The High Risk Transient Ischemic Attack

CAEP 11: Deep Discoveries
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- Chair, Measurement and Evaluation Working Group, Stroke Services BC
- Member, Steering Committee, SSBC
- Chair, CAEP Stroke Emergency Medicine Practice Committee
- Clinical Lead, B.C. Stroke Improvement Initiative
Disclosure

THIS TALK MIGHT INDUCE A PARADIGM SHIFT IN HOW YOU PRACTICE MEDICINE
**Why do we care?**

Stroke is the third leading cause of death in Canada; leading cause of adult disability

Each year, about 16,000 Canadians die from stroke (with more women than men)

40,000 to 50,000 strokes per year in Canada, with 300,000 living with the effects of disability

TIA is a major risk factor for stroke

Heart and Stroke Foundation of Canada (Online) (Accessed: June 1, 2011)
Outline

1. Prognosis after TIA

2. Risk stratification of TIA patients

3. Management of TIA patients
   - Investigations
   - Treatment
   - Disposition
Weather at Work

Level of rain

Twister from Wizard of OZ!!!!!!

Serious Storm

Raining hard plus wind.

Starting to rain.

Few clouds

Sunny Day!

Where I am

When I wake up. Riding my bike to work. At work. Riding my bike home. After I get home again.
Would you send this man home without investigations or treatment?

60 year old man
Hypertension, diabetes
Retrosternal chest pain lasting two hours: started at rest
Now pain free
Would you send this man home without investigations or treatment?

60 year old man
Hypertension, diabetes
Right arm weakness and speech difficulty, lasted 30 minutes; started at rest
Now totally normal
HIGHER Risk after TIA

The risk of stroke after TIA (9.9% 2 days; 13.4% 7 days; 17.3% 90 days)

IS HIGHER

Than the risk of myocardial infarction and major cardiovascular complications for undifferentiated chest pain patients in the ED (7-10% 30 day)
### WORSE Outcomes after Stroke

<table>
<thead>
<tr>
<th>MI</th>
<th>STROKE</th>
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<tbody>
<tr>
<td>10% die</td>
<td>15% die</td>
</tr>
<tr>
<td>20 – 35% chest pain</td>
<td>10% long term care</td>
</tr>
<tr>
<td>30 – 45% dyspnea</td>
<td>40% moderate/severe disability</td>
</tr>
<tr>
<td>15 – 25% off work</td>
<td>25% minor disability</td>
</tr>
<tr>
<td></td>
<td>10% normal</td>
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</table>
TIA

Take Immediate Action
TIA is unstable angina of the brain
Prognosis after TIA

Kaplan-Meier Life-Table Analysis of Survival Free From Stroke and All Adverse Events

Prognosis after TIA: Meta-analysis

3.1% 2 days; 5.2% 7 days
Includes ‘possible’ and ‘probable’ TIA
(Lancet Neurol 2007; 6: 1063-72.)

9.9% 2 days; 13.4% 7 days; 17.3% 30 days
‘Definite’ TIA only
(Arch Intern Med 2007; 167(22): 2417-2422)
But how do we determine who is low risk and who is high risk?
What is a TIA?

Sudden focal neurologic deficit

Lasting less than one hour

We’re Not The Only Idiots.

Agreement Regarding Diagnosis of Transient Ischemic Attack Fairly Low Among Stroke-Trained Neurologists

James Castle, MD; Michael Mlynash, MD, MS; Karming Lee, MD; Anna Finley Caulfield, MD; Connie Wolford, RN, MSN, NP-C; Stephanie Kemp, BS; Scott Hamilton, PhD; Gregory W. Albers, MD; Jean-Marc Olivot, MD, PhD

(Stroke. 2010;41:1367-1370.)
Risk Stratification of TIA

CONSIDERATIONS:

- Time before presentation
- Age of patient
- Vascular risk factors (DM, hypertension)
- Clinical Features
- Duration of symptoms
Risk Stratification – Time before seeking medical attention

- Highest risk within first few days to 7 days after a TIA

- Patients seen immediately after a TIA should be considered highest risk
Timing of Stroke after TIA

Figure 2: Time from onset of TIA to onset of stroke in all patients who had a stroke within 1 month of a TIA.

- Percentage of patients
- Time since onset of TIA (days)
- Time from TIA onset < 24 hours

Neurology 2009; 72(22): 1941-47
Risk Stratification - ABCD$^2$ Score

Age > 60 1
SBP > 140 or DBP > 90 1
Clinical features:
  Motor weakness 2
  Speech difficulty 1
Duration:
  > 60 minutes 2
  10 – 59 minutes 1
Diabetes 1

TOTAL = 7

*Lancet* 2007; 369: 283–92
Risk Stratification - ABCD² Score

Figure: Short-term risk of stroke by ABCD² score in six groups combined (n=4799)

*Lancet 2007; 369: 283–92*
High Risk TIA – Alberta Stroke Program

Symptom onset within the last 48 hours with any one of the following:

1. Motor deficit lasting more than 5 minutes
2. Speech deficit lasting more than 5 minutes
3. $\text{ABCD}^2$ score $> 3$
4. Atrial fibrillation with TIA

Complete investigations and be seen by a stroke specialist within 24 hours of referral

Problems with the ABCD² Score

- Validation mainly in retrospective and database studies – new evidence it is poor in emergency department settings
- Predicts severity rather than risk of recurrent events
- Misses young, posterior circulation, dissection
So How do We Risk Stratify?

- ABCD$^2$I
  - Add imaging to risk stratification (MRI or CT)
  - ABCD$^2$Ia

- Clinical Decision Rules

- Brain Biomarker
Proposal for a New Definition

Acute Ischemic Cerebrovascular Syndrome
Diagnostic Criteria

Chelsea S. Kidwell, MD; Steven Warach, MD, PhD

Background—Existing diagnostic classification systems for cerebrovascular disease are based primarily on clinical impression of temporal features, clinical syndrome, inferred localization, or ischemic mechanism. Diagnostic certainty of the ischemic pathology based on supportive or refuting laboratory or radiological evidence has been of secondary importance.

Summary of Comment—Acute ischemic cerebrovascular syndrome (AICS) describes a spectrum of clinical presentations that share a similar underlying pathophysiology: cerebral ischemia. Diagnostic criteria for AICS incorporate prior classification systems and currently available information provided by neuroimaging and laboratory data to define 4 categories ranging from “definite AICS” to “not AICS,” which define the degree of diagnostic certainty.

Conclusions—Clinical trials testing new treatments for acute ischemic stroke or secondary stroke prevention should limit enrollment to patients with “definite” AICS whenever feasible. (Stroke. 2003;34:2995-2998.)

Key Words: brain imaging • classification • diagnosis
Probability of **PATIENTS** Showing Up During My Shift

<table>
<thead>
<tr>
<th>Duration of My Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Never</strong></td>
</tr>
<tr>
<td><strong>When I arrive</strong></td>
</tr>
<tr>
<td><strong>While I'm looking at Facebook</strong></td>
</tr>
<tr>
<td><strong>When I'm bored and have nothing better to do</strong></td>
</tr>
<tr>
<td><strong>When I'm actually doing work</strong></td>
</tr>
<tr>
<td><strong>At the end of my shift</strong></td>
</tr>
</tbody>
</table>

**Chance of People Showing Up**

- **Always**
- **Most Likely**
- **Maybe**
- **Never**
Standard Investigations

- Performed to find an etiologic diagnosis and rule out stroke mimics
- CBC, electrolytes, glucose
- ECG
- Brain Imaging – CT, MRI
- Vascular Imaging

National Stroke Association Guidelines for the Management of TIA

Editorial Team: S. Claiborne Johnston, MD, PhD, Mai N. Nguyen-Huyen, MD, Miriam E. Schwarz, BS, Kate Fuller, MA, Christina E. Williams, BA, MS, and S. Andrew Josephson, MD
## Treatment – Primary and Secondary Prevention

<table>
<thead>
<tr>
<th>Strategy</th>
<th>RRR (95% CI)</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP therapy</td>
<td>42 (33-50)</td>
<td>7937</td>
</tr>
<tr>
<td>Statins</td>
<td>25 (14-35)</td>
<td>13333</td>
</tr>
<tr>
<td>ACE-I</td>
<td>30 (15-43)</td>
<td>11111</td>
</tr>
<tr>
<td><strong>SECONDARY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP therapy</td>
<td>28 (15-39)</td>
<td>51</td>
</tr>
<tr>
<td>Statins</td>
<td>25 (14-35)</td>
<td>57</td>
</tr>
<tr>
<td>Warfn (AF)</td>
<td>62 (48-72)</td>
<td>13</td>
</tr>
<tr>
<td>CEA</td>
<td>44 (21-60)</td>
<td>26</td>
</tr>
<tr>
<td>ASA</td>
<td>28 (19-36)</td>
<td>77</td>
</tr>
</tbody>
</table>
Treatment – Does it work?

90-day risk of stroke:

Phase I: 10.3%
Phase II: 2.1%

80% RRR

Time to assessment:

Phase I: 3 days
Phase II: < 1 day

EXPRESS Trial
Lancet 2007; 370: 1432–42
Treatment – Antiplatelets

- **Non-cardioembolic TIA:**
  - Aspirin: 50 to 100 mg / d minimum (CAST, IST)
  - Aspirin plus dipyridamole (25 mg / 200 mg BID) (Aggrenox ®) (ESPRIT, PRoFESS, EARLY)
  - Clopidogrel 75 mg / d (Plavix ®) (CAPRIE, FASTER)
To our knowledge, no clinical trials have directly addressed the issue of subsequent therapy for patients who experience recurrent episodes of brain ischemia while taking an antiplatelet drug. Many experts select an alternative antiplatelet drug.
# Treatment – Dual Therapy

<table>
<thead>
<tr>
<th></th>
<th>Combination treatment</th>
<th>Aspirin monotherapy</th>
<th>Risk ratio (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARLY (NIHSS score ≤ 3)</td>
<td>16/162</td>
<td>20/138</td>
<td>0.68 (0.37-1.26)</td>
<td>0.220</td>
</tr>
<tr>
<td>EARLY (NIHSS score &gt; 3)</td>
<td>12/121</td>
<td>18/122</td>
<td>0.67 (0.34-1.33)</td>
<td>0.252</td>
</tr>
<tr>
<td>FASTER</td>
<td>29/198</td>
<td>42/194</td>
<td>0.68 (0.44-1.04)</td>
<td>0.072</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>57/481</strong></td>
<td><strong>80/454</strong></td>
<td><strong>0.68 (0.49-0.93)</strong></td>
<td>0.014</td>
</tr>
</tbody>
</table>

Favours early combination therapy ≤24 h

Favours early aspirin monotherapy ≤24 h
Treatment – Atrial Fibrillation

- Long-term oral anticoagulation (target INR 2.5, 2.0 to 3.0)

- No recommendations on dabigatran (not approved at time of press)

- If contraindications to anticoagulant therapy, aspirin at a dose of 75 mg to 325 mg per day; may consider aspirin and clopidogrel (ACTIVE)


Circulation published online Dec 20, 2010;
Treatment – Atrial fibrillation

- Timing of anticoagulation:
  - Not sure
  - Best evidence from EAFT*
    - 50% treated under 2 weeks (no increase in hemorrhage)

- Recommendation:
  - “Initiate anticoagulation within 2 weeks” (right away!)
  - Consider delay if imaging shows infarct or hemorrhagic transformation

Treatment – Carotid Endarterectomy

- For severe stenosis (70 – 99%), NNT = 6 to prevent one stroke
  - Within 2 weeks, NNT = 6
  - Greater than 4 weeks, NNT = 125

- In moderate stenosis (50 – 69%), benefit depends on time to treat, age, sex, type of TIA, plaque morphology and surgeon skill

*These are considered ‘symptomatic’ stenosis because this is in the context of post-TIA; asymptomatic is not covered here
So Now What?

Consult?

Admit?
legitimate search

[Google logo]

1 2 3 4 5 6 7 8 9 10

it’s gotta be here somewhere...

Next

God help you what are you still doing here

GraphJam.com
AHA / ASA Guidelines

- Immediate hospitalization and urgent diagnostic evaluation of patients with an ABCD² score >2 within 24 hours of symptom onset
- All get MRI (DWI and PWI)
- Imaging of cervical and intracranial vessels
- Prolonged cardiac monitoring

Outpatient Management

- Secondary Prevention Clinics – why they are not ideal
  - Hospital affiliated
  - Monday to Friday (day hours); holiday and staffing closures
  - Difficulty in coordination of test results, imaging
  - Delays
  - Deterioration
Support for the Cause

Emergency Department

Stroke Prevention Clinic

Advantages
- 24/7 service 365 days/yr
- Skilled physicians and nurses
- Immediate access to lab, EKG, monitoring
- Access to CT, vascular imaging e.g. CTA, CUS
- Established referral mechanisms
- Capacity to educate, observe, admit, initiate Rx

TRANSIENT ISCHEMIC ATTACKS SHOULD BE MANAGED IN EMERGENCY DEPARTMENTS BY US.
Emergency Department – “Brain Attack Unit”

- $1000.00 less per patient
- Fifteen percent of ADP patients were admitted, with all positive clinical outcomes occurring while patients were in the observation unit.

Emergency Department Observation Unit

Evaluation of Transient Ischemic Attack in an Emergency Department Observation Unit

Latha G. Stead · M. Fernanda Bellolio · Smitha Suravaram · Robert D. Brown Jr. · Anjali Bhagra · Rachel M. Gilmore · Eric T. Boie · Wyatt W. Decker

- Outcomes: Recurrence 0.96% (2 d); 1.2% (7 d); 1.9% (30 d); 3.4% (90 d)

- 69.6% admitted to hospital – what?
St. Paul’s DTU TIA Pathway

All presumptive TIA patients admitted to observation unit.

Benefits:
- Prevent admissions (>80% discharged) – costs
- Rapid work-up
- Rapid consultation
- Rapid therapy if deterioration
A TIA Patient is Higher Risk than a Chest Pain Patient!

1. Examine – determine risk
2. ECG
3. Brain Imaging
4. Cerebrovascular imaging
5. Start antiplatelet (consider ACE-I, statin)

Consider admission or ED observation.
The High Risk TIA – Summary

TIA’s are high risk: use a risk stratification tool

Treatment works.

Manage TIA’s as you would chest pain.

This is an urgent disease that needs our attention in our emergency departments – a paradigm shift in how we practice medicine.
Things discussed at meetings

- Is there an agenda?
- Jokes
- The boss is an asshole
- Who is sleeping with the hot secretary
- Decisions
- When to hold the next meeting

GraphJam.com
Stroke Emergency Medicine Practice Committee

2:00 to 4:00 PM

Alcock Room

Convention Center
Thank you!!!
“On the basis of the SPARCL trial, administration of statin therapy with intensive lipid-lowering effects is recommended for patients with atherosclerotic ischemic stroke or TIA and \textbf{without known CHD} to reduce the risk of stroke and cardiovascular events (1B)”

Update to the AHA/ASA Recommendations for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack

\textit{Stroke}. May 2008
Treatment – Antihypertensives

- Recommended for prevention of recurrent stroke and prevention of all vascular events in patients who have had a TIA
  - Beyond the hyperacute period

- No definitive evidence on timing of therapy post-TIA

Guidelines for Prevention of Stroke in Patients With Ischemic Stroke or Transient Ischemic Attack