THE WARREN ALPERT
Medical School
BROWN UNIVERSITY

Rhode Island STROKE SYMPOSIUM

What is a minor stroke

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DISCLOSURE

- Research support from Genentech
- My talk will not include any off -label discussion

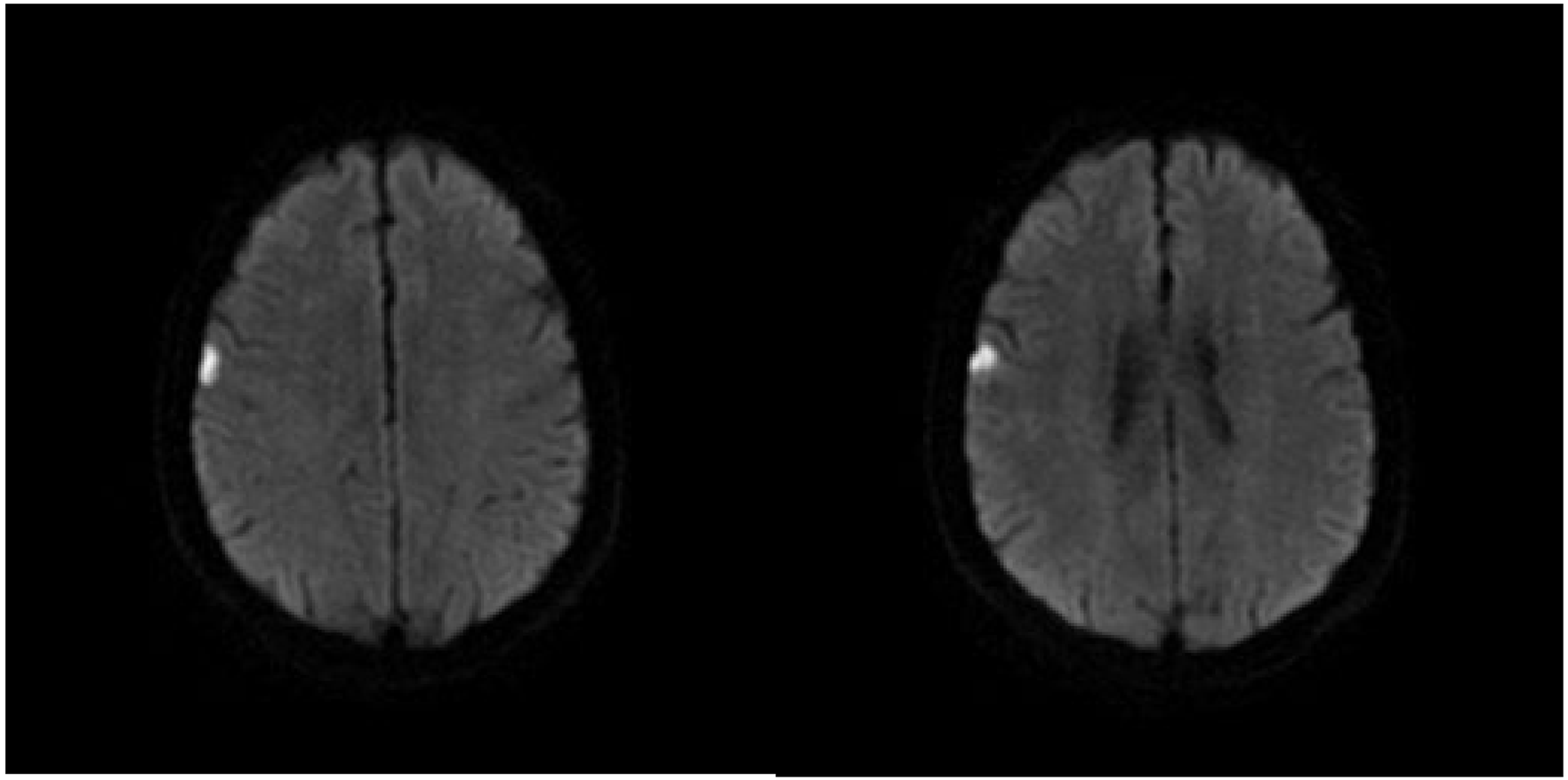
Overview

- Definition of TIA
- Prognosis after TIA and minor stroke

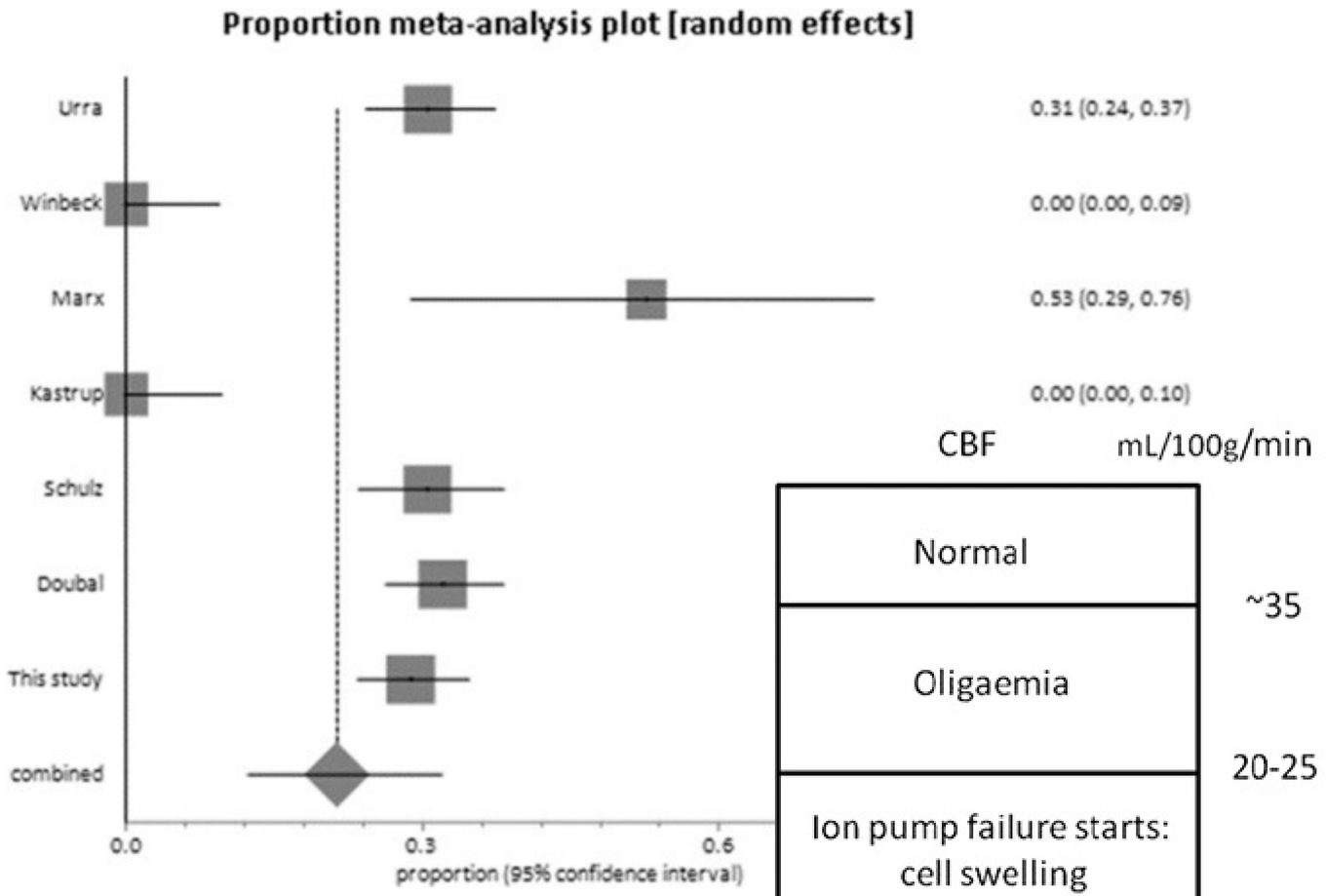
Definitions

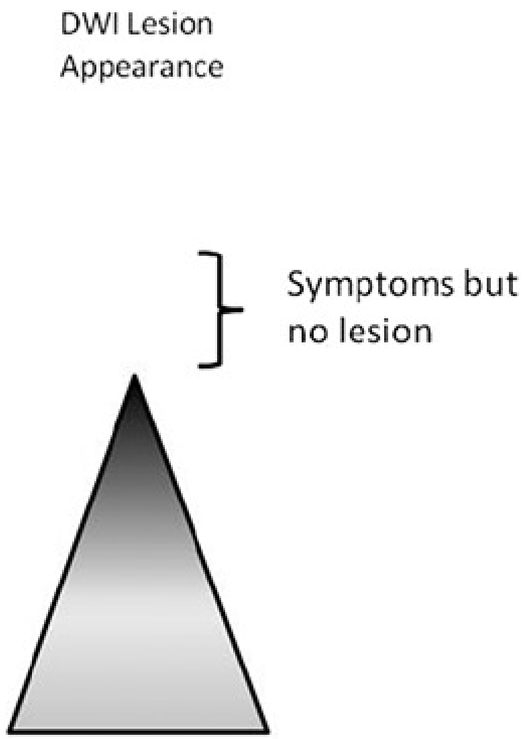
- Stroke/Brain attack (WHO): “an illness of sudden onset causing neurological impairment resulting from occlusion or rupture of a blood vessel that supplies a specific region of the brain”
- TIA: formerly any focal neurological deficit due to impaired cerebral blood flow lasting less than 24 hours
  - “New” definition: “transient neurological impairment caused by focal brain, spinal cord, or retinal ischemia without acute infarction” (Stroke 2009).

15 minutes of dysarthria



DWI negative stroke





Makin, Stroke 2015

DWI (+) TIA

- 99 patients with a TIA (< 24 hrs) and 83 controls were followed (Ay, Koroshetz, Ann Neurol 2005)
- DWI (+) lesions present in 41%
  - –20/36 were subcortical lesions, 6/36 were cortical
  - –Symptoms either lasted minutes or days, rarely longer than 200 minutes
- Larger studies have lower rates of DWI positive lesions, overall present in 34% (Brazzelli Ann Neurol 2014)

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- Better outcomes in POINT when DWI + (Rostanski, JAMA Neurol 2022)

Assessment Date ☐☐☐☐☐☐ Time ☐☐☐☐

Symptom onset Date ☐☐☐☐☐☐ Time ☐☐☐☐

GCS E=☐ M=☐ V=☐ **BP** ☐☐☐ ***BM** ☐☐☐

***If BM <3·5 mmol/L treat urgently and reassess once blood glucose normal**

Has there been loss of consciousness or syncope? Y (−1) ☐ N (0) ☐

Has there been seizure activity? Y (−1) ☐ N (0) ☐

Is there a NEW ACUTE onset (or on awakening from sleep)

I. Asymmetric facial weakness Y (+1) ☐ N (0) ☐

II. Asymmetric arm weakness Y (+1) ☐ N (0) ☐

III. Asymmetric leg weakness Y (+1) ☐ N (0) ☐

IV. Speech disturbance Y (+1) ☐ N (0) ☐

V. Visual field defect Y (+1) ☐ N (0) ☐

*Total Score_____(−2 to +5)

Provisional diagnosis

☐Stroke ☐ Non-stroke (specify) _____

*Stroke is unlikely but not completely excluded if total scores are ≤0.

	Stroke or TIA (n=101)	Non-stroke (n=59)
Characteristics		
Women	59 (58%)	35 (59%)
Mean (SD) age (years)	71 (14)	72 (16)
Presentation within 3 h	42 (42%)	32 (54%)
Presentation within 24 h	96 (95%)	57 (97%)
Previous stroke	18 (18%)	11 (18%)
Stroke classification		
Total anterior circulation stroke	12 (12%)	..
Partial anterior circulation stroke	23 (22%)	..
Lacunar stroke	29 (29%)	..
Posterior circulation stroke	16 (16%)	..
Primary intracerebral haemorrhage	8 (8%)	..
TIA	13 (13%)	..
Non-stroke diagnoses		
Syncope	..	13 (22%)
Seizure	..	8 (14%)
Sepsis	..	8 (14%)
Somatisation	..	7 (12%)
Brain tumour	..	4 (7%)
Labyrinthitis	..	3 (5%)
Subdural haematoma	..	3 (5%)
Other	..	13 (22%)

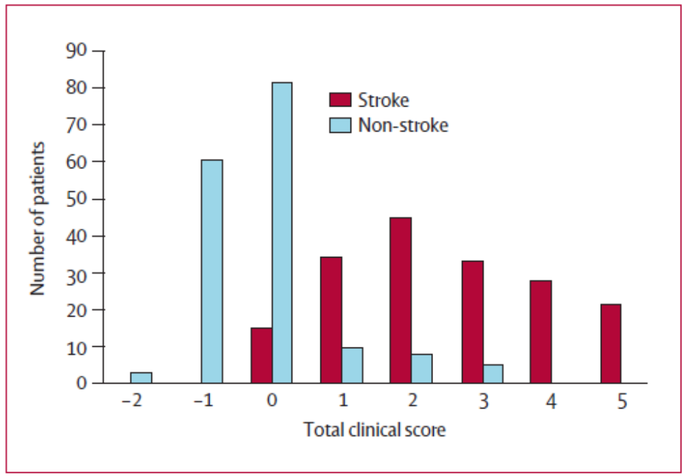


Figure 3: Internal validation of the ROSIER scale in 343 patients referred with suspected stroke (176 stroke, 167 non-stroke)

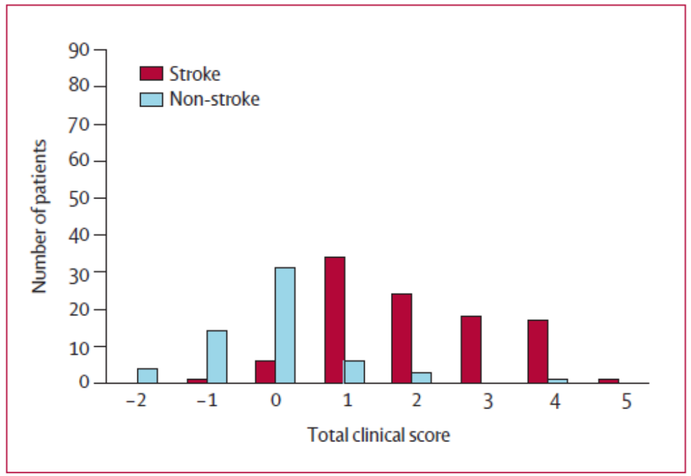


Figure 4: Prospective validation of the ROSIER scale in 160 patients referred with suspected stroke (101 stroke, 59 non-stroke)

FABS: screening mimics

- No facial, no afib, age < 50, SBP < 150, history of seizure, isolated sensory
- FABS 3 or greater: 90% sensitivity, 91% specificity
- Developed initially based on MRI in patients before thrombolysis, externally validated
- N=784. 459 MRI infarcts, mean NIHSS 7.
- Other predictors of mimics: paresthesias, minor stroke, migraine history, confusion

Risk stratification scores

- ABCD (age > 59, blood pressure > 140/89, clinical – hemiparesis or speech, duration 10-59 or > 60 minutes) score
- In a 7 day period 19/20 strokes occurred in patients with a score of 5 or more
- 0-4: 0.4%; 5: 12.1%; 6: 31.4%

Rothwell, Lancet 2005

ABCD2 pitfalls

- Wide variability has been observed in studies of risk of stroke after TIA (Rothwell, Lancet 2007)
  - Lower risk of stroke observed when patients are seen and evaluated by specialist stroke services
  - ABCD2 works best when not used by a neurologist
- Not a diagnostic score, but helps predict TIA mimics (Sheehan, Stroke 2009; Quinn Stroke 2009; Josephson, Stroke 2008)
- Scores derived from retrospective extraction of data are not as predictive (Giles, Stroke 2010)
- Meta-analysis negative (Wardlaw, Neurology 2015)

Our patient: $ABCD^2 = 2$

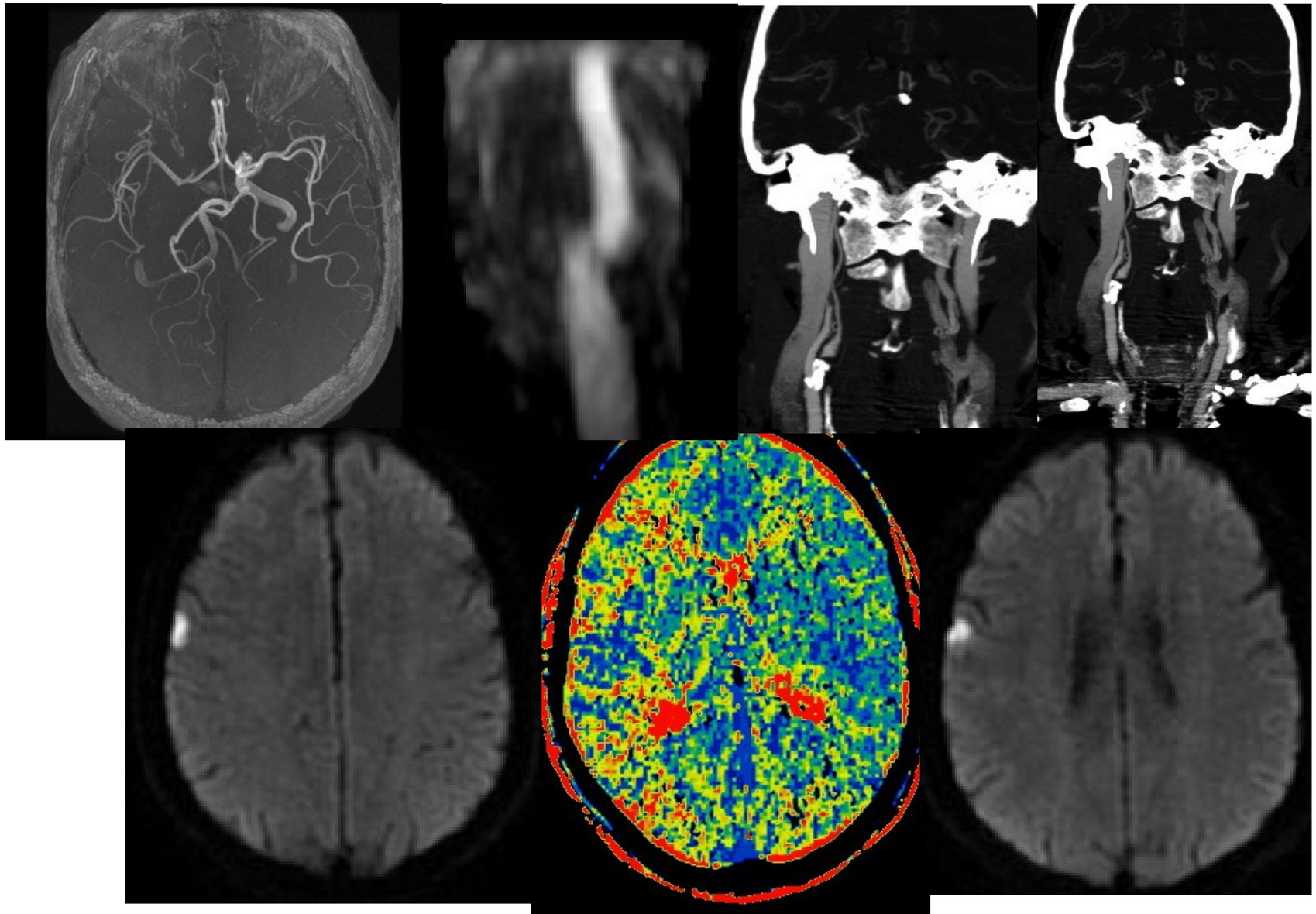


Table 2 Reasons for non-elective admission in patients with TIA and minor ischaemic stroke up to 7 and 30 days after discharge from treatment provision setting, n=810*

	Stroke clinic, n=563				Acute hospital, n=247			
	TIA, n=326		MIS, n=237		TIA, n=97		MIS, n=150	
	<7 days	8–30 days	<7 days	8–30 days	<7 days	8–30 days	<7 days	8–30 days
Recurrent stroke	2	1	4	2	3	0	0	2 (1 PICH, 1 ischaemic stroke)
Recurrent TIA	1	0	0	0	0	0	0	0
Rehabilitation	1	0	1	0	0	0	1	0
Sepsis	2	0	1	2	0	1	2	0
Fall	1	0	1	2	0	0	0	0
Bleeding	0	2 (GI bleed)	0	2 (1 GI, 1 GU bleed)	0	2 (GI bleed)	0	1 (GI bleed)
Other	1 (angina)	1 (giant cell arteritis)	1 (angina)	0	0	0	0	3 (urinary retention, colitis, pulmonary oedema)
Total	8	4	8	8	3	3	3	6

*Thirteen deaths at 30 days: three clinic referred (one TIA, two MIS), 10 hospital cases (three TIA, seven MIS).
GI, gastrointestinal, GU, genitourinary; MIS, minor ischaemic stroke; PICH, primary intracerebral haemorrhage, TIA, transient ischaemic attack.

Paul, JNNP 2013

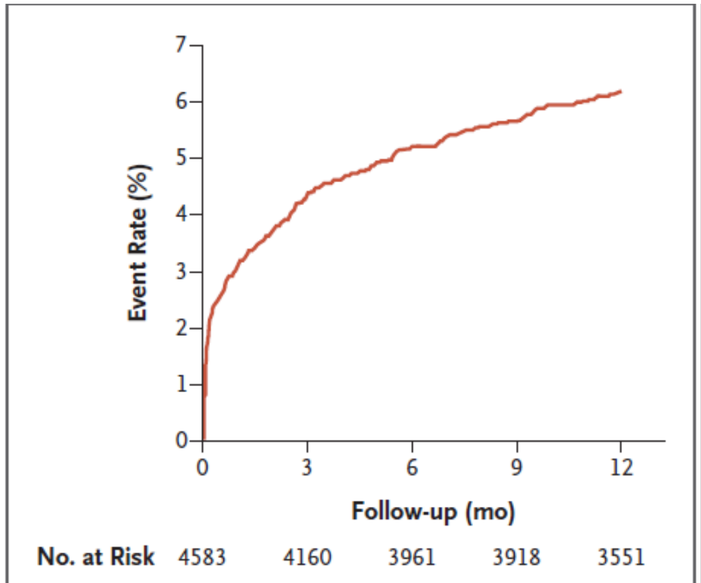


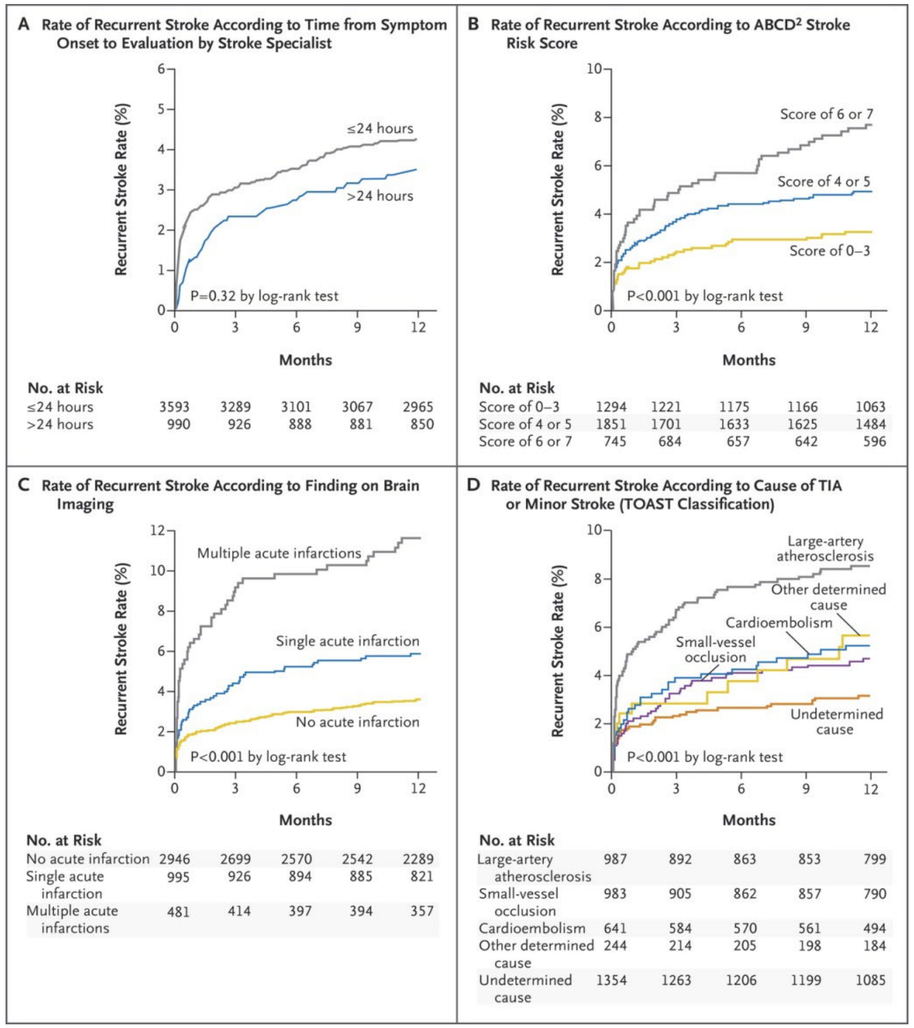
Figure 1. Cumulative Incidence of the Composite Outcome in the Overall Population.

The composite outcome included stroke, an acute coronary syndrome, and death from cardiovascular causes.

Table 4. One-Year Event Rates.*

Outcome	Patients (N=4583)
	no. (%)
Primary outcome	
Major cardiovascular events	274 (6.2)
Death from cardiovascular causes	25 (0.6)
Nonfatal stroke	210 (4.7)
Nonfatal acute coronary syndrome	39 (0.9)
Secondary outcomes	
Death from any cause	80 (1.8)
Stroke or TIA	533 (12.0)
Stroke	224 (5.1)
TIA	326 (7.4)
Intracerebral hemorrhage	16 (0.4)
Acute coronary syndrome	46 (1.1)
Myocardial infarction	16 (0.4)
Bleeding	87 (2.0)
Moderately severe bleeding†	16 (0.4)
Major bleeding‡	18 (0.4)

Amarenco NEJM 2016



Amarenco P et al. N Engl J Med 2016;374:1533-1542.

Improving on the ABCD2 score

- Vertebro-basilar TIA's previously perceived to have lower risk (Flossman, Brain 2003)
  - –May actually have a higher risk than ICA disease
- CDI score in a stroke unit: clinical, duration, carotid imaging – same as ABCD3I (Knoflach, Neurology 2016)
- ABCD3-I (dual TIA, MRI, ICA): better model fit? (Kelly Lancet Neurol 2016)
- ICA stenosis most predictive (Sheehan, Stroke 2010)(Yaghi, Neurology 2016)
- At the end of the day, "It's the vascular lesion, stupid!" (Edlow, Neurology 2012)

Transient Neurological Attack

- Myriad of acute onset, non-focal, neurological symptoms can be as prevalent as TIA's
  - Associated with higher risk of vascular events and dementia (Bos, JAMA 2007)
  - No alternative diagnosis
  - Non-focal = confusion, disoriented
- Clinician diagnosed TIA (87) versus TNA (56) in a TIA clinic within 7 days (van Rooij, Ann Neurol 2015)
  - 31 versus 23% positive DWI, most anterior
- Amyloid spells → TFNE's

Minor stroke

- Clinical trial definitions: NIHSS 3, 5, or others
- “Disabling” symptoms:
  - –complete hemianopia
  - –Severe aphasia
  - –Extinction
  - –Weakness against gravity
  - –Gait impairment
  - –Dysphagia
- When in doubt, ask the patient