Stroke in Asians and Blacks

Lauren H. Sansing, MD, MSTR
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Presenter Disclosure Information

Lauren H. Sansing, MD, MSTR
Stroke in Asians and Blacks

FINANCIAL DISCLOSURE:
None

UNLABELED/UNAPPROVED USES DISCLOSURE:
None
Rationale

• Differences in epidemiology, risk factors, and stroke subtypes
• Potential differences in responses to treatment
• Knowledge of these differences can
  – Prevent missing the correct etiology
  – Lead to most effective treatment
  – Aid in design of clinical trials to improve our care
Risk of Stroke in Blacks

• Blacks < 75 yo have 2x risk of stroke death
  – Driven by higher incidence (not case fatality)
• Higher prevalence of risk factors:
  – Diabetes, hypertension, renal failure
• Less access to specialists
• Lower tPA rates in blacks
  – 1195 AIS pts at 42 medical centers
  – Blacks 1/5 as likely to receive tPA!

Mortality in Ischemic Stroke

• Conflicting data on early mortality rates among black and white patients
• Blacks less likely to receive tPA and have less access to specialized care
• In cohort study of 23,659 pts hospitalized for stroke in NY:
  – Blacks had lower in-hospital mortality: 5 vs 7.4%
  – Lower all-cause mortality at 30 d: 6.1 vs 11.4%
  – Higher rates of life-sustaining interventions
  – Lower rates of hospice admission
  – Limited by lack of stroke severity and QOL measures

Disparities in Access to Care

- Among stroke survivors!
- Greater recurrent stroke risk
- U.S. blacks > 65 yo
  - Higher rate of no generalist f/u: 12% vs 8%
  - Inability to afford medications: 11% vs 6%
  - No specialist visit: 49% vs 40%
  - Differences persisted after adjustment for income, education

Rx for Risk reduction

• Hypertension:
  – Combination therapy: CCBs/ACE-I or thiazide diuretic/ACE-I

• Antiplatelet:
  – Subgroup of TASS (ticlodipine aspirin stroke study) found 24% RRR in ticlid arm among nonwhites
  – AAASPS: African-American Antiplatelet Stroke Prevention Study-
    • RCT ticlid vs aspirin in noncardioembolic strokes
    • No difference in outcomes

Gorelick et al. JAMA;289:2947-57.
Case

- 49 Black M presents with L numbness and weakness x 45 minutes
- Hx HTN, IDDM, nonsmoker, not obese
Intracranial atherosclerosis

• Nonwhites: OR for intracranial athero 4.4, after adjusting for age, education, IDDM, hyperlipidemia

• Intracranial athero confers high stroke recurrence rate: 22% in 1 yr for >50% stenosis (WASID)

• Aggressive med therapy warranted
  – Antiplatelets, statins, BP control, glycemic control, lifestyle modifications
  – No benefit for warfarin or stenting

Case

• A 15 yo AAF presents with large MCA infarct. MRA shows proximal L MCA occlusion and severe stenosis in R ICA. CBC shows wbc 9, Hb 8, plts 330.
What’s the diagnosis?
What’s the diagnosis?

SICKLE CELL DISEASE
Sickle Cell Disease

• Autosomal recessive, point mutation in β-globin on chromosome 11
• Abnormal Hb protein results in polymerization of hemoglobin under low O2 tension \(\rightarrow\) sickle-shaped rbcs
• Severe hemolytic anemia, released Hb depletes NO
• Risk of stroke 11% by age 20 in HbSS pts
• Usually blockage of intracranial ICA and MCA
Peripheral smear in SCD
STOP TRIAL

• Ages 2-16, HbSS or HbSβ^0, no hx stroke, not getting transfusions
• TCD screening – 2 studies with ICA or MCA > 200 → randomized to transfusion therapy versus standard therapy
• No hydroxyurea or other antisickling agents
• Transfusions to HbS < 30% total Hb (mean interval 1 month)
• Stroke rate 10% vs. < 1% - studied halted early

STOP2

• What about high-risk kids, treated with transfusions for 2 yrs or more, and now have nl TCDs?
  – Transfusions have risks- iron overload, infections, etc
• Ages 5-20, 2 nl TCDs while still getting transfusions
  Randomized to cont. transfusions or not.
• Halted early- 16 / 79 pts (all off transfusion) had either stroke or reversion to high velocities on TCDs- median time 3.2 mos
• Most need iron chelator therapy

TCD Criteria in Sickle Cell Disease

![Graph showing probability of remaining stroke free over time for different velocities: <170 cm/s, 170-199 cm/s, ≥200 cm/s.](Verduzco. Blood 114(25):5117, 2009)
Hydroxyurea?

- Cohort of pts at Duke
  - 59 children with nl TCDs and 15 with “conditional” TCD velocities (170-200) plus 6 kids with veloc > 200 whose families refused transfusion
  - Given hydroxyurea for pain crises, acute chest, etc
  - Significant reduction in TCD velocities
- Multicenter, controlled trial pending
- Current recs chronic transfusion therapy with chelation
  - $400,000 per patient for a decade

Case

• 64 AAM presents with sudden headache and flaccid R hemiparesis

• BP 225/118
Intracerebral hemorrhage
ICH Relative Risk (by Race)


Switching gears...

• Special considerations in Asians
Stroke etiology in Asians

• Higher burden of cerebrovascular disease
  – Stroke 3x more common than CAD

• Higher rates of ICH

<table>
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<tr>
<th>Study year</th>
<th>Population</th>
<th>CI (%)</th>
<th>ICH (%)</th>
<th>SAH (%)</th>
<th>UND (%)</th>
<th>CT (%)</th>
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<td>Zhang 2003</td>
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<td>0.1-4</td>
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</tbody>
</table>

CI=cerebral infarction, ICH=intracerebral haemorrhage, SAH=subarachnoid haemorrhage, UND=undefined. *Data given as total haemorrhagic strokes (ICH and SAH combined).

Antiplatelet therapy

- Cilastazol (phosphodiesterase 3 inhibitor)
  - Antiplatelet and vasodilator
  - Lower rates of ICH than aspirin
- Cochrane meta-analysis of 3400 Asian pts with TIA or stroke
  - Cilastazol RR 0.72 (95% CI 0.57 to 0.91) for all strokes
  - RR 0.26 (95% CI 0.13 to 0.55) for ICH

Kamal et al. Cochrane Database of Systematic Reviews 2011, 1.
BP control

- HTN strongest risk factor for AIS and ICH in Asians
- Asians have higher salt intake and HTN more likely to be salt-sensitive
- CCBS (esp amlodipine) → superior BP reduction and stroke prevention in Asians compared to other classes of BP meds
- Scientific statement from Asian Pacific Heart Association

Case

• 27 Korean F presents with recurrent brief episodes aphasia and R weakness

• History of stroke at age 13- L weakness, fully recovered
What’s the diagnosis?

MOYA-MOYA DISEASE
Moya-Moya Disease

- Acquired Intracranial Vasculopathy
- Progressive occlusion of terminal ICAs & proximal MCA/ACA
- Network of small collateral vessels form
  - Ischemic Stroke
  - Hemorrhage (aneurysm)
  - Epilepsy
- 2 age peaks
  - Most common 10-14yo
  - Smaller peak 40-50yo
Moya-Moya Disease

- Cause is unknown
- Familial occurrence in 10-15% of cases
- High incidence in Japanese and Asian populations
  - 0.35-0.94 per 100,000 incidence in Japan
  - 0.086 per 100,000 incidence in US
    - 0.28 per 100,000 in Asian Americans
    - RR 4 in Asian-Americans compared to Caucasian Americans
Pathophysiology

- Fibrocellular thickening of intima
- Undulation of the elastic lamina
- Attenuated media
- Microaneurysms
Moya-Moya Disease

Diagnostic criteria:

• Stenosis or occlusion at the terminal portion of the ICA and at the proximal ACA and MCA on MRA
• Abnl vessels in basal ganglia on MRA
• Bilateral angiographic findings
• Exclude: arteriosclerosis, autoimmune disease, tumor, cranial irradiation, down’s syndrome, head trauma, NF, meningitis
Moya-Moya Syndrome
Causes & Associations

• **Idiopathic**
  – (Moya-Moya Disease)

• **Inherited**
  – NF & TS
  – Turner & Down syndrome
  – Retinitis pigmentosa
  – Sickle-cell disease

• **Infectious**
  – Meningitis (anaerobic, TB)
  – Tonsillitis, Pharyngitis
  – EBV
  – Propionibacterium acne

• **Autoimmune**
  – SLE
  – Sjogren syndrome
  – PAN
  – Kawasaki disease

• **Others**
  – OCP
  – Tobacco & EtOH use
  – Craniocerebral trauma
  – Parasellar neoplasm
  – Atherosclerosis
  – Arterial dissection
  – FMD
  – XRT
Symptoms

- Recurrent TIAs
- Infarcts – mostly small, subcortical, watershed & frontal lobe
- Vascular dementia
- Movement disorders (hemichorea)
- Seizures
- Hemorrhage
- Poor prognosis w/ progressive disease
Hemorrhagic Moya-moya

• More common presentation in adults
• Risk increases > 45 y
• High rate of rebleeding
• 61% have recurrent hemorrhages

*Neurosurgery 2003; 52: 1049*
Treatment

• Search for and treat causative disorder
• Antiplatelets (no ICH)
• Avoid anticoagulants
• Surgical Procedures
  – Recurrent ischemia or dementia
  – Direct Bypass
    • STA-MCA anastamosis
  – Indirect Bypass
    • Encephaloduroarteriosynangiosis
  – Combined approaches
Moya-Moya

Systematic review of 55 studies/1156 kids w/ revascularization

• Symptomatic benefit in 87%
• Perioperative stroke rate of 4.4%
• 73% got indirect revascularization, 23% combined approach
  – No significant difference between groups
Thanks! Questions?