Rapid Access Transient Ischemic Attack (TIA) Care

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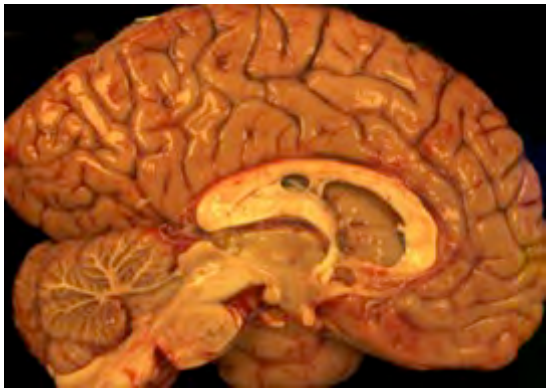
UR MEDICINE

Stroke Treatment Alliance of Rochester STAR-NY

Disclosures

- Financial relationships:
  - Employed by UR Medicine
  - Paid consultant – medical expert opinion

"Patients with minor stroke or transient ischemic attack (TIA)… have the least amount of disability and the most to lose should they have a stroke" [1]



Objectives

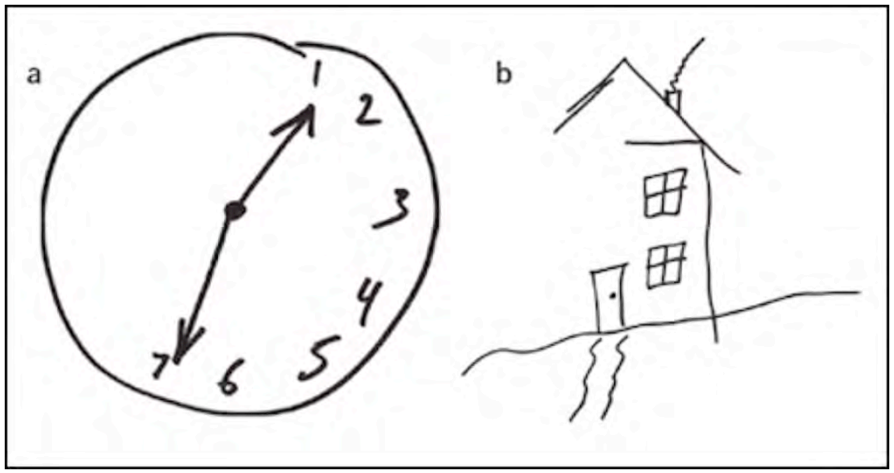
- Definition of TIA
- Topic relevance
- The rise and fall of the $ABCD^2$ score
- Prevalence of stroke mimics
- Importance of rapid evaluation and treatment
- Role of a TIA clinic
- Our experience

Definition of a TIA

"A transient episode of neurological dysfunction caused by focal brain, spinal cord, or retinal ischemia, without acute infarction" [2]

AHA/ASA Scientific Statement

Definition and Evaluation of Transient Ischemic Attack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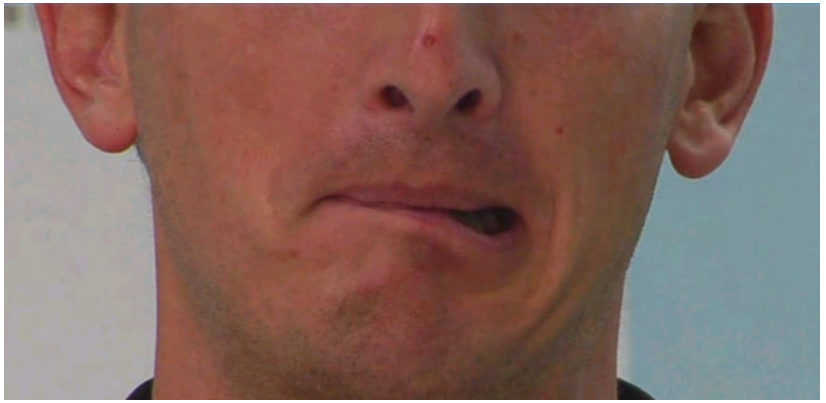
APHASIA


A

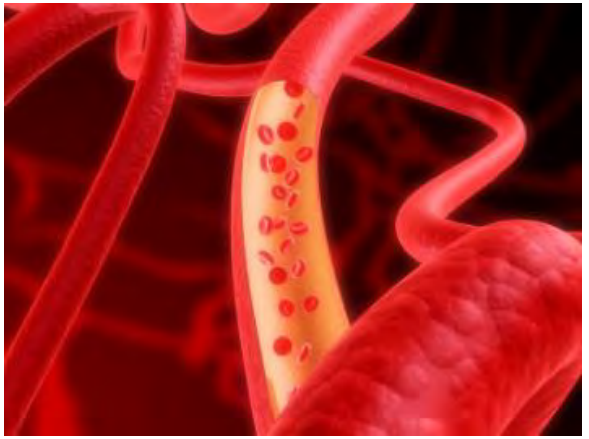

B




HCOCK'S

TIA Statistics [3-5]

- Prevalence – 5 million
  - Stroke (6.6 million)
  - Myocardial infarction (MI) (7.9 million)
- Incidence – variable
  - Upward of 217,000 annually
  - Stroke (795,000)
  - MI (750,000)
- Mortality risk
  - 12% at 1 year



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Case

- 68 year old male presented to his primary care provider's (PCP's) office the day after new onset left hand incoordination, numbness, and tingling that lasted upwards of 15 minutes duration
- The patient takes lisinopril for hypertension, low-dose atorvastatin for hyperlipidemia, and was a former smoker
- The patient's blood pressure was 134/86
- The PCP's neurological examination appeared grossly unremarkable, though the patient commented to him that his ability to play the guitar is not quite the same

Case

- The PCP suspects that the patient may have suffered a TIA
- Upon hearing the potential diagnosis, the patient asked his PCP a number of questions:

Am I at risk for further symptoms? What is my risk of stroke?
Could this be anything else other than a TIA?
Do I need to be urgently evaluated?
What tests might I need?
Are there any medications that can reduce my risk?

What is my risk of stroke?

Year of study	Type of study	Size of study	Stroke Risk			
			2 days	7 days	30 days	90 days
2000 [6]	Cohort	N=1,707	5.3%	---	---	10.5%
2007 [7]	Meta-analysis	N=10,126	3.1%	5.2%	---	---
2007 [8]	Meta-analysis	N=7,238	3.5%	---	8.0%	9.2%
2013 [9]	RCT	N=5,170	---	---	---	8.2 vs. 11.7%
2015 [10]	Meta-analysis	N=13,766	---	3.0%	---	5.2%
2016 [11]	RCT	N=13,199	---	---	---	5.9 vs. 6.8%
2016 [12]	Prospective registry	N=4,789	1.5%	2.1%	---	3.7%

Generally speaking…

2 day risk of 1.5 – 3%

90 day risk of 3 – 6 %

What is my risk of stroke?

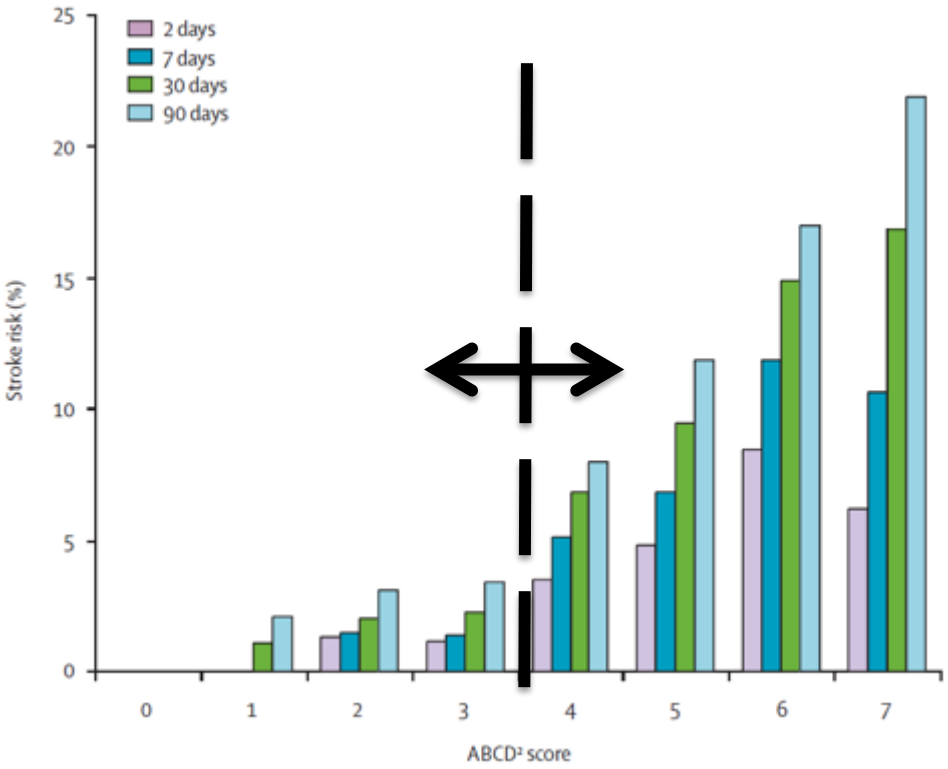
- Risk is not uniform
- Depends on patient's clinical characteristics, pathophysiology of TIA, and treatment plan enacted
- 2000 – 2007 – researchers looked into this and began to create risk stratification tools

ABCD^2 Score

Risk Factor	Points
Age ≥ 60	1
Blood pressure	
SBP ≥140 mm Hg or DBP ≥ 90 mm Hg	1
Clinical features	
Speech impairment without focal weakness	1
Focal weakness	2
Duration	
10 – 59 minutes	1
≥ 60 minutes	2
Diabetes	1
Total ABCD^2 Score	0-7

ABCD^2 Score

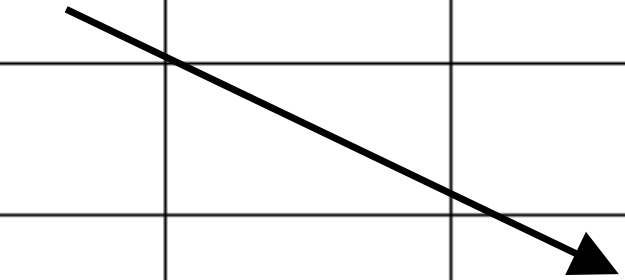
ABCD^2 Score	2-day Stroke Risk
0-3	1.0%
4-5	4.1%
6-7	8.1%



2007 – “4 or greater might justify 24 hour admission” [13]

Strength of Evidence

	Class I (should)	Class IIa (is reasonable)	Class IIb (may consider)
Level A (derived from multiple RCTs or meta-analyses)			
Level B (derived from single RCT or non-randomized studies)			
Level C (derived from consensus opinion or case studies)			



The Rise of the ABCD^2 Score

- 2008 – 2009 – several publications re: validation of score

- May 2009 – AHA/ASA scientific statement [2] affirmed use of score *(class IIa, level of evidence C)*
  - Perhaps more importantly, emphasized that the evaluation should include:
    - Neuroimaging (MRI preferred) *(class I, level of evidence B)*
    - Non-invasive cervical and intracranial vessel imaging *(class I, level of evidence A)*
    - EKG *(class I, level of evidence B)*
    - Echocardiography, routine blood tests (CBC, chemistry panel, PT/aPTT, lipid profile) *(class IIa, level of evidence B)*

The Fall of the $ABCD^2$ Score

- May 2009 – SOS – TIA cohort
  - Noted 20% of patients with $ABCD^2$ score < 4 had a clinical characteristic associated with a high risk for stroke recurrence (9.1% symptomatic carotid stenosis > 50%, 5.9% atrial fibrillation, 5.0% symptomatic intracranial stenosis) [14]
- 2009 – 2012 – further development and validation of scores incorporating imaging

The Fall of the ABCD^2 Score

- June 2012 – Meta-analysis [15] – 44 studies, N=16,070
  - The score “performed poorly when used to identify high risk patients in the setting of low overall baseline risk”
  - The score “performed modestly in the setting of high overall baseline risk”
  - The score “slight improved when used by stroke specialists”
  - They cautioned against the use of the score alone to guide decision making

The Fall of the ABCD^2 Score

- July 2015 – Meta-analysis [10] – 29 studies, N=13,766
  - Again, the score showed a high sensitivity (87%) though a low specificity (35%), similar to the earlier meta-analysis (89% and 34% respectively)
  - Again, noted a significant number of patients with ABCD^2 score < 4 had a clinical characteristic associated with a high risk for stroke recurrence

Patients with Probable of Definite TIA or Minor Stroke			
ABCD^2 Score	Proportion of patients (%)	Carotid stenosis (%)	Atrial fibrillation (%)
≥ 4	63.5	15.4	20.2
< 4	36.5	14.8	12.7

New Approach

- November 2016 – Pooled analysis of cohort studies – 16 studies, N=2,176
  - Compared the validity and prognostic utility of ***imaging-based stroke risk scores*** in patients after TIA
  - The study showed the $ABCD^3$ – I score [16,17] had better predictive value than $ABCD^2$ and $ABCD^2$ – I
  - The researchers concluded that the study "provides the strongest evidence so far that the ***combination of brain MRI, vascular imaging, and clinical features*** can distinguish patients at highest risk of early stroke after TIA" and that the $ABCD^3$ – I score should now be considered [18]

ABCD^3 – I Score

ABCD^3 – I Score	90-day Stroke Risk
0-3	0%
4-7	7.5%
8-13	40.9%

Risk Factor or Data	Points
Age ≥ 60	1
Blood pressure SBP ≥ 140 mm Hg or DBP ≥ 90 mm Hg	1
Clinical features Speech impairment without weakness Unilateral weakness	 1 2
Duration 10 – 59 minutes ≥ 60 minutes	 1 2
Diabetes	1
Dual TIA (two TIAs within preceding 7 days)	2
Imaging – Ipsilateral carotid stenosis ≥ 50%	2
Imaging – DWI positive	2
Total ABCD^3 – I Score	0-13

Could this be anything else other than a TIA?

TIA/Stroke Mimics

Year of Study	Type of Study	Location	Size of Study	Cerebrovascular Diagnosis (%)
2013[19]	Cross-sectional survey	UK	102 respondents	40-59% (half of respondents)
2015 [20]	Retrospective study	UK	N=1067	50%
2015[10]	Meta-analysis		N=13,766	55%
2016[21]	Prospective study	Australia	N=405	62%

Generally speaking…

45 – 50% of TIA clinic referrals will be mimics

TIA/Stroke Mimics [20]

Anxiety	Myasthenia gravis (MG)
Bell's palsy	Neuropathy
Brain tumor	Partial seizure
Labyrinthitis	Presyncope or syncope
Migraine	Subdural hemorrhage (SDH)

Do I need to be urgently evaluated?

What tests might I need?

Are there any medications that can reduce my risk?

Rapid Evaluation is Key

- Urgent assessment and early initiation of a combination of existing preventive treatments can reduce the risk of early recurrent stroke after TIA or minor stroke by about 80% [22]

- Patients with suspected TIA should be evaluated as soon as possible after an event (*class I, level of evidence B*) [2]

What tests might I need?

- MRI
- Cervical and intracranial vessel imaging
- EKG
- Echocardiography
- Routine blood tests (CBC, chemistry panel, PT/aPTT, lipid profile)

Key Interventions

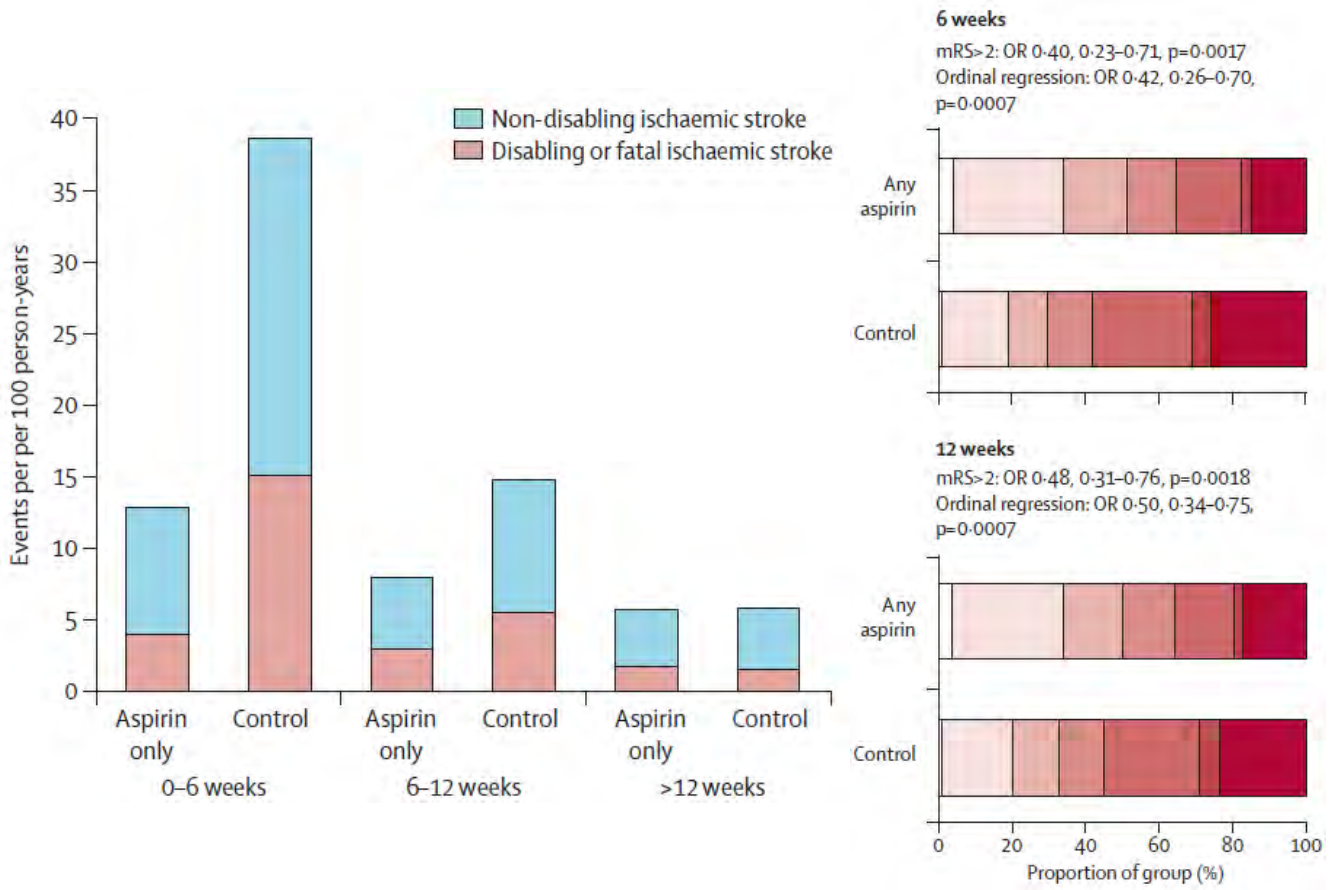
- Antiplatelets (NNT 53-104)
- Anticoagulants (NNT 13)
- HMG-CoA reductase inhibitors (statins) (NNT 230)
- Antihypertensives (NNT 45-118)
- Carotid revascularization (NNT 6-25)

Rapid Treatment is Key

- New evidence that aspirin may be a key intervention
- Previous data reported on 13 - 28% relative risk reduction

- 2016 Meta-analysis [23] – 12 studies, N=15,778
  - Aspirin vs. control in secondary prevention
  - 60% reduction of ischemic stroke within 6 weeks
  - 70% reduction of fatal or disabling stroke within 6 weeks
  - Substantial reduction in disability (seen in mRS shift)

Rapid Treatment is Key



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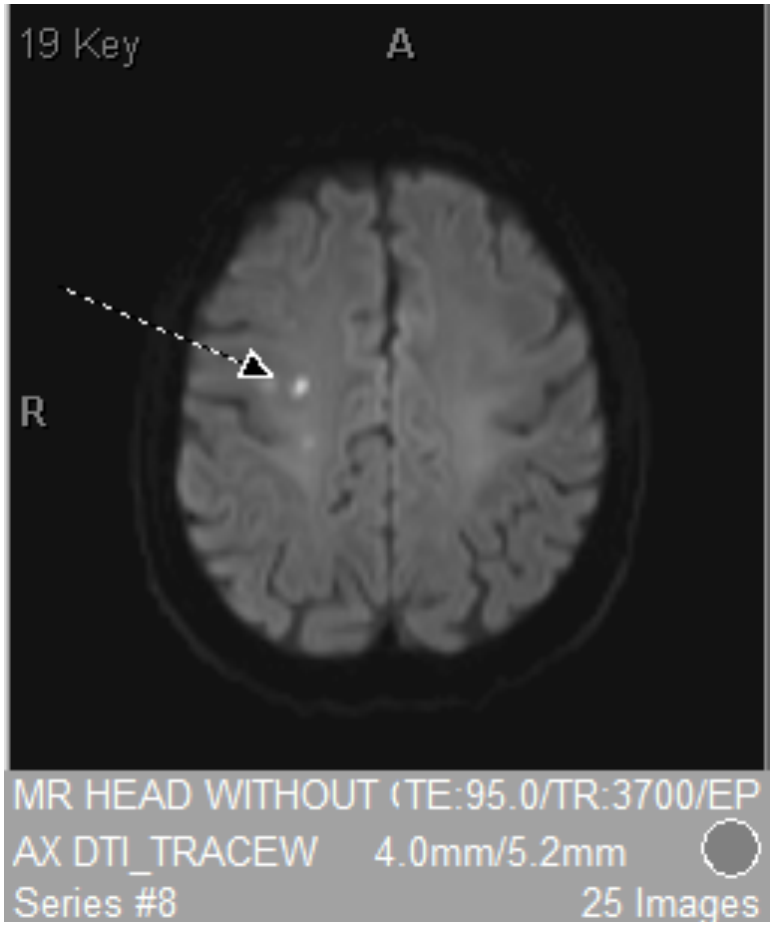
Role of a TIA Clinic

- Policy of admitting all TIA patients leads to inefficient use of health care resources
- Multiple alternative outpatient models are used globally
- All focus on minimizing use of expensive hospital resources on “mimics”
- Data shows that outpatient models are safe and appear to lower event rates [24]
- TIA clinics have shown cost savings [21,25,26]

Case

- The patient's PCP refers and the patient is seen in the neurology clinic the next morning
- Due to continued suspicion that a TIA may have occurred, after being evaluated by the neurologist, further testing is ordered and completed later that morning

Case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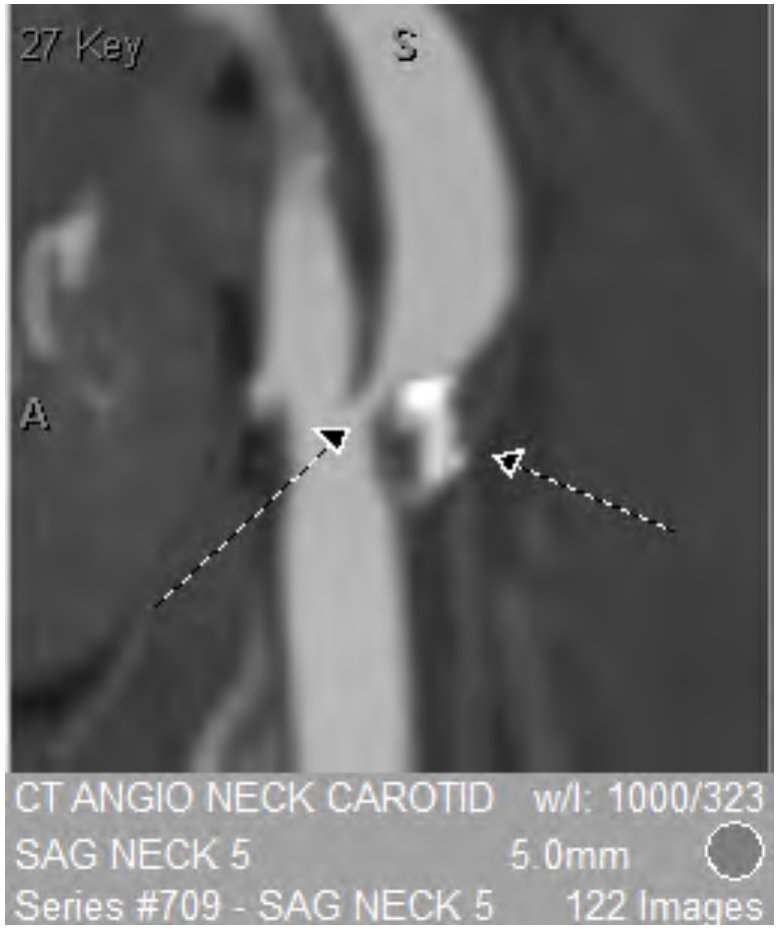
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Case

- After identifying the symptomatic carotid stenosis…
  - The patient was started on an antithrombotic, changed to a high-intensity statin, and subsequently went for carotid revascularization (CEA)

- He has not had any further events

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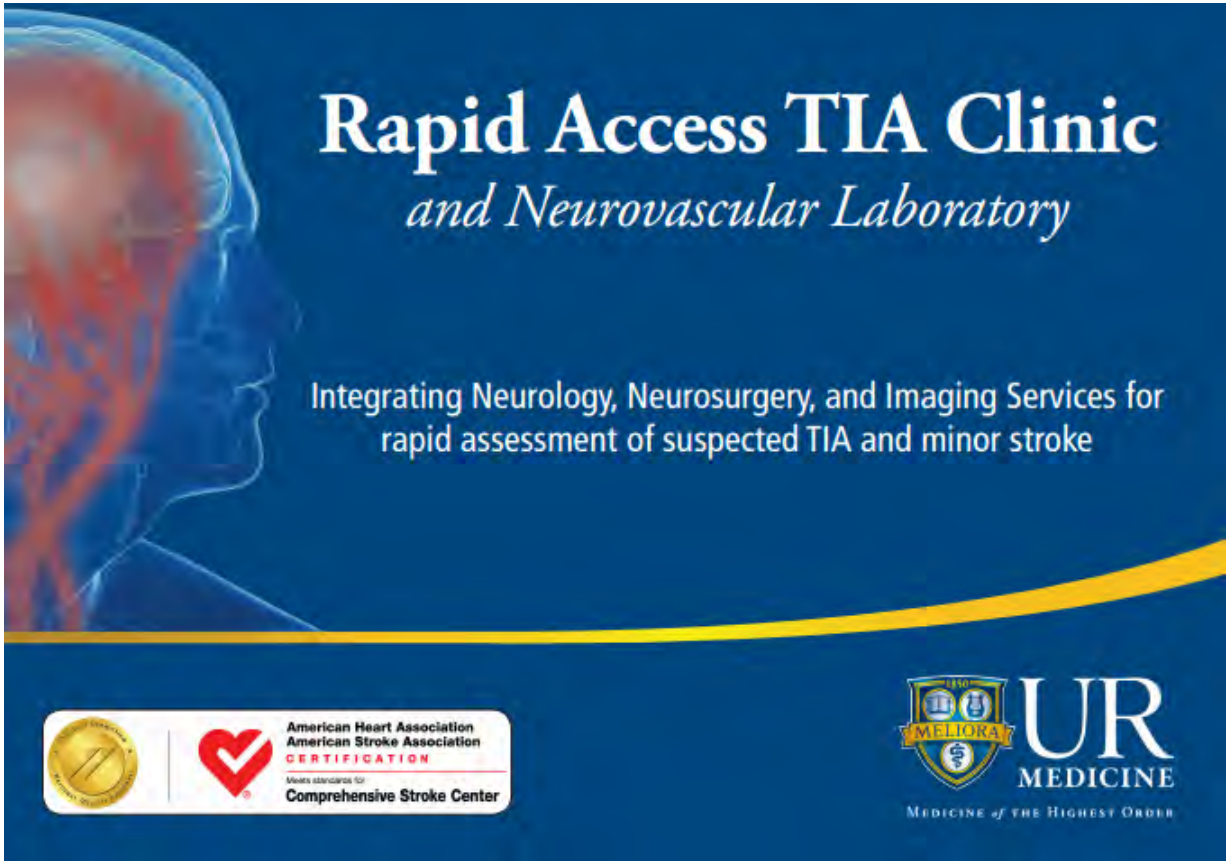
Our Experience

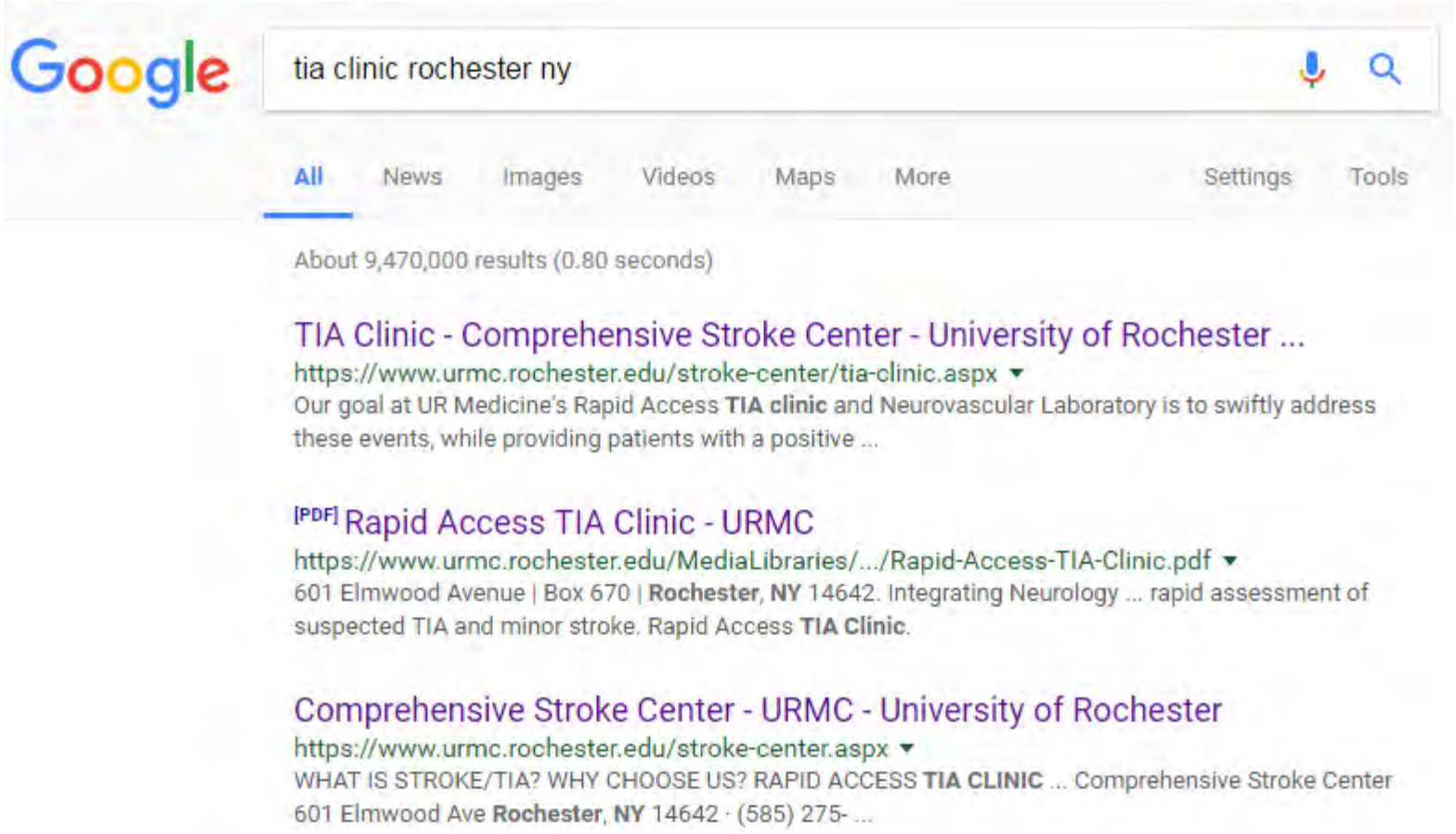


Launched January 2015

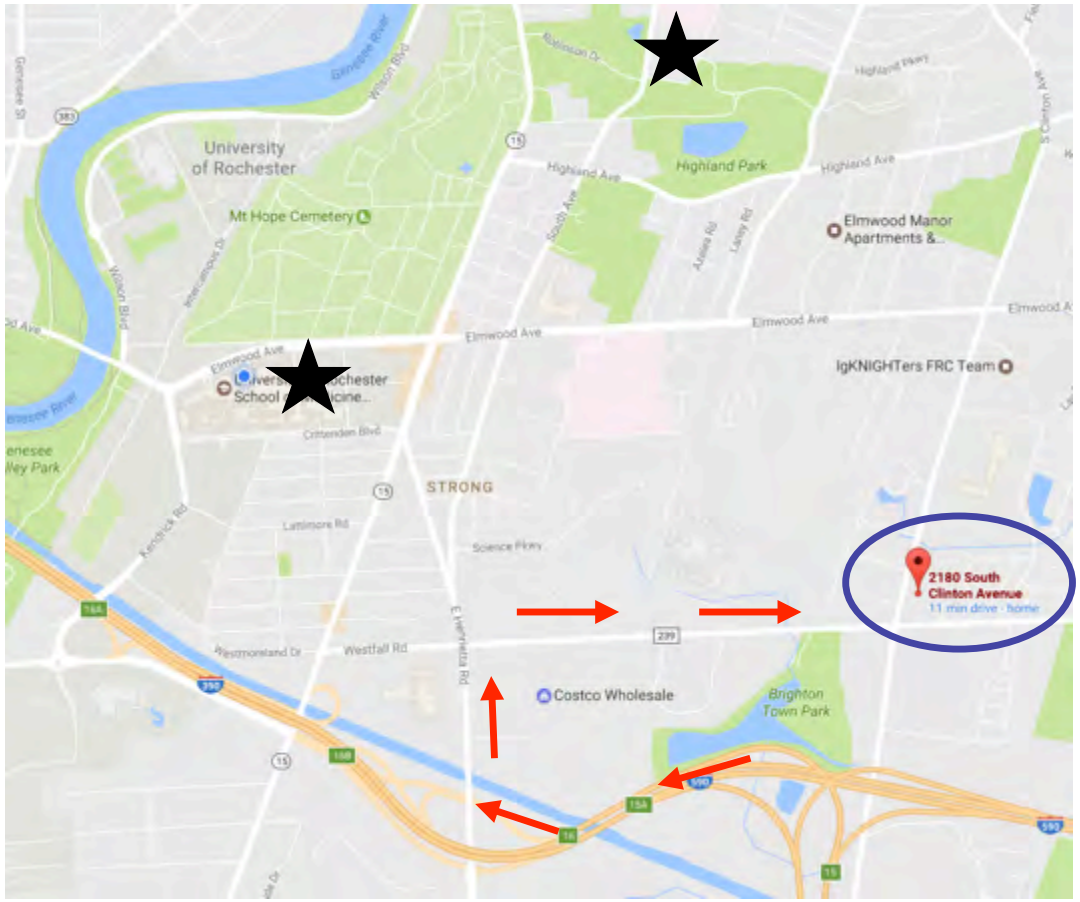
Our Vision

- Build a flagship program for our region that...
  - Provides a comprehensive, cost-effective ambulatory evaluation
  - Integrates the clinical evaluation and diagnostic studies
  - Fosters collaboration
  - Offers a convenient office location with co-located providers
  - Offers a comfortable environment for patients
  - Simplifies the referral process
  - Provides education opportunities for trainees
  - Reduces PCP referrals to ED

Regional Presence



Our Location



2180 South Clinton Avenue

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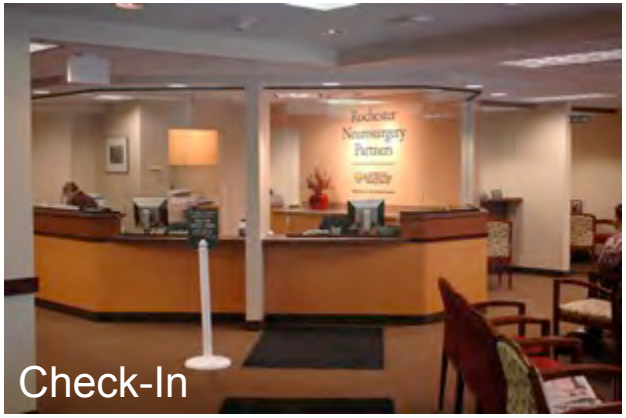
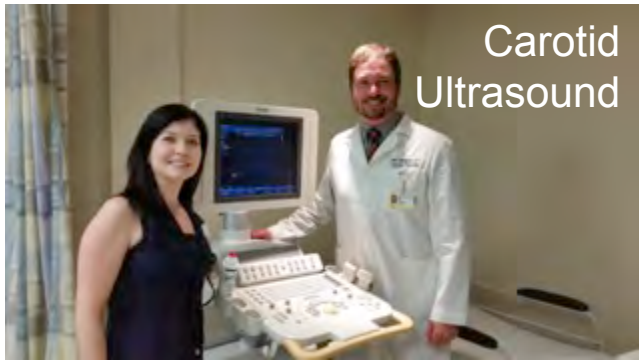
Patient Centered Care


Check-In


Consultation


Carotid Ultrasound


MRI

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Our Team

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Our Experience

Demographics:
- Average age = 68 years old
- Referred by PCP = 77%

Risk factors:
- Hypertension 67%
- Hyperlipidemia 56%
- Diabetes 21%
- Smoker, former 17%
- Smoker, current 14%
- Prior TIA/stroke 14%
- Atrial fibrillation/flutter 14%
- Coronary artery disease 13%
- Peripheral vascular disease 1%

Evaluation:
- Seen within 24 hours = 62%
- Seen within 48 hours = 74%
- Average BP = 139/73
- Average $ABCD^2$ score = 2.5
- Cerebrovascular Diagnosis = 56%
- Infarct on MRI = 21%
- Carotid stenosis (>50%) = 12%

Treatment:
- Antiplatelet initiated = 25%
- Anticoagulant initiated = 3%
- Carotid revascularization = 3%

126 patient encounters through January 2017

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Future Directions

- Continue to increase access
- Incorporate on-site EKG into evaluation
- Develop a triage system for area EDs and Urgent Care facilities
  - To facilitate same or next day access to our TIA clinic for those patient's who present to their facilities initially

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