Risk Factors for Stroke in non-Cranial Trauma Patients: A Population Based Study in Metro Detroit 2006-2014

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Learning Objectives

1. Participants will be able to describe risk factors for stroke in non CNS trauma patients.
2. Participants will be able to describe cohorts at greatest risk for post traumatic stroke.

Introduction

Trauma induces an inflammatory cascade which places patients at risk for thrombosis related comorbidity including stroke. Neurotrauma is a known risk factor for stroke, whereas the role of non-CNS trauma is less well defined. The current study sought to identify risk factors for stroke in non-cranial trauma patients.

Methods

Data were obtained from the Agency for Health Research and Quality's (AHRQ) Healthcare Cost and Utilization Project (HCUP). The Michigan State Inpatient Database (SID) from 2006 to 2014 for the Detroit Metropolitan Statistical Area (MSA) was queried, entailing 406,245 trauma patients. Cranial trauma admissions were excluded. Demographic subgroups included age, gender, race, socioeconomic background, mechanism of injury, and insurance type.

Table 1

Category		Unadjusted		Age-Adjusted	
Age Category	N (%)	M [95% CI]	*p*	M [95% CI]	*p*
Children (< 18)	21,141 (5.5%)	1.0 [0.8, 1.1]	0.491		
Younger Adults (18 – 39)	57,276 (14.9%)	1.0 [0.9, 1.1]	a		
Middle Adults (40 – 64)	115,178 (30.0%)	3.0 [2.9, 3.1]	< .001		
Older Adults (65+)	190,136 (49.6%)	6.3 [6.1, 6.4]	< .001		
Gender					
Male	190,457 (49.8%)	4.1 [4.0, 4.2]	a	4.8 [4.7, 4.9]	a
Female	191,957 (50.2%)	4.4 [4.3, 4.5]	< .001	3.8 [3.7, 4.0]	< .001
Race/Ethnicity					
White	218,440 (70.0%)	4.3 [4.2, 4.3]	a	3.8 [3.7, 3.9]	a
Black	81,078 (26.0%)	4.2 [4.1, 4.3]	0.49	5.8 [5.6, 6.0]	< .001
Hispanic	2,562 (0.8%)	2.8 [2.2, 3.5]	< .001	5.0 [4.0, 6.0]	0.021
Other	10,061 (3.2%)	3.9 [3.6, 4.3]	0.12	4.6 [4.1, 5.1]	< .001
Trauma Mechanism					
Fall	112036 (44.50%)	5.1 [5.0, 5.3]	< .001	4.5 [4.3, 4.8]	< .001
Gunshot Wound	6,466 (2.6%)	1.8 [1.5, 2.1]	< .001	5.5 [4.6, 6.7]	< .001
Motor Vehicle Traffic	21,736 (8.6%)	1.8 [1.6, 2.0]	< .001	3.0 [2.7, 3.4]	< .001
Other	87,654 (34.8%)	2.8 [2.7, 2.9]	a	3.7 [3.5, 3.8]	a
Insurance Type					
Private	106,423 (27.7%)	2.3 [2.2, 2.4]	a	3.3 [3.2, 3.5]	a
Medicare	203,448 (53.2%)	6.0 [5.9, 6.1]	< .001	5.1 [4.8, 5.3]	< .001
Medicaid	42,453 (11.1%)	2.8 [2.7, 3.0]	< .001	5.6 [5.2, 6.0]	< .001
Self-Pay	17,900 (4.7%)	1.3 [1.1, 1.4]	< .001	2.4 [2.1, 2.7]	< .001
Other	12,124 (3.2%)	1.4 [1.2, 1.6]	< .001	2.4 [2.0, 2.8]	< .001
Neighborhood Poverty Rate					
Lowest Quartile (< 6.5%)	64,102 (16.7%)	4.0 [3.9, 4.2]	0.019	3.6 [3.5, 3.8]	< .001
2nd Quartile (6.5% - 10.8%)	86,357 (22.5%)	4.3 [4.1, 4.4]	0.932	3.9 [3.7, 4.0]	< .001
3rd Quartile (10.8% - 18.7%)	92,380 (24.1%)	4.3 [4.2, 4.4]	0.725	4.1 [3.9, 4.3]	< .001
Highest Quartile (18.7% +)	140,892 (36.7%)	4.3 [4.2, 4.4]	a	5.1 [4.9, 5.2]	a

Table 1: Percent of trauma patients (excluding traumatic brain injury) with post traumatic stroke (a: reference cohort)

Results

There was a total of 406,245 admissions of patients with trauma diagnoses residing within the Detroit MSA. Of these, 23,822 were excluded because of concurrent neurotrauma diagnoses. The remaining sample of 382,423 trauma admissions (table 1) had 16,172 incidences of post-traumatic stroke. Overall, there was a 4.2% rate of post-traumatic stroke following non-cranial trauma. After controlling for age, post-traumatic stroke rates were: 1% for children and young adults; 3.0% in middle adulthood; 6.3% in older adults. Stroke rates were highest amongst black trauma patients and lowest amongst white trauma patients. Falls and gunshot wounds had equally high rates of stroke occurrence. Stroke rates were also increased in patients with Medicare and Medicaid insurance, as well as patients in the highest quartile of poverty.

Conclusions

Based on analysis of a metropolitan area with a diverse socioeconomic and racial mix, socioeconomically marginalized groups suffer an elevated risk of post-traumatic stroke.

References

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