


**EMRA /FERNE**  
**Case Conference:**  
**The ED Management of**  
**TIA, AIS and ICH Patients**


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**ACEP**  
**Scientific Assembly**


**New Orleans, LA**  
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**Can We Risk Stratify**  
**TIA Patients in the ED?**


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**Stroke Risk after TIA**

	Kaiser 2000 (n=1,707)	Oxford CP 2003 (n=209)	Oxford VS 2004 (n=87)	Alberta 2004 (n=2,285)	Ontario 2004 (n=265)	GCNK 2005 (n=927)
2 Days	5%				3%	4%
7 Days		9%	8%		4%	7%
1 Month		12%	12%		5%	11%
3 Months	11%		17%	10%	6%	15%
6 Months						17%
1 Year				15%		

Johnston SC et al. JAMA 2000;284:2901-2906.  
 Kleindorfer K et al. Stroke 2005;26:720-724.  
 Lovett JK et al. Stroke 2003;34(9):1158-64.  
 Coull AJ et al. BMJ 2004;328(7435):326.  
 Gladstone DJ et al. CMAJ 2004;170(7):1099-1104.  
 Hill MD et al. Neurology 2004;62(11):2015-20.

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**ORIGINAL CONTRIBUTION**

## Short-term Prognosis After Emergency Department Diagnosis of TIA

S. Claiborne Johnston, MD, MPH  
 Daryl R. Gress, MD  
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 Stephen Sidney, MD, MPH

**Context** Management of patients with acute transient ischemic attack (TIA) varies widely, with some institutions admitting all patients and others proceeding with outpatient evaluations. Defining the short-term prognosis and risk factors for stroke after TIA may provide guidance in determining which patients need rapid evaluation.

**Objective** To determine the short-term risk of stroke and other adverse events after emergency department (ED) diagnosis of TIA.

**Design and Setting** Cohort study conducted from March 1997 through February 1998 in 16 hospitals in a health maintenance organization in northern California.

**Patients** A total of 1707 patients (mean age, 72 years) identified by ED physicians as having presented with TIA.

**Main Outcome Measures** Risk of stroke during the 90 days after index TIA; other events, including death, recurrent TIA, and hospitalization for cardiovascular events.

**Results** During the 90 days after index TIA, 180 patients (10.5%) returned to the ED with a stroke, 91 of which occurred in the first 2 days. Five factors were independently associated with stroke: age greater than 60 years (odds ratio [OR], 1.8; 95% confidence interval [CI], 1.1-2.7; *P* < .01); diabetes mellitus (OR, 2.0; 95% CI, 1.4-2.9; *P* < .001); symptom duration longer than 10 minutes (OR, 2.3; 95% CI, 1.3-4.2; *P* < .005); weakness (OR, 1.9; 95% CI, 1.4-2.6; *P* < .001); and speech impairment (OR, 1.5; 95% CI, 1.1-2.1; *P* < .01). Stroke or other cardiovascular events were associated with much time to be done that work-up. It may have to be done on an expedited basis in a hospital."

TIA patients "need to basically call 911 and come in right away," Johnson said. "They need to be taken very seriously by the patient and by the hospital."

Dr. John Marler of the National Institutes of Health, which helped fund the study, agreed that such patients may need immediate hospitalization, which could allow prompt treatment as well as quick use of diagnostic measures such as brain scans and ultrasound.

About 300,000 Americans each year have TIAs. Symptoms include sudden numbness and blurred vision but disappear within about 15 minutes to 24 hours and do not cause permanent damage.

Doctors commonly send TIA patients home, thinking "that the

Some hospitals may send patients home with little or no treatment. In the study, just 14 percent were hospitalized and 8 percent received no treatment, which Johnson said is typical. Aspirin was the most common treatment.

The researchers studied patients age 72 on average who were

Johnston SC et al. JAMA 2000;284:2901-2906.

SA WEDNESDAY, DECEMBER 13, 2000 \*\*\* NA

## Mini-strokes found to be more serious than doctors thought

By LINDSEY TANNER  
 Associated Press

**HEALTH WATCH**

CHICAGO — Mini-strokes that involve brief lapses in blood flow to the brain may be a bigger danger sign than previously thought.

Doctors have long known that mini-strokes, or transient ischemic attacks, can be an early warning of a full-blown stroke. But new research suggests the danger may be much more imminent than doctors believed.

In a study of 1,707 patients, 180 had strokes within three months of a transient ischemic attack, or TIA, a 10.5 percent rate that was in line with previous research. But half of the strokes happened within two days of the initial attack.

"No one expected that. That was a surprise," said Dr. Claiborne Johnston, who led the study at the University of California at San

much time to be done that work-up. It may have to be done on an expedited basis in a hospital."

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## Independent Risk Factors for Stroke within 90 Days

	Odds Ratio (95% CI)	P Value
Age >60	1.8 (1.1-2.7)	0.01
Diabetes Mellitus	2.0 (1.4-2.9)	<0.001
> 10 min Duration	2.3 (1.3-4.2)	0.005
Weakness	1.9 (1.4-2.6)	<0.001
Speech Impairment	1.5 (1.1-2.1)	0.01

Johnston SC et al. JAMA 2000;284:2901-2906.

## 90-Day Stroke Risk by Number of Risk Factors

# Risk Factors	Patients # (%)	Stroke within 90 days # (%)
0	22 (1)	0 (0)
1	179 (10)	5 (3)
2	509 (30)	36 (7)
3	584 (34)	63 (11)
4	337 (20)	51 (15)
5	76 (4)	26 (34)

Johnston SC et al. JAMA 2000;284:2901-2906.

Articles

## A simple score (ABCD) to identify individuals at high early risk of stroke after transient ischaemic attack

P M Rothwell, M F Giles, E Flossmann, C E Lovelock, J N Ebdon, C P Warlow, Z Hertz

**Abstract**  
 Background Effective early management of patients with transient ischaemic attacks (TIA) is undermined by an inability to predict who is at highest early risk of stroke.

**Methods** We derived a score for 7-day risk of stroke in a population-based cohort of patients (n=209) with a probable or definite TIA (Oxfordshire Community Stroke Project; OCSP), and validated the score in a similar population-based cohort (Oxford Vascular Study; OXVASC; n=190). We assessed likely clinical usefulness to front-line health services by using the score to stratify all patients with suspected TIA referred to OXVASC (n=378; outcome: 7-day risk of stroke) and to a hospital-based weekly TIA clinic (n=210; outcome: risk of stroke before appointment).

**Results** A six-point score derived in the OCSP (age [≥60 years]=1; blood pressure [systolic >140 mm Hg and/or diastolic ≥90 mm Hg]=1; clinical features [unilateral weakness=2, speech disturbance without weakness=1, other]=1; and duration of symptoms in min [≥60=2, 10-59=1, <10=0]; ABCD) was highly predictive of 7-day risk of stroke in OXVASC patients with probable or definite TIA (p<0.0001), in the OXVASC population-based cohort of all referrals with suspected TIA (p<0.0001), and in the hospital-based weekly TIA clinic-referred cohort (p=0.006). In the OXVASC suspected TIA cohort, 19 of 20 (95%) strokes occurred in 101 (27%) patients with a score of 5 or greater; 7-day risk was 0-6% (95% CI 0-1.1) in 274 (73%) patients with a score less than 5, 12-13% (4.2-20.0) in 66 (18%) with a score of 5, and 31-41% (16.0-46.3) in 35 (9%) with a score of 6. In the hospital-referred clinic cohort, 14 (7-5%) patients had a stroke before their scheduled appointment, all with a score of 4 or greater.

**Conclusions** Risk of stroke during the 7 days after TIA seems to be highly predictable. Although further validation

Lancet 2005; 366: 29-36

Rothwell et al. Lancet 2005;366:29-36.

## ABCD Score

Risk Factor	Score
Age ≥60	1
SBP >140 mm Hg and /or DBP ≥90 mm Hg	1
Unilateral weakness	2
Speech disturbance without weakness	1
Symptom duration ≥60 minutes	2
Symptom duration 10-59 minutes	1
Symptom duration <10 minutes	0

Rothwell et al. Lancet 2005;366:29-36.

**7-Day Stroke Risk Stratified by ABCD Score:  
 OXVASC Validation Cohort**

	Patients (%)	Strokes (%)	% risk (95% CI)
<b>ABCD score</b>			
≤1	2 (1%)	0	0
2	28 (15%)	0	0
3	32 (17%)	0	0
4	46 (24%)	1 (5%)	2.2 (0-6.4)
5	49 (26%)	8 (40%)	16.3 (6.0-26.7)
6	31 (16%)	11 (55%)	35.5 (18.6-52.3)
Total	188 (100%)	20 (100%)	10.5 (6.2-14.9)

Rothwell et al. *Lancet* 2005;366:29-36.

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**Is the ABCD Score Useful for Risk Stratification of Patients With Acute TIA?**

- Prospective study of 117 TIA patients over 3 years
  - Diagnosed by a neurologist, using the classic <24-hour definition
  - Hospitalized within 48 hours of symptom onset

Cucchiara BL et al. *Stroke* 2006; 37(7):1710-1714.

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**Is the ABCD Score Useful for Risk Stratification of Patients With Acute TIA?**

- Primary Outcome Measure was
  - Dichotomization of subjects into high-risk and low-risk categories
    - High-risk group
      - Stroke or death within 90 days
      - ≥50% stenosis in a vessel referable to symptoms
      - Cardioembolic source warranting anticoagulation

Cucchiara BL et al. *Stroke* 2006; 37(7):1710-1714.

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**Results**

- 26 patients (22%) classified as high risk
  - Clinical events occurred in 4 patients
    - 2 strokes, 2 deaths
  - A ≥50% stenosis in a vessel referable to the patient's symptoms was found in 15 patients (14%)
  - A cardioembolic source warranting anticoagulation was found in 10 patients (9%)

Cucchiara BL et al. *Stroke* 2006; 37(7):1710-1714.

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**Results**

- Increasing ABCD scores marginally associated with increasing risk
  - ABCD scores in the 2 patients with stroke were 3 and 6
  - Strokes occurred 26 hours and 39 hours after TIA onset
- Both patients who died had an ABCD score of 5
- Patients without weakness or speech disturbance still had significant probability of being high risk (15%) or DWI+ (8%)

Cucchiara BL et al. *Stroke* 2006; 37(7):1710-1714.

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**Is the ABCD Score Useful for Risk Stratification of Patients With Acute TIA?**

- Discriminatory ability of ABCD score not optimal
  - Patients with a score of 0 to 3 still had a clinically significant probability of having stroke within 90 days, or a high-risk cause of cerebral ischemia warranting specific intervention
    - Roughly in the 10% to 20% range
- Similar percentage had evidence of ischemia on early MRI

Cucchiara BL et al. *Stroke* 2006; 37(7):1710-1714.

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## Conclusions

- Prediction rules require prospective validation
- Isolated visual or sensory symptoms suggest low short term risk for stroke
- Role of DWI MRI in short term stroke risk stratification needs further investigation

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## Questions?

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