NEW HORIZONS OF STROKE CARE

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DISCLOSURES

• No financial relationships

• Lecture will include a discussion of unapproved and investigational uses of products and devices
INDIANA EPIDEMIOLOGY

• 7th highest stroke rate in the country

• 15th in mortality from stroke

• 4th leading cause of death

• 2.6% of Indiana population living with sequelae of stroke

• Cost of medical care for stroke in Indiana was $373 million in 2006
STROKE MANAGEMENT

• Prevention

• Acute care

• Rehabilitation
PREVENTION

• Risk factors

• Antiplatelet agents

• Anticoagulation agents

• Carotid intervention
RISK FACTORS

- Standardized, case controlled study in 22 countries (only 14% high-income).
- 3000 new strokes vs. 3000 nonstroke age-matched controls.
- Data from history, physical exam, and ancillary testing.
- 90% of stroke risk attributable to 10 risk factors.
• Hypertension
• Smoking
• Waist to hip ratio (highest vs. lowest tertile).
• Dietary risk score (unhealthy CV diet)
• Regular physical activity
• Diabetes mellitus
• Alcohol (>30/month or bingeing)
• Cardiac causes (afib, CAD, valve disease)
• Ratio of apolipoprotein B to A1
• Psychosocial (stress, depression)
ANTIPATELET AGENT

- Double blind, randomized study comparing 100mg BID cilostazol to 81mg ASA after CVA in Japan.
- 1335 patients in each arm.
- 26% fewer recurrent strokes on cilostazol.
- 50% fewer bleeding complications.
- Cilostazol is known as pletal.
ANTIPLATELET AGENT

- Platelet Inhibition and Patient Outcomes Study (PLATO)
- Assessment of Ticagrelor in acute coronary syndrome vs clopidogrel
- Randomized, blinded study lasting 12 months
- All cause mortality: 9.8% ticagrelor, 11.7% clopidogrel
- CVA: 1.5% ticagrelor, 1.3% clopidogrel
- Slightly higher risk of hemorrhagic CVA with ticagrelor
- Recommendation is not to use this agent in patients with history of CVA or TIA
ANTICOAGULATION AGENT

- Randomized Evaluation of Long-Term Anticoagulant Therapy (RE-LY) trial.
- Double-blinded, randomized comparison of warfarin vs. 110mg dabigatran vs. 150mg dabigatran in patients with nonvalvular atrial fibrillation and prior cerebral ischemia.
- 1200 patients in each arm followed for a median of 2 years.
- No difference in recurrent CVA.
- 73 to 89% relative reduction in intracranial bleeding.
- Dabigatran – fixed dose with no need of coagulation monitoring.
CAROTID INTERVENTION

- Carotid Revascularization Endarterectomy vs. Stenting Trial (CREST).
- Prospective, randomized, controlled study spanning 10 years in U.S. and Canada.
- 1300 symptomatic (50% by angio, 70% by US, >70% by CTA) and 1200 asymptomatic (60% by angio, 70% by US, >80% by CTA) carotid stenoses.
- At 30 days, more CVA after stent, and more MI after CEA.
- Up to 4 years, ipsilateral CVA were same.
- Results same for symptomatic or asymptomatic and for either gender.
- However, under 70 years of age, stent better and surgery better if over 70.
CAROTID INTERVENTION (CONT.)

• International Carotid Stenting Study (ICSS).
• Prospective randomized trial including 1700 symptomatic patients in Europe, Australia, New Zealand, and Canada.
• At 30 days, twice as many CVA after stenting vs. CEA, and equivalent MI (0.5%).
• Included practice lead-in stenting cases, multiple types of stents, less use of distal protection devices
ACUTE CARE

- Intervention
- Imaging
- Telemedicine
- Stroke systems
MECHANICAL THROMBECTOMY

- Merci retrieval system
- Penumbra system
- EKOS ultrasound device
MERCI RETRIEVAL SYSTEM

• Use within an 8 hour window
• ICA, proximal MCA, basilar, & vertebral arteries
• Recanalization: 50% with device alone, 65% with device and tPA.
• Rankin <2 at 90 days: 32% (49% of those revascularized)
• Symptomatic intracerebral hemorrhage: 9% (with or without tPA)
• Mortality: 39% (2:1 not revascularized: revascularized)
PENUMBRA SYSTEM

• Use within an 8 hour window
• No tPA
• Recanalization: 81%
• Rankin <2 at 90 days: 25% (29% of those revascularized)
• Symptomatic ICH: 11%
• Mortality: 33% (29% if revascularized)
EKOS ULTRASOUND DEVICE

- Combines ultrasound with infusion of a thrombolytic agent
- Anterior and posterior circulation events
- 57% recanalization with an average time of 46 minutes.
EXTENDING THROMBOLYTIC USE

- Third European Cooperative Acute Stroke Study
- Randomized, placebo controlled study
- 821 patients treated between 3 and 4.5 hours after onset
- 90 day Rankin score of 1 or less: 52.5% tPA and 45% placebo
- Greater ICH but less mortality vs. placebo
- Now recommended by ASA, but not yet FDA approved
CT PERFUSION SCAN

• Serial CT scans acquired rapidly to dynamically track a bolus of contrast as it travels through the brain circulation
• Various parameters can be measured or calculated (e.g. CBF, CBV, MTT, and TTP
• CBF or MTT may indicate “at risk” tissue; CBV may represent irreversibly damaged brain tissue
• The larger the ratio of CBF/CBV, the greater the size of tissue that could be salvaged with reperfusion
• Thus, CT perfusion may allow for treatment at windows greater than 3 hours or prevent use in cases with little salvageable tissue
• Advantage over MRI is speed and cost
TELEMEDICINE

• Increases “comfort level” of ER MD for using tPA
• More direct neurology coverage of rural or underserved areas
  – Larger geographic region
  – Continuous availability
• More rapid evaluation of patient by neurologist
• Better information for the neurologist to use to make decision
  – See patient
  – See imaging study
TELEMEDICINE (CONT.)

- Fort Wayne, IN
- Cooperation between Lutheran and Parkview hospitals
- Links to several smaller hospitals in the area
- Staffing by the neurology group in Fort Wayne
- Option to maintain patient of transfer to larger facility
TELEMEDICINE (CONT.)

• Indiana Rural Health Association
  – Grant from federal government
  – 7 rural hospitals
  – Yet to determine the base provider

• Lugar Center for Rural Health in Terre Haute
  – Self funded
  – 4 rural hospitals
  – They will be the base provider
STROKE SYSTEMS

• Enables the provision of evidence-based care to all patients with CVA
• Provides neurologic coverage for underserved areas
• Coordinated emergency response call centers
• Predetermined interhospital protocols and transfer agreements available
• Availability of neurologic consultation in ER (at least by phone)
STROKE SYSTEMS (CONT.)

• M.D. should be aware of their primary hospitals capabilities for managing CVA
• M.D. should be familiar with a hospital that is comfortable managing acute stroke.
• M.D. should encourage primary hospital to have protocols to expedite CVA management
• M.D. should be able to identify signs and symptoms of CVA
• M.D. should have office protocol for the disposition of patient that presents with a potential CVA
• M.D. should have established communication patterns for hospitals and neurology consultation
REHABILITATION

• Mechanical intervention

• Global support
MECHANICAL INTERVENTION

• Bioness
• Neuroprosthesis for the treatment of limb paralysis
• Provides electrical stimulation of peripheral nerves to operate specific muscle groups
• Facilitates specific movements to allow typical ADL’s: walking, grasping
MECHANICAL INTERVENTION (CONT.)

• Muscle re-education

• Minimization of disuse atrophy

• Maintenance of joint range of motion

• Improve local blood circulation

• Reduction of muscle spasm
GLOBAL SUPPORT

• Peer mentoring
  – Stroke survivors interact with stroke patients and their families
  – Sharegivers program from American Stroke Association
    • Trains volunteers about stroke and how to listen

• Post rehabilitation resources
  – From the Indiana Stroke Prevention Task Force
  – Provides information about contacts and programs that can provide assistance for everyday problems.
CONCLUSIONS

• Stroke is a BIG DEAL
• Current management is helpful, but we can always do better
• Treatment needs to start with prevention
• The effects of acute CVA can be minimized
• Rehabilitation can make a difference
• Primary care medicine is important in all phases of CVA management