# Stroke Mimics: A Diagnostic Challenge

**Dr. Ghazala Iffat Basir, MD**

**Neurologist, Thunder Bay Regional Health Sciences Centre**

**Northwestern Ontario Regional Stroke Network**

**Provincial Stroke Rounds**
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## Evaluation

- For the Provincial Stroke Rounds Planning Committee:
  - To plan future programs
  - For quality assurance and improvement
  - To demonstrate compliance with national accreditation requirements

- For You: Reflecting on what you've learned and how you plan to apply it can help you enact change as you return to your professional duties.

- For Speakers: The responses help understand participant learning needs, and teaching outcomes, opportunities for improvement .

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## Mitigating Potential Bias (Planning Committee)

**The Provincial Stroke Rounds Planning Committee** mitigated bias by ensuring there was no Industry involvement in planning or education content.

To comply with accreditation requirements of the College of Family Physicians of Canada and The Royal College of Physicians and Surgeons of Canada, speakers were provided with Declaration of Conflict of Interest forms, which were reviewed by the Ontario Regional Education Group (OREG) Host member on behalf of the Planning Committee and submitted to the NOSM CEPD Office.

The Ontario Regional Education Group (OREG) Host member on behalf of the Planning Committee reviewed the initial presentation supplied by the speaker to ensure no evidence of bias.

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## Presenter Disclosure

- Dr. Ghazala Iffat Basir

- Relationships with commercial interests:
  - **Grants/Research Support:** None
  - **Speakers Bureau/Honoraria:** None
  - **Consulting Fees:** None
  - **Other:** None

## Objectives

At the end of this presentation, the target audience will be able to:

1. Define stroke mimics and understand the importance of recognizing mimics in acute patient setting.

2. Discuss common mimics and their clinical presentation.

3. Distinguish between definite stroke and a stroke mimic.

## Relationship to Best Practices

- This month's topic relates to the Recognition of Stroke section and the Hyperacute stroke section of the Canadian Stroke Best Practice Recommendations.

- Find more information at **http://www.strokebestpractices.ca**

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- Stroke devastates lives around the world.

- It is the leading cause of disability and the second leading cause of death globally.

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- Rapid and accurate diagnosis

- Focused neurologic examination, rapid interpretation of brain imaging, and a thorough knowledge of stroke syndromes and common mimics.

## What is stroke mimic?

- "Manifestations of nonvascular disease processes presenting with stroke like clinical picture."

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- The clinical diagnosis of acute stroke is inaccurate in approximately 10%-30% of cases.

- Early studies found the frequency of stroke mimics range from 1% (O'Brien et al, 1987) to 19% (Libman et al, 1995) in patients with suspected or initially diagnosed stroke.

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Stroke

American Heart Association | American Stroke Association.

**Distinguishing Between Stroke and Mimic at the Bedside: The Brain Attack Study**
Peter J. Hand, Joseph Kwan, Richard I. Lindley, Martin S. Dennis and Joanna M. Wardlaw

*Stroke.* 2006;37:769-775; originally published online February 16, 2006;

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## Common Stroke Mimics

| NEUROLOGICAL | • Seizure<br>• Complicated Migraine<br>• Brain Tumor<br>• Demyelinating Disorder<br>• Myasthenia Gravis |
|---|---|
| INFECTIOUS | • Viral Encephalitis<br>• Basal Meningitis<br>• Brain Abcess |
| CARDIOVASCULAR | • Syncope<br>• HTN Encephalopathy |

| INNER EAR | • Labyrinthitis<br>• Vestibular Neuronitis<br>• BPPV |
|---|---|
| METABOLIC | • Hypoglycemia<br>• Hyponatremia<br>• Hepatic Encephalopathy<br>• Hyperglycemia |
| PSYCHIATRIC | • Conversion Disorder<br>• Malingering |

**The 20 most common stroke mimics, identified in a systematic review and meta-analysis of case series.40.**



Peter M Fernandes et al. Pract Neurol 2013;13:21-28

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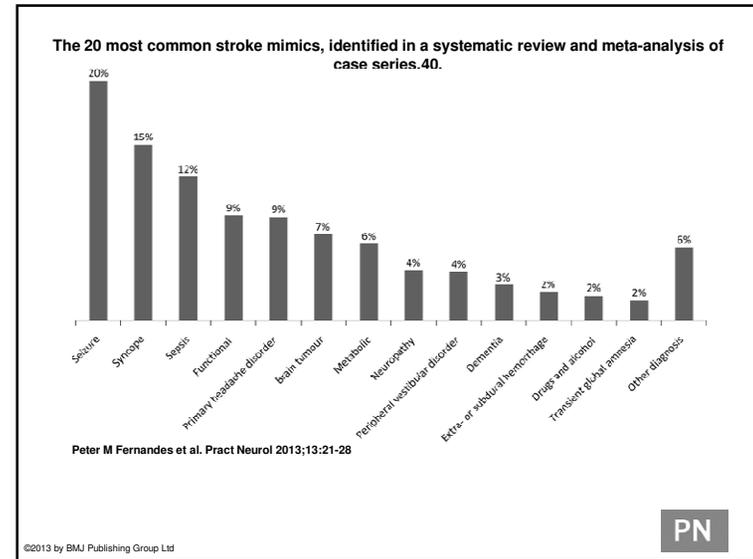
## Case 1

■ Mr. B is 72 years old male found lying on ground by his wife. He was last seen well 20 minutes earlier. She noticed he was sleepy, did not answer questions and was unable to move his right side.

## PMH

■ Hypertension,Dyslipidemia,left MCA stroke 2 year earlier. He had recovered well with only minor deficits.

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- O/E:awake,global aphasia, right facial paresis, right sided hemparesis.

- Improving clinically.

- He had no lateral tongue bite, urinary or fecal incontinence.

- He was vitally stable BP 160/70

- Blood work including blood glucose was normal.

- CT showed an old left insular infarct. No signs of acute infarction.

## Reflective Question

- What is most probable diagnosis?

- What will be the next action?

- Sudden onset of focal neurological deficits and had multiple vascular risk factors.

- On arrival his exam and presentation were compatible with acute left MCA stroke.

- Last seen well 50 minutes before arriving to hospital.

- With in 4.5 hour time window.

- CT was unremarkable.

- Leaving CT witnessed seizure lasted for about a minute.

- Possible seizure secondary to acute ischemic stroke.

- Seizure with Todd's paralysis since the very onset.

- MRI negative for any acute stroke.

## Seizure(Todd's paralysis)

- 20% of stroke mimics.

- Recurrent Focal motor seizure

- H/o Epilepsy

- Substrate for seizure is old ischemic or hemorrhagic stroke

- Imaging can help.

Case 2:

- Miss B is 21 year old female. She presented with right sided numbness and weakness.

- 1 hour later she had a throbbing left sided headache and she felt nauseous.

- PMH:Recurring unilateral throbbing headaches of moderate intensity accompanied by nausea, photophobia and phono phobia.

- 1 year earlier, history of similar episode of headache preceded by a feeling of heaviness of right arm which subsided in a few hour.

- FH: Her sister and mother had a similar history of headache and occasional weakness.

- O/E: BP 105/60, Afebrile

- Blood glucose N

- She had right facial palsy, a right hemiparesis and right hemi sensory loss.

**Reflective Question**

- What is most probable diagnosis?

- What will be the next action?

- Headache resolved with in 3 hours but her right hemiparesis persisted for more than 5 hours.

- Young age and lack of traditional vascular risk factors………………………..Alternative Diagnosis.

- The presence of recurrent transient neurologic deficits followed by headache led to the diagnosis of Migraine with Aura.

## Migraine with Aura
## (complex migraine)

- Headache common.

- 27% experience headache at stroke onset.

- Primary headache disorders 10% of stroke mimic.

- A family history may help.



## Diagnostic considerations

- Diagnosis of complex migraine relies on careful description of the aura and on exclusion of other causes.

- The diagnosis is often made only after recurrent stereotypic attacks.

- It's rare for a patient's first-ever migraine episode to involve complicated migraine.

- Thus, a patient who presents with what looks like complicated migraine but no history of migraine is much more likely to have TIA/stroke.

## Case 3:

- Mrs. C presented to hospital with increased somnolence, confusion and decreased strength in her left arm and leg.

- She had taken her medication in morning and had gone walking.

- 2 hours later her husband found her to be somnolent with confused speech and left sided weakness.

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- PMH:DM,IHD

- MED Glibenclamide,Metformin,Aspirin.

- O/E: impaired level of consciousness, confusion and left sided weakness.

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## Reflective Question

- What is most probable diagnosis?

- What will be the next action?

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- Blood glucose level was 50 mg/dl.

- Received treatment.

- 20 minutes later she started to improve and make complete recovery in 5 hours.

## Hypoglycemia

- Usually Autonomic

- Focal neurological symptoms alone

- Episode of focal neurological symptoms at same time each day.

- Insulin/ sulphonylureas

- Alcohol

## Diagnostic Consideration

- Always check blood glucose concentration in patients presenting with impaired level of consciousness or acute focal neurological symptoms.

## Case 4:

- Mr. A is 45 year old male. He presented to emergency with fluctuating right sided weakness and word finding difficulty since 3 days.

- PMH:Unremarkable

- CT head :showed large left fronto-parietal lesion that showed cortical enhancement.

## Intracranial mass lesions

- Includes primary tumors, abscesses, metastatic lesions

- Tumors typically cause slow progressive deficits but 5% of strokes have tumor like presentation.

- Hemorrhage into lesion /compression by edema , obstructive hydrocephalus or Todd's paresis.

- Very early mass effect suggest tumor.

- Large artery stroke 24-48 hr to devlop cerebral edema.

- History and imaging help make diagnosis.

## Panic attacks

- Occasionally involve focal neurologic symptoms, but more typically the symptoms are vague and random.

- History of panic disorder or an anxiety disorder

- Panic symptoms, including shortness of breath, dizziness, palpitation, abdominal pain, or fear of dying.

## Conversion disorder

- History of psychiatric disease of some other kind

- Neurologic symptoms don't adhere to a physiologic pattern.

- Inconsistencies on examination non physiologic sensory loss or weakness, or absence of tremor when the patient is distracted by a task.

- The distinctions can be subtle; a neurologic consultation can be very helpful when conversion disorder is suspected.

## Safety of tPA in stroke Mimics

Stroke
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association | American Stroke Association

**Safety of Intravenous Thrombolysis in Stroke Mimics: Prospective 5-Year Study and Comprehensive Meta-Analysis**
Georgios Tsivgoulis, Ramin Zand, Aristeidis H. Katsanos, Nitin Goyal, Ken Uchino, Jason Chang, Efthimios Dardiotis, Jukka Putaala, Anne W. Alexandrov, Marc D. Malkoff and Andrei V. Alexandrov

*Stroke*. 2015;46:1281-1287; originally published online March 19, 2015;

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Table 1. Baseline Characteristics and Outcome Variables in Patients With Stroke Mimics and Confirmed AIS Treated With Intravenous Thrombolysis During a 5-Year Period in a Tertiary Care Stroke Center (Memphis, TN)

| Variable | Stroke Mimics (n=75) | Confirmed AIS (n=441) |
|---|---|---|
| Mean age, y, SD | 56±12 | 60±14 |
| Male sex, n (%) | 32 (43%) | 226 (51%) |
| Median baseline NIHSS, points (IQR) | 6 (3–9) | 11 (6–22) |
| Mean door-to-needle time, min (SD) | 66 (32) | 63 (24) |
| Hypertension, n (%) | 33 (44%) | 368 (83%) |
| Diabetes mellitus, n (%) | 21 (28%) | 185 (42%) |
| Hypercholesterolemia, n (%) | 19 (25%) | 251 (57%) |
| Current smoking, n (%) | 20 (27%) | 160 (36%) |
| Mean pretreatment SBP, mm Hg (SD) | 142 (24) | 164 (29) |
| Mean pretreatment DBP, mm Hg (SD) | 83 (11) | 91 (18) |
| Mean pretreatment blood glucose, mg/dL (SD) | 128 (32) | 141 (58) |
| Symptomatic intracranial hemorrhage, n (%) | 1 (1.3%; 95% CI,* 0%–7.9%) | 5 (1.13%; 95% CI,* 0%–2.7%) |
| Orolingual edema, n (%) | 0 (0%; 95% CI,* 0%–4.2%) | 0 (0%; 95% CI,* 0%–0.7%) |
| Major extracranial hemorrhagic complications, n (%) | 0 (0%; 95% CI,* 0%–4.2%) | 0 (0%; 95% CI,* 0%–0.7%) |
| Minor extracranial hemorrhagic complications, n (%) | 2† (2.7%; 95% CI,* 3%–9.8%) | NA |
| Median length of hospitalization, d (IQR) | 3 (2–4) | 6 (1–11) |
| Functional independence at hospital discharge, n (%)‡ | 66 (88%; 95% CI,* 79%–94%) | 172 (39%; 95% CI,* 34.5%–43.6%) |
| In-hospital mortality, n (%) | 1 (1.3%; 95% CI,* 0%–7.9%) | 38 (8.6%; 95% CI,* 6.3%–11.6%) |

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## Approach

- The diagnosis of acute stroke remains a clinical diagnosis in the initial phases of patient evaluation.

- Is this a vascular event?

- Consider the different stroke subtypes.

- Consider other CNS events that may simulate stroke.

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- Clinical history.

- The timing of symptom onset.

- The symptoms are focal or diffuse.

- Symptoms follow a characteristic vascular pathway.

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## Summary

- Stroke mimics are common.

- The key to differentiating transient ischemic attacks and strokes from their mimics lies in the clinical history.

- Imaging and laboratory facilitate diagnosis.

## Thank You and Questions

**For More Information:**

Dr. Ghazala Iffat Basir
basirg@tbh.net

## Final Remarks

- Return attendance sheets to NOSM contact at bottom of sheet

- CME Certificates will be sent from NOSM if name and email provided clearly, within 6-8 weeks

- Next Provincial Stroke Rounds:

  **November 1, 2017** – Northeastern Ontario Stroke Network Hosting

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