Definitions and mimics

TRANSIENT ISCHAEMIC ATTACKS
Dr. C. Miller Fisher, a Neurologist at Massachusetts General Hospital whose pioneering discoveries in the causes and treatment of strokes created the basis for modern stroke treatments.

He authored more than 200 publications detailing his observations.

“strokes do not occur at random”,
In his most famous observation, he repeatedly noted "premonitory fleeting symptoms" (including limb sensory symptoms, and monocular visual loss) experienced by patients prior to a ischaemic stroke, and made the crucial link to carotid artery atheromatous disease.
cerebral arterial spasms:
This hypothesis put forward by Raynaud (1862) to account for the transient loss of vision was accepted by many authors (Weiss, 1882; Bland, 1889; Peabody, 1891; Osier, 1896) as the most convincing pathophysiological explanation of cerebrovascular transient episodes.
The Clinical Concept of T.I.A

- During the 2nd Princeton Conference:
  - intermittent vascular insufficiency,
  - ischemic recurrent attacks
  - recurrent focal cerebral ischemic attacks
  - transient cerebral ischemia

- Defined by Dr Miller-Fisher in 1958:
  - "Transient Ischemic Attack"

- In 1958 the ‘Ad hoc Committee’ NIH indicated the transient episodes as
  - ‘transient cerebral ischemia’

- 1961 3rd Princeton Conference the term:
  - ‘focal intermittent insufficiency or
  - ischemic attack’ was still used,

- It was only in the 4th Princeton Conference of 1965, however, that the definition gained unanimous acceptance.
  - “transient ischemic attacks”

(Carolie et al., 1998)
Stendhal’s Aphasic spells:
The first report of TIA’s followed by a stroke.

- Famous French novelist of the 19th Century.
- Had a series of short lived speech impairments, reported in his correspondence.
- Stendhal’s TIA’s occurred a few months before a fatal stroke.
- Forgot how to speak French, had word finding problems.

Bogousslavsky, J. (Lausanne) , Boller, F. (Paris) 2005
Frontiers of Neurology and Neuroscience, Vol. 19
Neurological Disorders in Famous Artists
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Stendhal by Soedermark in 1840
STENDHAL’S LAST PORTRAIT

- Portrait by Henry Lehmann Aug 1841
- Exactly 20 years before Broca’s presentation at the Society d’Anthropologie
- Right hand and face weakness, (Del Litto, 1968)
- Dominant right hand
- Stendhal never reported right hemiparesis.

Stendhal sketched in 1841 by Henri Lehmann (Musée Stendhal, Grenoble)
1958 DEFINITION OF TIA

Cerebral Ischemic episode that: “may last from a few seconds up to several hours, the most common duration being a few seconds up to five or ten minutes”.

Fisher, C. Miller, Oct 1958,
Cerebrovascular diseases: pathophysiology, diagnosis, and treatment, Journal of Chronic Diseases, Volume 8, Issue 4, 419 - 447
“Episodes of temporary and focal dysfunction of vascular origin, which are variable in duration, commonly lasting from 2-15 minutes, but occasionally lasting as long as 24 hours; they leave no persistent neurologic deficit”.

“Sudden focal cerebral dysfunction lasting less than 24 hours of presumed vascular origin confined to the area of brain or eye perfused by a specific artery”.

WHERE ARE THE FLAWS?

Time dependency!
The probability of infarct on MRI, DWI increases as the symptom duration increases,

- Observed brain infarcts with symptoms lasting for 30 seconds
- As well as normal DWI despite symptoms lasting for several hours.

Sorensen et al, 2011:
Where are the flaws? - 2

Resolution of symptoms

- TIA is not necessarily transient at the tissue level
- 1/3 of traditionally defined TIAs have had infarcts.

The most important characteristic of TIA-related infarcts on DWI is their small size, Koroshetz WJ, Benner T, et al. 2005.

Infarcts as small as 0.07 ml can occur during a TIA.

96% of all infarcts in TIA are smaller than 1 ml. Oliveira-Filho et al (2002) describes these infarcts as: “footprints of transient ischemia” for lesions on DWI that remain after complete resolution of TIA symptoms,


WHERE ARE THE FLAWS? - 3

Stroke, TIA & Mimics

Focal symptoms identifiable to an arterial territory not always an ischemic mechanism;

- Non-ischemic mechanisms include:
  - Seizures,
  - Subdural haemorrhage,
  - Intracerebral haemorrhage,
  - Brain tumours,
  - Multiple sclerosis and,
  - Migraine

Can cause transient neurological symptoms confined to a vascular territory (Prabhakaran, 2008; Sheehan, 2009)
Figure 1  Frequency of transient ischaemic attack (TIA) mimics from 1532 consecutive suspected TIA referrals to the University College London comprehensive stroke service.
TIA

- **TIA** is a transient episode of neurologic dysfunction caused by focal brain, spinal cord, or retinal ischaemia, without acute infarction. AHA 2009

STROKE

- **Ischaemic stroke** is defined as:
  An infarction of central nervous system tissue (brain, spinal cord, or retinal cell death) attributable to ischemia, based on neuropathologic, neuroimaging, and/or clinical evidence (ie, persistence of symptoms or findings) of permanent injury. AHA 2013
IMPORTANCE OF ACCURATE DIAGNOSIS

- Misdiagnosis:
  - Inappropriate treatment
  - Unnecessary investigations
  - Long term secondary prevention
  - Anxiety
  - Driving restrictions, i.e. HGV
Positive Symptoms

An excess of CNS Neuronal activity

- Visual
  - Flashing lights
  - Zigzag shapes
  - Lines
  - Shapes
- Somatosensory
  - Pain
- Motor
  - Jerking limb movements
Negative Symptoms

- Loss or reduction in CNS neuronal function
  - Visual loss
  - Hearing loss
  - Loss of sensation
  - Reduced limb power
**MIMICS**

- Usually Positive symptoms
  - Random symptoms, no respect for vascular pathways
  - Slow variable progression, - Jacksonian march
  - Progressive paraesthesia
  - LoC
  - Stereotypical events
  - Tongue biting
  - Vomiting
  - Longer durations
  - Precipitating factors

**TIA**

- Usually negative symptoms
  - Vascular pathways are respected
  - All start together
  - Abrupt start,
  - Gradual offset
  - Not stereotypical events
  - Short duration <1 hr
ANY QUESTIONS PLEASE?


