

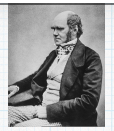

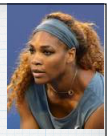

Headaches and Stroke Syndromes

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Historical Note...

* 1664 - Thomas Willis
  * "This gentleman... was tormented with a cruel pain of the head towards the left side. The cause whereof cannot be more probably assigned, than that the blood excluded from the right carotidick [sic] artery, when at first it rushed more impetuously in the left, had distended the membrane..."

Headaches and Stroke: A Complex Conversation

* HA coincidental to stroke
* HA as a consequence of stroke
* Stroke with clinical features of migraine
* Migraine with clinical features of stroke
* HA/Migraine may increase the risk of stroke

HA Coincidental to Stroke

* Causal association is not definitively proven
* Both are common!
  * Migraine: The most common neurological disorder (10-15% adult pop)
  * Stroke: 5th leading cause of death; 800,000/yr
* Increased risk of migraine in the young with increased risk of stroke (and stroke risk factors) as we age.

"Public appearances are a headache. I hold mine down to a minimum."
-Jack Nicklaus

Headache as a Consequence of Stroke

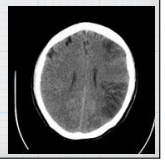
* Hemorrhagic Stroke
  * Invariable in SAH
  * May be within hrs of onset in ICH
* Sentinel Headache
  * May occur days to weeks before SAH

Headache as a Consequence of Stroke

Pain Sensitive	Pain Insensitive
Afferent veins	Brain parenchyma
Arteries at base of brain and arteries of dura	Ependyma
Dura around the venous sinuses and vessels	Choroid plexus
Falx	Piamater
Skin, subcutaneous tissue, muscle, periosteum of the skull	Arachnoid
Delicate structures of the eye, ear, nasal and paranasal sinuses	Dura over convexities of skull
Intracranial venous sinuses and large tributaries	

Headache as a Consequence of Stroke

* Ischemic stroke
  * HA may occur prior to, during, after stroke
  * 27-38% of strokes
    * Uncommon in lacunar stroke
    * Common in posterior circulation strokes
  * ?Mechanism



Headache as a Consequence of Stroke

Artery involved in infarct	Prevalence of headache
Posterior cerebral artery	64-90%
Vertebral artery	68%
Basilar artery	21-53%
Middle cerebral artery	10-39%
Anterior cerebral artery	0-18%

Artery involved in infarct	Characteristics of headache
Posterior cerebral artery	Frontal and lateralised
Vertebral artery	Pain over eyes, nose and cheek, or occipital, lateralised
Basilar artery	Occipital, lateralised, associated with neck stiffness
Middle cerebral artery	Steady pain behind corresponding eye
Anterior cerebral artery	Uni- or bifrontal

J Headache Pain. 2001 Jun; 2(1): 25–29.

Headache as a Consequence of Stroke

* Reversible Cerebral Vasoconstriction Syndromes
  * Etiology unknown
  * Often sudden/severe ("thunderclap") HA
  * Imaging may/may not be normal
  * Examples: Call-Fleming Syndrome, Postpartum angiopathy, Drug-induced cerebral vasoconstriction, Migrainous vasospasm, Benign angiography of the central nervous system
  * Complications: (Benign outcome in most patients) - Ischemic stroke, lobar hemorrhage, Reversible brain edema
* Hypertensive Encephalopathy
* Posterior Reversible Leukoencephalopathy

Headache as a Consequence of Stroke

* Cerebral Venous Thrombosis
  * HA, papilledema, visual loss, focal/gen sz, focal neuro deficits, change in LOC
  * Linked to hypercoaguable states (inherited/acquired/pregnancy, infection/malignancy)
  * Treatment: control sz, control intracranial hypertension, reverse the underlying cause if known and anticoagulate (warfarin)

Headache as a Consequence of Stroke

* Cerebral venous thrombosis

"No matter how bad things are, they can always be worse. So what if my stroke left me with a speech impediment? Moses had one, and he did all right."
-Kirk Douglas

Stroke with Clinical Features of Migraine

* "Migraine mimics"
* Cervical ICA dissection - ipsilateral HA (orbital/frontal/temporal), acute, severe, sometimes with neck pain
  * 1/2 with prior hx of migraine
* AVM

Stroke with Clinical Features of Migraine

* To scan or not to scan...
  * Change in the pattern of HA
  * New headache in pt >50yo
  * Onset of seizures; Personality change
  * HA associated with systemic illness
  * Symptoms suggestive of raised intracranial pressure (i.e. HA in early morning or worse with coughing, sneezing, straining)
  * Acute onset of worst HA of the pt's life
  * Abnormal neurologic finding (not longstanding)
* Choosing Wisely Campaign
* No good controlled trials
* Public health vs Socioeconomic vs Medicolegal question...

Stroke with Clinical Features of Migraine

* AHA/ASA Guidelines for Treatment of Acute Ischemic Stroke - 2018
  * Reconsider MRI brain: Routine use of brain MRI in all pts with acute ischemic stroke is not cost-effective and is not recommended for initial dx or to plan subsequent treatment. (Class III)
  * Reconsider MRI/CTA of the head: Routine noninvasive imaging by means of CTA or MRA of the intracranial vasculature to determine the presence of intracranial arterial stenosis or occlusion is not recommended. (Class III)
  * Perform carotid u/s early: For patients with non-disabling stroke in the carotid territory who are candidates for CEA or CAS, noninvasive imaging of the cervical vessels should be routinely performed within 24 hours of admission. (Class I)

American Heart Association.
life is why™

"When you have a stroke, you must talk slowly to be understood, and I've discovered that when I talk slowly, people listen. They think I'm going to say something important!"
-Kirk Douglas

Migraine with Clinical Features of Stroke

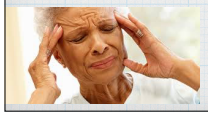
* Migraine with aura - 15-20% migraine pts
  * Typically homonymous visual disturbances, develop gradually over 5-20 minutes
  * Sensory/language disturbances

Migraine with Clinical Features of Stroke

* "Ophthalmoplegic migraine"
* "Retinal/Ocular migraine"
* "Confusional migraine"
* "Complicated migraine"
* "Vertebrobasilar migraine"
* "Hemiplegic migraine"

Symptomatic Migraine

* International Classification of HA Disorders
  * Migraine without Aura - at least 5 attacks fulfilling criteria:
    * Recurrent HA with attacks lasting 4-72 hrs (untx'd or unsuccessfully tx'd)
    * At least 2 of 4: unilateral, pulsating, mod-severe intensity, aggravated by routine physical activity
    * At least 1: Associated with nausea/vomiting or photo-/photophobia



Symptomatic Migraine

- International Classification of HA Disorders
  - Migraine with aura - at least 2 attacks
    - One or more fully reversible aura symptoms: visual, sensory, speech/language, motor, brainstem, retinal
    - At least 2 of the following 4: 1+ aura sx spreads gradually over >5 min and/or 2+ in succession, each aura sx lasts 5-60 min, at least 1 aura sx is unilateral (aphasia is "unilateral"), the aura is accompanied (or followed w/in 60 min) by HA. Motor sx's may last up to 72 hrs.
  - Persistent aura without infarction: occurring in a patient with migraine with aura and typical of previous auras except 1+ aura sx's persists for >/= 1 week. Neuroimaging shows no evidence of infarction

Migraine with Clinical Features of Stroke





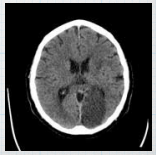

"Indeed, I have but a little moment in the morning in which I can either read, write or think; being obliged to be shut up in a dark room from early in the forenoon till night, with a periodical headache [sic]"
-Thomas Jefferson

Genetic Syndromes

- Cerebral Autosomal dominant arteriopathy with Subcortical Infarcts and Leukoencephalopathy (CADASIL)
- Mitochondrial encephalopathy, lactic acidosis, and stroke-like symptoms (MELAS)

Migrainous Infarction

* Int'l Classification of HA Disorders:
  * Occurs in pts with migraine with aura and typical of previous attacks except deficits (aura) last >1 hour
  * Neuroimaging shows infarction in relevant area
  * No better dx

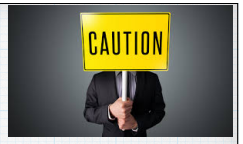


"Our only president who has died as U.S. commander in chief in war is Franklin Delano Roosevelt - who died of a cerebral hemorrhage or massive stroke on April 12, 1945, only three weeks before the unconditional surrender of the German armed forces he had laid down as implacable Allied policy two years before."
-Nigel Hamilton

Treatment

* Not well studied
* Consider: stroke risk factor control with migraine prophylaxis
* Consider: education on aura vs TIA symptoms
* Consider: clinical caution not to dismiss focal symptoms in these pts

Treatment



* Avoid vasoconstrictive medications: triptans, serotonin antagonists (pizotifen and methysergide), ergot alkaloids
* Avoid beta blockers as initial tx for migraine prophylaxis in pts>60yo or smokers
* Avoid ASA and NSAIDs for acute HA in pts with ICH/SAH hx
* Avoid triptans in the first months after SAH

Treatment

* Contraception
  * Women <35yo with migraine without aura and no other risk factors for stroke may use OCP with low-dose estrogen (<50mcg - ACOG) or (<35mcg -WHO)
  * WHO - Risks of estrogen-progestin contraceptives outweigh the benefits in women >35yo who have migraine without aura or for women of any age who hav migraine with aura.
* Encourage women with migraine with aura to d/c tobacco use, control BP, use alternative contraception

Treatment

* Combined hormonal contraceptives are a category 1 for non migraine HA, a 2 for migraines without aura, and a 4 for migraines with aura. Levonogestrel-releasing IUDs, implants, DMPA,and progestin-only pills are a category 1 in women with migraines, regardless of whether aura is present.

"Hiding my migraines on the set may have been my toughest challenge as an actor. There were times when the pain from migraine headaches was so severe that I literally had to crawl across my dressing room floor. But I couldn't let anyone know. If they thought I might slow production, I figured that would end my career."
-Morgan Fairchild

The End!

Questions?