brain tumor associated stroke (BTS) and non-brain tumor associated strokes (NBTS) in this population-based cross-sectional cohort study using a large national health database.

Methods

- We identified patients with AIS and thrombolysis in the Nationwide Inpatient Sample Database from 2002 to 2011 using ICD-9 codes
- Patient demographics, hospital characteristics and outcomes between the BTS and NBTS groups. Exclusion criteria: Patients <18 yrs, ESRD, acute MI, metastatic brain tumors, spine tumors.
- The primary outcomes were in-hospital mortality and home discharge. Safety outcome of interest was ICH (symptomatic and asymptomatic)
- Elixhauser index, a validated weighted score of 21 different comorbidities with van Walraven modification was used for comorbidity adjustment. These scores were grouped into the following quartiles: <5, 5-7, 8-14, and ≥ 15.
- Pearson's Chi-square test and Wilcoxon-Mann Whitney tests were used for categorical and continuous variables respectively
- Stepwise logistic regression models were used to assess thrombolysis outcomes, multivariate generalized linear models were used to assess resource utilization

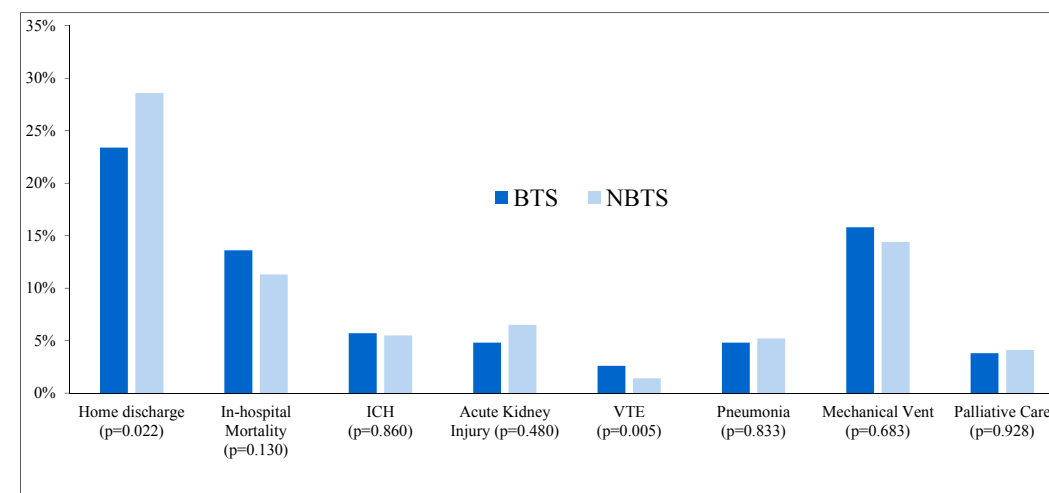
Results

- 124,083 patients with AIS who received thrombolysis, including 416 patients with BTS and 123,667 NBTS
- The overall thrombolysis utilization rate for NBTS was 2.6% and 0.8% for BTS
- The thrombolysis utilization rate for benign BTS was 1.3% and 0.4% for malignant BTS

Table 1 : Demographics of the thrombolysis-treated patients

Variables	BTS (%) n=416	NBTS (%) n=123,667	p value
Age (categorical)			
18-64	98 (23.6)	47680 (38.6)	0.005
65-79	169 (40.7)	44138 (35.7)	
>80	149 (35.7)	31849 (25.8)	
Sex			
Male	138 (33.1)	60548 (51.0)	<0.001
Female	278 (66.9)	63103 (49.0)	
Race			
1. Caucasian	271 (65.0)	74038 (59.9)	0.006
2. Black	24 (5.8)	14389 (11.6)	
3. Hispanic	11 (2.8)	6961 (5.6)	
4. Asian	21 (5.0)	2415 (2.0)	
3. Other	26 (6.2)	3284 (2.7)	
4. Missing	63 (15.2)	22577 (18.3)	
Elixhauser Quartile			
First (<5)	120 (28.7)	36635 (29.7)	<0.001
Second (5-7)	80 (18.9)	31158 (25.3)	
Third (8-14)	100 (24.3)	31193 (25.3)	
Fourth (≥15)	116 (28.0)	24161 (19.6)	
Diabetes mellitus	112 (26.9)	32523 (26.3)	0.907
Hypertension	310 (73.1)	91249 (74.1)	0.816
Hyperlipidemia	192 (46.2)	56091 (45.4)	0.874
Valvular heart disease	43 (10.4)	10745 (8.7)	0.522
Coronary artery disease	84 (20.2)	35425 (28.6)	<0.001
Coagulopathy	10 (2.4)	3929 (3.2)	0.459
Anticoagulant Use	25 (6.0)	4056 (3.3)	0.003

Figure 1: Univariate analysis of primary and secondary outcomes



Results

Table 2: Multivariate analysis of Outcomes

Outcomes	OR (95% CI)	p value
Home Discharge	1.15 (0.87-1.53)	0.40
In-hospital Mortality	0.98 (0.77-1.26)	0.918
ICH	0.94 (0.62-1.44)	0.801

Table 3: Multivariate analysis of Outcomes based on brain tumor subtype

Outcomes	Brain Tumor Subtype	OR (95% CI)	p value
In-hospital Mortality	NBTS	Reference	
	Benign BTS	0.67 (0.44-1.02)	0.063
	Malignant BTS	2.51 (1.66-3.79)	<0.001
Home Discharge/ Self-Care	NBTS	Reference	
	Benign BTS	1.23 (0.95-1.61)	0.123
	Malignant BTS	0.36 (0.18-0.72)	0.004
Intracerebral Hemorrhage	NBTS	Reference	
	Benign BTS	0.85 (0.49-1.45)	0.544
	Malignant BTS	1.15 (0.59-2.25)	0.672

Conclusions

- Thrombolytic therapy for acute stroke appears to be safe in patients with primary brain tumors, with similar rates of ICH.
- Malignant BTS have worse outcomes, while benign BTS have outcomes comparable to NBTS.
- Careful consideration of tumor pathology may aid in selection of patients with poor thrombolysis outcomes.