Migraine and Stroke: What’s the link?

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Disclosures

Objectives

• Assess the risk of stroke in migraine with & without aura
• Describe the association of migraine & other risk factors for stroke
• Be aware of the management of migraineurs at risk for stroke

Consultant – Novartis, Aralez
Research/educational grant - Allergan
No relevance to this talk
Possible Relationships Between Stroke and Migraine

- Migraine is extremely common – WHO deemed 3rd most prevalent
- Migraine symptoms mimicking stroke
- Headache may be coincidental with/due to stroke
- Stroke may be due to migraine
  - migrainous infarction
  - ? PFO
- Migraine therapy may complicate stroke
- Migraine and stroke may share common cause – OCP, CADASIL
Migraine Mimicking Stroke: What is an aura?

A. At least 2 attacks
B. Fully reversible symptoms: often positive (may be negative)
   • visual
   • sensory
   • speech symptoms
   • no motor weakness
C. At least 2 of the following:
   • Unilateral symptoms (sensory)
   • Develops gradually over > 5 mins
   • Duration: > 5 minutes and < 60 minutes
D. Headache meets criteria for migraine and begins during the aura or follows within 60 mins
## Migraine Mimicking Stroke

### 42 yr old, “trouble seeing” in right eye, lasting 15 minutes

<table>
<thead>
<tr>
<th></th>
<th>Stroke</th>
<th>Migraine Aura</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptom onset</strong></td>
<td>sudden</td>
<td>gradual, prodrome</td>
</tr>
<tr>
<td><strong>Symptom characteristics</strong></td>
<td>negative, one eye, fixed</td>
<td>positive &amp; expanding, moving, both eyes/field/cover-uncover</td>
</tr>
<tr>
<td></td>
<td></td>
<td>march of sensory symptoms</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>older</td>
<td>younger (or older)</td>
</tr>
<tr>
<td><strong>Uncommon types</strong></td>
<td></td>
<td>Hemiplegic Migraine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HaNDL</td>
</tr>
<tr>
<td><strong>Past History</strong></td>
<td>CVD, DM, lipids, HTN</td>
<td>migraine</td>
</tr>
</tbody>
</table>
### Headache coincidental to/ caused by stroke

<table>
<thead>
<tr>
<th>Stroke Type</th>
<th>% with Headache</th>
</tr>
</thead>
<tbody>
<tr>
<td>ischemic</td>
<td>8.4%</td>
</tr>
<tr>
<td>hemorrhagic</td>
<td>21.3%</td>
</tr>
<tr>
<td>CVST</td>
<td>50%</td>
</tr>
</tbody>
</table>

Lee 2016  Zhang 2017
Stroke in Migraineur  Zhang BMJ 2017  Kurth 2012

• first described in late 1800s by Charcot
• numerous studies suggest link between migraine and stroke
• conclusions are varied due:
  • inconsistencies in research methodology
  • varied patient populations
  • methods used to diagnose migraine - neurologist vs self report
• Consensus:
  • stroke is more common in women <45 yr **migraine with aura**
Studies of Stroke in Migraine  Stang 2005, Kurth 2005

• Atherosclerosis Risk in Communities study (ARIC)
  • Approx 12, 400 women and men >55yr

• Women’s Health Study
  • Approx 39, 800 women >age 45 without cardiovascular ds

Risk of stroke increased in migraine with aura
Migraine and Stroke  Mawet 2016, Kurth 2012, Sacco 2013

• Migraine with aura affects 25% of migraine sufferers
• Women under age 45 with aura seem to be at highest risk
• Women with aura are more likely to have stroke than men with aura
• Migraineurs have increased risk of CVD but do not have enhanced atherosclerosis
  • Inflammation?
  • Vasospasm?
• Younger migraineurs have increased risk of cervical artery dissection
• Is there endothelial dysfunction?
• Childhood Adversity?
• Migraineurs with aura are 2x more likely to have hypercoaguability
Stroke and Migraine Studies  

- Ischemic stroke due to clot/reduced blood flow (> 80% of all strokes)
- Stronger association of MwA and ischemic vs hemorrhagic stroke
- Migraine with aura increased risk 2.4x
- Estrogen HRT 30% more likely to have stroke b/c increased risk of clot
  - If HRT worsens migraine, 30% more likely to have stroke but risk very small to start (2.5%)
- Multiple risk factors highly problematic
  - must manage other RF: smoking, HTN, DM, cholesterol, sedentary lifestyle
  - screen migraineurs for CVD risks – even if young

Zhang 2017  Lee 2016
Consider other risk factors  BMJ Meta-analysis Schurks 2009

OCP and smoking are biggest risks
Migrainous Infarction  Lee 2016   Zhang 2017

- Rare
- Stroke occurs in immediate proximity to migraine attack
- Symptoms/location of stroke must be consistent with known aura & >60 min
- More in younger women and more in posterior circulation
- Etiology
  - duration and degree of Cortical Spreading Depression
  - ? vasospam/vascular, inflammatory, endothelial structure
  - underlying hypercoaguuble state
  - medications used to treat migraine attack - vasoconstrictive
  - Cerebral autosomal dominant arteriopathy w subcortical infarcts & leukoencephalopathy
    CADASIL
  - PFO
  - OCP
• PFO is common occurring in about 1 in 4 people (about same as ♀ migraine)
• it is impossible to determine with certainty whether PFOs caused stroke/TIA
• the effectiveness of PFO closure to reduce stroke risk remains uncertain
• procedure associated with uncommon, yet potentially serious, complications

• Clinicians should not routinely offer PFO closure for patients with cryptogenic ischemic stroke outside of a research study

• Antiplatelet therapy is sufficient over anticoagulation in most circumstances
OCP and Migraine

- Over 3 million Canadian women with migraine
- Afflicted in peak productive years
- Issue of OCP will arise
  - adolescent through post-menopausal woman
- OCP is one of most commonly prescribed drugs
- Both OCP and migraine independently increase risk of stroke
Case – Oral Contraceptive Pill

- 26 year old woman
- OCP concerns
- Severe migraines 6x/month

- Can she go on/stay on pill?

- What if she has aura?
Migraine and Estrogen

International Headache Society Task Force on Combined Oral Contraceptives and HRT

- estrogen use in a migraineur is safe provided:
  - no other risk factors for arterial/vascular disease
  - migraine is without aura or simple, predictable aura
  - use lowest effective dose
  - if symptoms change while on estrogen, d/c therapy

Cephalalgia 2000, Contraception 2016
OCP and Migraine

- generally migraine remains stable
- use lowest effective dose (10ug or less)
- use monophasic pills
- ask about risk factors -? miscarriage
- cautious use in migraine with simple aura
- avoid OCP in migraine with >simple aura or new onset aura, or change in aura
- not if smoker!
OCP Case

- 24 year old - hx migraine without aura
- started on OCP for birth control
- developed new onset aura with anomic aphasia and tingling right arm and leg, lasting 30-40 min
  - referred to neurology
  - what now?
- exam normal; MRI and bloodwork ordered
- neurologist recommended stopping OCP to evaluate
- patient felt safe to continue
  - left MCA infarct
  - found to have ACLA
Managing Migraine in Patient with Stroke

- Migraine patients may experience a stroke
- General principles in migraineur without a stroke
  - Detailed past history – risk factors
  - Hypercoaguability in family? Childhood adversity?
  - Limit triptans >age 50, use with caution over age 55
  - New drugs in 2018 lasmitidan and CGRP blockers – no CVD risk
- Migraineur with stroke
  - Strict management of RF
  - No triptans, ergotamines
  - Consider prevention agents at lower frequency to limit migraine attacks
    - ACE inhibitors; case studies with statin and vitamin D
Key Points in Migraineurs

- Migraine with aura carries increased risk of stroke in women <45 yr
- Encourage healthy lifestyle
- Monitor risk factors
- Explore childhood trauma as risk factor
- Absolutely no smoking/help patient quit if she desires OCP
- Avoid OCP except M w/o aura or M with SIMPLE aura
- No chiropractic neck manipulation
- Migraine prevention should be offered if 4 or > HA/month
- Consider RF when choosing therapy