

# Mastering the Migraine and Stroke Exam

Presented By:

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# Disclosures

- I have no relevant relationships with ineligible companies to disclose within the past 24 months. (Note: Ineligible companies are defined as those whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.)

# Educational Objectives

At the conclusion of the session participants should be able to:

1. Describe the clinical presentation of migraine and acute stroke
2. Discuss the correlation between pathology and clinical presentation of migraines and acute stroke
3. Identify neurological findings that warrant an emergent neurological workup

# Migraine – Clinical Presentation

- Recurrent attacks seen in migraine disorder
- Classic migraine (migraine with aura)
- Common migraine (migraine without aura)
- Symptoms of attacks develop over hours to days

Four phases of classic migraine attacks:

1. Migraine prodrome
2. Migraine aura
3. Migraine headache
4. Migraine postdrome

# Migraine – Clinical Presentation

## **Migraine Prodrome**

- Up to 77% of patients
- Symptoms appear 24-48 hours prior to onset of headache
- Yawning, euphoria, depression, irritability, food cravings, constipation, neck stiffness

# Migraine – Clinical Presentation

## Migraine Aura

- ~25% of patients
- Presence of 1+ focal neurologic symptoms that:
  - **Occur during or before the headache**
  - **Develop gradually**
  - **Last < 1 hour**
  - **Involve combination of positive (+) and negative (-) symptoms**
  - **Are reversible**

# Migraine – Clinical Presentation

## Migraine Aura

- **Positive symptoms** (d/t active discharge from CNS neurons)
  - Visual (bright lines, shapes, objects)
  - Auditory (tinnitus, noises)
  - Somatosensory (burning, pain, paresthesia)
  - Motor (jerking or repetitive rhythmic movements)
- **Negative symptoms** (d/t absence or loss of function)
  - Loss of vision, hearing, feeling, or ability to move a part of the body

# Migraine – Clinical Presentation

## Migraine Aura

- Develops gradually (5-60min)
  - May develop acutely (< 5min); need to rule out \_\_\_\_\_?
  - Symptoms may occur alone or in sequence; do not generally occur simultaneously
- **Visual aura**
  - **Most common**
  - Begins as a small area of visual loss often just lateral to the point of visual fixation
  - It may either appear as a **bright spot** or as an **area of visual loss**
  - **Visual disturbance expands** to involve a quadrant or hemifield of vision (5-60min)
  - Along the expanding margin, **geometric shapes or zigzagging lines often appear**
  - As the aura resolves, vision usually returns first to the areas of central vision initially affected by the aura



# Migraine – Clinical Presentation

## Migraine Aura

- **Sensory aura**

- Common and typically follows the visual aura within minutes
- Begins as a **tingling** in one limb or on one side of the face
- **Numbness** develops as tingling migrates
- May involve inside of mouth, affecting the buccal mucosa and half the tongue

# Migraine – Clinical Presentation

## Migraine Aura

- **Language aura**
  - Less common
  - Ranges from mild wording difficulties to frank dysphasia with paraphasic errors
- **Motor aura (hemiplegic migraine)**
  - Rare
  - Unilateral weakness of extremities or face
- **Aura without headache**
  - “Migraine equivalent” or “acephalgic migraine”
  - Isolated aura unaccompanied by HA
  - Late-life migraine accompaniments: onset >50y/o; visual, sensory, language, motor; gradual evolution of aura sx and spread of deficits

# Migraine – Clinical Presentation

## **Migraine Headache**

- Unilateral and throbbing or pulsatile (most common)
- Nausea +/- vomiting as severity increases
- Photophobia or phonophobia
- Osmophobia and cutaneous allodynia
- HA can range 4-72hrs if untreated
- May resolve in sleep

# Migraine – Clinical Presentation

## **Migraine Postdrome**

- Sudden head movement causes pain
  - Transient, same location as HA
- Feeling drained or exhausted
- Some may feel better (euphoric)

# Take Home Points

- Look for history of migraine “attacks”
- Ask if patient experiences any of the four phases of these attacks
- Prodrome: affective or vegetative symptoms 24-48hrs before HA
- Aura: ~25%, visual (MC), sensory, language, motor
- HA: unilateral, throbbing/pulsatile, N/V, photo/phonophobia
- Postdrome: pain w/ head movement

# Connecting the Physical Exam to the Patho

- Vascular theory is not supported by the current evidence
- **Cortical spreading depression**
  - Self-propagating wave of neuronal and glial depolarization that spreads across the cerebral cortex
  - Causes the aura
  - Activates trigeminal nerve afferents
  - Alters blood-brain barrier permeability

# Connecting the Physical Exam to the Patho

- **Activation of the trigeminovascular system**
  - **Inflammatory changes in pain-sensitive brain structures**
  - Fire sensory neurons from the trigeminal nerve and upper cervical roots -> pain in anterior/posterior head and upper neck
  - Deep brain structures also involved -> affective/vegetative sx
  - Stimulation of trigeminal nerve causes **release of vasoactive neuropeptides**
    - Substance P, calcitonin gene-related peptide (CGRP), neurokinin A
- Neuronal sensitization suspected to cause unique clinical symptoms

# Clinical Presentation of Stroke

## **Anterior Circulation**

- Anterior cerebral arteries (ACA)
- Middle cerebral arteries (MCA)
- Internal carotid arteries (ICA)

## **Posterior Circulation**

- Posterior cerebral arteries
- Cerebellar arteries
- Basilar artery
- Vertebral arteries



# Clinical Presentation of Stroke

## Anterior Cerebral Artery

- **Contralateral leg weakness** (may see some arm weakness)
- **Contralateral leg sensory impairment**
- **Urinary incontinence**
- **Abulia**, lack of spontaneity, whispering, reflex distraction to stimuli
- Contralateral grasp reflex, sucking reflex, paratonic rigidity
- Gait apraxia
- Left-sided dyspraxia, tactile aphasia

# Clinical Presentation of Stroke

## Middle Cerebral Artery

- **Contralateral face, arm, and leg weakness**
- **Contralateral face, arm, and leg sensory impairment**
- **Dysarthria**
- **Aphasia (dominant hemisphere)**
- **Constructional apraxia, anosognosia, neglect (nondominant hemisphere)**
- **Homonymous hemianopia**
- **Horizontal gaze deviation**

# Clinical Presentation of Stroke

## **Posterior Cerebral Artery**

- Ranges from HA to coma
- Visual: homonymous/bilateral hemianopia, cortical blindness, visual anosognosia, achromatopsia, 3<sup>rd</sup> CN palsy, others
- Memory deficits
- Hallucinations
- Thalamic syndrome, contralateral hemiplegia, others

# Clinical Evaluation of Acute Stroke

General physical exam findings supportive of stroke:

- A-fib, murmurs, cardiomegaly = cardioembolic disease
- Absent pulses (LE, radial, or carotid) = atherosclerosis w/ thrombosis
  - Sudden onset of a cold, blue limb = embolism
- Neck bruit = atherosclerosis
- *Absent facial pulses = common carotid artery occlusion*
- *Increased facial pulses = internal carotid artery occlusion w/ collaterals*

# Clinical Presentation of TIA

- Focal neurologic symptoms
- Sudden onset
- **Transient**
- Can include one or more of the following:
  - Transient monocular blindness (amaurosis fugax)
  - Aphasia or dysarthria
  - Hemianopia
  - Hemiparesis and/or hemisensory loss

# DDX of Transient Neurological Events

- Seizure (focal, generalized, psychogenic)
- Syncope
- TIA
- Migraine aura
- Hypoglycemia
- Transient global amnesia
- Others

# Determine the Following

- The focal or non-focal nature of attacks
- The nature of the symptoms and their progression
- The duration and timing of symptoms
- Associated symptoms during and after the attacks

# Nature of Symptoms

- **Positive symptoms**

- visual (bright lines, shapes, objects), auditory (tinnitus, noises, music), somatosensory (burning, pain, paresthesia), or motor (jerking or repetitive rhythmic movements)

- **Negative symptoms**

- absence or loss of function e.g. loss of vision, hearing, feeling, or ability to move a part of the body

- **Seizures and migraine auras begin with positive symptoms**

- **TIAs are characterized by negative symptoms**



# Progression, Course, and Duration

- **Migraine aura**

- Progresses slowly within one modality
- Progresses from one modality to another
- Lasts 20 – 30min; may persist for hours

- **Seizure**

- Positive sx in one modality which progress very quickly
- LOC
- Lasts 30sec – 3min

- **TIA**

- Negative sx in one or more modalities; if multiple modalities, all are affected at about the same time
- Usually lasts < 1hr

- **Syncope**

- LOC
- Lasts seconds

# Precipitating Factors

- **Migraine**

- Emotional stress, hormonal, hunger, weather, sleep disturb., odor, neck pain, others

- **Seizure**

- Stroboscopic stimulation, hyperventilation, d/c AED, F, EtOH, w/d.

- **TIA**

- ↓ BP, position change

- **Vasovagal syncope**

- Emotional or orthostatic stress, painful or noxious stimuli, fear, prolonged standing, heat exposure, physical exertion, hypovolemia

# Associated Symptoms and Demographics

- **Migraine**

- HA, N/V
- F > M

- **Seizure**

- HA, bitten tongue, incontinence, muscle aches
- Any age

- **TIA**

- May have HA after
- Uncommon in young w/o risk factors
- M > F

- **Vasovagal syncope**

- Diaphoresis, pallor
- Nausea, urge to urinate/defecate may precede or follow
- F > M

A 35-year-old otherwise healthy female presents to your clinic with a complaint of recurrent, severe unilateral headaches over the last few months. These headaches, which often last for several hours, are associated with nausea and photophobia. She also states that before each headache, she experiences visual disturbances for about 15 to 30 minutes, including seeing zigzag lines and bright lights. These visual disturbances, she says, resolve with the onset of her headache. She further shares that during the most recent episode, that occurred two days ago, she additionally faced difficulty speaking for approximately 10 minutes. She drinks a glass of wine once or twice per week and does not smoke.

What is the most likely diagnosis based on the clinical findings?

- A. Migraine with aura
- B. Migraine without aura
- C. Transient Ischemic Attack
- D. Cluster Headache
- E. Ischemic Stroke

A 68-year-old male with history of HTN and diabetes presents to the emergency department with a complaint of sudden onset difficulty speaking and weakness in his right arm that lasted for about 30 minutes earlier in the morning. He also mentions experiencing a blind spot in his left visual field that also lasted for approximately the same duration. He explains that these episodes have occurred twice in the past month. Each episode was preceded by a headache that he describes as throbbing and moderately severe, mostly on the right side of his head. His blood pressure and glucose levels have been well-controlled on medication. Vitals signs are stable. On physical examination, you find that both his speech and motor strength in his right arm have returned to normal, and there are no visual field defects.

What is the most likely diagnosis based on the clinical findings?

- A. Migraine with aura
- B. Transient Ischemic Attack
- C. Simple Partial Seizure
- D. Ischemic Stroke
- E. Hemorrhagic Stroke

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Questions?