



TIA: distinguishing funny spells from high risk incidents

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Agenda

- A. Definitions and diagnosis of TIA
- B. What is the 'aim of the diagnosis'?
- C. Work up
- D. Treatment
- E. Under- and over diagnosis: how to refute a TIA diagnosis
- F. And when you are still in doubt..
- G. Migraine, TGA, and TIA or how clinical work ruins any theory..



Definitions of TIA

- Symptoms of assumed vascular origin with complete remission within 24 hours.
- Europe
- AND no findings on MRI
- US

What is complete remission?

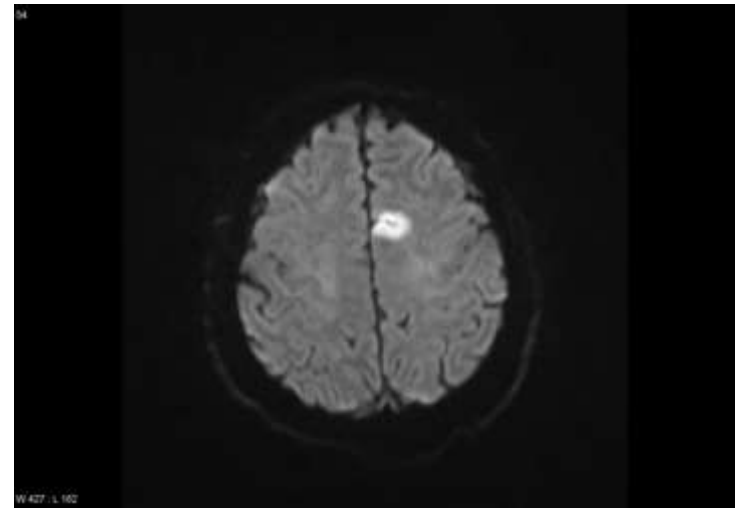
- a. NIHSS = 0
- b. Neurologist really finding nothing
- c. Patient feeling perfectly OK (not light headed, no subjective feelings of heaviness or numbness; not tired and depressed one week later)



Frequency of TIA diagnosis

Frequency of TIA among patients presenting with acute stroke at my institution in Copenhagen, and a final diagnosis of stroke or TIA

- 1995 < 10%
- 1998-2001: 15%
- 2016: 30 %





What is the consequence of a TIA diagnose?

- Secondary prevention can be installed reducing risk of stroke/TIA within 3 months with up to 80% (Rothwell, EXPRESS-study)
- Motivating for smoking cessation, weight loss, improved diet and increased exercise
- Reduced options for insurance
- Potential side effects from unneeded drugs
- (Reduced quality of life)
- Everybody should anyway quit smoking, lose weight, eat a healthy diet and exercise..



Work up in patients with suspected TIA

How is it done?

- Patient status: acute admission, acute out patient clinic, seen day after by consultant, GP; no specific track
 - A. First clinical interview: nurse, resident, senior resident, consultant. Systematic?*
 - B. Imaging: CT, MRI, Carotid UL, TCD, chest X-ray/chest CT*
 - C. Cardiac examinations: echocardiography (TTE, TEE), monitoring – how long??*



First clinical interview

- There are no symptoms left, so there is only the history to go by
- Open questions: do not induce symptoms
- Ask what worried them, why they came to see a doctor
- Risk status
- Comorbidities



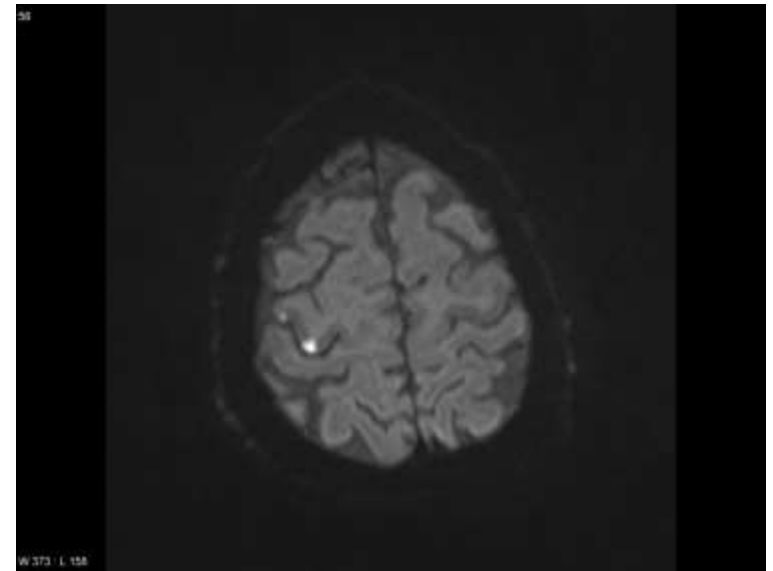


Risk of new stroke/TIA

ABCD² Tool⁴

- A** AGE: ≥ 60 years (1 point)
- B** BLOOD PRESSURE: systolic ≥ 140 mmHg or diastolic ≥ 90 mmHg (1 point)
- C** CLINICAL FEATURES: any unilateral weakness (2 points), speech impairment without weakness (1 point)
- D** DURATION: ≥ 60 mins (2 points), 10-59 mins (1 point)
- D** DIABETES (1 point)

ABCD² Tool interpretation⁵: >4 = HIGH risk; ≤ 4 = LOW risk (max = 7)



A mix of clinical symptoms & risk factors:
For triage on admission or also a help in diagnosis?

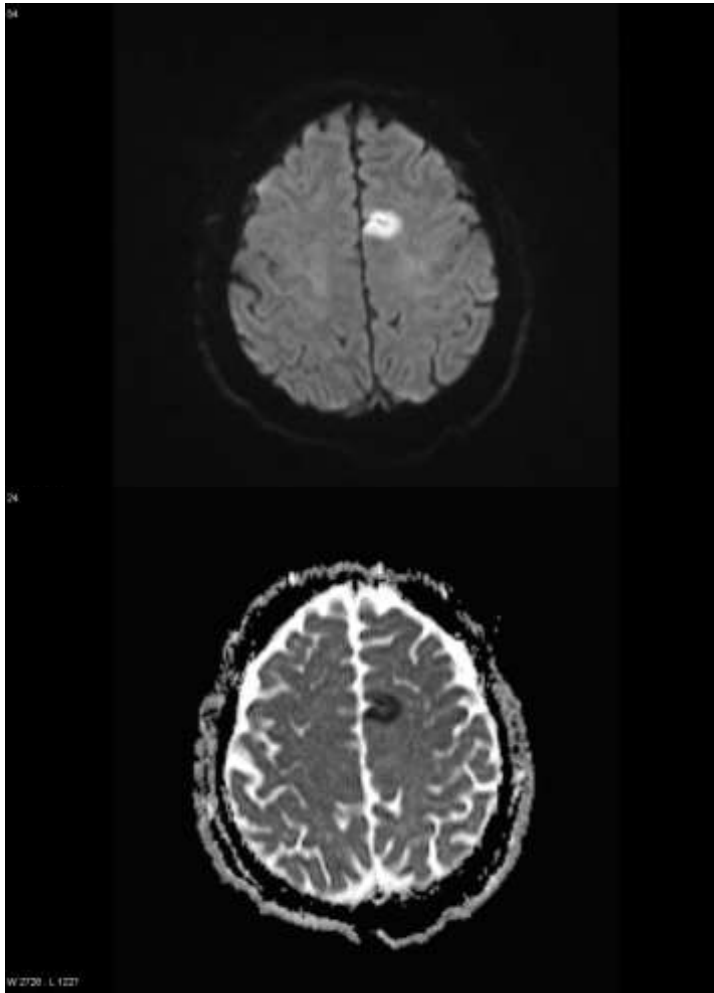


Aim of examinations

- To establish risk factor profile
 - Pharmacological and non-pharmacological secondary prevention
- To establish possible mechanisms of stroke
 - Large vessel disease, cardio-embolic stroke, small vessel disease, etc
- To perform a general screening
 - Patients with cerebrovascular disease often have other (neglected) conditions including sleep apnea, C pulm, COL, alcoholism etc.



Brain imaging





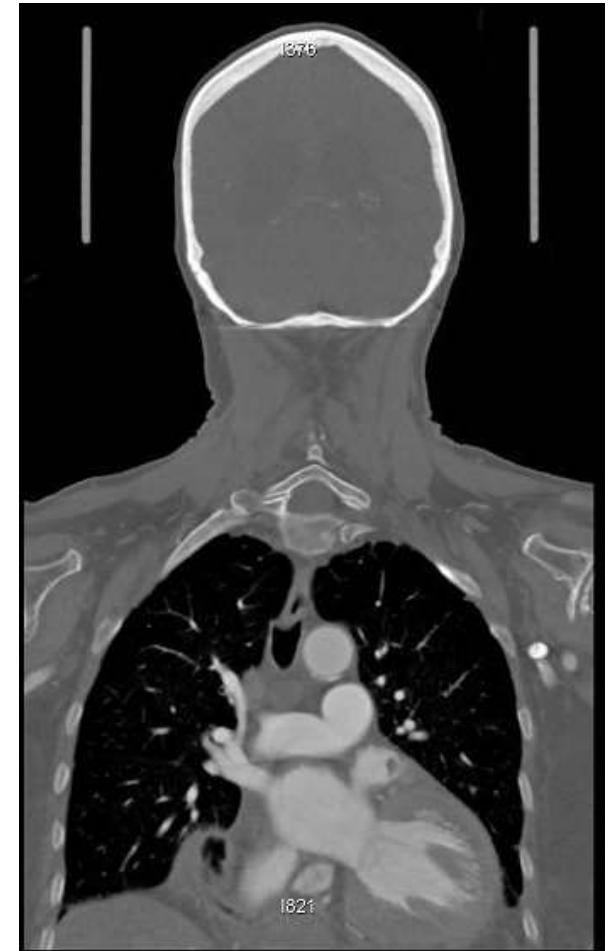
Vessels and chest

- CTA
 - Easy to get good overview of vascular status
 - MRA
 - Time consuming if doing both intra and extra cranial (two coils), contrast is needed for neck vessels due to movement artefacts
 - Carotid UL
 - Screening carotids for indication for TEA
 - TCD
 - Especially if CTA with large vessel disease
 - chest X-ray/chest CT
 - Chest X-ray is obsolete (I think); low dose CT a good idea if signs of heart or lung problem
- Indsæt CTA



Hart – cardioembolic stroke

- Echocardiography
 - TTE, TEE
 - Structural pro-thrombotic lesions
 - Indicators of e.g. AF (left atrial diameter): stratification
- ECG: usually done pre-hospital
- Monitoring – long term monitoring
 - The longer the more findings
 - Burden of AF
 - AF always the cause if 30 sec observed?
 - Selection or 30 days for everybody





Treatment: secondary prevention according to same principles as stroke

- Non-pharmacological
 - Smoking
 - Alcohol
 - Exercise
 - Diet
 - Psycho-education?
- Pharmacological
 - Antithrombotics
 - Antiplatelets
 - OAC
 - Antihypertensives
 - Cholesterol lowering
 - (diabetes, other specific treatments)



ORIGINAL RESEARCH

Open Access

Medical dispatchers recognise substantial amount of acute stroke during emergency calls



Søren Viereck^{1*}, Thes Palgaard Møller², Helle Klingerberg Jensen², Hanne Christensen³ and Freddy Lippert³

Methods: This was an observational study of 2653 consecutive unselected patients with a final diagnosis of stroke or transient ischemic attack (TIA). All admitted through the Emergency Medical Services Copenhagen, during a 2-year study period (2012–2014). Final diagnoses were matched with dispatch codes from the Emergency Medical Dispatch Centre. Sensitivity and positive predictive value were calculated. The effect of age, gender, and time-of-day was analysed using multivariable logistic regression.

Results: The sensitivity was 66.2 % (95 % CI: 64.4 %–68.0 %), and the positive predictive value was 30.2 % (95 % CI: 29.1 %–31.4 %). The multivariable logistic regression analyses showed that emergency calls during daytime and a final diagnosis of TIA vs. intracerebral haemorrhage (ICH), was positively associated with recognition of stroke (OR 2.70, 95 % CI: 2.04–3.57).

Table 3 Results of multivariable logistic regression model identifying factors associated with recognition of stroke/TIA

Effects	Unadjusted OR (95 % CI)	Adjusted OR (95 % CI) ^a
TIA vs. ICH	2.77 (2.10–3.69)	2.70 (2.04–3.57)
TIA vs. AIS	1.45 (1.20–1.78)	1.43 (1.15–1.78)
AIS vs. ICH	1.90 (1.49–2.43)	1.89 (1.48–2.41)
Day vs. Night	1.39 (1.07–1.82)	1.38 (1.02–1.87)
Day vs. Evening	1.12 (0.91–1.34)	1.12 (0.91–1.34)
Night vs. Evening	0.81 (0.61–1.07)	0.81 (0.61–1.09)
Age, y	0.994 (0.988–1.001)	0.996 (0.990–1.003)
Male	1.18 (1.01–1.39)	1.17 (0.99–1.38)

Abbreviations: OR odds ratio, CI confidence interval, TIA transient ischemic attack, AIS acute ischemic stroke, ICH intracerebral haemorrhage
^aAdjusted for sex, age, time of day and final diagnosis

TIA: an easy diagnosis???

how to refute a TIA diagnosis



Over diagnosis: how to refute a TIA diagnosis

- Start wondering if (at least all of the following):
 - Symptoms not typical for stroke - if directly atypical, start assuming this is not a TIA
 - Patient not typical stroke patient (e.g. 22 y o healthy person just left by boyfriend)
- But anyone can have a stroke; not all patients are really good at explaining, and some do have unusual symptoms
- Suggest going through all evidence, and refute if the patient has no solid evidence for anything



And when you are still in doubt..

- 52 y.o. woman: Very early menopause (32 y.o.), family history (mother and her sisters) of repeated strokes from mid fifties. Runs marathon, slender and healthy looking vegetarian
- Director of a large cultural institution; lost mother recently and was left by her companion last week
- Unclear symptoms: bilateral pins and needles: but mostly in right hand + at right side of mouth, felt perhaps salivation..
- MRI with quite extensive WML. Tot cholesterol 7.1; LDL 3.6 (negative work up for FH)
- I put her on a statin + 3 months aspirin & a follow up with MRI in 12 months... (don't think it was TIA, but..)



Migraine

- 28 yo woman, no previous history
- Repeated prolonged untypical aura-phenomena: Not really fortification-scotoma, more quick lights and gray spots
 - Ophthalmologist refuted retinal corpus lutreum problem
- MRI: 5 small (ADC confirmed) subcortical lesions more parietal than occipital on the corresponding side. Possibly older lesions (gliosis)
- Had atrial septum deficit – large and aneurismatic– this was closed
- No further symptoms



TGA

- 73 y.o. German women, on a cruise
- Probable motor TIA 10 year ago without seeking medical attention, hypertension, hypercholesterolemia. On aspirin, ACE-inhibitor and statin
- Clinically TGA: asked the same questions - forgetting what she was doing, duration 60 min, remitted on admission
- Hippocampal DWI – ADC confirmed.
- No follow up in this patient– but we do see gliosis/atrophy in some at 3 months, just as in TIA
- Some reports that the lesion ('hyperintensity') always disappears, some that in TGA there are no findings on MRI, some that this phenomenon is frequent, some that it is rare
- Absolutely certain that reassurance is enough in all cases of TBA?
- We kept her on her medication and said that it was probably a mini-stroke. She saw Prof Steiner in Frankfurt afterwards – don't know what he said

