Stroke Risk Heavy Hitters: Atrial Fibrillation and Hypertension

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Disclosures

No disclosures
Stroke Statistics

Stroke is the fifth leading cause of death and the leading cause of disability in adults in the United States.

Almost 800,000 people each year have a stroke – roughly the same number of people who have a heart attack. That is about one person every 40 seconds.

Impact on Society and Economy
• $33.9 billion annually, in health care costs
• Loss of productivity
  – 2006-2010 rates not decreasing in younger populations (<65yrs) as they did for >65 yrs (Younger age of stroke = greater amount of time with disability)
Disease Statistics

7.2 million Americans living with stroke (2.7% population)
• ~10% of all strokes 18 to 50 years
• 17% Stroke patients >85 years

Two types
Ischemic *clot, blockage* (87%)
Hemorrhagic *bleeding* (13%)
Stroke Recognition

**F**ACE  
drooping or numb?  
**A**RMS  
weak or numb?  
**S**PEECH  
slurred or jumbled?  
**T**IME  
to call 911!  
Act FAST.  
**+E D**

**Signs/symptoms:**
- Weakness or numbness, on one side of the body
- Difficulty speaking
- Sudden changes in eyesight
- Sudden dizziness, loss of balance
- Sudden, severe headache

- Time to call 9-1-1;
  - take note of time when patient was last normal, when stroke symptoms started (if witnessed)
Stroke Treatment

Time = brain

• An average of 2 million brain cells die per minute during a stroke
• Emergency treatment is to restore blood flow
  ➢ Act as quickly as possible to lose the smallest number of brain cells
  ➢ Available for a limited amount of time

• Thrombolytic therapy (Clot-busting medication)
  ➢ Available up to 4.5 hours from the stroke onset
• Endovascular therapy (Catheter in vessel to remove clot)
  ➢ Available up to at least 6 hours from the stroke onset, up to 24 hours for some patients

80% of strokes are considered preventable, with risk factor control
Stroke Risk Factors

• **Non-Modifiable**
  – Prior stroke, TIA or heart attack; Family history of stroke; Age; Race; Gender

• **Modifiable – Lifestyle**
  – Smoking; Obesity; Unhealthy Diet; Lack of exercise

• **Modifiable – Disease**
  – **Hypertension**
  – **Atrial fibrillation**
  – Diabetes
  – **High Cholesterol**
  – Others
    • Heart Disease
    • Carotid Artery Disease
    • Peripheral Artery Disease
    • Sickle Cell Disease
    • Obstructive Sleep Apnea

To reduce your risk for stroke, follow Life’s Simple 7™:
Hypertension (HTN)

• High Blood Pressure – Primary or Essential, Hypertension
  – Complex, multifactorial. Altered homeostasis via various mechanisms
    • Vasomotion, fluid balance, sympathetic nervous system, prostaglandins

• Silent Killer
  – Often, no obvious symptoms

• HTN increases risk of cardiovascular disease
  – ↑20mm Hg SBP or 10m Hg DBP doubles risk of death from stroke, heart disease, or other vascular disease
  – 25% of the cardiovascular events (CHD, coronary revascularization, stroke, or HF) were related to HTN, in one large, population-level study
Hypertension Statistics

- New Guidelines 11/2017
- Prevalence
  - 46% (130/80)
  - 32% (140/90),
    - 2011 age-adjusted prevalence of hypertension among US adults ≥20 years of age = 34.0%, so 85.7 million adults*
  - Increases with:
    - Age
    - African American ethnicity
  - Lifetime risk very high
- Awareness
  - (2013-2014) 15.9% of US adults with hypertension are unaware they have it*

* prevalence numbers established using previous HTN definition guidelines, i.e. 140/90
Risk Factors

Modifiable

- Smoking
- Obesity
- Dyslipidemia
- Diabetes
- Physical Inactivity
- Unhealthy Diet

Difficult to change or Non-Modifiable

- Male
- Increased Age
- Family History
- Chronic Kidney Disease
- Obstructive Sleep Apnea
- Lower socioeconomic status
- Lower educational status
- Psychosocial stress

Multiple risk factors common; ≥3 risk factors present in 17% of patients
↑ risk factors = ↑ risk for cardiovascular events, stroke and death from CV events
HTN and Stroke Statistics

- 70% of acute stroke patients have hypertension
- Higher SBP explains \( \approx 50\% \) of the excess stroke risk among blacks compared with whites
- Associated with increased risk for all types:
  - Ischemic
  - Subarachnoid Hemorrhage
  - Intracerebral Hemorrhage (highest)
Hypertension and Stroke

**Small Artery Stroke**
- Lipohyalinosis
  - Build-up of fatty hyaline matter
    - Vessel wall thickening
    - Thrombosis

**Large Artery Stroke**
- Atherosclerosis
  - Vessel wall injury/stress
    - Reaction
    - Stenosis, Plaque
    - Embolus, thrombus

**Hemorrhagic Stroke**
- Artery rupture
  - ICH
    - Build-up of fatty hyaline matter
    - Vessel wall thickening
  - SAH
    - Aneurysm/AVM form
      - Hemodynamic forces within lesion weaken wall
      - Rupture
Screening

- **Diagnosis**
  - Average of ≥2 readings taken on ≥2 visits
  - New Stage 1: 130/80

### Blood Pressure Categories

<table>
<thead>
<tr>
<th>Blood Pressure Category</th>
<th>Systolic mm Hg (upper number)</th>
<th>Diastolic mm Hg (lower number)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Normal</strong></td>
<td>LESS THAN 120</td>
<td>LESS THAN 80</td>
</tr>
<tr>
<td><strong>Elevated</strong></td>
<td>120 – 129</td>
<td>LESS THAN 80</td>
</tr>
<tr>
<td><strong>High Blood Pressure (Hypertension) Stage 1</strong></td>
<td>130 – 139</td>
<td>80 – 89</td>
</tr>
<tr>
<td><strong>High Blood Pressure (Hypertension) Stage 2</strong></td>
<td>140 OR HIGHER</td>
<td>90 OR HIGHER</td>
</tr>
<tr>
<td><strong>Hypertensive Crisis</strong></td>
<td>HIGHER THAN 180</td>
<td>HIGHER THAN 120</td>
</tr>
</tbody>
</table>
Diagnosis

• Measurement (office and self/home)
  – Steps for performing accurate measurements
    • Sit still, relax, 5 minutes prior to measure, no talking during rest or measurement
    • No caffeine, smoking, or exercise 30 min prior. No full bladder.
    • Sit in chair (not exam table), feet on floor, legs uncrossed, limb supported
    • Sleeve off, Middle of cuff at heart level, correct size (bladder 80% of arm)
    • Repeated measurements 1-2 min apart
    • If auscultatory readings: radial pulse obliteration first, deflate slowly (2mm/sec) – If BP measurement device: calibrate periodically

• Out of office measurements are recommended to confirm diagnosis, titrate meds, and telehealth
  – Home BP vs Ambulatory BP

• Masked and White Coat Hypertension
Diagnosis

- Screen for Secondary Hypertension
- Screening for other CVDs risk factors
- Screen for target organ damage
- ASCVD Risk - ACC/AHA Pooled Cohort Equations (http://tools.acc.org/ASCVD-Risk-Estimator/)
HTN treatment

- Lifestyle changes and Pharmacological

- Characteristics of initiatives with substantial improvement in BP control
  - Structured, goal-oriented BP treatment
  - Feedback
  - Include provision of free medication
HTN treatment

• Lifestyle changes (non-pharmacological)
  – Diet
    • DASH (Dietary Approaches to Stop Hypertension)
      – high in fruits, vegetables, whole grains and low-fat dairy products
    • Sodium reduction/Potassium supplementation
  – Physical activity
    • Structured exercise program
  – Weight management
    • ↓ 1mm Hg for each Kg lost
  – Smoking cessation
  – Reduce alcohol consumption (for excessive drinkers)
HTN treatment

• Pharmacological –
  – Primary prevention (prevent recurrent CHD, congestive HF, and stroke) ≥130/80
  – Secondary prevention
    • 10-yr ASCVD risk ≥ 10% & ≥ 130/80 (Stage 1)
    • 10-yr ASCVD risk < 10% & ≥ 140/90 (Stage 2)
  – Then reassess in a month, and consider intensifying if goal is not met. Follow-up monthly until control achieved

Primary Agents:
• Thiazide diuretics
• ARBS
• ACE-Is
• CCBs

Secondary Agents:
• Other diuretics
• Beta-Blockers
• Direct Renin Inhibitor
• Alpha-blockers
• Central Alpha agonists
• Vasodilators

– Goal: ≤ 130/80
HTN treatment

• Co-morbids
  – Cerebrovascular disease - STROKE
  – Heart Failure
  – Chronic Kidney Disease
  – Ischemic Heart Disease
  – Peripheral Arterial Disease
  – Diabetes
  – Others, including Atrial Fibrillation
Special Populations

• African Americans
• Older Adults
Achieving Control and Adherence

- Shared Decision-Making
- Home BP monitoring
- Telehealth

- Daily dosing when possible
- Combination pills when available

- Open, blame-free environment
- Use adherence assessment tools
Community Education / Outreach

• Screening of BP, using accurate methods
  – Provide results written and verbal, with guidance for follow-up

• Education
  – Focus on lack of symptoms until target organ damage
  – Pathophysiology, effects/risks of HTN

• Address health literacy and barriers
Atrial Fibrillation (AF)

- An irregular beat (quivering) of the upper chambers (atria) of the heart
- Symptoms
  - Fatigue
  - Palpitations (feeling flutters in chest, awareness of heart beat)
  - Shortness of breath
  - Hypotension (low BP)
  - Syncope (passing out)
  - OR no symptoms at all
- Triggers and Maintenance
  - What causes AF? What causes it to persist?
  - Risk factors: Age, HTN, DM, CAD, MI, HF, CABG, Valvular heart disease, obesity, lack of exercise, EtOH, sleep apnea, smoking, hyperthyroidism, European ancestry, family history

Check out the video on the American Heart Association to see what it looks like: www.watchlearnlive.heart.org

AF stats/impact

- ~2.7-6.1 million Americans living with Afib (2010 data), this is expected to rise (12.1 million by 2030)
- Lifetime risk 21% white male, 17% white females, 11% African Americans (by age 80)
- White males vs females, incidence
  - Age 15-44: 20.6/100,000 vs 6.6/100,000
  - Age > 85: 1077.4/100,000 vs 1203.7/100,000
- Snapshot of Medicare patients in 2007
  - ≈55% were females,
  - 91% were white,
  - 84% had hypertension,
  - 36% had HF,
  - 30% had cerebrovascular disease
- Cost – $26 billion/year (2008 estimate)
AF and stroke

• Patho
  – Formation of atrial thrombi, often in LAA (left atrial appendage)

• Cryptogenic stroke
  – Up to 33% strokes annually classified as cryptogenic (we aren’t sure what caused them)

• Increases risk of stroke 4-5 times (400%-500%)
  – In non-anticoagulated populations
Diagnosis

• Screening & Diagnosis
  – Systematic pulse assessment during routine clinic visits
  – 12-lead ECG in those with an irregular pulse
  – 2D Echo
  – Serum electrolytes and of thyroid, renal, and hepatic function, CBC
    • Rhythm monitoring
    • TEE, Electrophysiology study

Often progresses over time. The more time spent in AF, more likely to stay in AF

• Classifications
  – Paroxysmal (<7d, may recur)
  – Persistent (sustained > 7d)
  – Permanent (decision to stop attempts to restore NSR)
  – Non-valvular (no MR, stenosis, repair, or heart valve)
Treatment

Thromboembolic risk treatment
Rate Control
Rhythm Control
Treatment – Medications

Medications:

• Depend on shared decision-making and risk stratification
  – HAS-BLED, CHA$_2$DS$_2$-VASc

• Comorbidbs
  – HF, Kidney disease
  – Valvular disease
**CHA\textsubscript{2}DS\textsubscript{2}-VASc**

- **Risk Stratification**

<table>
<thead>
<tr>
<th>Age</th>
<th>&lt;65 0</th>
<th>65-74 +1</th>
<th>≥75 +2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male 0</td>
<td>Female +1</td>
<td></td>
</tr>
<tr>
<td>CHF history</td>
<td>No 0</td>
<td>Yes +1</td>
<td></td>
</tr>
<tr>
<td>Hypertension history</td>
<td>No 0</td>
<td>Yes +1</td>
<td></td>
</tr>
<tr>
<td>Stroke / TIA / Thromboembolism history</td>
<td>No 0</td>
<td>Yes +2</td>
<td></td>
</tr>
<tr>
<td>Vascular disease history</td>
<td>No 0</td>
<td>Yes +1</td>
<td></td>
</tr>
<tr>
<td>Diabetes history</td>
<td>No 0</td>
<td>Yes +1</td>
<td></td>
</tr>
</tbody>
</table>

E.g. **4 points** for a 67 yo female with diabetes and HTN, no hx stroke, CHF, or vascular disease

This tells you that:
Stroke risk was 4.8% per year in >90,000 patients (the Swedish Atrial Fibrillation Cohort Study) and 6.7% risk of stroke/TIA/systemic embolism.

0: low risk
- ✓ no anticoag

1: low-moderate risk -
- ✓ consider antiplatelet or anticoagulation

≥2: moderate-high risk
- ✓ anticoagulation candidate
Treatment – Medications, cont’d

Antithrombotics / anticoagulants

• Aspirin and Antiplatelets
• Warfarin
• NOACs (Novel Oral Anticoagulants)
  – Factor Xa or Direct Thrombin Inhibitors
Shared Decision-Making

- The selection of an antithrombotic agent should be based on shared decision making that takes into account risk factors, cost, tolerability, and patient preferences
- Reevaluation at periodic intervals is recommended
Treatment – Medications, cont’d

**Rate Control**
- Resting HR <80 goal
  - Lenient rate <110 bpm is asymptomatic and LV systolic function is OK
- Beta blocker or calcium channel antagonist (verapamil, Diltiazem, not in decomp HF)

**Rhythm control**
Antiarrhythmics
- Amiodarone (when other measures are unsuccessful or contraindicated)
- Dronedarone (not for permanent AF)
- Dofetilide
- Flecainide
- Propafenone
- Sotalol

Not to continue once AF becomes permanent

**Upstream Therapy**
- ACE or ARB for new onset AF in HF
- ACE or ARB for prevention of AF in HTN
- Statin for prevention of new onset AF after CABG
Treatment – Procedures

• DC Cardioversion
  – Hemodynamically unstable patients
  – First line to restore sinus rhythm

• MAZE
  – Cardiac surgery patients and minimally invasive

• AF Catheter Ablation
  – When meds inadequate to control

• LAA Occlusion/Excision
  – Cardiac surgery patients

• WATCHMAN
Special Populations

• Women
Community Education / Outreach

• Screening for AF
• Education
  – Pathophysiology, effects/risks of AF
• Address health literacy and barriers
Summary

• Stroke – ALWAYS TEACH S/S and call 9-1-1
  
  **FACE**
  Drooping or numb?

  **ARMS**
  Weak or numb?

  **SPEECH**
  Slurred or jumbled?

  **TIME**
  To call 911!
  Act FAST.

  + **E D**

• Time is brain - Treatment is time limited

• Prevention IS KEY
Summary

- **AF & Stroke**
  - Increases the risk of stroke 400-500%
  - Atrial emboli

- **HTN & Stroke**
  - Most common risk factor for stroke
  - Impacts blood vessel health
  - New, lower threshold for dx – 130/80mm Hg
Summary

• Afib treatment
  – Rate, Rhythm Control
  – Thromboembolic risk treatment
  – Restoration sinus rhythm
  – Symptom management – catheter and surgical
  – Consider co-morbids
  – Performance measures
Summary

• HTN treatment
  – Clearly identified goals – together with patient
  – Include non-pharmacological interventions
    • Detailed plans, suggestions for lifestyle changes
  – Special population needs and co-morbidities taken into account
  – Team-based care & follow-up
  – Performance measures
  – Financial incentives

Flowchart for HTN management
Summary

• Resources to consider
  – Health insurance and medication plan assistance
  – Social and community services
  – Family members, friends, caregiver - in communicating with patient as appropriate
  – Social media, smartphone/mobile technology
  – EHR and telehealth monitoring
Resources

• American Heart Association
  – www.heart.org/HBP
  – www.watchlearnlive.heart.org

• American Stroke Association

• www.myafibexperience.org
High blood pressure equals higher risk of stroke.

**NORMAL BLOOD PRESSURE IS BELOW**

120/80

**80% of strokes can be prevented.**

**STROKE HAPPENS WHEN A CLOT OR RUPTURE INTERRUPTS BLOOD FLOW TO THE BRAIN. WITHOUT OXYGEN-RICH BLOOD, BRAIN CELLS DIE.**

Nearly 1 in 6 American adults with high blood pressure **DON'T KNOW.**

**Have your blood pressure checked and keep it in check to**

**REDUCE your RISK OF STROKE.**

**DID YOU KNOW?**

86% of patients think they know the definition of a stroke... but only 1 in 6 actually do.

At age 60, people without high blood pressure have a life expectancy 5 years longer than people with high blood pressure.

15% to 20% of all strokes are attributable to atrial fibrillation.

**WHAT ATRIAL FIBRILLATION PATIENTS ARE THINKING ABOUT STROKES:**

- 25%
- 25%
- 50%

**WHAT ATRIAL FIBRILLATION PATIENTS SAY THEIR GREATEST HEALTH CONCERN IS:**

- 42%
- 8%

**What can you do?**

- Take an active role in your health. Do this by having regular checkups with your healthcare professional.
- Work together to identify heart issues and stroke risk factors. If you are at risk, it is critical that you follow the treatment plan prescribed by your doctor.

**Fight the “silent killer.” Check your blood pressure.**

#CheckIt Check. Align. Context.
Other ASA resources

• Multicultural toolkit

F.A.S.T. Song - Stroke Signs: featuring Dee-1 & Tha Hip Hop...

• GWTG - Stroke
References