ENHANCING PATIENT OUTCOMES AFTER STROKE: ACUTE CARE AND BEYOND

Combined Sections Meeting 2017, San Antonio, TX
February 16, 2016

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Learning Objectives

1. Identify guidelines and best practices for comprehensive stroke care in the Acute Care setting.
2. Identify Physical Therapy functional outcomes appropriate for use in the Acute Care setting for patients post stroke.
3. List evidence-based practices in the Acute Care setting that may improve patient outcomes and prevent secondary complications for patients following stroke.
4. Describe the benefits of coordinate stroke care and recall process improvement strategies that will assist clinicians in better managing patients after stroke across the continuum of care.
Disclosure

The speakers do not present with any conflicts of interest in regards to the content of the presentation and have no relevant financial relationships to disclose.
Stroke Statistics

• Leading cause of disability and one of the highest causes of death in the US\(^1\)
• Recent decline from 4\(^{th}\) to 5\(^{th}\) leading cause of death in US; 2\(^{nd}\) worldwide\(^2\)
• Almost 800,000 individuals in the US suffer a stroke annually and 600,000 of them experience life long disability\(^3,4\)
• In 2010, the worldwide prevalence of stroke was 33 million, with 16.9 million having a first stroke\(^3\)
Stroke Statistics After tPA$^5$

- Mortality from stroke has declined since the use of intravenous tissue plasminogen activator (tPA) and improvements in multidisciplinary inpatient stroke care
Rates of Disability After Stroke

• 25-74% of the 50 million stroke survivors worldwide are fully or partially dependent in ADLs and mobility\textsuperscript{5,6}.

• 40% of stroke survivors are left with moderate functional impairments and 15-30% experience severe disability\textsuperscript{1,7}.

• Early rehabilitation in the first month after stroke leads to better recovery of body function and reduced disability\textsuperscript{8}.
Stroke Statistics$^9$

• Recurrent stroke is frequent- 25% of people who have a CVA will experience a second CVA within 5 years

• The country's highest death rates from stroke are in the southeastern United States
Stroke Mortality Rates$^{10}$
Demographic Differences

• 5th leading cause of death for Americans, but the risk varies with race and ethnicity\textsuperscript{9}
  – The risk of having a first stroke is nearly twice as high for blacks than for whites; blacks are more likely to die following a stroke than are whites
  – Rate of strokes in the Hispanic population falls between the rate of strokes for whites and blacks
  – American Indians, Alaska Natives and blacks are more likely to have had a stroke than other groups\textsuperscript{11}

• In 2009, 34\% of people hospitalized for stroke were younger than 65 years\textsuperscript{12}
Costs and Statistics

• Annual economic burden of stroke care is 34 billion dollars; this includes direct expenses and indirect costs\(^9\)

• According to 2010, CDC data, the average length of stay in the hospital for a patient post-stroke is 6.1 days\(^{13}\)
Stroke Awareness

• In a 2005 survey, most respondents recognized sudden numbness on one side as a symptom of stroke
  – Only 38% were aware of all major symptoms of stroke and knew to call 9-1-1 when someone was having a stroke\(^\text{14}\)

• Patients who arrive at the emergency room within 3 hours of their first symptoms tend to have less disability 3 months after a stroke than those who received delayed care\(^\text{15}\)
Stroke Research

- An increase in stroke research over the last decade may be responsible for the decade-long decline in stroke incidence and mortality.
- There are not many clinical trial or randomized control trials (RCTs) in the US.
- Largest area of growth in research has been in the specialty of Physical Medicine and Rehabilitation.
Northeast Cerebrovascular Consortium\textsuperscript{16}

- An independent organization established in 2006
- Comprised of 8 states in the Northeastern US
- Develops recommendations based on the Stroke Systems of Care Model to:
  - Improve care and decrease disparity
  - Improve collaboration and coordination
  - Share best practices
- Focus on stroke prevention and community education
  - EMS notification and response
  - Acute and subacute treatment and rehabilitation
Helsingborg Declaration 2006\textsuperscript{17,18}

- Helsingborg Declaration on stroke management recommendations:
  - Patient rehab needs should be assessed by a multidisciplinary team
  - Early rehabilitation within first few days after stroke and the creation of patient-centered rehab goals
  - Dedicated stroke units/beds
  - An understanding of the role of each team member
  - Cardiovascular conditioning
  - Continuum of care with stroke team on discharge and the use of community stroke liaisons
  - Long term follow-up to allow easy referral to rehab if functional changes are noted
  - Caregiver education
Rehabilitation Recommendations

• Severity of stroke is the biggest predictor of outcome
• Age negatively impact outcomes
• Patients need to be able to learn and tolerate therapy to benefit from acute inpatient stroke rehabilitation
• Patients with moderately to severe deficits benefit most from comprehensive inpatient specialized rehabilitation settings
• Treatment on an organized inpatient stroke unit:
  – Increases survival rates, possibility of returning home, possibility of achieving independence
  – Decreases chance of medical complications
• Early admission to rehab as soon as medically stable is also associated with improved patient outcomes up to 1 year
Level of Evidence for Stroke Care

- Level 1a evidence that patients treated on a multidisciplinary inpatient stroke unit have decreased:
  - Death, dependency, need for institutionalization
  - Length of stay

- Care on acute rehabilitation stroke units are associated with improved functional outcomes
Evidence for Efficiency of Stroke Care

• Very few studies have considered the cost of care provided by family, loss of income, long-term disability and general societal burden related to stroke

• Costs were not significantly lower for home-based versus in-patient therapy\textsuperscript{21,22}
  – Multiple regression analysis showed that the cost of a home-based program was related to level of disability after adjustment for age, comorbidity and presence/absence of a care-giver

• For patients with severe deficits, the initial cost may be greater for acute/subacute stroke specific programs, but there is reduced death and mortality versus home-based programs\textsuperscript{20}
Efficiency of Stroke Care

- Large percent of costs are for incidental/informal costs (i.e., caregiver cost/time)
  - Long-term disability and complication costs are a burden on our health care system
- Study in the UK on stroke care cost reported:
  - 49% of costs were direct, 24% were indirect, and 27% were informal
- Healthcare dollars are best if used on:
  - Primary prevention and treatment of vascular risk factors related to stroke
  - Admission of patients to multidisciplinary, stroke units
  - Adherence to stroke guidelines for patients in the acute phase of stroke
  - Early rehabilitation and availability of acute medical interventions
JFK Medical Center

- JFK Medical Center is a private, not-for-profit suburban hospital with 498 licensed bed
- Largest Emergency Department in the state
- Designated as a Comprehensive Stroke Center by the Joint Commission- recertified in 2016
- American Heart Association(AHA)/American Stroke Association (ASA) certified
  - Recipient of the AHA/ASA Get With the Guidelines for Stroke Gold+ Performance Achievement Award
- Healthgrades Stroke Care Excellence Award
- Ranked #1 in NJ for the last 10 years and in the top 5% of the country as per the Joint Commission
Johnson Rehabilitation Institute

• An onsite, 94 bed acute rehabilitation center
  – Accredited by the Joint Commission and Committee on Accreditation of Rehabilitation Facilities (CARF)
  – Inpatient rehabilitation unit: orthopedic cases, neurological cases, general medical cases
  – Specialized brain trauma unit: traumatic brain injury, brain tumors, stroke

• Both units receive patients following stroke
JFK Stroke Order Set

- Physical Therapy is an automatic consult for physicians using the stroke order set
- Allows therapists to quickly follow-up with referrals for patients after stroke
- Patients are often evaluated in the Emergency Department (ED) or Intensive Care Unit (ICU)
Management of Patients in the Emergency Department (ED)

- PT works with the nursing and medical staff to ensure medical stability
  - Special consideration for patients who have a neurosurgical consult or have received intravenous tPA

- A recent study which analyzed physician’s impressions of PT practice in the ED revealed:
  - Physicians had positive perceptions of PT practice in the ED
  - PTs were considered a “valuable asset” to the interprofessional team

- Lebec and colleagues concluded that PTs working in the ED improve quality of care, patient education and patient satisfaction
Management of Patients in Neurocritical Care (NCC)

• PT in the NCC Unit is specialized and requires therapists to understand both medical and surgical interventions for patients with hemorrhagic or ischemic strokes
  – Must possess a knowledge of craniotomies, craniectomies, burr hole procedures, aneurysm coilings and clippings
  – Familiarity with patients on ventilators or external ventriculostomy devices (EVDs)²⁶
Use of Functional Outcome Measures\textsuperscript{27-29}

• Functional outcome measure (OM) use is:
  – Influenced by time, comfort, evidence, resources
  – Mostly associated with practice setting instead of years of practice
    • APTA membership or specialty certification
Use of OMs in Practice\textsuperscript{29,30}

- Evidence Database to Guide Effectiveness (EDGE) template developed by APTA Section on Research was modified to assess utility and merit of use for evaluating a patient with stroke
- “Stroke EDGE” completed by the Neurology Section; 56 OMs were reviewed in a final compilation based on initial screening for appropriateness; Each scored from 4 (highly recommended) to 1 (not recommended)
- OMs can be used to: Monitor progress and identify at risk individuals
  - Contribute to an improved development of a care and discharge plan
  - Improve communication between care givers and facilities
  - Increase efficiency of practice
  - Compare patient outcomes between different clinicians and different facilities
- Use of OMs may facilitate compliance with CMS requirements
- Study showed training programs are effective in improving the use of OMs
Using Tools to Predict Outcomes

- For stroke trials, the Barthel Index (BI) and Modified Rankin Scale (mRS) are most commonly used.
- FIM is not well used in cohort studies beginning from stroke onset.
- OMs performed early during a patient’s acute stay are often underestimated because patients are still bedridden.
- If BI is done too early, it is not a good predictor of long-term function.
<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>6 MWT</strong></td>
<td>1 minute for instruction, 6 minutes for test</td>
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<tr>
<td></td>
<td>30 meters (100') of uninterrupted walk area</td>
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<tr>
<td></td>
<td>Stopwatch and measuring tape</td>
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<tr>
<td><strong>Timed Up and Go</strong></td>
<td>Measures fall risk, mobility, balance, walking capacity</td>
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<tr>
<td></td>
<td>Less than 5 minutes</td>
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<td></td>
<td>Stopwatch and arm chair</td>
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<tr>
<td></td>
<td>Able to use assistive device, but must do without assist</td>
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<tr>
<td></td>
<td>Cut-off score &gt;13 sec</td>
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<tr>
<td><strong>5 Times Sit to Stand</strong></td>
<td>Less than 5 minutes</td>
</tr>
<tr>
<td></td>
<td>Arm chair and stopwatch</td>
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<tr>
<td></td>
<td>Can use device, but if unable to complete without assistance, it is a failure</td>
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<td></td>
<td>Allows contact guard, (close) supervision and (modified) independent ratings</td>
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<tr>
<td><strong>10 Meter Walk Test (10 MWT)</strong></td>
<td>Walking speed</td>
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<tr>
<td></td>
<td>Less than 5 minutes</td>
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<tr>
<td></td>
<td>14 meters of unobstructed walking path</td>
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<tr>
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<td>Stopwatch</td>
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<tr>
<td></td>
<td>Can use device, but cannot have assistance</td>
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<tr>
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<td>Increased speed indicative of increased ability to walk independently</td>
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Modified Rankin Scale (mRS)$^{33,34}$

- Scored from 0 to 6
  - Describes clinically distinct functional levels
  - Responds well to patient reported outcomes and disability levels
  - Less detectable changes noted at lower scores (from 0-2)
  - Has a ceiling effect
- mRS scores are often reported in research studies
- Scores may be completed by physicians, nurses, therapists or researchers
Barthel Index (BI)

• 10 items with varying weight\textsuperscript{31,33,34}
  – Point scale of 0, 5, 10, 15
  – Higher score indicates increasing independence
  – Has a ceiling effect
  – Good for minimal detectable change in long term studies
  – 2-5 minutes to complete self-report and 20 minutes of direct clinician observation

• When BI scores are compared with FIM scores they show similar results\textsuperscript{34,35}
  – On higher functional levels both the BI and mRS had fairly equivalent scores
Predicting Outcomes in the Upper Extremity (UE)\textsuperscript{8}

- Many evidence-based (EB) treatments are dependent on appropriate patient selection
- For 80\% of patient’s who suffered from their first stroke, recovery follows the same sequence of activity progression as BI items
- Studies demonstrate that the greatest gains are within 3-6 months, but improvements can continue for over a year
- The Copenhagen study of 1,179 patients showed 95\% of patients reached their maximum on the BI at 4 months
  - 4-10\% of all patients will show further improvement in UE and lower extremity (LE) function and ADL
  - 15-25\% show a significant decline in function at 6 months
Patient Goals After Stroke

• The rehabilitation of stroke patients is a continuum, which may begin with preventative measures and passive interventions.36

• Goals of early rehab for PT:
  – Encouraging proper positioning
  – Prevent contractures and pressure ulcers
  – Chest PT to improve secretion clearance and airway management
  – Passive stretching to maintain muscle length, prevent contractures, reduce motor neuron excitability and spasticity.37
  – Cardiovascular training and progressive mobility as tolerated
  – Patient and caregiver education
  – Goal setting and discharge planning

• Goal is to improve functional outcomes for patients, which also contributes to:
  – Increased Patient/caregiver satisfaction
  – A potential reduction for readmission and long-term financial expenditures.38
Progressive Mobility

• For lower level patients, increase:
  – Mobility with and without assistive device use
  – Activity tolerance and time out of bed
  – Patient and family education: orientation, positioning, cognitive awareness

• With higher level patients:
  – Increase ability to multi-task and higher level cognitive tasks
  – Introduce higher level balance training and coordination activities
  – Promote improved endurance and introduce fall recovery strategies
  – Initiate community re-entry and education on return to work/driving
JFK Program Improvement

• Emphasize clear communication across providers and patients/caregivers, concise documentation and more thorough handoffs

• Therapy department assisted:
  – Nursing staff on our stroke service with revising their nursing handoff form
  – Nursing leadership with improving unit-to-unit and shift-to-shift communication
  – With trials of a written handoff of each patient’s mobility status in the NCC unit
JFK Program Improvement

• New NCC Intensivist started at JFK with a mission to improve mobility, communication and patient outcomes
  – Prioritizing NCC patients in the AM
  – White board handoffs
  – Improved communication of therapy staff and NCC team
• Timeframe for bedrest was 24 hours after tPA
  – Suggested a reduction in the tPA window from 24 hours of bedrest to 6 hours of bedrest with physician consent
Mobilizing Patients After tPA

• Studies demonstrated the safety of early mobilization of patients with acute ischemic stroke between 12 and 24 hours after receiving intravenous tPA and 90% of patients experienced no adverse events
  – 1 patient experienced asymptomatic orthostatic hypotension
  – 73% were mobilized without adverse events and 89% tolerated all mobilization activities
    • One patient had transient hemiparesis
    • Patients require neurologic and vital sign monitoring
Mobilizing Patients After tPA

- Patients received PT with early mobility 13-24 hours after receiving intravenous tPA\textsuperscript{41}
  - 76\% of patients had no complications with mobility
  - 87\% of mobility activities were tolerated without any adverse response
    - No sustained neurological deficit noted or bleeding from an invasive line
- AVERT Phase III included 500 patients who had tPA and focused on rehabilitation treatment and timing during a patient’s hospital stay\textsuperscript{42}
Mobilizing Patients After tPA

• At JFK, over 20 cases where patients have received tPA and been mobilized in under 12 hours

• No adverse events reported
Mobilizing Patients After Stroke

• Many guidelines have advocated for early patient mobility, but the timing and type of mobility has not been addressed in research\textsuperscript{42,43}

• Body of evidence on the potential negative effects of mobility within 24 hours of stroke for patients with intracerebral hemorrhage\textsuperscript{44,45}

• Smaller study found that earlier mobility, defined as mobilization within 24 hours of stroke onset, was not a positive predictor of function at 3 months\textsuperscript{46}
Mobilizing Patients After Stroke

• Early mobilization within 24 hours of stroke onset was feasible and did not increase 3 month mortality\textsuperscript{47}
  – Patients returned to walking 2.5 days faster\textsuperscript{48}
  – Improved functional outcomes noted at 3 months\textsuperscript{49}
  – Reduced cost of care\textsuperscript{50}

• Rehabilitation intensity was a significant predictor of function after adjusting for initial stroke severity and age\textsuperscript{51}
  – Patients with severe stroke benefited more than those with moderate stroke from increased rehabilitation intensity

• It costs less to care for patients receiving early mobilization compared to standard care\textsuperscript{52}
Mobilizing Patients After Stroke

• Limitation of research: Early mobilization group had a higher intensity of activity with more frequent doses\(^5\)

  – Future research should look at the dose response relationship of mobility and assess different mobility activities
Mobilizing Patients After Stroke

- Authors hypothesized that PT would be different between treatment group versus standard care group and that immobility-related events would be associated with therapy dose
  - Single blind, multicenter, RCT
  - Timing, amount of therapy and therapy type was recorded and analyzed for 71 patients
  - Frequency of therapy and percentage of out of bed activities were different between groups
  - Mobilization was earlier, occurred an average of 3 times/day, with more patients receiving out-of-bed activities
- Conclusion: The therapy schedule was different in the intervention group, but there was no difference in immobility-related events in 3 months post-stroke between groups
Mobilizing Patients After Stroke

• Early mobility was found to be safe for patients after aneurysmal subarachnoid hemorrhage (SAH) in a small, retrospective analysis\(^5\)\(^5\)
  – 25 patients received early mobility by PT/OT following SAH
  – Patients were mobilized 3.2 days after aneurysmal SAH
  – No mortalities 30 days after mobility and adverse events occurred in under 6% of cases

• Early mobilization and rehabilitation increased the chance of good functional outcome in patients with poor grade aneurysmal SAH\(^5\)\(^6\)
  – Prospective study that assessed the impact of early mobility and rehab on global function one year after the hemorrhage
  – Regression analysis did not reveal a significant effect for most patients; however in poor grade patients, early rehab more than doubled the chance of a favorable outcome
  – Early rehabilitation was not harmful
Mobilizing Patients After Stroke\textsuperscript{57}

- AVERT Phase III:
  - Trial took place in 5 countries and included 56 stroke units
  - 2,014 patients were enrolled over 8 years including those with intracerebral hemorrhage and those that received tPA
  - Patients after stroke received either usual care or were in the early mobilization group
  - Primary outcomes was functional independence on the mRS score at 3 months
  - Conclusion: Those that received early mobilization had a less favorable mRS outcome compared to the usual care group and there was no difference in mortality or immobility-related complications between the 2 groups
  - No differences found for patients who received tPA
Mobilizing Patients After Stroke

• Authors recommend:
  – Early, lower-dose out-of-bed activity regimen is preferable to very early, frequent, higher-dose intervention
  – Refining present stroke care guidelines to reflect results
  – Further research should look at analyses of dose-response associations
External Ventricular Devices (EVD)

- EVDs should be clamped for safe mobility\(^5^8\)
- PTs mobilize patients with EVDs based on:\(^5^9\)
  - Patient current medical status, clinical findings and patient safety concerns
  - Intensity level of patient mobilization is related to the experience level of the therapist
- Prospective case series:\(^6^0\)
  - 90 patients with 185 patient encounters were recorded over a 1 year period
  - In 81% of encounters, patients were at least standing and 54% were walking with assistance or better
  - Four adverse events were recorded
Mobilizing Patients After Stroke

• Early mobility can decrease:\textsuperscript{61}
  – Number of patient days in restraints
  – Pneumonia and infection rates
  – Overall cost of care
  – Hospital readmission rates and morbidity

• Safety always comes first!
  – Follow systolic pressure guidelines as physicians may induce HTN to improve cerebral perfusion\textsuperscript{62}
    • This may minimize brain damage and improve functional outcomes after stroke
Group Discussion & Break

• Identify areas of improvement in your organization:
  – Therapy referral process
  – Staff education
  – Patient & caregiver education
Evidence-Based Intervention

- Reviewed 467 RCTs involving 25,372 patients post-stroke at varying levels
- Many interventions are not generalized or transferable
- Early mobility within 24 hours:
  - No significant benefits for decreasing complications or neurological deterioration
  - Did not significantly affect fatigue, independence in ADLs at 3 months or discharge home
- High intensity exercise therapy-mean of 17 hours more than control group over 4 weeks:
  - Beneficial for UE/LE motor function, gait speed, tone, quality of life, ADL, anxiety, muscle strength
- Sit to stand training- no significant benefit for body weight distribution, sit to stand and balance
- Standing balance training without biofeedback- no significant benefit for postural sway, sit to stand, balance or walking
Evidence-Based Intervention$^{5,19}$

- Standing balance with biofeedback (with use of force platforms)- used to improve postural sway
  - No significant benefit for paretic LE function, gait speed, cadence, step length, balance, functional ambulation and ADLs
- Balance training during functional activities- positive benefit for increased independence with ADLs and balance during mobility
- Partial Weight Body Support (PWBS) Training- meta-analysis showed positive effect for comfortable gait speed and walking distance, but none for max speed, motor function, aerobic capacity, quality of life
- Electromechanical-assisted gait training:
  - Without functional electrical stimulation (FES)- improved gait speed, walking distance, peak heart rate and basic ADLs; best in early phase
  - With FES- positive for walking and balance only in early rehab phase
- Speed-dependent treadmill (no PWBS)- good for maximum walking speed and step length and beneficial at all phases
Evidence-Based Intervention$^{5,19}$

- Over ground walking: beneficial for decreasing anxiety and balance in independently walking patients, particularly in chronic phase
  - Encourages more walking
- Circuit training class with different stations: very beneficial for increased walking speed, balance, walking ability and physical activity
- Neuromuscular Electrical Stimulation (NMES) for paretic LE: beneficial for increased motor function, muscle strength, tone
- Transcutaneous Electrical Stimulation: good results for strength, walking ability
- Constraint-induced movement therapy (CIMT): original protocol has level 1 evidence also, positive results with multiple protocols
  - Modified CIMT (mCIMT): some as little as 3 hours constraint time
  - Improved UE motor function, synergy, daily functional use and ADLs
- UE splinting/supportive devices: not beneficial for motor function or pain
- NMES for paretic UE: showed best results with use for wrist and finger extension
PT Performance Improvement Projects

• Goal is for PT to initiate an evaluation for all patients diagnosed with a CVA/TIA within 24 hours of electronic order placement
  – Percentage in the high 90s
  – Improve weekday/weekend communication; provide more staff feedback & education

• Decrease the window of PT care provided and actual documentation completed
  – 90 minutes after completion of treatment
  – Goal: Decrease patient LOS & improve communication with other multidisciplinary team members
Other Program Changes

• Improved communication about stroke orders to stroke coordinator
  – Private physicians may not order OT or Physiatry/Rehab Medicine
  – New residents may inadvertently not use the Stroke protocol
• Code strokes are called in to the hospital while patient is in transit
• Flag patients with strokes for other members of the interdisciplinary team
  – One study looked at the rate that patients with acute ischemic stroke were missed by looking at ICD-9 codes
    – Of 2,027 cases, 14% were missed in the ED
    – Hospital stay was longer in those patients with missed diagnosis
    – Younger age and decreased levels of consciousness were associated with a higher odd of being missed
    – Altered mental status was the most common diagnosis that was missed
Rehabilitation Recommendations

- Severity of stroke is the biggest predictor of outcome
- Screening for rehabilitation:
  - Medical status, functional status, social and environmental factors
  - Capacity for improvement and assessment of needs
    - Family training, equipment, vocation and leisure activities
- Age negatively impacts outcomes:
  - For more elderly patients, factors such as cognition, family support and pre-morbid function highly impact the potential for discharge home
- Patients with moderate to severe deficits benefit most from comprehensive acute rehabilitation stroke care
Timing for Rehabilitation Transfer

• Transfer should be as soon as the patient is medically stable enough to participate in therapy\textsuperscript{65,66}

• One retrospective study looked at short, moderate or long onset admission intervals for patients with stroke who were admitted into an acute rehabilitation setting\textsuperscript{67}
  – FIM scores at admission and discharge for 418 patients after first stroke were recorded
  – Time of admission did not affect rehab outcomes of patients referred from acute care facilities where rehabilitation services were provided early and throughout the patient’s acute care stay
Decreasing Secondary Complications\textsuperscript{68}

- Energy expenditure during walking can be up to 2 times greater in patients with hemiplegia.
- Multiple RCTs with a variety of cardiovascular exercise program models ranging from 2 to 3x/week for 10 to 12 weeks with from 20 to 60 minutes of continuous exercise, yielded improvement in:
  - Peak oxygen consumption, blood pressure response, exercise tolerance and aerobic capacity.
- Aerobic programs can improve cardiovascular risk factors and improve medical management in stroke survivors.
Decreasing Secondary Complications$^{68}$

- Depression and fatigue have been shown to be barriers to participation in stroke rehabilitation.
- Neurological deficits and comorbidities may impact participation:
  - Study found if a physician recommended exercise, patients were 2 times more likely to follow through.
- Aggressive rehabilitation beyond 6 months post-stroke has been shown to increase aerobic capacity and sensorimotor function.
- If a patient is unable to tolerate a higher intensity program, they should have more frequent training at a lower intensity.
Discharge Dispositions

• Options include:
  – Acute inpatient rehabilitation or subacute rehabilitation
  – Long term acute care or long term care/skilled nursing facility
  – Home with:
    • No services
    • Homecare services or outpatient services
    • Recommendations for community resources - medical fitness centers, local gym membership
Discharge Recommendations

- Retrospective study of 311,910 patients over 65 year old, post-stroke
  - Average admission FIM was 60 and discharge was 84.8
  - More than 75% were discharged home after acute hospital stay
  - Patients were more likely to be discharged to another inpatient facility if:
    - FIM scores worse than 60
    - They were older than 77
    - Unmarried
  - FIM score, age and marital status were good predictors of discharge status

- Data collected from 481 patient records found a positive correlation between FIM scores and discharge to the community
  - FIM found to be a reliable prediction of discharge to the community from the acute hospital among patients with stroke
Discharge Recommendations

- Prospective study using NIHSS, mRS, Short Portable Mental Status Questionnaire, and BI
- Higher BI was the only factor found to be associated with a return home versus another inpatient facility
- More likely to be discharged to rehab with moderate to severe ADL impairment (BI score 25-60)
- Factors affecting discharge home versus inpatient facility:
  - Sociodemographics, premorbid function and ADL impairment
- Selection of rehab versus subacute rehab influenced by nonclinical factors such as:
  - Cost, geography, referral relationship or bed availability
Discharge Recommendations

• The National Quality Forum reports that:
  – Clinical stroke rehabilitation guidelines and national standards of care suggest assessment of patients for rehabilitation after stroke
  – Place of discharge is associated with rate of functional gains and readmission rates to acute care
  – Endorse ordering rehabilitation services for all patients and assessment for further rehabilitation in acute care
Staff Education & Training

• Hospital-wide staff education and training
  – BE: Balance decreased & Eyes impaired
  – FAST: Face drooping, Arm weakness, Speech difficulties, Time to call 9-1-1

• Patient/Caregiver handouts:
  – ROM handouts
  – Improved NCC Unit education
STROKE RECOVERY IN THE CRITICAL CARE UNIT

Welcome to JFK Medical Center. Patients who are admitted to the hospital with a new diagnosis of stroke will receive Occupational, Physical and Speech Therapy as part of their treatment. The process begins when therapy is ordered by your doctor and begins in the Critical Care Unit. Each patient will have an evaluation at the bedside. Based on these findings, an individualized treatment program is developed.

**OCCUPATIONAL THERAPY**: Evaluates essential skills for independence in daily activities. These areas include eating, bathing, dressing and toileting. In addition, mobility, vision and thinking skills are assessed to determine the ability to safely complete daily activities.

**PHYSICAL THERAPY**: Evaluates strength, balance and muscle control and the impact of these areas on physical function, including walking and moving in bed. The therapist determines the safest way to move around and assesses the need for walking equipment.

**SPEECH THERAPY**: Evaluates swallowing, speech, language and cognitive skills. The speech pathologist works with the doctor and nurse to determine the safest diet for the patient. Additional testing may occur at the next level of care.

The therapy team works closely with the nurses and doctors during the initial stages of stroke recovery. The therapists will work together to ensure patient safety and manage critical lines.

Immediately following a stroke, some muscles may become weak. Often, the arm or leg will feel “heavy” and may look or seem limp. This would indicate a loss of muscle strength and tone. Therapy treatment will consist of skilled exercises and may include caregiver instruction. As recovery occurs, patients may regain mobility, strength and coordination to allow better use of his/her limbs. The amount of recovery differs patient to patient, depending on the area of the brain affected. We encourage visitors to stand or sit on the patient’s weaker side which will promote awareness. Proper positioning in bed is important and may prevent injury. Communication and swallowing problems may occur following a stroke. Sometimes patients may “forget” where he/she is and not remember family members’ names. These are areas that the speech pathologist will work on in treatment sessions.

As the recovery process continues, further recommendations will be made for the next step of rehab. Therapy services are available at various settings to further address patient goals for returning to his/her prior level of function. Available services are based on a variety of factors.

Our mission is to provide patients, families and caregivers with the knowledge and education needed to begin a smooth recovery process. The therapy team is available to answer questions regarding this journey of recovery from stroke. Please feel free to discuss concerns or questions with members of the therapy department.
Role of Acute PT

• PTs play an active role in multidisciplinary committees

• Why is this important?
  – Educate other practitioners/disciplines about PT role in the Acute setting
  – Improve programs and patient outcomes
  – One study found that factors that positively influenced Acute PT staff’s experiences and clinical decision making was:73
    • Communication/relationships and professional identity/role
    • Strategies to improve these areas in the Acute Care setting include:
      – Promoting interprofessional relationships
      – Clearly defining the role of PT in the work setting
      – Conducting multidisciplinary team member education
Improving Patient Mobility

• Work with nursing department to write a proposal for ceiling lifts
  – Improve staff and patient safety
  – Decrease patient and therapist exertion

• Case report of PT treatment of a patient with stroke while using a ceiling mounted lift for transfers/gait training:\textsuperscript{74}
  – With lift use, the patient’s rate of perceived exertion (RPE) was an average of 6
  – RPE for the PT was a 2 when the ceiling lift was used and 5 when it was not used
Certified Stroke Rehab Specialist Committee

- Comprised of PTs and OTs who are stroke-certified
- Mission/Goals are to:
  - Provide a standardized level of excellent care across the rehabilitation continuum at JFK for patients with stroke
  - Organize a uniform system of assessments for stroke used across the continuum of care
  - Participate in stroke research to support evidence-based practice and sustain our JFK values of perfect performance and visionary spirit
  - Promote interdepartmental communication amongst the disciplines and departments to improve the care of patients with stroke across the rehabilitation continuum
  - Promote and enhance patient and family education regarding stroke management, recovery and prevention
Case Study

- 68 year-old female was found confused and wandering
- Diagnosed with a right frontal hematoma; treated and discharged
- No improvement after a few days, family brought her to JFK for further workup which revealed:
  - Large right frontal intracranial hemorrhage with edema and mass effect
- PT/OT evaluation revealed: mRS score of 4
  - 3+ bilateral LE muscle strength
  - Completed bed mobility and transfers with close supervision
  - Ambulated 50 feet with contact guard assistance, with no assistive device
  - Decreased right eye vision and scanning to the left side
  - Poor attention to task, decreased memory, decreased cognition, decreased insight and orientation
  - Decreased independence with activities of daily living: dressing, grooming, bathing
Case Study

• Therapy plan: balance training, labeling of objects, visual scanning and improving attention to the left side, patient and family education

• Discharge disposition was initially home
  – Objective PT/OT findings, functional status, safety, social support were discussed extensively with patient, caregivers and with multidisciplinary team members
  – Team decided that the patient would benefit from a Physiatry consult for safe and appropriate discharge planning based on findings

• Following the Physiatrist’s evaluation it was determined that the patient was a good acute rehabilitation candidate
  – Insurance authorization was obtained and patient was transferred to the brain trauma unit of the Johnson Rehabilitation Institute
Case Study

- She received 3 hours of skilled PT, OT and speech language services, 5 days a week
- Plan of care in inpatient rehabilitation was similar to that on the acute care service, but more intense
- The patient was followed by her cardiologist and neurologist while in acute rehabilitation
- Upon discharge from inpatient rehabilitation, the patient was:
  - Independent with feeding
  - Required supervision for washing/drying clothes and completing toilet/shower transfers
  - Required close supervision for ambulation and stair climbing
  - Was not cleared for return to work or to driving
JFK Stroke Recovery Program

• Compares outcomes of patients with stroke who received specialized, multidisciplinary outpatient follow-up with patients receiving traditional rehab

• Why is this important?
  – Hospital readmission among stroke survivors with disability is common; follow-up intervention after discharge can prevent readmissions, especially for patients with greater impairments\(^75\)
  – Physical activity, muscle strengthening and exercise should be incorporated into the management of stroke survivors\(^76\)
  – Research shows that patients with stroke do better with an organized, interprofessional approach to post-acute rehabilitation\(^77\)
Dissemination of Stroke Information

- In-service on stroke continuum and 4 hours of stroke education
- Journal club:
  - Individuals with chronic right middle cerebral artery (MCA) territory lesions exhibit slower, asymmetrical gait compared to those with left MCA lesions\textsuperscript{78}
    - For these patients, larger amounts of gray matter may help preserve locomotor control
  - Aquatic treadmill training yields better cardiovascular responses than land training for patients with subacute stroke\textsuperscript{79}
  - TENS, electrostimulation, optokinetic stimulation, mirror therapy and virtual reality training are effective in treating unilateral neglect syndrome in patients with stroke\textsuperscript{80}
  - Early assessment of and management of trunk control for patients with stroke can predict and potential improve long term ADL function\textsuperscript{81}
Dissemination of Stroke Information

• Staff education: American Heart Association/American Stroke Association released updated guidelines on preventing recurrent stroke in patients who have had a previous stroke/TIA
  – Guidelines address risk factors for stroke: modifiable vascular risk factors and behavioral risk factors¹
Additional Resources

- National Stroke Association\textsuperscript{82} – Information for stroke survivors, patients, families and healthcare professionals
- American Heart Association/American Stroke Association American\textsuperscript{83} - Information for patients and families on life after stroke, warning signs
- Center for Disease Control and Prevention\textsuperscript{84} - Quick stroke facts and educational materials for patients/families
- National Institute of Neurological Disorders and Stroke\textsuperscript{85} - Information on general stroke facts, post-stroke brochures for patients and caregivers, rehabilitation and research initiatives
Additional Resources

• National Institute of Health\textsuperscript{86} - Information on stroke for families via a stroke toolkit, available in English and Spanish
• Academy of Neurologic Physical Therapy\textsuperscript{87} - Consumer information and stroke PT information
• Rehabilitation Measures Database\textsuperscript{88} - List of different rehabilitation measures with valuable information
• Move Forward. Physical Therapy Brings Motion to Life\textsuperscript{89} - List of stroke warning signs and symptoms and information for patients following stroke
• Booklet on Stroke Recovery\textsuperscript{90} - Describes the stroke recovery process for patients and families
Additional Resources

• The Northeast Cerebrovascular Consortium\textsuperscript{16} - Dedicated to improving stroke systems of care across the Northeast

• Evidence Based Research on Stroke Rehabilitation (EBRSR)\textsuperscript{91}: The Canadian Partnership for Stroke Recovery - Provides in depth reviews on stroke-related research

• Stroke Engine\textsuperscript{92} - The Canadian Partnership for Stroke Recovery patient education website
Questions
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