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The Canadian TIA Score – How to Identify High and Low Risk Patients for Subsequent Early Stroke

Dr. Jeff Perry

Ontario Stroke Rounds June 2 2021

The Ottawa Hospital RESEARCH INSTITUTE | L'Hôpital d'Ottawa INSTITUT DE RECHERCHE

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Disclosures of Affiliations, Financial Support, & Mitigating Bias

- I have no relationships with for-profit or not-for-profit organizations
- I do receive salary support through an unrestricted Mid-Career Salary Support Grant from the Heart and Stroke Foundation of Ontario

MITIGATING POTENTIAL BIAS (PROVINCIAL STROKE ROUNDS COMMITTEE)

- The Provincial Stroke Rounds Committee mitigated bias by ensuring there was no Industry involvement in planning or education content.

Objectives

- To review the science behind the Canadian TIA Score
- To identify high risk features for subsequent stroke in patients with a new TIA/minor stroke
- To learn how to safely stratify TIA/minor stroke patients as low, medium or high risk for subsequent early stroke
- To compare the Canadian TIA Score to the ABCD2 and ABCD2i Scores to identify TIA/minor stroke patients' risk for subsequent stroke

Case One

- 56 year old woman
- 09:00 - Last seen well
- 09:45 - Found with aphasia and right face, arm, leg weakness
- 10:15: Arrival in ED, deficits resolved
- 10:20 – You arrive to assess

WHO Definition of Stroke / TIA

A clinical syndrome

characterized by the sudden onset

of a focal neurological deficit

presumed to be on a vascular basis

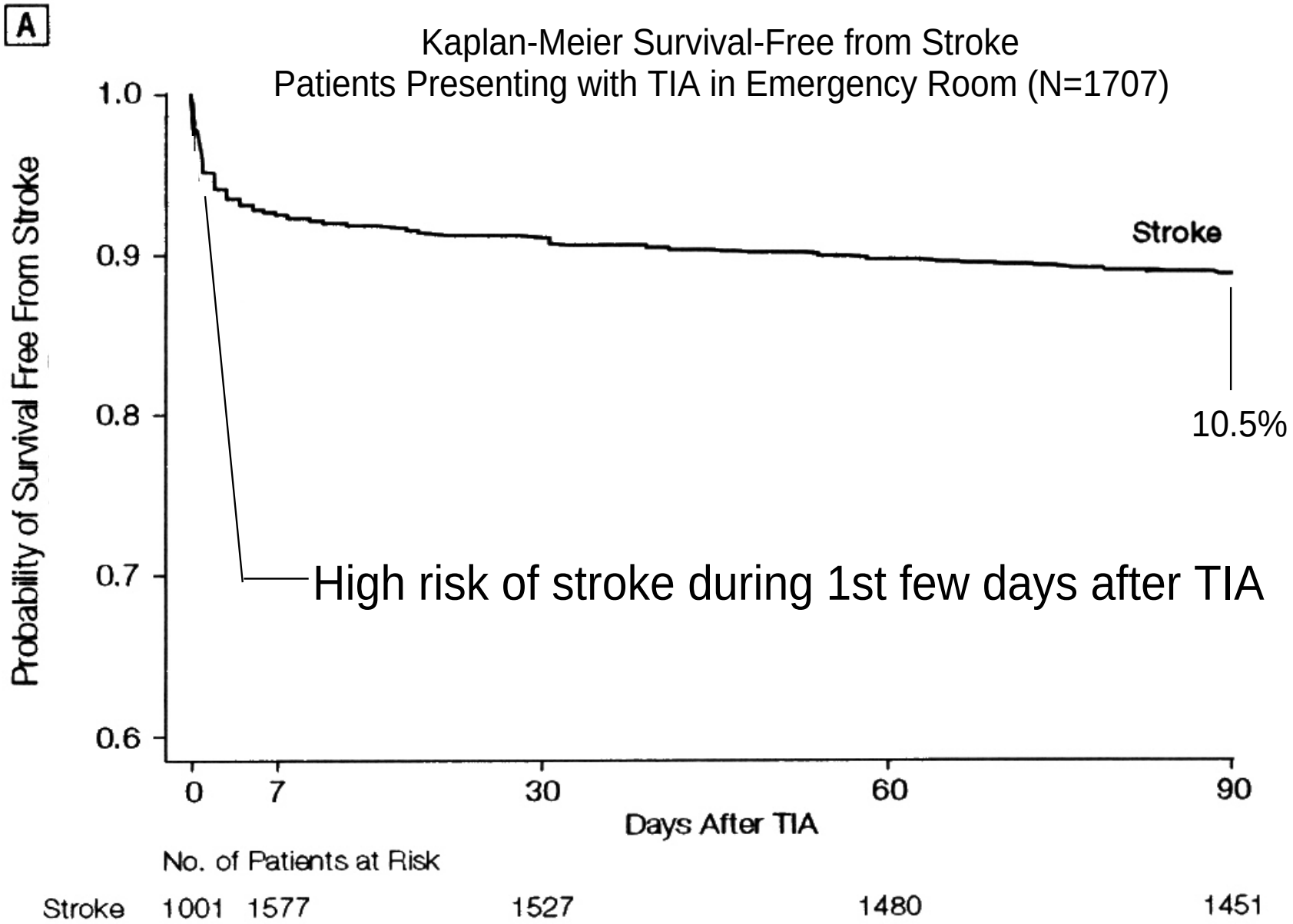
Tissue Based TIA Definition

- **Brief episode (<1h) caused by focal brain or retinal ischemia without evidence of infarction**
- **Indicates risk**
- **Encourages neurodiagnostic tests**
- **Facilitates rapid intervention**

Albers GW et al. N Engl J Med 2002;347:1713-1716

Back to the case. What Is Her Risk Of Stroke in Next 7 Days?

- **Do you have enough information to decide?**



JAMA 2000;284:2901-2906

Who is High Risk for Stroke?

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Validation of the Canadian TIA Score: Who is at High Risk for a Subsequent Stroke Following a TIA/Non-disabling Stroke

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Transient Ischemic Attack: A Warning Symptom of Stroke

- **A TIA precedes 15%-20% of strokes**
- **Opportunity for preventative intervention**
- **Existing scores are context-dependent or have not been well-validated**
- **We previously derived the Canadian TIA Score in a prospective cohort of 3,906 patients at 8 sites**

Development of a TIA Clinical Prediction Score

0. Baseline Management of TIA (N=212)

CJEM 2012

Ia. Validation of ABCD2 Score (N=2,056)

CMAJ 2011

Ib. Derivation of Canadian TIA Score (N=3,906)

Stroke 2014

Ic. Survey Neurologists (N=250); Emergency Physicians (N= 246)

J Stroke Cerebrovasc Dis 2015 *CJEM 2016*

Id. Assessment of CT Findings for Stroke (N=2,028)

Stroke 2015

II. Validation of the Canadian TIA Score (N=7,607)

BMJ 2021

CMAJ. 2011 Jul 12;183(10):1137-45

Prospective validation of the ABCD2 score for patients in the emergency department with transient ischemic attack

Jeffrey J. Perry MD MSc, Mukul Sharma MD MSc, Marco L.A. Sivilotti MD MSc, Jane Sutherland MEd, Cheryl Symington RN, Andrew Worster MD MSc, Marcel Émond MD MSc, Grant Stotts MD, Albert Y. Jin MD, Weislaw J. Oczkowski MD, Demetrios J. Sahlas MD, Heather E. Murray MD MSc, Ariane MacKey MD, Steve Verreault MD, George A. Wells MSc PhD, Ian G. Stiell MD MSc

See related commentary by Hill and Coutts on page 1127 and at www.cmaj.ca/lookup/doi/10.1503/cmaj.110704.

Abstract

Background: The ABCD2 score (Age, Blood pressure, Clinical features, Duration of symptoms and Diabetes) is used to identify patients having a transient ischemic attack who are at high risk for imminent stroke. However, despite its widespread implementation, the ABCD2 score has not yet been prospectively validated. We assessed the accuracy of the ABCD2 score for predicting stroke at 7 (primary outcome) and 90 days.

Methods: This prospective cohort study enrolled adults from eight Canadian emergency departments who had received a diagnosis of transient ischemic attack. Physicians completed data forms with the ABCD2 score before disposition. The outcome criterion, stroke, was established by a treating neurologist or by an Adjudication Committee. We calculated the sensitivity and specificity for predicting stroke 7 and 90 days after visiting the emergency department using the original "high-risk" cutpoint of an ABCD2 score of more than 5, and the American Heart Association recommendation of a score of more than 2.

Results: We enrolled 2056 patients (mean age 68.0 yr, 1046 (50.9%) women) who had a rate of stroke of 1.8% at 7 days and 3.2% at 90 days. An ABCD2 score of more than 5 had a sensitivity of 31.6% (95% confidence interval [CI] 19.1–47.5) for stroke at 7 days and 29.2% (95% CI 19.6–41.2) for stroke at 90 days. An ABCD2 score of more than 2 resulted in sensitivity of 94.7% (95% CI 82.7–98.5) for stroke at 7 days with a specificity of 12.5% (95% CI 11.2–14.1). The accuracy of the ABCD2 score as calculated by either the enrolling physician (area under the curve 0.56; 95% CI 0.47–0.65) or the coordinating centre (area under the curve 0.65; 95% CI 0.57–0.73) was poor.

Interpretation: This multicentre prospective study involving patients in emergency departments with transient ischemic attack found the ABCD2 score to be inaccurate, at any cutpoint, as a predictor of imminent stroke. Furthermore, the ABCD2 score of more than 2 that is recommended by the American Heart Association is nonspecific.

Competing interests: Please see end of article.

This article has been peer reviewed.

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CMAJ 2011. DOI:10.1503/cmaj.101668

Stroke 2014;45:92-100

A Prospective Cohort Study of Patients With Transient Ischemic Attack to Identify High-Risk Clinical Characteristics

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Background and Purpose—The occurrence of a transient ischemic attack (TIA) increases an individual's risk for subsequent stroke. The objectives of this study were to determine clinical features of patients with TIA associated with impending (≤7 days) stroke and to develop a clinical prediction score for impending stroke.

Methods—We conducted a prospective cohort study at 8 Canadian emergency departments for 5 years. We enrolled patients with a new TIA. Our outcome was subsequent stroke within 7 days of TIA diagnosis.

Results—We prospectively enrolled 3906 patients, of which 86 (2.2%) experienced a stroke within 7 days. Clinical features strongly correlated with having an impending stroke included first-ever TIA, language disturbance, longer duration, weakness, gait disturbance, elevated blood pressure, atrial fibrillation on ECG, infarction on computed tomography, and elevated blood glucose. Variables less associated with having an impending stroke included vertigo, lightheadedness, and visual loss. From this cohort, we derived the Canadian TIA Score which identifies the risk of subsequent stroke ≤7 days and consists of 13 variables. This model has good discrimination with a c-statistic of 0.77 (95% confidence interval, 0.73–0.82).

Conclusions—Patients with TIA with their first TIA, language disturbance, duration of symptoms ≥10 minutes, gait disturbance, atrial fibrillation, infarction on computed tomography, elevated platelets or glucose, unilateral weakness, history of carotid stenosis, and elevated diastolic blood pressure are at higher risk for an impending stroke. Patients with vertigo and no high-risk features are at low risk. The Canadian TIA Score quantifies the impending stroke risk following TIA. (***Stroke*. 2014;45:92-100.**)

Canadian TIA Risk Score to Identify Patients with TIA at High Risk of a Subsequent Stroke or Carotid Revascularization within 7 Days

ITEMS	POINTS
Clinical Findings:	
1) First TIA (in lifetime)	2
2) Symptoms ≥ 10 minutes	2
3) Past History of Carotid Stenosis	2
4) Already on Antiplatelet Therapy	3
5) History of Gait Disturbance	1
6) History of Unilateral Weakness	1
7) History of Vertigo	-3
8) Initial Triage Diastolic Blood Pressure ≥ 110 mmHg	3
9) Dysarthria or Aphasia (History or Examination)	1
Investigations in Emergency Department:	
1) Atrial Fibrillation on Electrocardiogram	2
2) Infarction (new or old) on CT	1
3) Platelet Count ≥ 400 x 10^9/L	2
4) Glucose ≥ 15 mmol/L	3
Total Score (-3 to 23):	_____

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National Survey of Emergency Physicians for TIA Risk Stratification Consensus and Appropriate Treatment for a Given Level of Risk

CAEP Vancouver May 2013

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Objectives

- 1) Assess anticipated use of the Canadian TIA Score by the national emergency physician population
- 2) Assess Canadian TIA Score's component face validity
- 3) Assess risk strata for stroke ≤7 days
- 4) Assess actions required for the Canadian TIA Score dependent upon level of risk for subsequent TIA

Methods

- Mail Survey of 246 Canadian ED physicians listed in Scott's Medical Directory
- Modified Dillman Technique
  - Pre-notification
  - 3 Survey attempts
    - 1st letter included a $10 Tim Horton's Gift Card
  - 4th attempt – registered mail

Methods

- 41 questions asked including:
  - Demographics
  - Face validity of the Score's components (4-point scale)
  - If physicians will use the Score (4 point scale)
  - Cutoffs (open percents) for low, medium, high and critical-risk
  - Suggested actions for each risk stratum (4-point scale)
  - Calculated results using descriptive statistics.

Components of the Proposed Canadian TIA Score

Respondents rating components as "very important" or "important" were:

First TIA	80%
≥10 minutes duration	97.2%
History carotid stenosis	88.0%
Antiplatelet therapy	85.2%
Gait disturbance	76.9%
Unilateral weakness	97.2%
Vertigo (-ve predictor)	27.8%
Speech disturbance	96.2%
Diastolic BP ≥110	71.4%
Atrial fibrillation (AF) on ECG	98.2%
Infarction on CT	88.9%
Platelets $\geq 400 \times 10^9$/L	25.2%
Glucose ≥15mmol/L	36.1%

- 96.4% would use the Canadian TIA Score after validation

Degree of Risk

Using the 25th percentile (i.e. 75% of physicians would accept this degree of risk or more) defined:

Low-risk	<1%
Medium-risk	1-4.9%
High-risk	5-10%
Critical-risk	>10%

Conclusions

- Canadian ED physicians are likely to use a validated Canadian TIA Score
- Most components of the Canadian TIA Score have high face validity (9/13 ≥ 75%)
- Risk strata are defined as:
  - Low-risk <1%, Medium-risk 1-4.9%, High-risk 5-10%, and Critical Risk >10%
- Actions needed for each strata in the ED are clear and represent a combination of diagnostic tests/imaging, new medications and involvement of specialists

BMJ. 2021 Feb 4;372:n49. doi: 10.1136/bmj.n49

Objectives

- **To prospectively validate the Canadian TIA Score in a new cohort of emergency department patients with TIA or nondisabling stroke**

Methods

Design: **Prospective cohort study**

Setting: **13 high volume urban Canadian EDs 2014 to 2018**

Data Collection: **Components of the Canadian TIA Score individually and as a whole, investigations, admissions**

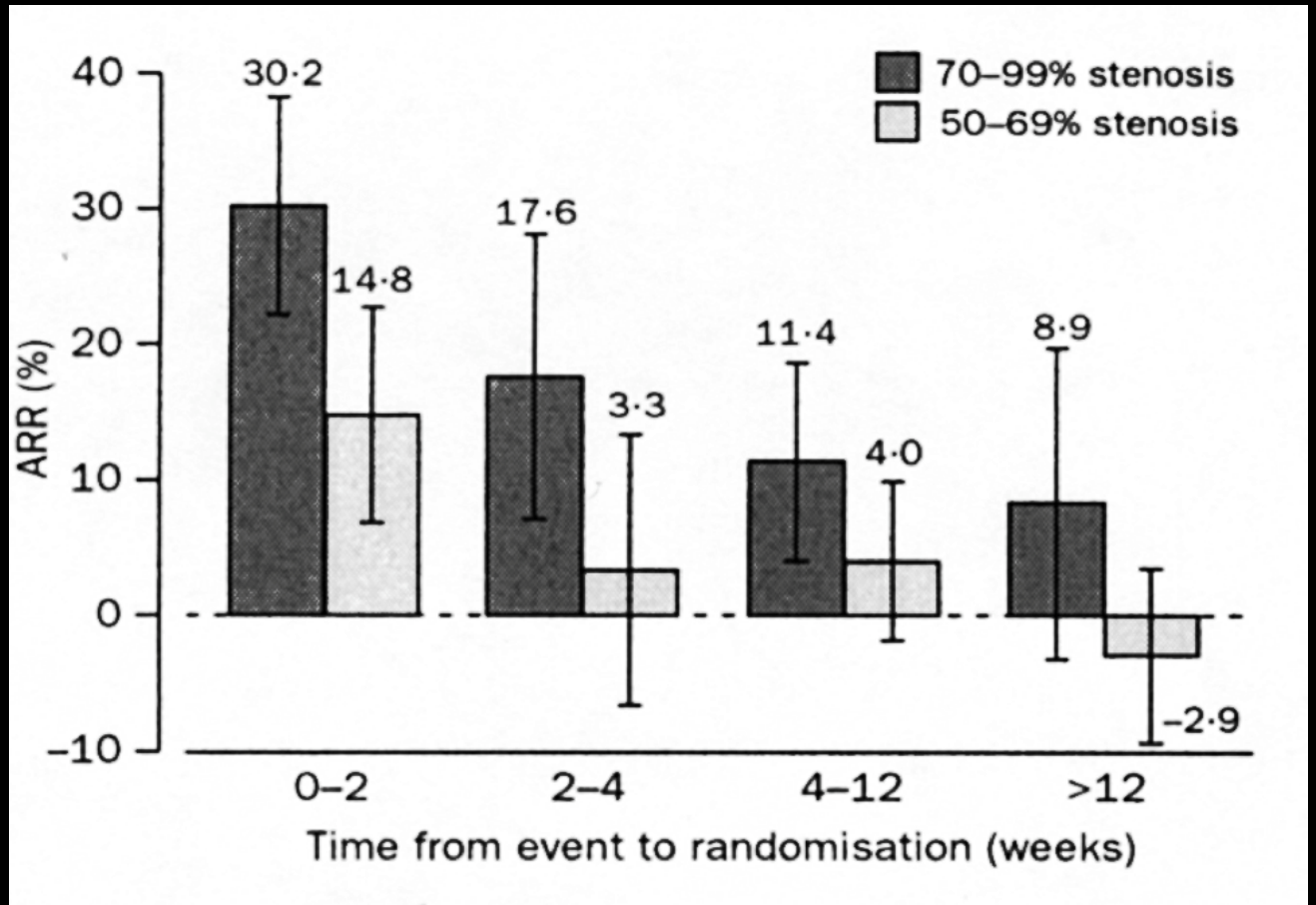
Outcome: **Primary: Subsequent stroke or carotid revascularization within 7 days; Secondary: Subsequent Stroke within 7 days**

Analysis: **Interval likelihood ratios (iLR) with 95% CIs**

Sample Size: **5,004 patients including 93 patients with stroke within 7 days**

Rapid Carotid Revascularization

Stenosis	NNT in First 2 Weeks
50 – 69%	6.8
70 – 99%	3.3



Subject#: _____ ***TIA STUDY – PHASE II*** * FAX FORM, ROT AND ECG TO - 613-548-2537**

ED Visit Date: (yy/mm/dd) ___/___/___ **Physician:**_____

Interobserver: O Yes O No If yes, Physician:_____

Inclusion criteria: Adult with ED Diagnosis of TIA or Stroke **O HDH** **O KGH**

Exclusion criteria: **O** Symptoms > 1 week **O** GCS <15 or decreased from baseline

HISTORY **Is this patient eligible?** O Yes O No

Symptoms on Arrival to ED O Yes O No

First known TIA O Yes O No

If not first TIA (including new event), total # in past _____, total # in past 24 hrs ____

Date of Onset O Today O Yesterday O < 1 week O > 1 week

Duration of Symptoms O <1 minute O 1–4 minutes O 5-9 minutes
O 10-29 minutes O 30-59 minutes O 60-119 minutes O ≥120 minutes

Altered Sensation	O Yes O No	If yes,	O Face	O R	O L	O Both
			O Arm	O R	O L	O Both
			O Leg	O R	O L	O Both
Weakness	O Yes O No	If yes,	O Face	O R	O L	O Both
			O Arm	O R	O L	O Both
			O Leg	O R	O L	O Both

Language Disturbance	O Yes	O No
Lightheaded	O Yes	O No
Vertigo	O Yes	O No
Confusion	O Yes	O No
Gait Disturbance	O Yes	O No
Visual Loss	O Yes	O No
If yes,	O One Eye	O Both Eyes
Syncope or Near Syncope	O Yes	O No

PHYSICAL EXAM **Pronator Drift** O Yes O No

Weakness O Yes O No	**If yes**	**O Face**	**O R**	**O L**	**O Both**
			O Mild	O Moderate	O Complete
		O Arm	O R	O L	O Both
			O Mild	O Moderate	O Complete
		O Leg	O R	O L	O Both
			O Mild	O Moderate	O Complete

MILD – Drift
MODERATE - Some effort against gravity
COMPLETE - No effort against gravity

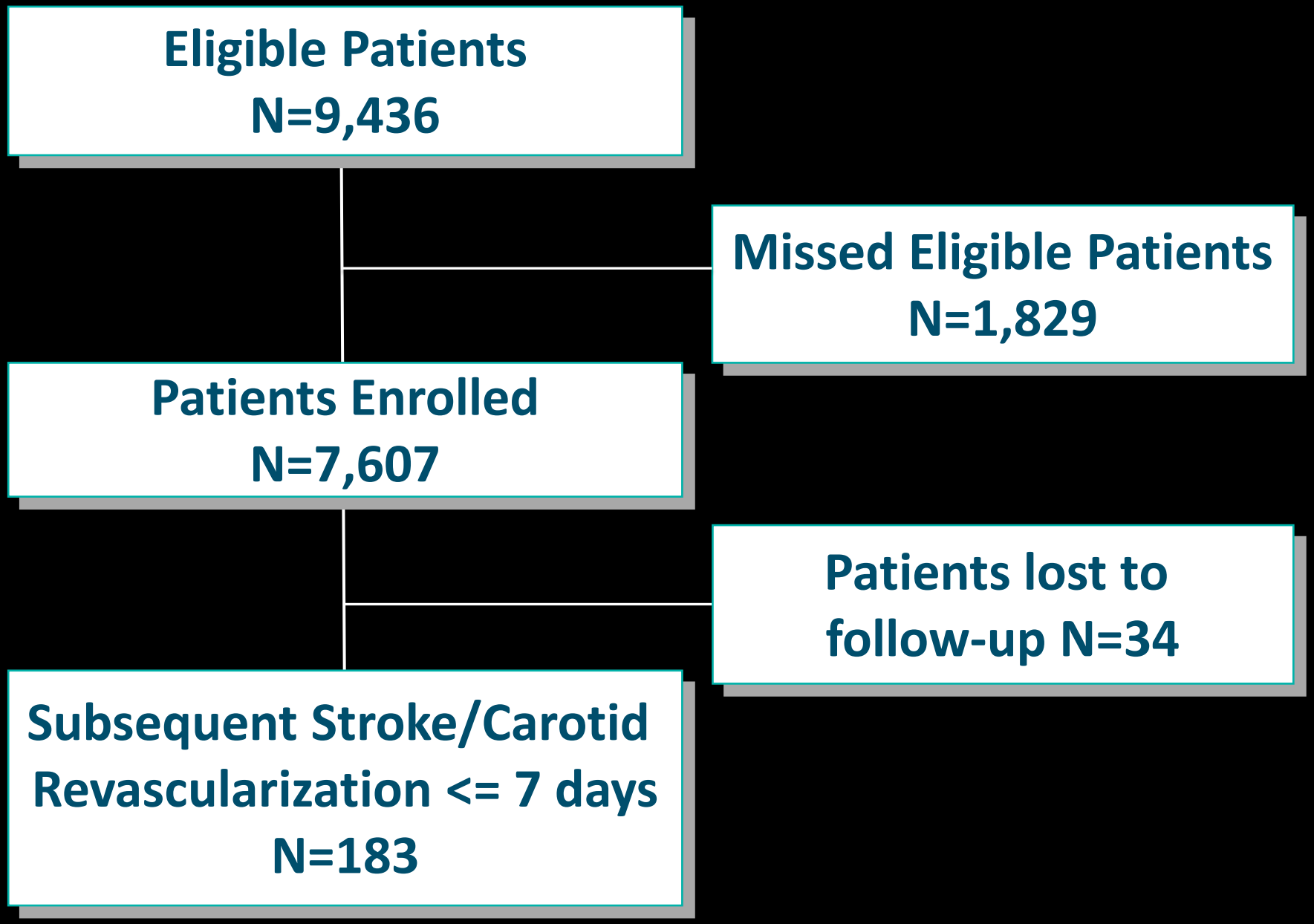
Speech Difficulty	O Yes	O No	If yes, O Aphasia	O Dysarthria
Altered Sensation	O Yes	O No		
Gait Abnormality	O Yes	O No		
Abnormal Finger-Nose Test	O Yes	O No	If yes, O R O L	
Visual Field Deficit	O Yes	O No		

APHASIA - Loss of ability to use written/oral language
DYSARTHRIA - Difficulty articulating

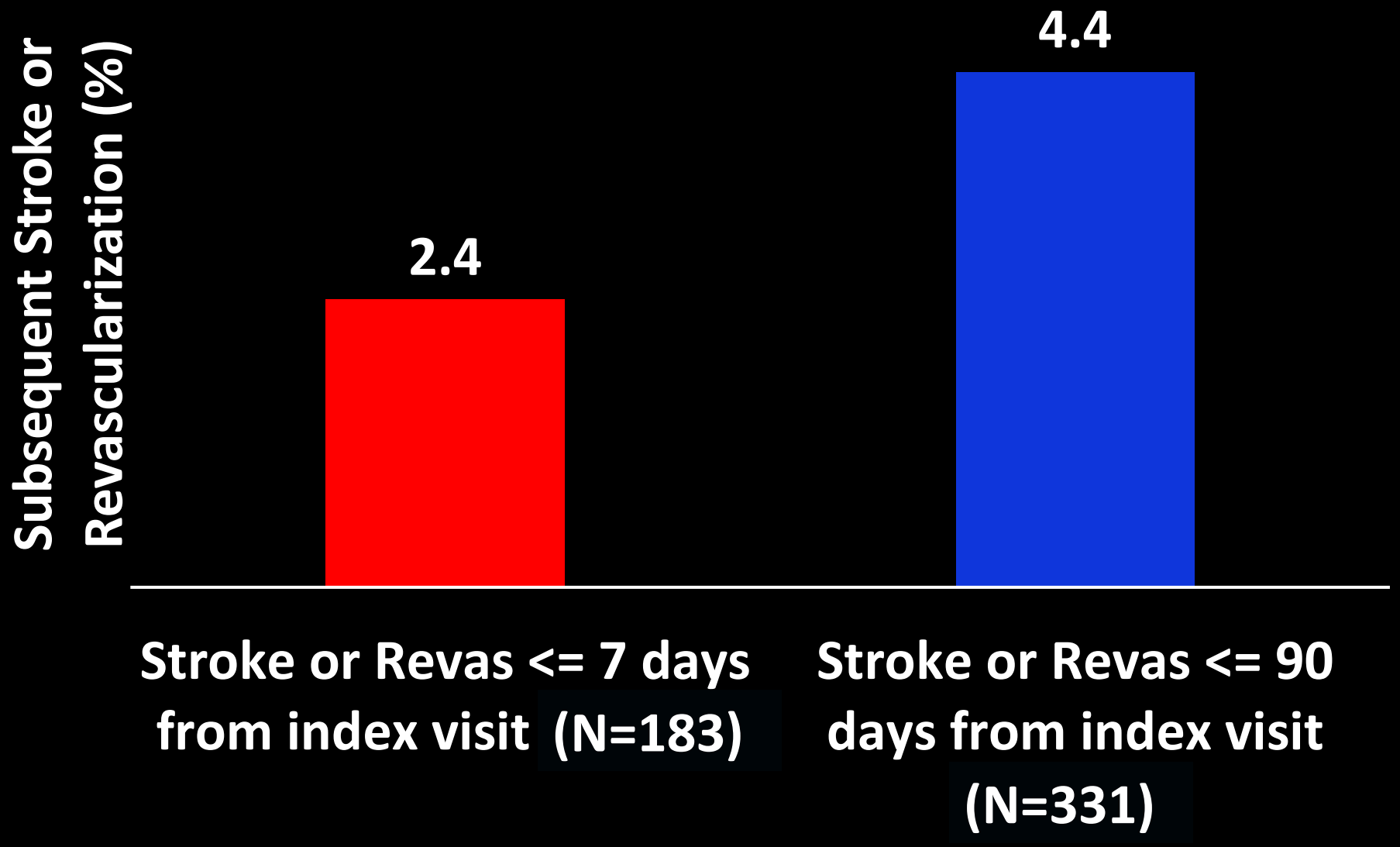
Past Medical History	
O Hypertension	O Coronary Artery Disease
O Atrial Fibrillation	O Peripheral Vascular Disease
O Diabetes	O Known Prior Stroke
O Current Smoker	O Carotid Stenosis
O CHF	O High Cholesterol
O Dementia	O Valvular Heart Disease
O None of the above	O Obesity
	O Inactive lifestyle

Medications	**Already Taking**	**Started In ED**	**Stopped In ED**
ASA	O	O	O
Dipyridamole (Aggrenox)	O	O	O
Clopidogrel (Plavix)	O	O	O
Statin	O	O	O
Antihypertensives	O	O	O
Ticlodipine (Ticlid)	O	O	O
Warfarin (Coumadin)	O	O	O
Other anticoagulant (ie pradax)	O	O	O

Study Flow


Eligible Patients
N=9,436
Missed Eligible Patients
N=1,829
Patients Enrolled
N=7,607
Patients lost to
follow-up N=34
Subsequent Stroke/Carotid
Revascularization <= 7 days
N=183

Subsequent Stroke or Revascularization (N=7,607)



Characteristics	All Patients N=7,607	Low Risk N=1,242	Medium Risk N=5,484	High Risk N=881
Demographics				
Age in years, mean (SD)	68.5 (14.7)	65.3 (14.5)	68.1 (14.8)	75 (11.7)
Female (%)	3,982 (52.3)	695 (56.0)	2,936 (53.5)	351 (39.8)
Clinical Features - History (%)				
Arrival by Ambulance (N=7,605)	2,765 (36.4)	365 (29.4)	1,962 (35.8)	438 (49.7)
First ever TIA (N=7,589)	5,706 (75.2)	765 (61.8)	4,208 (76.9)	733 (83.5)
Duration of Symptoms (N=7,543)				
<1 minute	221 (2.9)	132 (10.8)	86 (1.6)	3 (0.3)
1-4 minutes	468 (6.2)	232 (19.0)	226 (4.2)	10 (1.1)
5-9 minutes	486 (6.4)	216 (17.7)	247 (4.5)	23 (2.6)
10-29 minutes	1,383 (18.3)	130 (10.6)	1,076 (19.8)	177 (20.2)
30-59 minutes	1,120 (14.8)	126 (10.3)	844 (15.5)	150 (17.1)
≥ 60 minutes	3,865 (51.2)	386 (31.6)	2,966 (54.5)	513 (58.6)
History of Altered Sensation (N=7,521)	3,269 (43.5)	470 (38.2)	2,465 (45.5)	334 (38.3)
History of Weakness (N=7,544)	3,019 (40.0)	273 (22.1)	2,164 (39.8)	582 (66.5)
Language Disturbance (N=7,442)	2,943 (39.5)	327 (27.1)	2,109 (39.3)	507 (58.7)
Lightheaded (N=7,281)	1,297 (17.8)	302 (25.1)	871 (16.6)	124 (14.9)
Vertigo (N=7,338)	779 (10.6)	474 (38.8)	281 (5.3)	24 (2.9)
Gait Disturbance (N=7,356)	1,571 (21.4)	226 (18.8)	1,027 (19.3)	318 (37.8)
Visual Loss (N=7,113)	1,069 (15.0)	254 (21.9)	740 (14.4)	75 (9.2)

Clinical Examinations	All Patients N=7,607	Low Risk N=1,242	Medium Risk N=5,484	High Risk N=881
Initial Systolic Blood Pressure, mean (SD) (N=7,597)	151.9 (26.1)	150.6 (24.1)	151.7 (25.7)	155.4 (30.4)
Initial Diastolic Blood Pressure, mean (SD) (N=7,594)	82.9 (13.7)	82.9 (11.8)	82.7 (13.3)	84.3 (18.3)
Initial Heart Rate, mean (SD) (N=7,600)	77.6 (15.0)	77.2 (14.2)	77.7 (14.9)	77.6 (16.3)
Weakness (N=7,547)	997 (13.2)	57 (4.6)	720 (13.2)	220 (25.2)
Altered Sensation (N=7,489)	868 (11.6)	105 (8.5)	675 (12.5)	88 (10.2)
Any Speech Difficulty (N=7,523)	850 (11.3)	51 (4.2)	617 (11.4)	182 (20.8)
Gait Abnormality (N=7,397)	617 (8.3)	105 (8.6)	383 (7.2)	129 (15.4)
Dysarthria (N=7,486)	564 (7.5)	30 (2.4)	397 (7.4)	137 (15.8)
Pronator Drift (N=7,053)	405 (5.7)	33 (2.9)	278 (5.5)	94 (11.7)
Aphasia (N=7,486)	268 (3.6)	18 (1.5)	205 (3.8)	45 (5.2)
Abnormal Finger-Nose Test (N=7,312)	262 (3.6)	30 (2.5)	182 (3.5)	50 (6.0)

Clinical Features - Past Medical History (%)	All Patients N=7,607	Low Risk N=1,242	Medium Risk N=5,484	High Risk N=881
Hypertension	4,505 (59.3)	599 (48.4)	3,191 (58.3)	715 (81.3)
High Cholesterol	2,772 (36.5)	379 (30.6)	1,973 (36.0)	420 (47.7)
Diabetes Mellitus	1,448 (19.1)	138 (11.1)	1,002 (18.3)	308 (35.0)
Coronary Artery Disease	1,289 (17.0)	101 (8.2)	866 (15.8)	322 (36.6)
Known Prior Stroke	976 (12.9)	119 (9.6)	672 (12.3)	185 (21.0)
Current Smoker	840 (11.1)	128 (10.3)	616 (11.3)	96 (10.9)
Atrial Fibrillation	806 (10.6)	96 (7.8)	535 (9.8)	175 (19.9)
Peripheral Vascular Disease	269 (3.5)	17 (1.4)	176 (3.2)	76 (8.6)
Carotid Stenosis	251 (3.3)	9 (0.7)	138 (2.5)	104 (11.8)

Diagnostic Tests in ED (%)	All Patients N=7,607	Low Risk N=1,242	Medium Risk N=5,484	High Risk N=881
Computed Tomography of Head	7,337 (96.5)	1191 (95.9)	5,287 (96.4)	859 (97.5)
Evidence of Acute or Old Infarction	2,080 (27.3)	172 (13.8)	1,413 (25.8)	495 (56.3)
Electrocardiogram (ECG)	6,923 (91.0)	1114 (89.7)	4,993 (91.0)	816 (92.6)
Evidence of Atrial Fibrillation	425 (5.6)	22 (1.8)	255 (4.7)	148 (16.8)
Magnetic Resonance Imaging Head	323 (4.2)	37 (3.0)	244 (4.4)	42 (4.8)
Carotid Doppler	4,382 (57.6)	684 (55.1)	3,225 (58.8)	473 (53.7)
Computed Tomography Neck Angiography	2,085 (27.4)	309 (24.9)	1,493 (27.2)	283 (32.1)

Routine Medications at Time of Index TIA (%)	All Patients N=7,607	Low Risk N=1,242	Medium Risk N=5,484	High Risk N=881
Antihypertensive	3,579 (47.0)	461 (37.1)	2,522 (46.0)	596 (67.7)
Any Antithrombotic	3,274 (43.0)	231 (18.6)	2,328 (42.5)	715 (81.2)
ASA	2,274 (29.9)	101 (8.1)	1,593 (29.0)	580 (65.8)
Clopidogrel	588 (7.7)	31 (2.5)	423 (7.7)	134 (15.2)
Warfarin	348 (4.6)	66 (5.3)	224 (4.1)	58 (6.6)
Dipyridamole/ASA	55 (0.7)	3 (0.2)	41 (0.7)	11 (1.2)
Ticlopidine	6 (0.1)	2 (0.2)	3 (0.1)	1 (0.1)
Other anticoagulant	367 (4.8)	49 (3.9)	269 (4.9)	49 (5.6)
Statin	2,772 (36.4)	342 (27.5)	1,946 (35.5)	484 (54.9)
Medications on Discharge (%)				
Antihypertensive	3,728 (49.0)	473 (38.1)	2,634 (48.0)	621 (70.5)
Any Antithrombotic	6,667 (87.6)	1002 (80.7)	4,807 (87.7)	858 (97.4)
ASA	5,477 (72.0)	866 (69.7)	3,943 (71.9)	668 (75.8)
Clopidogrel	1,251 (16.4)	65 (5.2)	898 (16.4)	288 (32.7)
Warfarin	362 (4.8)	66 (5.3)	233 (4.2)	63 (7.2)
Dipyridamole/ASA	136 (1.8)	8 (0.6)	97 (1.8)	31 (3.5)
Ticlopidine	6 (0.1)	2 (0.2)	3 (0.1)	1 (0.1)
Other anticoagulant	413 (5.4)	51 (4.1)	296 (5.4)	66 (7.5)
Statin	3,109 (40.9)	401 (32.3)	2,195 (40.0)	513 (58.2)

Disposition and Outcomes	All Patients N=7,607	Low Risk N=1,242	Medium Risk N=5,484	High Risk N=881
Primary Outcome (%)				
Stroke or Carotid Revascularization ≤ 7 days	183 (2.4)	6 (0.5)	124 (2.3)	53 (6.0)
Secondary Outcomes (%)				
Carotid Revascularization ≤ 7 days from index visit	84 (1.1)	3 (0.2)	52 (0.9)	29 (3.3)
Carotid Revascularization ≤ 90 days from index visit	156 (2.1)	12 (1.0)	95 (1.7)	49 (5.6)
Cumulative Stroke ≤ 2 days from index visit	70 (0.9)	1 (0.1)	51 (0.9)	18 (2.0)
Cumulative Stroke ≤ 7 days from index visit	108 (1.4)	3 (0.2)	81 (1.5)	24 (2.7)
Cumulative Stroke ≤ 30 days from index visit	153 (2.0)	4 (0.3)	116 (2.1)	33 (3.7)
Cumulative Stroke ≤ 90 days from index visit	192 (2.5)	5 (0.4)	141 (2.6)	46 (5.2)
Cumulative Recurrent TIA ≤ 90 days from index visit	357 (4.7)	44 (3.5)	244 (4.4)	69 (7.8)
Myocardial Infarction ≤ 90 days from index visit	26 (0.3)	2 (0.2)	16 (0.3)	8 (0.9)
Admitted to Hospital during index visit	441 (5.8)	40 (3.2)	298 (5.4)	103 (11.7)

Probability of Stroke/Revascularization within 7 Days by Strata

N=7,607

SCORE	N	# EVENTS	RISK %	RISK CATEGORY
-3	4	0	0	Low
-2	2	0	0	
-1	35	0	0	
0	80	0	0	
1	148	1	0.7	
2	432	3	0.7	
3	541	2	0.4	
4	1,245	15	1.2	Medium
5	1,499	22	1.5	
6	1,042	28	2.7	
7	920	25	2.7	
8	778	34	4.4	
9	467	27	5.8	High
10	228	11	4.8	
11	117	10	8.5	
12	54	3	5.6	
13	13	1	7.7	
14	2	1	50.0	

Interval LRs

	Outcome		
	Yes	No	Interval likelihood ratio (95%CI)
Subsequent stroke/carotid revascularisation			
Low risk (–3 to 3)	6	1236	0.20 (0.09 to 0.44)
Medium risk (4 to 8)	124	5360	0.94 (0.85 to 1.04)
High risk (≥9)	52	829	2.56 (2.02 to 3.25)
Subsequent stroke			
Low risk (–3 to 3)	3	1239	0.17 (0.06 to 0.51)
Medium risk (4 to 8)	81	5403	1.04 (0.93 to 1.16)
High risk (≥9)	24	857	1.94 (1.36 to 2.78)

ABCD2 and ABCD2i Comparison using DeLong Method

Score or comparison	AUC (95% CI)	Difference in AUC (95% CI)	P value
Canadian TIA Score	0.70 (0.66 to 0.73)	-	-
ABCD2	0.60 (0.56 to 0.64)	-	-
ABCD2i	0.64 (0.59 to 0.68)	-	-
Canadian TIA Score *v* ABCD2	-	0.10 (0.05 to 0.15)	‹0.001
Canadian TIA Score *v* ABCD2i	-	0.06 (0.01 to 0.11)	0.01

AUC=area under curve; TIA=transient ischaemic attack.

Canadian TIA score *v* ABCD2

Outcome

Canadian TIA score cut-offs:
-3 to 3 low risk*
4 to 8 medium risk*
≥9 high risk*

Number of outcomes	183
Correct classification	40
Incorrect classification	27
Net reclassification	13

No outcome

ABCD2 cut-offs:
No cases <1% risk*
0 to 5 medium risk*
≥6 high risk*

Number of no outcomes	7424
Correct classification	1575
Incorrect classification	678
Net reclassification	897

Additive net reclassification index = 19.2
Absolute net reclassification index = 12.0%

Outcomes

Canadian TIA score cut-offs

ABCD2	Low	Medium	High	Total
Low	0	0	0	0
Medium	6	103	40	149
High	0	21	13	34
Total	6	124	53	183

No outcomes

Canadian TIA score cut-offs

ABCD2	Low	Medium	High	Total
Low	0	0	0	0
Medium	1226	5021	678	6925
High	10	339	150	499
Total	1236	5360	828	7424

Canadian TIA score *v* ABCD2i

Outcome		No outcome	
Canadian TIA score cut-offs: -3 to 3 low risk* 4 to 8 medium risk* ≥9 high risk*		**ABCD2 cut-offs:** No cases <1% risk* 0 to 8 medium risk* ≥9 high risk*	
Number of outcomes	183	Number of no outcomes	7424
Correct classification	41	Correct classification	1365
Incorrect classification	21	Incorrect classification	737
Net reclassification	20	Net reclassification	628

Additive net reclassification index = 19.4
Absolute net reclassification index = 8.5%

Outcomes

Canadian TIA score cut-offs

ABCD2i	Low	Medium	High	Total
Low	0	0	0	0
Medium	6	109	41	156
High	0	15	12	27
Total	6	124	53	183

No outcomes

Canadian TIA score cut-offs

ABCD2i	Low	Medium	High	Total
Low	0	0	0	0
Medium	1233	5231	737	7201
High	3	129	91	223
Total	1236	5360	828	7424

Discussion

- **The Canadian TIA Score accurately identified the risk of TIA patients' risk for stroke/revascularization within 7 days**
- **The Canadian TIA Score outperformed the ABCD2 and ABCD2i Scores**
- **Individual health care systems can determine specific thresholds to make management decisions**

An example of this may be:

- **Low risk patients can be safely discharged following a careful ED assessment with routine follow-up**
- **Moderate risk patients can undergo additional testing in the ED, have antithrombotic therapy optimized and have early specialist follow-up**
- **High risk patients should be fully investigated and managed in consultation with a stroke specialist during their index ED visit**

Limitations

- As this was an observational study there was some variation between physicians and centers regarding testing and management
- We did not adjudicate if the side of the carotid stenosis with an intervention correlated with the symptoms
- We have not yet completed the refinement step – in which we will try to assess if a more sensitive or specific model is feasible
- Unlike other emergency conditions, the Canadian TIA Score will not give a 100% sensitive model, which directs care, but rather one which identifies high, medium and low risk patient groups

Conclusions

- **The Canadian TIA Score identifies the risk of TIA patients for subsequent stroke or carotid artery revascularization within 7 days**

- **It is anticipated that using the Canadian TIA Score will optimize resources to improve decisions on hospitalization, investigations and prioritization for specialist consultation**

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