Women and Stroke

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Disclosures

- "I have no relevant commercial relationships to disclose."

Topics for Discussion

- Incidence of stroke in women
- Overview of Stroke Pathophysiology
- Risk Factors unique to women
- Signs and symptoms of stroke unique to women
- Treatment of stroke in women
- Stroke prevention in women
- Stroke outcomes in women
Stroke

- Stroke is the loss of brain function due to a disturbance in the blood supply to the brain.
- This disturbance is due to either ischemia or hemorrhage.
Incidence of Stroke

- Relative stroke deaths declined by 35.1% over the past 10 years, total decline of 21.2%
- Every 40 seconds, someone in the United States has a stroke
- Approximately 795,000 experience a new or recurrent stroke
  - 610,000 (new) 185,000 (recurrent stroke events)
- Stroke accounts for 1/20 deaths in the United States.
  - Average one death from stroke every 4 minutes

Incidence of Stroke in Women

- 3.8 million stroke death yearly are women
- More than 53.5% of the estimated 795,000 new strokes in US occur in women
- 55,000 more strokes occur in women than men
- 5th leading cause death for men
- 4th leading cause of death for women 20-59 and 2nd leading cause of death women age > 60
Incidence of Stroke in Women Cont.

- Incidence of institutionalization is greater for women after stroke than men
- Ischemic stroke incidence higher after age 85
- SAH incidence related to aneurysmal rupture higher in women > 55
- ICH lower in women than men
- 60% of deaths from strokes are in women as opposed to men

Mozaffarian, Benjamin, Go, et al, 2015

Fact to Consider

- Stroke kills twice as many women as breast cancer every year
  - In 2011, stroke was the cause of death in 398,035 females.
    - Females represented 51.0% of deaths from CVD.

American Cancer Society, 2015
Mozaffarian, Benjamin, Go, et al, 2015

Women and Stroke

- Women have increased longevity compared to men
  - Relative risk of stroke in ages 55-75
    - Women 20%
    - Men 17%
  - Women more likely to be widowed and live alone before stroke
  - Institutionalized post stroke
Notable Trends in Women and Stroke

- Women have more stroke events than men
- Non-Traditional symptoms
- Less overall aggressive stroke care
- Increased life expectancy
- Increased incidence of Atrial Fibrillation and Hypertension

Gender Differences in Stroke


- Sample: 2318 Women and 2274 Men
  - Women older: Mean age 78 vs. 73.2
  - %> 85 women: 28.4% vs. 15.5%
  - MRI performed: 33.8% men vs. 29.6% women
  - Lacunar infarcts: men 21.5% vs. 12.2%
  - Cardioembolic infarcts: women 26% vs. 15.6%
  - Rate of overall complications: women > 31.5% vs. 26.1%
  - In hospital deaths: women 13.5% vs. 10.8%
  - > 12 days hospitalization: 44.9% vs. 39%
  - Symptom free at discharge: men favorable 11.8% vs. 13.9%
  - Transfer to nursing home vs. rehab: Women 13.2% vs. 9.5%
Risk Factors Parallel in Men and Women

- Sedentary lifestyle
- Obesity
- Age
- Prior Cardiovascular Disease
- Smoking
- Metabolic Syndrome

Bushnell and McCullough, 2014

Risk Factors More Prevalent in Women

- Migraine headaches with aura
- Atrial fibrillation
- Diabetes
- Hypertension
- Depression
- Psychological stress

Bushnell & McCullough, 2014
Baptist Health South Florida
Sex Explicit Risk Factors

- Pregnancy
  - Preeclampsia
  - Gestational diabetes
- Hormonal Use
  - Oral Contraceptive
  - Postmenopausal hormonal replacement therapy

Bushnell & McCullough, 2014

Gender Differences in Ischemic Stroke

Atrial Fibrillation(Afib)

- Atrial Fibrillation higher in >85 women (1,203.7 per 100,000 persons) than in men (1,077.4 per 100,000 persons)
- Women with Afib have a moderately increased risk for embolic strokes
- Greater thromboembolic risk when not on anticoagulation
- Increased incidence with DM, HTN and CHF
Atrial Fibrillation and Women


- Evaluate clinical and functional outcome of atrial fibrillation in women and men. Study concluded:
  - Women more symptomatic, less functional, had worse quality of life outcome despite less persistent Afib
  - Women more likely to undergo ablation
  - Women experience higher risk of stroke or systemic type embolism
  - Higher adjusted survival and lower risk cardiac death

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Atrial Fibrillation and Women Stroke Risk

  - Prospective observational study, evaluated the risk factors for Afib in postmenopausal women and measure the population burden of modifiable risk factors
  - Rates of Afib sig increased with age, higher for women with CHD rate of afib was relatively 2.8% with CHD and 4.9% with CHD
  - 42.4% had history of HTN
  - Diabetes
  - Heart failure strongest independent predictor
  - Developed Afib 1.02% per year

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Stroke in Women and Diabetes

  - Estimate comparative sex difference that exists for the risk of diabetes related to stroke.
  - Results
    - After adjustment, the relative risk of stroke associated with diabetes was 2.28 (95% CI [1.93–2.69]) for women and 1.83 (1.60–2.08) for men, and the ratio of relative risks between women and men with diabetes was 1.27 (1.10–1.46).
  - Conclusion: The risk of stroke in women with diabetes is significantly higher than that of men with diabetes independent of other.

Migraine Incidence

- 18% of American women, 6% of men, and 10% of children experience migraines
- Common between the ages of 25 and 55
- Affects approx. 28 million women in the U.S.
- 1 in 4 women will experience migraine in their lives
- Three times as many women than men suffer migraine in their adult lives

Migrainous Infarctions

- Migrainous Infarctions
  - One or more migraine aura symptoms associated with an ischemic brain lesion in the appropriate territory demonstrated by neuroimaging.
    - Migraine with aura similar to previous attacks except one or more aura type symptom last > 60 minutes
    - Infraction present on neuro-imaging
    - Symptoms cannot be explained by any other means
    - The stroke must occur in the area of the brain that can explain the aura symptoms
Migraine and Stroke Risk in Women

- Evaluated migraine headaches and stroke risk in women. This study concluded:
  - Participants who had migraine with aura showed a 1.5 fold increase in the risk of total strokes after adjusting for confounders
  - 1.7 fold increase in the risk of ischemic strokes
  - Women who reported migraine headache in the last year had increased risk for ischemic strokes
  - Increase in stroke was more prominent in women < 55 years

Contraception

- Increases the risk of stroke from 1.4-to 2.0-folds in young women
- Low absolute risk
- Risk increases with
  - Smoking
  - HTN
  - Hyperlipidemia
  - DM

Menopause/Hormone Replacement Therapy

  - Combined hormone replacement therapy was associated with statistically significant in the risk of stroke when compared with placebo (RR, 1.25; 95% CI: 1.04-1.05; P= 0.01)
  - Estrogen therapy alone on stroke: Out of 12847 participants 423 had stroke events related to estrogen therapy. Showing that estrogen therapy increased stroke risk by 27% when compared with placebo (RR, 1.27; 95% CI: 1.06-1.53 P= 0.01)
Depression and Psychological Stress


- Evaluated association with depression and stroke among middle aged women.
  - >2 fold greater odd of stroke (OR, 241; 95% CI, 1.78-327).
  - Strong association in middle aged women

Pregnancy

- Stroke risk increases significantly with pregnancy
  - Natural changes in the body increases stress on the heart
  - High blood pressure
    - Preeclampsia and eclampsia higher risk for coronary heart disease and stroke later in life
    - High blood pressure during pregnancy associated increased risk morbidity and mortality due to vascular disease
    - Increased risk during perinatal period
Stroke and Pregnancy

  - Evaluated the relationship between history of HTN during pregnancy and development of CHD and ischemic and hemorrhagic stroke
  - Treatment for HTN warranted mid 50's 27% with hypertensive pregnancy vs. 10% without
  - Relative risk for CHD event with hypertensive pregnancy 1.25 (95% CI 1.27 to 1.31 non-hypertensive pregnancy)
  - Mortality r/t CHD 1.35 (95% CI 1.29 to 1.42)
  - Ischemic stroke 1.29 (95% CI 1.23 to 1.35)
  - Hemorrhagic stroke (1.14 [95% CI 1.07 to 1.21]).

Signs and Symptoms

  - Cross sectional survey design to evaluate contemporary knowledge of stroke warning signs and intent to call 911 if warning signs occur, overall and by race and ethnic group, among a nationally represented sample
  - Sudden weakness/numbness of face limb or one side 51%
  - No diff by race or ethnicity
  - Loss of trouble talking or trouble understanding 44% > whites vs. Hispanic women
  - Severe headache 23%, sudden dimness or loss of vision in 1 eye 18%, unexplained dizziness 20%
  - 84% identified to call 911 with stroke symptoms
Stroke Symptoms

- Sudden numbness or weakness of face, arm, or leg (mainly on one side of the body)
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, or loss of balance
- Sudden confusion or trouble talking or understanding speech
- Sudden bad headache with no known cause

Unique Stroke Symptoms in Women

- Sudden face and arm or leg pain
- Sudden hiccups
- Sudden nausea (feeling sick to your stomach)
- Sudden tiredness
- Sudden chest pain
- Sudden shortness of breath (feeling like you can't get enough air)
- Sudden pounding or racing heartbeat
- Loss of consciousness
- Agitation
- Hallucinations
- Sudden change in behavior
- Seizures

Stroke Symptoms Disparities


- Prospectively investigated gender differences in stroke symptoms
  - 51.8% (n=116) reported at least 1 nontraditional stroke/TIA symptom in comparison to 43.9% (n=104)
  - Nontraditional stroke/TIA symptom were 1.37 (95% CI, 0.95–1.98) times greater in women compared with men.
  - Most prevalent nontraditional symptom was mental status change
    - 23.2% of women and 15.2% of men (P=0.03).
Stroke Treatment Disparities

  - Analyzed data from the Promoting Acute Thrombolysis for Ischemic Stroke Study (PRACTISE) to evaluate the treatment difference for men and women with the use of alteplase in acute ischemic stroke.
  - 5515 Patients: 2778 women, 2737 men
  - Age variant: women 4 years older
  - Median NIHSS: 6 for women, 5 for men
  - Fewer women treated with intravenous alteplase (11% vs. 14%; odd ratio, 0.8; 95% CI 0.7-0.9).
  - 27% of women arrived to the ED within 4 hours vs. 33% of men (CI, 0.7-0.9)
  - Door to onset of symptoms was 27 minutes longer for women

Stoke in Women

  - Evaluated sex specific differences in risk factor profile, presentation, thrombolytic rates and performance of the GWTG quality measures
  - Women more likely to have hypertension 67% vs. 63%
  - Women less likely to receive thrombolysis than men (odds ratio, 0.92; 95% CI 0.86-0.99; P=0.02)
  - Longer ER assessment time and less likely to have DTN time < 1hour (odds ratio, 0.83; 95% CI, 0.71-0.97; P=0.02) compared to men
  - Women older more likely to have experienced a prior stroke and have high prevalence of AFIB 19% vs. 16% P<0.0001

Treatment of Stroke in Women

  - Utilized data from the Women’s Health Study and examined the effects of randomized assignment of 100 mg of ASA every other day on functional stroke outcomes after cerebrovascular accident.
  - ASA group had sig lower risk TIA compared to non-ASA group (odds ratio= 0.77; 95% CI, 0.63-0.94
  - ASA group without or with a remote history of smoking showed a significant reduction in TIA (odds ratio = 0.67; 95% CI, 0.48-0.93 for mRS 0-1).
  - Slight increase risk hemorrhagic stroke with ASA slightly higher mRS
  - No significance found in reduction of functional outcomes
10 Strategies for Preventing Stroke in Women

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<th>Recommendation</th>
<th>Class</th>
<th>Level of Evidence</th>
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<td>Women with asymptomatic carotid stenosis should be screened for other stroke risk factors, and appropriate lifestyle changes and medical therapies should be initiated.</td>
<td>I</td>
<td>C</td>
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<tr>
<td>Treatment for women with atrial fibrillation and stroke risk factors is important.</td>
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<td>Anticoagulation therapy with vitamin K antagonists is recommended for women with atrial fibrillation and stroke risk factors.</td>
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Note: Recommendations are based on evidence from clinical studies. Class I indicates that all patients should receive the treatment; Class II indicates that most patients should receive the treatment; Class III indicates that the treatment is not recommended.
Stroke Prevention in Women

- Screen for HTN prior to starting oral contraceptives
- HTN in Preeclampsia should be treated with safe antihypertensive medications
- Migraine with aura should avoid smoking
- Regular exercise moderate physical activity
- Hormone replacement therapy not recommended for primary or secondary prevention of stroke

Bushnell and McCullough, 2014

Stroke Prevention in Women Cont.

- History of preeclampsia should have early assessment of cardiovascular risk and lifestyle modification
- Recommendation for moderate HTN in pregnancy
  - Consider treating blood pressure 150-159 mm Hg systolic and 100-109 mm Hg diastolic
  - American congress of obstetrics and gynecology recommends treatment 160/110

American Heart Association, 2016

Stroke Outcomes for Women

  - Females less likely than men to gain independence with basic ADL 6 months post stroke
  - After three months 13% vs. 28% complete eight of nine IADL completely without assistance. Six months 18% vs. 34%
  - Less likely to score ≥ 90 on SF-36 PF scale 6 months post stroke
Summary

- Women have unique presentation of stroke symptoms
- Women have unique risk factors and treatment challenges
- It is pertinent to continually assess the unique characteristics of this disease in women in order to afford optimal care outcomes
- Plan sex specific interventions

References

References