

Risk Factors of Ischemic Cerebral Stroke in Patients Presenting with Amaurosis Fugax

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MY ROLE IN THIS RESEARCH:

Conception and design of the work/project

Acquisition of data

Analysis and interpretation of data

Creation and/or critical review of the presentation

Ischemic Cerebral Stroke

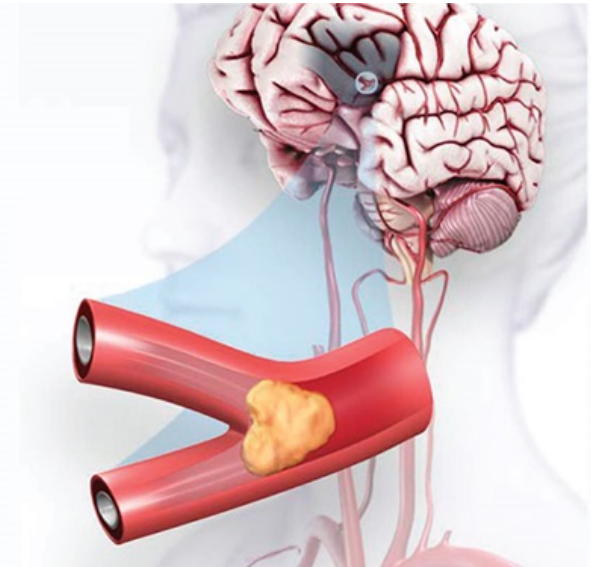


- Ischemic cerebral stroke causes significant morbidity and mortality.
- Early recognition and timely intervention are crucial in improving patient outcome.
- Retinal ischemia is considered a stroke by American Heart Association and American Stroke Association.¹
 - Retinal artery occlusion (RAO) = Ischemic retinal stroke.
 - Amaurosis fugax (AF) = Transient ischemic attack (TIA) of the retina.

1. Sacco RL, Kasner SE, Broderick JP, et al. An updated definition of stroke for the 21st century: A statement for healthcare professionals from the American heart association/American stroke association. *Stroke*. 2013;44(7):2064-2089. doi:10.1161/STR.0b013e318296aeca

Amaurosis Fugax and Transient Ischemic Attack are Harbingers of Ischemic Cerebral Stroke

- AF was traditionally believed to carry a lower risk of future stroke compared to TIA.²
- More recent studies, however, suggest a higher incidence of subsequent cerebral stroke (asymptomatic or symptomatic) in AF patients; ranges from 4.3% to 11.8%.³

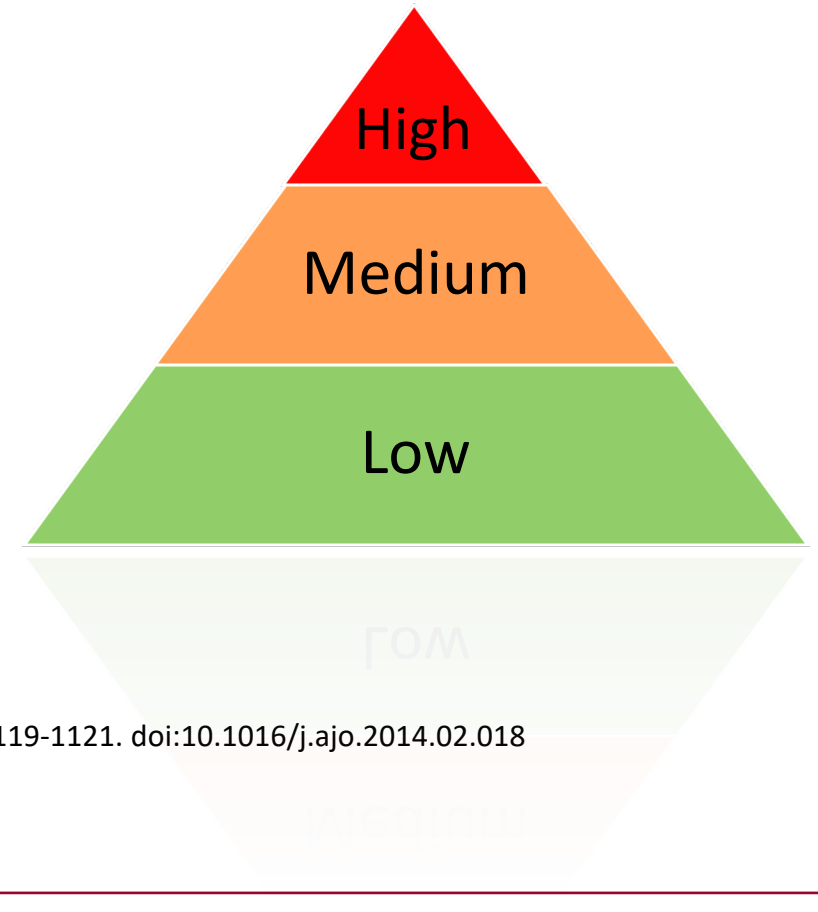


2. Benavente O, Eliasziw M, Streifler JY, Fox AJ, Barnett HJM, Meldrum H. Prognosis after Transient Monocular Blindness Associated with Carotid-Artery Stenosis. *N Engl J Med*. 2001;345(15):1084-1090. doi:10.1056/NEJMoA002994

3. Fallico M, Lotery AJ, Longo A, et al. Risk of acute stroke in patients with retinal artery occlusion: a systematic review and meta-analysis. *Eye*. 2020;34(4):683-689. doi:10.1038/s41433-019-0576-y

Management of Acute Amaurosis Fugax

- Urgent referral for stroke workup and management is recommended but often not strictly followed.⁴
- Better risk stratification of AF helps in recognizing patients at high risk of developing ischemic stroke, who may require emergent medical evaluation.



4. Biousse V. Acute Retinal Arterial Ischemia: An Emergency Often Ignored. *Am J Ophthalmol*. 2014;157(6):1119-1121. doi:10.1016/j.ajo.2014.02.018

Purpose of study

- To identify the risk factors for ischemic stroke in patients presenting with acute AF using a database representative of United States population.

Data Source

- Patient dataset was obtained from [National Inpatient Sample \(NIS\) database, 2002-2014](#).
 - Publicly available database managed by the Agency of Healthcare Research and Quality.
 - Included 20% sample of hospitalization in the US; 97% of population.
- Available data includes patient demographics, ICD-9 diagnosis codes, associated medical comorbidities, diagnostic tests and procedures performed, acute in-hospital events, length of stay, etc.



NIS Database Documentation

The National (Nationwide) Inpatient Sample (NIS) is a large publicly available all-payer inpatient care database in the United States, containing data on more than seven million hospital stays each year.

Study Method

Study group: Patients age 21 or above with primary admitting diagnosis of amaurosis fugax, identified using ICD-9 code 362.34. Patients were stratified into two age groups, 21-50 years and over 50 years.



Patient demographics, systemic comorbidities, diagnostic tests and therapeutic procedures performed, and in-hospital complications were extracted using relevant ICD-9 and procedural codes.



Statistical analyses of selected comorbidities (chi-square, Firth univariate and multivariable logistic regression analyses).

Risk Factor Selection

- Alcohol Use Disorder
- Aneurysm/Dissection
- Atrial Fibrillation/Flutter
- Atherosclerosis
- Bleeding Diathesis
- Congestive Heart Failure
- Chronic Lung Disease
- Coronary Artery Disease
- Diabetes Mellitus
- Dyslipidemia
- Hypercoagulable State
- Hypertension
- Renal Failure
- Tobacco Use
- Cardiac Valvular Disease

Patient Demographics

	All Patients	21 - 50 Years (n = 1613)	51+ Years (n = 10529)	p-Value
Gender				
Men	6067 (50.0%)	733 (45.4%)	5334 (50.7%)	< 0.001
Women	6070 (50.0%)	880 (54.6%)	5190 (49.3%)	
Race				
White	7542 (62.1%)	818 (50.7%)	6723 (63.9%)	< 0.001
Black	1214 (10.0%)	262 (16.2%)	953 (9.1%)	< 0.001
Hispanic	717 (5.9%)	186 (11.5%)	531 (5.0%)	< 0.001
Asian Pacific Islander	151 (1.2%)	23 (1.4%)	128 (1.2%)	0.478

P<0.05 was considered significant

Geographic Location

	All Patients	21 - 50 Years (n = 1613)	51+ Years (n = 10529)	p-Value
Geographic Location				
Northeast	3083 (25.4%)	419 (26.0%)	2664 (25.3%)	0.562
Midwest	2968 (24.4%)	377 (23.4%)	2591 (24.6%)	0.282
South	4548 (37.5%)	563 (34.9%)	3984 (37.8%)	0.024
West	1543 (12.7%)	253 (15.7%)	1290 (12.3%)	< 0.001
Type of Community				
Rural	1159 (9.5%)	153 (9.5%)	1006 (9.6%)	0.930
Urban	10983 (90.5%)	1460 (90.5%)	9523 (90.4%)	

P<0.05 was considered significant

Prevalence of Selected Medical Comorbidities

Variable	All Patients	21 - 50 Years (n = 1613)	51+ Years (n = 10529)	<i>p</i> -Value
Hypertension	8023 (66.1%)	665 (41.5%)	7357 (71.0%)	< 0.001
Diabetes Mellitus	2381 (19.6%)	218 (13.5%)	2163 (20.5%)	< 0.001
Dyslipidemia	5428 (44.7%)	461 (28.6%)	4967 (47.2%)	< 0.001
Coronary Artery Disease	2789 (23.0%)	99 (6.1%)	2690 (25.5%)	< 0.001
Cardiac Valvular Disease	1685 (13.9%)	225 (14.0%)	1460 (14.1%)	0.944
A. Fibrillation/Flutter	1444 (11.9%)	53 (3.3%)	1391 (13.2%)	< 0.001
Atherosclerosis	382 (3.1%)	*	<u>82 (0.8%)</u>	0.339
History of Stroke	746 (6.1%)	50 (5.0%)	666 (6.3%)	0.033
Hypercoagulable State	74 (0.6%)	53 (3.3%)	20 (0.2%)	< 0.001
Systemic Vasculitis	134 (1.1%)	11 (0.7%)	123 (1.2%)	0.082
Alcohol Use Disorder	168 (1.4%)	68 (4.2%)	100 (1.0%)	< 0.001
Tobacco Use	2858 (23.6%)	454 (28.1%)	2414 (22.9%)	< 0.001

P<0.05 was considered significant

*As per HCUP guidelines on reporting results from analysis of the NIS Database, cells with 1 to 10 patients must be redacted for privacy purposes; *p*-values are reported. For variables with redactions, the underlined cells represent the group (21-50 vs. 50+) with the higher prevalence.

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In-Hospital Thrombotic Complications

Variable	All Patients	21 - 50 Years (n = 1613)	51+ Years (n = 10529)	<i>p</i> -Value
Ischemic Stroke	103 (0.9%)	21 (1.3%)	82 (0.8%)	0.033
Myocardial Infarction	35 (0.3%)	* —	25 (0.2%)	0.008
DVT/PE	35 (0.3%)	* —	30 (0.3%)	0.860
Non-Cerebral Systemic Venous Thrombosis	44 (0.4%)	* —	34 (0.3%)	0.064

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Risk Factors for In-Hospital Ischemic Stroke

	Univariable		Multivariable	
	OR (95% CI)	p-Value	OR (95% CI)	p-Value
Hypercoagulable State	9.71 (3.96 - 23.80)	<0.001	8.98 (3.43 - 23.49)	<0.001
Systemic Vasculitis	4.63 (1.84 - 11.63)	0.001	4.16 (1.64 - 10.57)	0.003
Coronary Artery Disease	2.63 (1.78 - 3.89)	<0.001	4.05 (2.67 - 6.15)	<0.001
Atherosclerosis	2.75 (1.35 - 5.61)	0.005	3.60 (1.75 - 7.38)	<0.001
Dyslipidemia	0.64 (0.43 - 0.96)	0.033	0.54 (0.35 - 0.81)	0.003

P<0.05 was considered significant for univariable regression analysis, whereas P<0.005 was considered significant after Bonferroni Correction in multivariable regression analysis.

Strength and Limitation

- Strength
 - Large sample size.
 - Demographics representative of entire US population.
- Limitations
 - Study results rely on accuracy and specificity of ICD-9 codes in the NIS database.
 - Limited to patient with acute symptoms of AF.
 - Reported prevalence of hospital complications (including ischemic stroke) refers to events occurred during the same hospitalization (within an average of 5 days of acute AF).

Conclusion

- Hypercoagulable state, systemic vasculitis, CAD, and atherosclerosis are risk factors for ischemic cerebral stroke in patients with acute AF.
- Dyslipidemia is associated with a decreased risk of stroke.
- Systemic thrombotic complications were noted in 0.3%-0.9% of acute AF cases within an average of 5 days of hospital admission and included ischemic cerebral stroke, MI, DVT/PE and other non-cerebral systemic venous thrombotic events.
- Patients with acute AF should be assessed for hypercoagulability, systemic vasculitis, CAD, and atherosclerosis.

Acknowledgements

- Neelakshi Bhagat, MD, FACS
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References

- 1. Sacco RL, Kasner SE, Broderick JP, et al. An updated definition of stroke for the 21st century: A statement for healthcare professionals from the American heart association/American stroke association. *Stroke*. 2013;44(7):2064-2089. doi:10.1161/STR.0b013e318296aeca
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Thank you!