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Cerebral
Vascular
Disease

INTRODUCTION

A TIA is a clinical syndrome characterized by the sudden onset of a focal neurologic deficit presumed to be on a vascular basis.

a regional reduction in blood flow (ischemia)

➤

brain dysfunction in a circumscribed area

➤

resulting in transient observable clinical symptoms

The significance of early diagnosis and treatment of TIA :

- 20% of patients with ischemic stroke present with a TIA in the hours to days preceding the stroke
- Up to 80% of strokes after TIA are preventable

Hankey GJ, et al. Lancet 1999.
Rothwell PM, et al. Neurology 2005.

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A CASE

- A 50-year-old man presented to the emergency department with an episode of left hemiplegia that lasted 5 minutes
- He smoked cigarettes but otherwise had no significant past medical history
- His physical examination of nervous system was normal, with blood pressure of 125/75 mm Hg and an ABCD² score of 2

What characteristics of this patient?

What investigations should he take?

What was the diagnosis?

What about the probability of ischemic events?

What was the proper management?

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What characteristics of this patient?

Acute onset

An episode of 5 minutes

Deficits of central nervous system

Risk factors of cerebral vascular disease

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KEY POINT - TAKING AN ACCURATE HISTORY

sudden onset

- A vascular event usually has a sudden onset, with the deficit being maximal at the time of onset.

a focal neurologic deficit presumed to be on a vascular basis

- The most important clinical determination is whether the neurologic symptoms are focal or nonfocal
- **Typical focal** neurologic symptoms usually affect one side of the body (eg, weakness or sensory abnormality on the right or left side)
- **Nonfocal** neurologic symptoms include generalized weakness, light-headedness, fainting, blackouts, and bladder or bowel symptoms.

the circumstances of the event

- What was the patient doing at the time?
- Have the symptoms occurred before?

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INVESTIGATIONS

A full neurologic and cardiac examination should be completed on all patients with suspected TIA

Cardiac
examination



Routine
blood work



Brain

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INVESTIGATIONS - CARDIAC EXAMINATION

- Blood pressure, pulse rate, and oxygen saturation should be obtained
- An ECG should be performed to evaluate for atrial fibrillation
- Many patients will also require an echocardiogram and some form of extended cardiac monitoring if no definitive cause is found for the TIA

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INVESTIGATIONS - ROUTINE BLOOD WORK

- **Complete blood count:** Complete blood count to measure total hemoglobin and screen for anemia or erythrocytosis as a cause of TIA. Platelet count is relevant as thrombocytosis is a potential cause of TIA
- **Coagulation screen (INR):** disorders of coagulation can present as a TIA. A thrombophilia screen, is also advised
- **Blood glucose:** as hypoglycemia and hyperglycemia are important potential mimics of a TIA. Hypoglycemia, in particular, needs to be recognized and treated quickly

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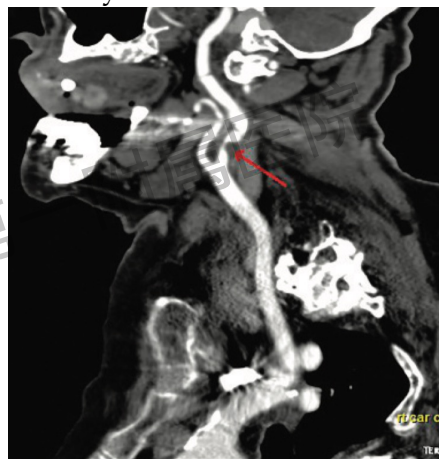
INVESTIGATIONS - BRAIN IMAGING

- **Brain imaging is key**
- **First imaging:** a noncontrast CT scan of the brain
 - This is a key investigation as it rules out structural causes for the symptoms, such as subdural hematoma
- **Further imaging:** Brain MRI, MRA, CTA

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BACK TO THE CASE

- Head CT was normal, but CT angiography showed a high-grade stenosis of the right internal carotid artery.



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DIAGNOSIS

- 1 acute onset and time-based deficits (< 24 hrs)
- 2 the focal neurologic signs or symptoms referable to known cerebral arterial distributions
- 3 without direct cerebral infarction according to the neuro-imaging
- 4 background risk factors for ischemia

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CLINICAL/EVENT FEATURES AND SCORES

- A combination of factors, clinical risk stratification tools have been developed to help identify patients at high risk of recurrent events

ABCD2 Score And Prognosis After TIA	Score	Factor Assessed at Time of TIA
	1	Age ≥ 60 years
	1	Blood pressure $\geq 140/90$ mm Hg on first evaluation
	2	Clinical symptoms of focal weakness with the spell (or)
	1	Speech impairment without weakness
	2	Duration ≥ 60 minutes (or)
	1	10 to 59 minutes
	1	Diabetes

ABCD2 Score And Risk of Stroke	ABCD2 Score	2-Day Risk of Stroke (%)
	0 to 1	0
	2 to 3	1.3
	4 to 5	4.1
	6 to 7	8.1

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CLINICAL/EVENT FEATURES AND SCORES

Clinical and Imaging Features That Increase the Risk of a Recurrent Stroke or Symptom Progression After Transient Ischemic Attack or Minor Stroke

Feature	High Risk	Low Risk
	←	→
Timing	Hours ago	Weeks ago
Age (years)	>60	<45
Blood pressure at presentation (mm Hg)	>140/90	<140/90
Diabetes mellitus	Yes	No
Symptoms	Speech, weakness	Dizziness, numbness
Duration (minutes)	>60	<10
Frequency of events	One or few	Many
Degree of clinical improvement	Vanishing severe deficit	Improving mild deficit
Intracranial stenosis	Severe	None
Extracranial stenosis	Present	Absent
Intracranial occlusion	Present	Absent
Diffusion-weighted imaging lesion	Multiple greater than single	None
Transcranial Doppler emboli detection (microembolic signals/hour)	>50	None

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MANAGEMENT

- Recognition and management of TIA offers the greatest opportunity to prevent disabling stroke
- There is 80% reduction in the risk of stroke after TIA with the early implementation of secondary stroke prevention strategies

antiplatelet agent → thrombosis

anticoagulation → embolism

treatment with statins

management of hypertension and/or DM

Lifestyle interventions

Etiological treatment

Lavallée PC, et al. Lancet Neurol 2007.

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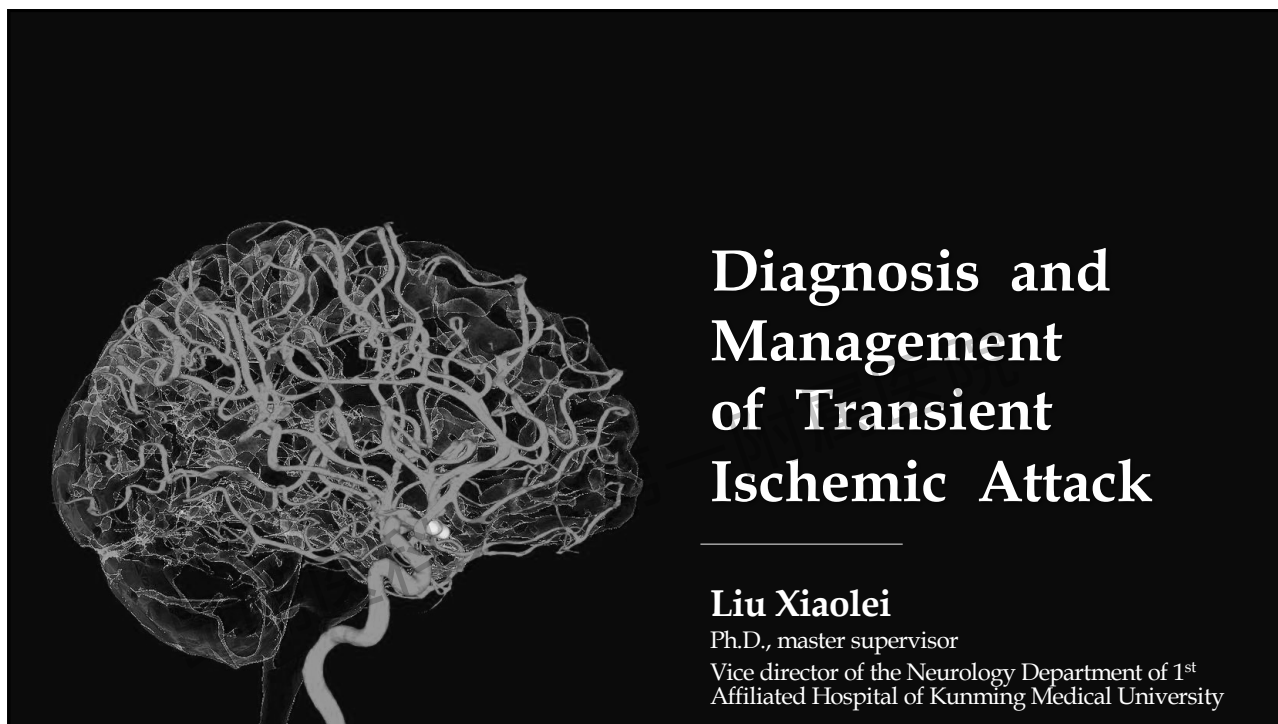
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- He was started on 81 mg aspirin and 40 mg of simvastatin daily. The patient underwent right carotid endarterectomy the next day without complication.

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COMMENT

- This patient had a transient ischemic attack and was at high risk of early recurrent stroke, although it was not identified as such by the ABCD² score
- Carotid artery stenosis is an important cause of a transient ischemic attack with a high risk of recurrence
- Early vascular imaging is required to identify this treatable cause of stroke
- Carotid revascularization should be performed as soon as reasonably possible if the patient is medically stable

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