Stroke Prognosis and Treatment in Elderly Patients

Ryan J. Lynch, DO, MSEd
General Adult Neurology/Neurorehabilitation
Medical Director of the Stroke Program
LECOM Health

Disclosures

• I have nothing to disclose.
References

1. Statistical data taken from the American Heart and Stroke Association web sites, CDC web site, NIH web site
3. “Rehabilitation following stroke in patients aged 85 and above,” *Journal of Rehabilitation Research and Development*. January/February 2005; Volume 42, Number 1, Pages 47–54

References

Objectives

At the end of this course, one should have:

- A basic understanding of the stroke definition
- A basic understanding of stroke types
- A basic understanding of stroke work up and treatment
- A basic understanding of TIA work up and treatment
- A basic understanding of hemorrhagic stroke types
- A basic knowledge of stroke statistics
- A basic understanding of neurorehabilitation of a stroke
- A basic understanding of stroke rehab potential and prognosis

Definition of Stroke

Any clinical disorder produced by a derangement of the cerebral circulation”

- Non-Specific
- All-Inclusive
Obsolete and incorrect Terminology

Nothing is constant except change”
Heraclitus

- Cerebrovascular Accident (CVA)
- Reversible Ischemic Neurologic Deficit (RIND)
- “Completed” Stroke & Stroke “In Evolution”
- Mini Stroke

Nomenclature: General Classification

- 87% Ischemic Stroke:
  - Cerebral Infarction
  - Transient Ischemic Attack (minutes!!)

- 13% Hemorrhagic Stroke:
  - Intracerebral Hemorrhage
  - Subarachnoid Hemorrhage
ETIOLOGIC CLASSIFICATION

Stroke Subtype

- Atherothromboembolic
  - Cardiogenic
  - Lacunar
  - Other
- Unknown Etiology
- Type I: Incomplete Evaluation
- Type II: More than one cause
- Type III: Unknown

Stroke types according to pathogenesis

- Hemorrhagic Stroke (13%)
  - Intracerebral Hemorrhage (59%)
  - Subarachnoid Hemorrhage (41%)
- Ischemic Stroke (87%)
  - Atherothrombotic Cerebrovascular Disease (20-25%)
  - Lacunar (15-25%)
  - "Cardiogenic" (20%)
  - Criptogenic (30%)
Definition of Lacunar Infarct

- Occlusion of the deep penetrating small arterioles

Epidemiology

Background: Stroke Worldwide

- Second most common cause of death (6.7 million deaths annually)

- Severe disabilities among the survivors. (30 million)
Epidemiology
Background: Stroke in the U.S.

- Fifth leading cause of death
- 800,000 new or recurrent strokes per year
- 130,000 deaths per year

An estimate 6.8 million people are living in the U.S. following a stroke.

Leading cause of serious, long-term disability

Epidemiology

Background: Economic Impact

The current cost of stroke in the US is $34 Billion

Stroke Mortality, US and the Stroke Belt, 1999
Warning Signs of Stroke

- Sudden Weakness of Arm, Leg, face
- Sudden Sensory Loss
- Sudden Speech Abnormalities
- Sudden and Unusual Headache
- Sudden Dizziness or Loss of Balance
- Sudden Loss of Vision or Double Vision

Warning Signs of Stroke

- Limb shaking TIA’s
- Drop Attacks
- Amauroxis fugax
- Anton’s syndrome (denial of cortical blindness)
- Posterior circulation
- Abulia
Stroke Mimics

- Tumors “Pseudo stroke”
- Disorders of metabolism
  - Glucose disorders
  - Dehydration
- Migraine attack
- Seizures
- Conversion
- Infections
- Recurrent symptoms of prior infarction

Questions to ask when evaluating a stroke patient

- Does the patient have a stroke?
- Hemorrhage v/s ischemia?
- Localization?
  - Small vessel v/s large vessels
  - Cortical v/s sub cortical
  - Anterior v/s posterior
- What is the likelihood of severe disability or mortality?
- What is the likelihood of clinical deterioration and co morbidities?
Stroke Localization - Cortical Symptoms of Stroke

Small vessel v/s large vessels”
“Cortical versus subcortical”
- Aphasia (can the patient repeat)
- Neglect
- Extinction
- Spatial disorientation / acalculia
- Face arm v/s face arm and leg
- Graphyestesia, tow point discrimination
- Horizontal gaze preference
- Hemianopsia

Stroke Syndromes

- Large vessels
  - MCA
  - PCA
  - ACA / RAH
  - BA syndrome
- Small vessels
  - Purely motor
  - Purely sensory
  - Dysarthria clumsy hand
  - III nerve +
  - Ataxic hemiparesis
Branch Occlusion

Top Of Basilar Embolus
ACA Infarction

Stroke Risk Factors

Uncontrolled risks
- Age, 55 or older
- Family history
- Gender
- Genetics
- Prior stroke or TIA

Controllable
- High Blood Pressure
- Diabetes
- Cigarette Smoking
- Alcohol Consumption
- Dyslipidemia
- Atrial Fibrillation
- Cardiac disease

Overweight/ Obesity
- Physical Inactivity
- Sleep apnea
- Contraception and HRT
- Depression
- Presence of Migraine history, particularly migraine with aura
- Carotid bruit
- Illicit drug use
- Pregnancy
How Many Strokes Can Be Prevented by Risk Factor Control in the United States?

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Prevented Strokes</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTN</td>
<td>360,000</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>146,000</td>
</tr>
<tr>
<td>Smoking</td>
<td>90,000</td>
</tr>
<tr>
<td>AF</td>
<td>69,000</td>
</tr>
<tr>
<td>Heavy alcohol use</td>
<td>34,000</td>
</tr>
</tbody>
</table>

Based on an estimated 731,000 strokes annually


Cardiac Stroke Risk Assessment

Occlusion of cerebral vessels with debris from cardiac source
Cardiac Stroke Risk Assessment

- Debris;
  - Platelet aggregates
  - Thrombus
  - Platelet-thrombi
  - Cholesterol
  - Calcium
  - Bacterial
  - Neoplastic cells form Mixomatous material

- 20% of cardiac embolus goes to brain
- 80% of cardiac embolus involved anterior circulation
- 20% vertebro–basilar system
**Stroke Work Up - ER**

- STAT CT Head, +/- CTA Head and Neck, EKG, PT/PTT/INR, CMP, CBC with diff, VS
  - Basic History – last seen normal vs onset of symptoms
  - Contraindications? To TPA
  - NIHSS > 4 or vision/speech deficits?
  - Rapidly Improving?
  - Onset of Symptom Time? No contraindications to TPA?
    - Less than 3 hours – Give IV TPA
    - 3 - 4.5 hours – more stringent TPA Protocol – written consent
    - 4.5 - 6 hour – intra-arterial intervention – can be used from the 0 to 6 hour range, if it would provide a better outcome, IV TPA given first
  - Wake Up Stroke – more stringent TPA guidelines

**Stroke Work Up – After ER**

- Repeat CT Head 24 hours after first – if the patient can’t have MRI
- Vascular imaging – CTA of Head and Neck (if not done in ER), MRA of the Head (no contrast), MRA of Neck (better with contrast), Carotid US
- Echo – transesophageal much better, if no contraindications
- Telemetry
- Neuro checks with close monitoring of VS
- Typically keep SBP < 180 and DBP < 110, can be as high as 225/110 in Neuro ICUs
- Fasting Lipid Profile
- Hypercoagulable work up in young people
Stroke Work Up – After ER

- 30 day cardiac monitor as an outpatient – quickly going to become a standard of care – a lot of missed Afib

Stroke Treatment

- No ASA or Anticoagulation for 24 hours following TPA administration – prevents hemorrhagic conversion
- Initiating or changing antiplatelet therapy
  - ASA 81 mg Qdaily is indicated – doesn’t need to be higher, studies were done on 50 mg dosing
  - Switching to Clopidogrel or aspirin/extended-release dipyrdamole
    - aspirin/extended-release dipyrdamole not used much any more due to it being difficult to tolerate and some studies show it may be better for small vessel disease
- Anticoagulation – Warfarin, Heparin, Lovenox, vs new ones – dabigatran etexilate, rivaroxaban, apixaban, edoxaban
  - Used under certain circumstances, stroke size is factor
Stroke Treatment

- Initiate statins for hyperlipidemia, mainly LDL > 99, show reduction in stroke risk
- Initiation or changing of BP meds, slowly normalize back to normal
  - ACE inhibitors show reduction in stroke risk
  - Avoidance on clonidine – can have profound rebound HTN
- Nicardipine GTT – can be used to control malignant HTN well
- Keep blood glucose close to normal
- Hydrate – NS works best
- Avoid opiates and sedatives in the first 72 hours of stroke to avoid side effects that mimic stroke worsening
- Good Nutrition – favor PEG over NG tube

Stroke Treatment

- Treatment of any infections – studies show that infections can cause enough inflammation in the body to potentially cause strokes
  - Some institutions don’t vaccinate during stroke admissions for this reason
- Treatment of underlying medical problems – in order to maximize rehab potential
- Treatment of PFOs, vascular problems
- Treat stroke induced depression – improves rehab potential – may need psychiatry and neuropsychology
- Explain to family, goals of treatment is to prevent the next stroke, we can only “support” the active stroke, if the patient was not given TPA or had an intra-arterial intervention
Stroke Treatment

- Initiate rehab – PT, OT, and ST
- Watch for endurance with therapies and monitor therapists recommendations for rehab need and level following inpatient discharge
- Does rehab suggest assistive devices such as: canes, walkers, wheelchairs, orthotics, splints, etc
- Assess for spasticity vs flaccidity – will the patient need spasticity reduction with: oral meds, botulinum toxin, or baclofen pump vs will they need splinting for flaccidity?
- Monitor the patient’s mood and apathy – do they want to get better? Do they want therapy? Do they want to give up and die?

TIA

- **Old Definition**
  - Time base
  - 1960
  - Misleading
- **New definition**
  - Tissue base
  - Sense of urgency
  - Optimal risk assessment
- **2009 definition**
2009 Definition of TIA

- “TIAs are brief episodes of neurological dysfunction resulting from focal cerebral ischemia not associated with a permanent cerebral infarction.”

- *Definition and Evaluation of Transient Ischemic Attack: A Scientific Statement Healthcare Professionals From the American Heart Association/American Stroke Association Stroke Council; Council on Cardiovascular Surgery and Anesthesia - Stroke. 2009;40:2276-2293; originally published online May 7, 2009;*

---

ACUTE VASCULAR SYNDROME

- Any acute onset of focal neurological deficit from brain, cord or retina of presume vascular origin which is undefined as either a TIA or Stroke due to pending evaluation
TIA (ABCD 2)

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age $&gt; 60$ years</td>
<td>1</td>
</tr>
<tr>
<td>Blood pressure</td>
<td></td>
</tr>
<tr>
<td>SBP $\geq 140$ mm Hg or Diastolic BP $\geq 90$ mm Hg</td>
<td>1</td>
</tr>
<tr>
<td>Clinical features of TIA</td>
<td></td>
</tr>
<tr>
<td>Unilateral weakness with or without speech impairment</td>
<td>2</td>
</tr>
<tr>
<td>Speech impairment without unilateral weakness</td>
<td>1</td>
</tr>
<tr>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td>TIA duration $\geq 60$ minutes</td>
<td>2</td>
</tr>
<tr>
<td>TIA duration 10-59 minutes</td>
<td>1</td>
</tr>
<tr>
<td>History of DM</td>
<td>1</td>
</tr>
<tr>
<td>Total score</td>
<td>0-7</td>
</tr>
</tbody>
</table>

Prediction of Stroke Risk Based on ABCD2 score

<table>
<thead>
<tr>
<th>ABCD2 Score</th>
<th>2 day Stroke Risk</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3</td>
<td>1.0%</td>
<td>Hospital observation may be unnecessary without another indication</td>
</tr>
<tr>
<td>4-5</td>
<td>4.1%</td>
<td>Hospital observation is justified in most occasions</td>
</tr>
<tr>
<td>6-7</td>
<td>8.1%</td>
<td>Hospital observation is worthwhile</td>
</tr>
</tbody>
</table>
Significance of TIA

- As many as 50% of patients presenting with atherothromboembolic stroke have had a TIA
  - 17% on the day of the stroke
  - 9% on the previous day
  - 43% on the previous 7 days

Risk of Stroke After TIA

- 24 hrs after TIA  4%
- First 30 days  12%
- First year  32-40%

- Risk for cardiac events after TIA is 2.6% in 90 days
Management of TIA

- Imaging evaluation within 24 hrs
- Electrocardiography (ASAP)
- Prolonged cardiac monitoring (ASAP)
- Echocardiography (ASAP)
- Admit to hospital if:
  - If symptoms < 72 hrs and ABCD ≥ 3
  - Evaluation can’t be obtained in a timely manner
- Work up and treatment for TIA is very similar to a stroke, but with a TIA, the patient’s deficits have resolved, so typically, rehab is not necessary for the “new symptoms.”

ICH
Pathogenesis of Intracerebral Hemorrhage

- Hypertension
- Vascular Malformations
  - Saccular Aneurysms
  - Arteriovenous Malformations
  - Venous Angiomas
  - Cavernous Angiomas
- Bleeding Disorders
  - Other
**Intracerebral Hemorrhage**

Pathogenesis of Intracerebral Hemorrhage

---

Vol = $A \times B \times C / 2$

Vol = $40 \times 25 \times 40 / 2$

Vol = 52.5 cc

---

Slice#1

Slice#8

C = 8 x (5mm)
SAH

Epidemiology

- 5% of all strokes
- Incidence increases with age, median (50-60yrs)
- Women/men 3:2 in > 40 yrs old. Man > woman < 40 yrs
- African Americans
- 10,000 pts die prior to hospital arrival
- Of patient admitted to 50% death or severe disability
- Usually caused by a ruptured aneurysm
SAH

Non Aneurysmal Causes

- Trauma
- Arterial dissection
- Mycotic Aneurysm (Infected)
- Arteriovenous malformation
- Cocaine and amphetamine use
- Moyamoya disease
- Central venous system vasculitis
- Idiopathic perimesencephalic nonaneurysmal subarachnoid hemorrhage (PM-NASAH) – studies show that 15-20% of SAH do not have a vascular lesion in a 4 vessel cerebral angiogram (seen in increased ICP)

Aneurysmal location

- 80% in anterior cerebral circulation
SAH
Risk factors

- Alcohol
- Transient hypertension
- Hypertension
- Smoking
- Hormonal
- Postmenopausal woman, decreased risk in patients of HRT

Risk factors

- Non modifieble
  - Family history (4 fold)
  - AD polycystic kidney disease
  - Marfan’s Syndrome
  - Ehler- Danlos syndrome
  - Fibromuscular displasia
  - Pseudoxanthoma elasticum
  - Coartation of Aorta

Patients with at least two first degree family members or AD PKD should undergo screening
Treatment of ICH

- Stabilize ABCs and VS
- Reversal of offending agent, if present, FFP, Vitamin K, idarucizumab (if available in your institution), etc
- Transfer of patient to a neurosurgical institution for potential evacuation, repair of trauma and transfer to neuro ICU, if indicated
- Decrease BP if elevated
- Monitor for vasospasm
- Discover cause, if not known, to prevent a repeat bleed
- Treat other medical problems if present
- Once stable, start rehab, PT, OT, ST

Imaging Techniques
Helical CT scanning

- Poor sensitivity / specificity
  - Size
  - Location
  - Time

Helical CT scanning

- Early signs of ischemic tissue damage
**Helical CT scanning**

- Good for detection of hemorrhage.

**Diffusion Weighted Imaging**

- **DWI**
  - Decrease diffusion = increased signal

- **ADC**
  - Increase in ADC = decrease in signal
**DWI**

- High signal to noise
- Early detection
- High sensibility
- High specificity
- Better than T2:
  - Cortical lesions
  - Small / multiple
  - Early changes due to embolization

**DWI**

- Sensitive to motion (needs ECHO Planar MRI)
- Fast (1 minute)
- Non invasive
- Timing of the lesion
- Prognosis factor
- Response to therapy
**Perfusion MRI**

- **Rapid Echoplanar / Gadolinium**
- **First Pass**
  - Relative mean transient time.
  - Time to peak.
  - Regional cerebral blood flow.
- **Miss-match**

**Perfusion Images Complete the Picture**

- Combined diffusion and perfusion imaging
  - Clinical severity and outcomes
  - Define ischemic penumbra
Mismatch = Tissue at Risk

Neurorehabilitation of Stroke

- Most patients require some form of rehab following a stroke.
- Four main levels of rehab
  - Inpatient Rehab – Inpatient Rehab Facility (IRF)
  - Skilled Nursing Facility (SNF)
  - Outpatient Therapy
  - Home Therapy
Basic Levels of Rehabilitation

1. Inpatient Rehab Facility (IRF)
   - Rehab in a hospital setting, usually considered the most aggressive and superior to the rest
   - Typically reserved for the most severe strokes
   - Typically 3 hours per day, 6 days per week, with the potential for quick progression

2. Skilled Nursing Facility (SNF)
   - Less aggressive and typically used for those with a decreased level of endurance or those that will ultimately need SNF placement, usually < daily

3. Outpatient Rehab
   - Usually used for patients with less severe strokes or those that have graduated from the other levels of rehab
   - Patients have to arrange transportation which can be difficult
   - Usually only 2 to 3 times per week but can be more or less

4. Home Rehab
   - Usually used for patients with less severe strokes without transportation, 2 to 3 times per week
Predictors of Rehab Potential

- In the rehab world these are called “barriers” to rehab
- Some patients are great candidates for rehab and others are not.
- There are many limitations/barriers for neurorehabilitation potential in patients with stroke and other neurological diseases
  - It’s important to consider these when ordering rehab for our patients
- Knowing and recognizing all of a patient’s rehab barriers, will allow you to predict a patient’s rehab potential and ultimately their prognosis.

Barriers to Neurorehabilitation

- The number one barrier to rehab, for any disease, is the patient’s desire to participate in rehab
  - In the elderly, if the patient does want therapy and their kids do, this patient’s rehab potential and prognosis will be very poor.
  - It’s also important to choose rehab close to family, loneliness from friends and family can be a barrier
  - Convenience to home can be a barrier
Barriers to Neurorehabilitation

- Age can be a large limitation/barrier to rehab, it cannot be modified, of course, however, it should be recognized.
  - Most studies show that older patients have a poorer prognosis for recovery from stroke when compared to younger patients.

- One of the biggest limiting factors for patients is endurance.
  - Following a stroke, patients typically need PT, OT, and ST.
  - For inpatient therapy, plan 1 hour for each type of therapy, thus 3 hours per day.

Barriers to Neurorehabilitation

- Remember, 3 hours a day of exercise can be difficult for “normal people” let alone stroke patients, think about this when ordering inpatient therapy.

- Next limitation is co-morbidities:
  - COPD, CAD/MI, Seizures, PD, HTN, Depression, Anxiety, OSA, DM, DVTs, Infections, smoking/addictions, etc.
  - When under control these are OK with rehab but therapies can be interrupted greatly when they are not.
Barriers to Neurorehabilitation

• Another limitation is nutrition, patients need adequate nutrition to rehab effectively, if dysphagic, we recommend PEG tube over NG and TPN for much better nutrition, poor nutrition usually means poor rehab

• Depression can limit rehab greatly, and strokes typically cause organic depression, if treated, patients typically rehab much better

• Mental status can limit rehab greatly too, obviously, a severely sedated person won’t be able to participate in rehab but a perfectly healthy demented patient, who can’t follow any commands, will not rehab well either, if at all
Barriers to Neurorehabilitation

• Other psychiatric issues can play a huge role in how well a patient rehabs
  – Typically we consult a neuropsychologist to help in assessing for these problems, which occur more often than you think and were never diagnosed before

• Pure sedation from a nondominant (usually right hemispheric stroke) can be a major limitation to rehab and we can give alerting medications for this

Barriers to Neurorehabilitation

• Sleep is a major limitation in therapy following a stroke, we need to start checking for more OSA following strokes
  – Day-Night Confusion falls into this category too

• Finally, some medications can be limiting factors in patients, mainly side effects
  – Usually we gear med changes around keeping the patient awake and able to participate in therapy
  – Abused drugs also fall into this category, ie cocaine, meth, ETOH
Barriers to Neurorehabilitation

- It’s important to realize that inpatient rehab is not for everyone, especially if we can’t change or treat these limitations.

- Also realize that patients who can’t tolerate inpatient rehab initially, may tolerate other forms first, and once they are “strong enough,” we can admit to the inpatient unit.

- If these limitations are addressed prior to admission to the inpatient unit, the patient will rehab better and faster.

Who is a neurorehabilitation candidate?

- Anyone with a persistent neurological deficit who wants it to resolve

- This is true for strokes or any other type of neurological diseases

- It also helps to choose patients who want to get better, if they don’t, they won’t get better

- Some of the worst rehab candidates are the one’s who have their families choose for them
Barriers to Neurorehabilitation

- When working in the rehab industry or when interpreting rehab studies, scales or scores are often used – they are used to follow a patient’s progress and/or determine how well they are doing at the time of assessment
  - NIHSS
  - Modified Rankin Score
  - Functional Independence Measure

### Modified Rankin Score

<table>
<thead>
<tr>
<th>SCORE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No symptoms at all</td>
</tr>
<tr>
<td>1</td>
<td>No significant disability despite symptoms; able to carry out all usual duties and activities</td>
</tr>
<tr>
<td>2</td>
<td>Slight disability; unable to carry out all previous activities, but able to look after own affairs without assistance</td>
</tr>
<tr>
<td>3</td>
<td>Moderate disability; requiring some help, but able to walk without assistance</td>
</tr>
<tr>
<td>4</td>
<td>Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance</td>
</tr>
<tr>
<td>5</td>
<td>Severe disability; bedridden, incontinent and requiring constant nursing care and attention</td>
</tr>
<tr>
<td>6</td>
<td>Dead</td>
</tr>
<tr>
<td>Component</td>
<td>Score</td>
</tr>
<tr>
<td>-----------</td>
<td>-------</td>
</tr>
<tr>
<td>Motor Arm Left</td>
<td>0</td>
</tr>
<tr>
<td>Motor Arm Right</td>
<td>0</td>
</tr>
<tr>
<td>Motor Leg Left</td>
<td>0</td>
</tr>
<tr>
<td>Motor Leg Right</td>
<td>0</td>
</tr>
</tbody>
</table>

**NIH Stroke Scale**

**Figure 2. National Institutes of Health Stroke Scale**
Stroke Outcomes in those over 80

- Canadian Study, published 2008, reference #2
- Looked at 7 day stroke fatality, discharge home to pre-stroke residence, and length of hospital stay (LOS)
- Less than 59 yo – 3.3% 7 day fatality, 66.8% were discharged to their pre-stroke residence, 6 day LOS
- 60-69 yo – 4.6% 7 day fatality, 63.7% were discharged to their pre-stroke residence, 7 day LOS
- 70-79 yo – 6.9% 7 day fatality, 58.0% were discharged to their pre-stroke residence, 8 day LOS
- Greater than 80 yo – 11.2% 7 day fatality, 47.2% were discharged to their pre-stroke residence, 10 day LOS

Rehabilitation following stroke in patients aged 85 and above

- Israeli study, published 2005, reference #3
- Looked at FIM scores and rehab hospital LOS
- 85 yo and older – Pre-stroke FIM = 117 +/- 12, post-stroke FIM = 64 +/- 20, LOS was 21 +/- 11 days and 80% went home
- 75 to 84 yo – Pre-stroke FIM = 118 +/- 13, post-stroke FIM = 66 +/- 20, LOS was 23 +/- 11 and 88% went home
- They felt age really was not a factor if patients were carefully selected for rehab
- Only study that really showed age was not a factor in rehab prognosis
Short- and long-term prognosis for very old stroke patients. The Copenhagen Stroke Study

- Danish study, published 2004, reference #4
- 85 yo and older (88 yo mean) – 58.6% died or were discharged to a nursing home, 35.6 had an inpatient mortality rate
- Less than 85 yo (71.7 yo mean) 31.2% died or were discharged to a nursing home, 18.1 had an inpatient mortality rate
- For the 85 yo and older, 5 years following the stroke, 91.6% of the patients had died or were nursing home residents
- For the less than 85 yo, 5 years following the stroke, 67.6% of the patients had died or were nursing home residents

Ischemic Stroke Prognosis in Adults

- From www.uptodate.com, last updated on December 28, 2015, reference #5
- “Acute phase predictors of stroke prognosis are stroke severity and age”
- Great recovery occurs between 3 and 6 months, and recovery can occur up to 18 months
- Estimated 30 day fatality rate after the first ischemic stroke ranges from 16% to 23%
- “In patients that are 12 hours to 7 days out from their stroke, who experience no complications, experience moderate and steady improvement in their neurological deficits.”
Long-Term Outcomes of Acute Ischemic Stroke in Patients Aged 80 Years and Older

- Korean study, published 2008, reference #6
- It looked at the mean duration of estimated survival following a stroke
  - 80 - 84 yo - 24 +/- 6.4 months
  - 85 – 89 yo – 8 +/- 7.3 months
  - 90 – 94 yo – 7 +/- 2.0 months

Stroke Prognosis in Elderly Patients

- As you can see, stroke prognosis is based on many factors
- Most studies show that stroke severity and age are the some of the largest factors
  - Stroke severity is measured by the persistent NIHSS (NIH Stroke Scale) that the patient has at discharge
- The administration of TPA, improves overall prognosis as well, even if no improvements are seen in the initial hospital stay
- Most studies show that stroke treatment on the floors, not the ER, is the best way to predict how well a patient will do on discharge
- Every stroke and every patient is different in predicting prognosis
Questions?