

Olson Center Brown Bag Luncheon
May 15, 2018

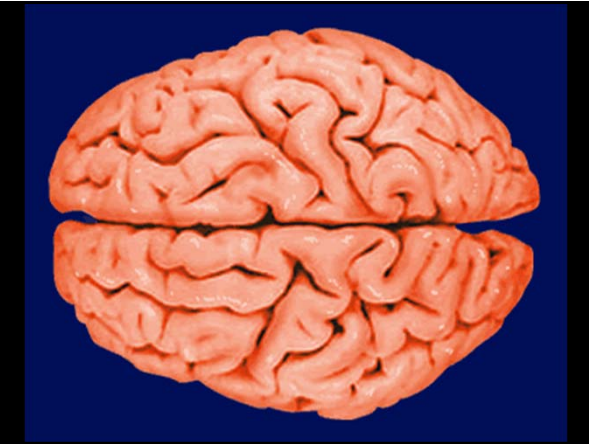
Preventing and Treating Stroke in Women: Why, When and How?

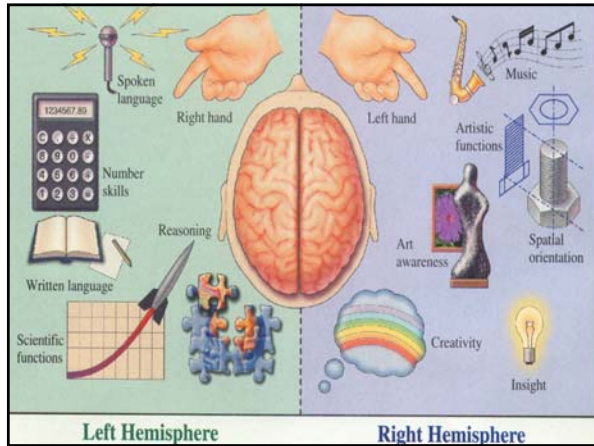
Pierre Fayad, MD

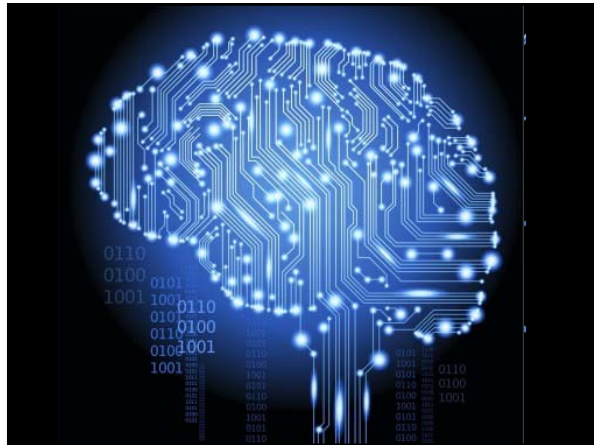
Professor, Department of Neurological Sciences
University of Nebraska Medical Center, Omaha, NE
Medical Director, Nebraska Stroke Center

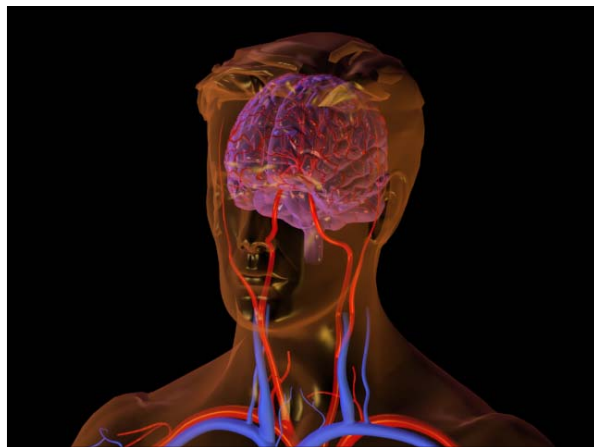
Learning Objectives

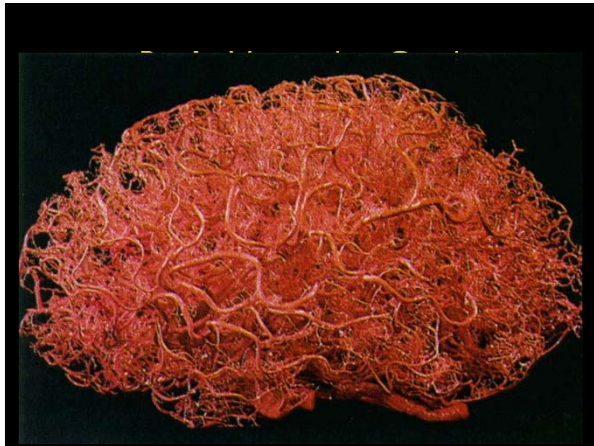
- ◆ Describe the key symptoms of stroke, its presentation and major risk factors in women
- ◆ Discuss management and treatment approaches of acute strokes.
- ◆ List major strategies for stroke prevention in women.











What Is A "STROKE"?

- ◆ Permanent **BRAIN** damage. (**NOT HEART!!!**)
- ◆ Caused by blood vessel **blockage** or **rupture**.
- ◆ **Result = Loss of brain function.**

Major Types of Stroke

- ◆ *Ischemic Stroke*
 - ◆ Brain damage caused by lack of blood flow to an area of brain.
 - ◆ Blood vessel blockage from clot.
 - ◆ Most common type of stroke
- ◆ *Hemorrhagic Stroke*
 - ◆ Brain damage caused by blood rushing out of broken blood vessel.
 - ◆ Blood crushes and destroys the brain.

US Stroke General Statistics

- ◆ **Incidence**
 - ◆ ~ 800,000 strokes yearly
 - ◆ One stroke every 40 seconds
 - ◆ **Leading cause of disability in adults**
- ◆ **Prevalence**
 - ◆ ~ 7 million Americans ≥20 years of age have had a stroke.
 - ◆ Silent cerebral infarction 6% - 28%.
 - ◆ **2030 Projections:** additional 4 million strokes (21.9% increase v. 2013)
- ◆ **Mortality**
 - ◆ 30,000 Stroke-related death yearly (1 of 19 deaths in 2009)
 - ◆ One stroke-related death every 4 minutes
 - ◆ 1999-2009, 36.9%, decreased annual stroke death rate stroke
 - ◆ 3 -> 4th -> **5th leading cause of death**
- ◆ **Costs**
 - ◆ ~ \$40 billion direct & indirect medical costs.
 - ◆ \$140,048 Mean lifetime cost of ischemic stroke in US.

Go, A et al. Circulation. 2013;127:e6-e245; <http://circ.ahajournals.org>

Strategies For Treating Stroke (**6 Rs**)

- ◆ **Recognize** symptoms
- ◆ **Remedy** damage
- ◆ **Relieve** complications
- ◆ **Recover** from deficits
- ◆ **Restore** function
- ◆ **Relentlessly Prevent**

Recognize A Stroke
When You Feel it or ...
When You See it !!!

Major Stroke Symptoms

- ◆ Sudden **weakness** or **numbness**
- ◆ Sudden **Speech** difficulties
- ◆ Sudden loss of **vision**
- ◆ Sudden loss of **balance**
- ◆ Sudden and severe **headache**

SPOT A STROKE FAST

SPOT A STROKE



Stroke Warning Signs and Symptoms

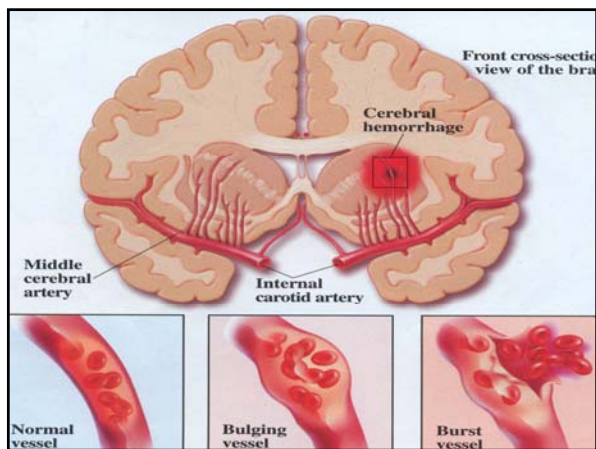
- https://www.heart.org/idc/groups/heart-public/@wcm/@fdr/documents/downloadable/ucm_467905.pdf
- <http://www.stroke.org/understand-stroke/recognizing-stroke/act-fast>

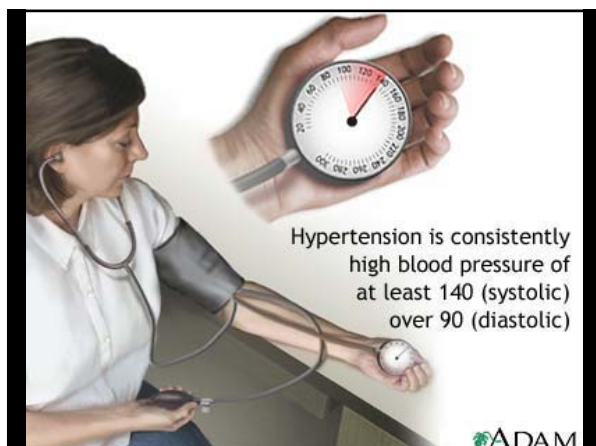
ACT on Stroke

- ◆ Call 911
- ◆ Go to Emergency Room
- ◆ Choose a hospital
- ◆ **Stroke Certified Hospitals**
 - ◆ Non-Stroke Hospitals
 - ◆ Stroke-Ready Hospitals (SRH)
 - ◆ Primary Stroke Centers (PSC)
 - ◆ Thrombectomy-Capable Stroke Center (TSC)
 - ◆ Comprehensive Stroke Centers (CSC)
- ◆ **Stroke Systems of Care**
 - ◆ Pre-Hospital Emergency System Protocols
 - ◆ State Legislation for Stroke Care

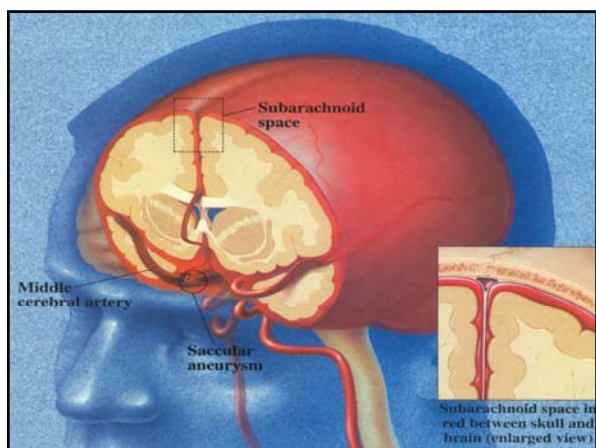
Learn About Stroke

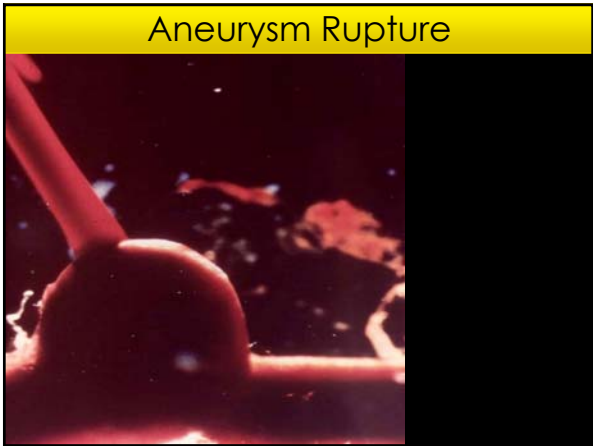
Hemorrhagic Stroke (Caused by brain vessel rupture and Bleeding)

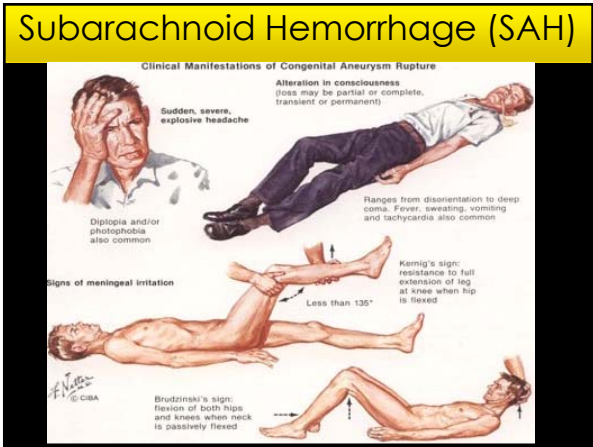


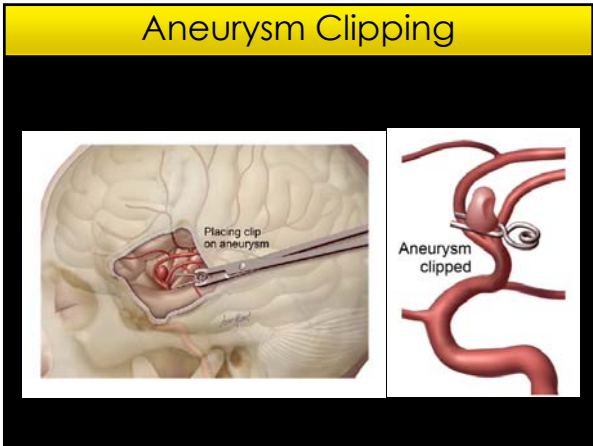




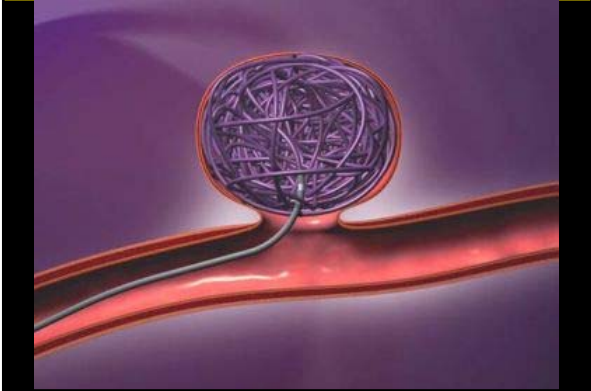






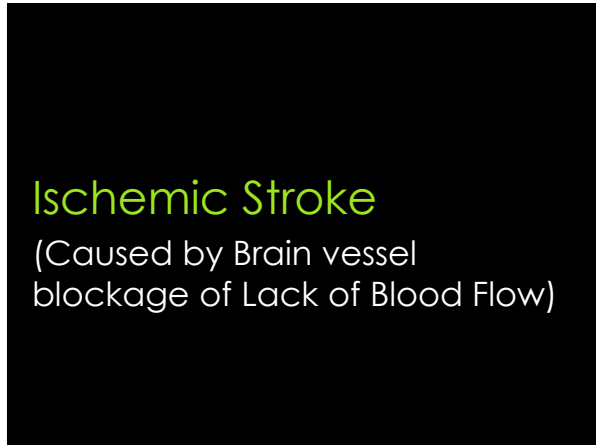


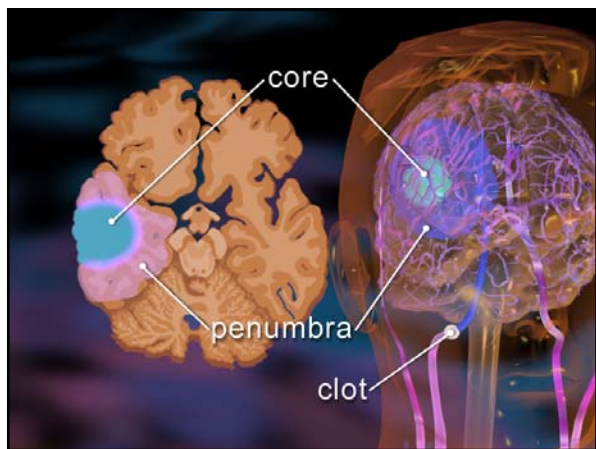
Aneurysm Coiling

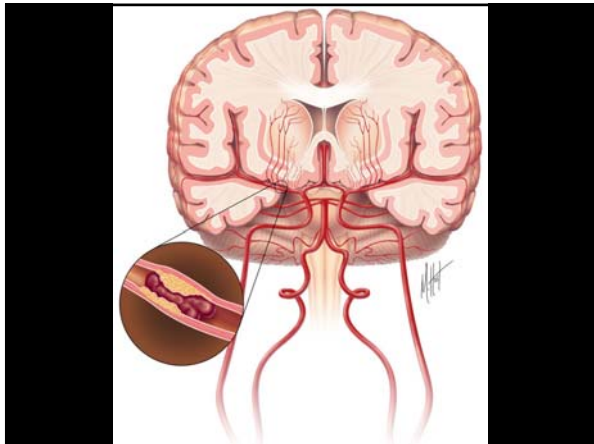


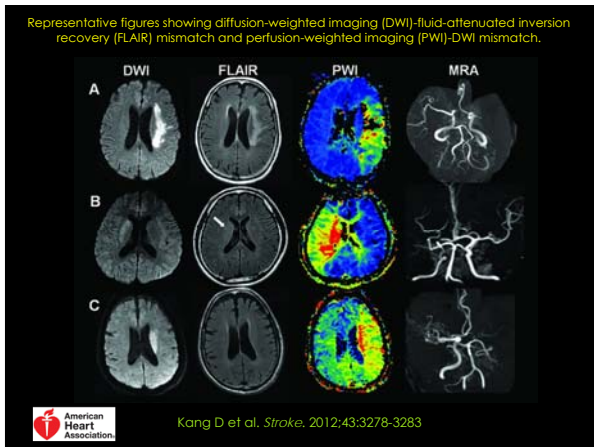
Ischemic Stroke

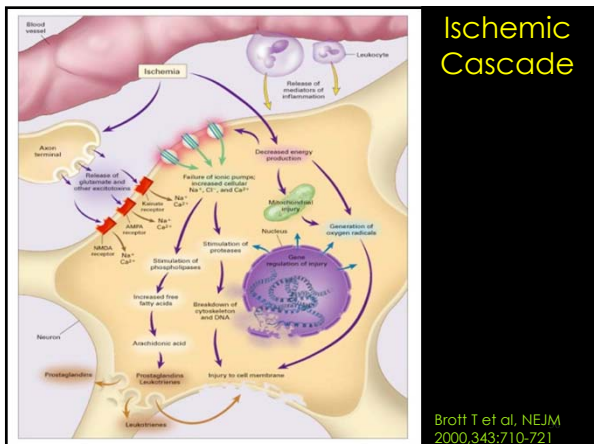
(Caused by Brain vessel blockage of Lack of Blood Flow)











Japanese Tsunami 2011



Hurricane Katrina 2005





Brain Substance Loss With Each Minute of Ischemia

A typical **untreated** acute ischemic stroke **loses with each minute**

- ◆ 1.9 million neurons
- ◆ 14 billion synapses
- ◆ 12 Km/7,5 miles of myelinated fibers

Saver J. Stroke 2006; 37: 263-269

Strategies For Acute Stroke Treatment

- ◆ Open blocked blood vessel (in Less than 24 hours)
 - ◆ Medication through vein (in Less than 4.5 hours)
 - ◆ Use device to take clot out (in Less than 24 hours)
- ◆ Protect damaged brain from further damage (Research)
- ◆ Cool the brain
 - ◆ Give medication through vein to stop chemical reactions.



GENENTECH, INC.

Alteplase (Activase®)

50 mg (29 million IU)
Packaged with diluent

100 mg (58 million IU)
Packaged with diluent and double-sided sterile, siliconized transfer device

Activase®
(alteplase, recombinant)

tissue plasminogen activator

TPA For Cerebral Ischemia within 3 Hours of Onset: Changes in Outcome Due to treatment

Benefits/Risks of IV tPA For Stroke <3 hrs

For every 100 patients treated

Benefits

- 13 patients cured or almost from neurologic deficits
- 19 patients with improved neurologic deficits

Risks

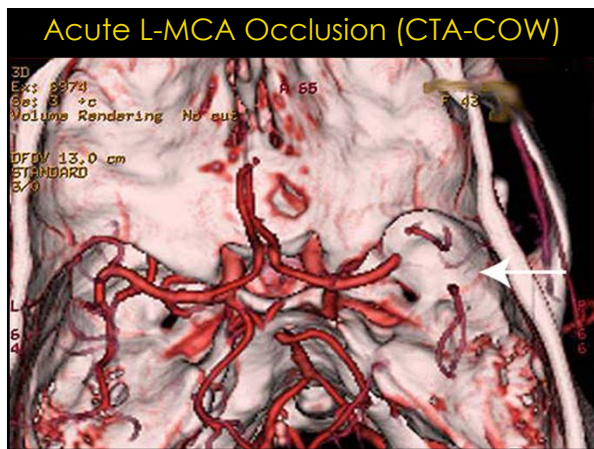
- 6 have neurologic deterioration from ICH
- 3 patients worsen
- 1 patient severely disabled or dead

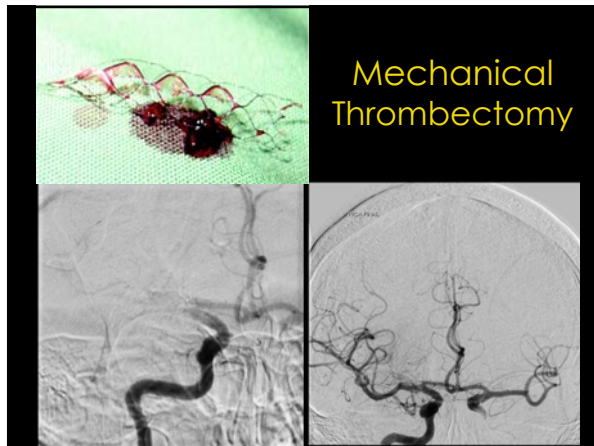
Changes in final outcome as a result of treatment:

- Normal or nearly normal
- Better
- No major change
- Worse
- Severely disabled or dead

Early course:


- No early worsening with brain bleeding
- Early worsening with brain bleeding





Acute Thrombectomy 0-6 Hrs
Major Outcomes

ONE



IN FOUR

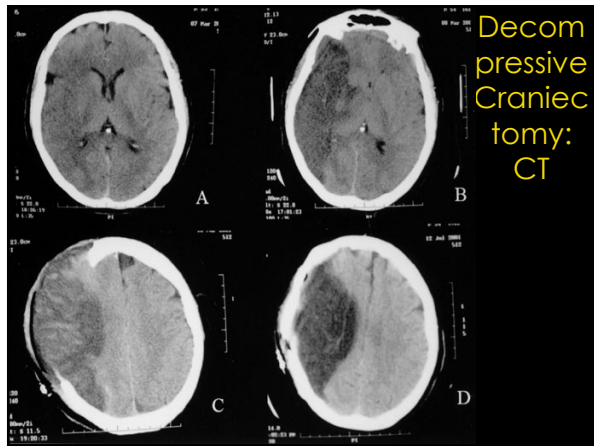
1 IN **2**

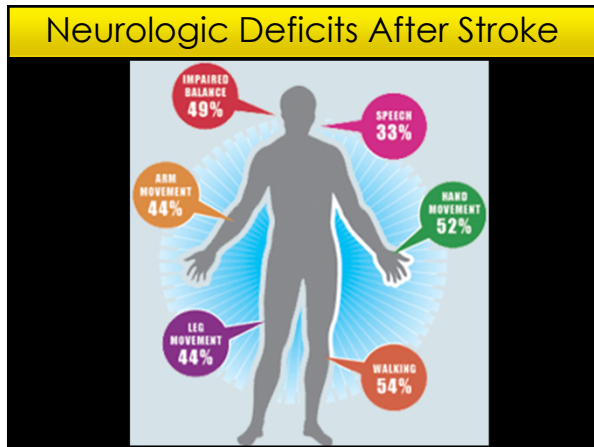
For every **Four patients** treated with thrombectomy, **One patient** is functionally independent at 3 months.

Neurologic Deficits (NIHSS) are cut in half within 24 hours

Acute Treatments and Time

- ◆ 0 - 4.5 Hours IV tPA
- ◆ 0 - 24 Hours Thrombectomy





- ### Strategies For Stroke Recovery
- ◆ Utilize undamaged brain
 - ◆ Use strategies to compensate for deficits
 - ◆ Use tools to compensate for deficits
 - ◆ Enhance function of undamaged brain
 - ◆ Special therapies
 - ◆ Special technologies
 - ◆ Brain Computer Interface
 - ◆ Rebuild neural networks
 - ◆ Brain Electric/Magnetic Stimulation
 - ◆ Chemical substances
 - ◆ Stem cells

Preventing Stroke

Before it Happens

Stroke Risk Factors

Modifiable

Medical Conditions

- Hypertension
- Cardiac disease
- Atrial fibrillation
- Hyperlipidemia
- Diabetes mellitus
- Carotid stenosis
- Prior TIA or stroke

Behaviors

- Cigarette smoking
- Heavy alcohol use
- Physical inactivity

Non-Modifiable

- Age,
- Gender,
- Race,
- Heredity

Hypertension



HTN Category	SBP mm HG		DBP mm Hg
Normal	<120	&	<85









Major Treatments for Preventing Stroke

Heart is cause of stroke

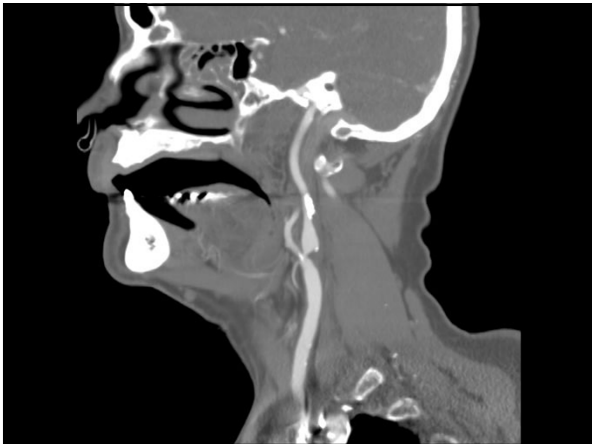
- ◆ Warfarin (Coumadin®)
- ◆ Dabigatran (Pradaxa®)
- ◆ Apixaban (Eliquis®)
- ◆ Rivaroxaban (Xarelto®)
- ◆ Edoxaban (Savaysa®)

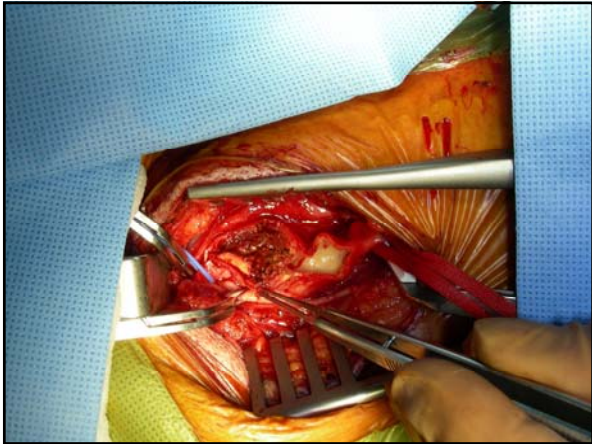
Heart is not cause of stroke

- ◆ Aspirin
- ◆ Aspirin + extended-release dipyridamole (Aggrenox®)
- ◆ Clopidogrel (Plavix®)

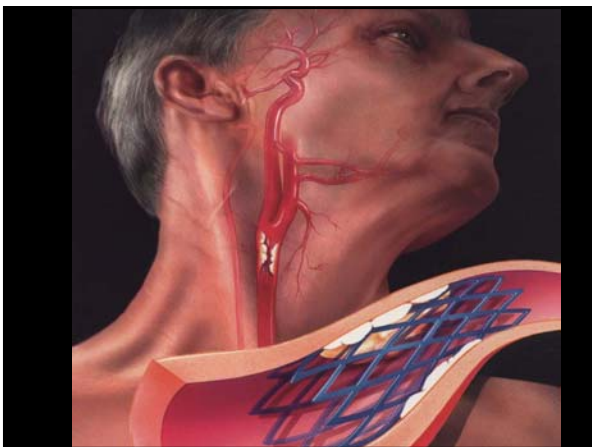
Carotid artery cause of stroke

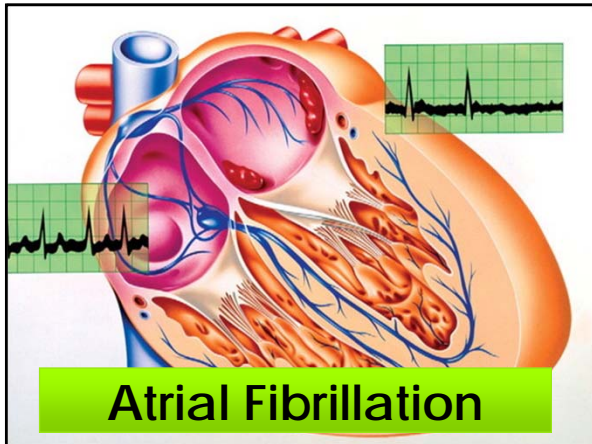
- ◆ Medications
- ◆ Carotid endarterectomy or stenting

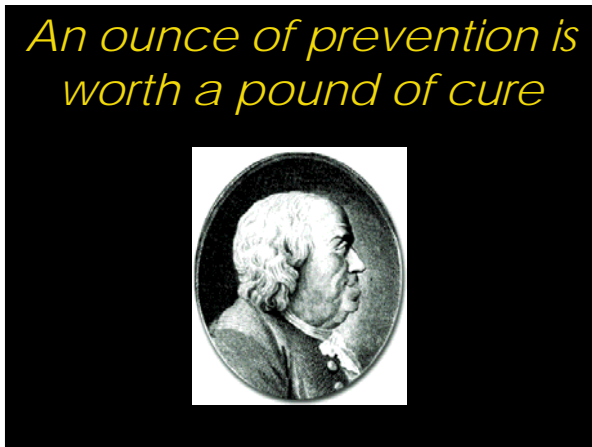












Stroke Epidemiology in Women

- ◆ Stroke affects more women than men (women live longer and stroke risk increases with age).
- ◆ Women have more pre-stroke disability than men.
- ◆ Women are more likely to be living alone, in assisted living or nursing home before their stroke.
- ◆ Women suffer greater stroke-related disability and a poorer quality of life than men.
- ◆ Women with stroke are older (5 years average) than men.
- ◆ Among those aged 85 years and older there are almost three times more black women than men with stroke, and double in whites.

Stroke Epidemiology in Women

- ◆ Women who have a stroke are more likely to have hypertension, dementia and atrial fibrillation.
- ◆ Hypertension becomes increasingly prevalent and is higher in postmenopausal women than men after the age of 55 years.
- ◆ Women are less likely than men to have myocardial infarction and diabetes.
- ◆ Stroke Subtypes:
 - ◆ Increase risk of subarachnoid hemorrhage in women.
 - ◆ Increased risk of cardioembolic ischemic stroke in older women (atrial fibrillation).

Stroke Risks Specific to Women: Pregnancy & Delivery 1

- ◆ Overall the risk of stroke during pregnancy is low: 34.2 per 100,000 deliveries compared with 11 per 100,000 non-pregnant women of childbearing age.
- ◆ The risk for all stroke subtypes increases with pregnancy, but the relative risk for intracerebral hemorrhage is higher than that for cerebral infarction.
- ◆ The highest stroke risk is in the **peripartum** (-2 to +2 days).
- ◆ Excess stroke risk persists into the **puerperium** (ie, 2 days to 6 weeks postpartum).
- ◆ 50% of women with **gestational diabetes** will develop type 2 diabetes mellitus, a major risk factor for stroke, within 5 to 10 years of their pregnancy.

Stroke Risks Specific to Women: Pregnancy & Delivery - 2

- ◆ Certain pregnancy complications further increase stroke risk, including **pre-eclampsia**, **eclampsia**, **postpartum obstetric hemorrhage**, and **postpartum infection**.
- ◆ Early-onset preeclampsia (before 32 weeks' gestation) in particular has been noted to increase risk for stroke 5-fold compared with later-onset preeclampsia.
- ◆ **Postpartum preeclampsia** is associated with a high risk for stroke and may be the underlying cause of severe postpartum headaches.
- ◆ Women with high BP during pregnancy who have given birth, continue to be at risk for preeclampsia and stroke.

Stroke Risks Specific to Women: Pregnancy & Delivery - 3

- ◆ The incidence of **Cerebral Venous Thrombosis (CVT)** during pregnancy and the puerperium is 1 in 2,500 deliveries to 1 in 10,000 deliveries.
- ◆ The greatest risk periods for CVT include the third trimester and the first 4 postpartum weeks.
- ◆ Up to 73% of CVTs in women occur during the puerperium.
- ◆ Cesarean delivery appears to be associated with a higher risk of CVT.

Stroke Risks Specific to Women: Exogenous Female Hormones

- ◆ **Oral contraceptives** use increases stroke risk three times, although in absolute terms it is a small risk (one stroke per 24,000 women per year).
- ◆ Stroke incidence rises steeply from 3.4 per 100,000 at ages 15 to 19 years to 64.4 per 100,000 in women aged 45 to 49 years.
- ◆ Certain subgroups of women, those who are older, smoke cigarettes, or have hypertension, diabetes mellitus, obesity, hypercholesterolemia, or mutations, may be at higher risk for stroke.
- ◆ **Hormonal therapy in post-menopausal women**, does not reduce stroke risk and may increase the risk of stroke.

Stroke Strategic Planning Am I At Risk For Stroke?

- ◆ Did I have a stroke or TIA?
- ◆ Am I older than 65?
- ◆ Do I have hypertension, diabetes, heart disease, high cholesterol, atrial fibrillation?
- ◆ Do these diseases run in my family?
- ◆ Do I smoke?
- ◆ Do I exercise? Is my diet healthy?
- ◆ Is my pulse regular?
- ◆ Do I crack my neck or the chiropractor cracks my neck?

Stroke Strategic Planning

I Know I am At Risk For Stroke

What Should I do?

- ◆ Learn about the type of stroke you had and your risk factors
- ◆ Manage your risk factors: Diet, exercise, weight, blood pressure, diabetes, cholesterol,
- ◆ Take your medications.
- ◆ Know the signs and symptoms of stroke.
- ◆ Know the certified stroke hospitals in your area.
- ◆ Know if you have a Stroke System of care legislation in your state.
- ◆ Call 911 or instruct others to do it !!!
