Where do we go from here?

Overview of Rehabilitation for Stroke

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Objectives

- Review role of PM&R specialist
- Discuss criteria for inpatient rehabilitation
- Discuss principles of stroke rehabilitation
- Review some newer stroke rehabilitation techniques

Physicians Adding Quality to Life

Physiatrists, or rehabilitation physicians, are nerve, muscle, and bone experts who treat injuries or illnesses that affect how you move. The job of a rehabilitation physician is to treat any disability resulting from disease or injury, from sore shoulders to spinal cord injuries. The focus is on the development of a comprehensive program for putting the pieces of a person’s life back together after injury or disease – without surgery.

What do I tell patients?

Physiatrists specialize in function.
Goals of the PM&R Specialist

- Restore patient to maximum mobilization
- Help patient regain functional independence and confidence
- Provide measures to prevent falls and ensure safety
- Educate patient and family about secondary prevention
- Facilitate psychosocial adjustment

Definition of Disablement

- Organ dysfunction (impairment)
- Difficulty with tasks (disability)
- Social disadvantage (handicap)

- The ultimate goal of rehabilitation is to reduce handicap

Stroke Statistics

- Strokes account for ~17% IRF admissions
- Average LOS in IRF is 15 days
- 70% stroke patients go home from IRF
- By 3 months post CVA, 90% of patients are home
Elements of Stroke Rehabilitation

- Prevention
- Treatment
- Compensation
- Maintenance
- Reintegration

Rehabilitation During Acute Hospitalization

- Within 12-24 hours, if possible (?)
- Daily active/passive ROM exercises
- Progressively increased activity
- Changes of position in bed
  - pullsheet method
  - limb positioning & support
- Encouragement to resume self-care & socialization
Early Mobilization

- Very Early Rehabilitation or Intensive Telemetry after Stroke (VERITAS)  Being allocated to the early mobilization group was associated with an odds ratio of 5.5 (0.3 to 114) of achieving independent walking.

- A Very Early Rehabilitation Trial (AVERT), a multicenter, phase II randomized trial  Earlier and more intensive mobilization after stroke may fast-track return to unassisted walking and improve functional recovery.

- AVERT phase III randomized trial  Fewer patients in the very early mobilisation group had a favourable outcome than those in the usual care group (n=480 [46%] vs n=525 [50%]; adjusted odds ratio [OR] 0.73, 95% CI 0.59–0.90; p=0.004)5 Lancet 2015; 386: 46–5

Early Mobilization

- First mobilisation took place within 24 h for most patients in this trial. The higher dose, very early mobilisation protocol was associated with a reduction in the odds of a favourable outcome at 3 months. Early mobilisation after stroke is recommended in many clinical practice guidelines worldwide, and our findings should affect clinical practice by refining present guidelines; however, clinical recommendations should be informed by future analyses of dose–response associations.

- The effect on patient outcome of lying down for 24 h after admission for stroke is being assessed in the large HeadPoST trial.

Management of Dysphagia

- Goals
  - prevent dehydration and malnutrition
  - prevent aspiration and pneumonia
  - restore ability to chew and swallow safely

- Compensatory treatments
  - changes in posture for swallowing
  - learning new swallowing maneuvers
  - changes in food texture and bolus size

- Fallback measures
  - parenteral or tube feeding
  - gastrostomy for long-term tube feeding
Maintaining Skin Integrity
- Daily inspection
- Routine cleansing
- Protection from moisture
- Frequent position changes
- Maintenance of adequate hydration/nutrition
- Individual mobility-improvement measures

Managing Bowel/Bladder Dysfunction
- Timed voiding
- Clean intermittent catheterization
- Indwelling catheter as last resort
- Bowel training program

Preventing Falls
- At-admission and periodic risk assessment
- High-risk factors
  - visual neglect
  - slowness in performing tasks
  - impulsive movements
  - older age
  - history of falls
  - multiple transfer situations
Determining Rehabilitation Needs

- Standardized protocols
  - repeated clinical examinations
  - full & consistent documentation throughout
- Assessment targets
  - neurologic impairments
  - medical problems
  - disabilities
  - living conditions and community reintegration
- Determine appropriate rehabilitation setting as soon as patient is medically stable

Continuity of Care and Family Involvement

- Multiple care settings during recovery
- Patient and family must:
  - be fully informed & participate in decisions
  - participate actively in rehabilitation

Patient Characteristics Suggestive of Poor Rehabilitation Outcomes

- Severe functional/motor/cognitive deficits
- Persistent urinary/fecal incontinence
- Severe visual/spatial deficits
- Sitting imbalance
- Severe aphasia
- Altered level of consciousness
- Major depression
- Severe co-morbidities
- Disability before stroke
- Older age
Rehabilitation After the Acute Phase

SNF vs IPR

- 24-hr nursing care
  - 15-30 patients per RN
- 1-2 hours therapy per day
- Physician visits 1-2 times per month

- 24-hr nursing care
  - 5-7 patients per RN
  - Certified rehabilitation nurse
- At least 3 hours therapy per day
- Physician visits at least 3 times per week

Insurance Criteria for IPR/IRF

1. Requires more than one therapy
2. Requires an intensive program
3. Is expected to show measurable, practical improvement in function within a reasonable period of time.
4. Requires close rehabilitation physician supervision
5. Requires an interdisciplinary team approach
1. Requires more than one therapy

- Disabilities in two or more of the following:
  - Mobility
  - Swallowing
  - Pain management
  - Cognition
  - Bowel/bladder control
  - Communication
  - ADL function
  - Emotional function

2. Requires an intensive program

- Patients must be able to tolerate a minimum of 3 hours of therapy per day
- In some cases, 15 hours of therapy over 7 consecutive days (i.e. hemodialysis)
- In the acute setting, physical endurance sufficient to:
  - Sit at least 1 hour per day (supported)
  - Participate in rehabilitation
3. Is expected to show measurable, practical improvement in function within a reasonable period of time.

- Clear and reasonable goals
- Achievable within a reasonable period of time
- Will likely result in discharge to a less restrictive level of care

4. Requires close rehabilitation physician supervision

- Physician is available 24 hours / day
- Sees patient and documents at least 3 times / week
- Physician directs and oversees the rehabilitation program
- Requires frequent physician oversight of one or more medical problems
- Other physician specialties frequently involved – primary care/hospitalist, neurology, psychiatry, geriatrics

5. Requires an interdisciplinary team approach

- Weekly team meetings
- Frequent communication between disciplines
- Team members work collaboratively to achieve goals
- Setting Rehabilitation Goals
  - Both short- and long-term
  - Realistic
  - Agreed upon by all parties
  - Specific about roles, tasks, and activities
Functional Independence Measure (FIM)

- Standardized, validated measure of function
  - Assesses 18 domains of physical and cognitive function
  - Score ranges from 18 (dependent) to 126 (independent)
- Used by all IRF at admission and discharge
- Helps determine reimbursement by Medicare
- Used to assess effectiveness/performance of IRF units

Functional Independence Measure

1. Dependent (D)
2. Maximum assistance (Max A)
3. Moderate assistance (Mod A)
4. Minimum assistance (Min A)
   [Contact guard assistance (CGA)]
5. Supervision (S)
6. Modified independent (Mod I)
7. Independent (I)

POST-ACUTE MANAGEMENT OF SPECIFIC CONDITIONS
Managing Sensorimotor Deficits and Impaired Mobility

- Remediation/facilitation to enhance motor recovery
- Compensatory training to improve function
- Adaptive devices/orthotics

Managing Cognitive and Perceptual Deficits

- Goal-directed treatment plans
- Retraining
- Substitution of intact abilities
- Compensatory approaches

Diagnosing Depression

- Symptoms and history
  - diminished interest in activities
  - loss of energy/appetite/concentration
  - sleep disturbances/agitation
  - feelings of worthlessness/suicidal thoughts
  - history/observed behavior changes
- Causes to rule out
  - medications, e.g., sedatives
  - environmental factors
Treating Depression

- Mild depression
  - attention/encouragement, therapeutic activities
  - simple environmental changes
- More severe depression
  - antidepressant medications
  - psychotherapy

Treating Speech/Language Disorders

- Aphasia
  - language retrieval
  - improved comprehension
- Dysarthria/apraxia of speech
  - reinstate normal intelligibility
  - assistive devices

Various Rehabilitation Techniques

- Many new methods being studied
- Most research is case study, anecdotal, or Phase II
- Difficult to isolate individual techniques, especially in acute stroke
- Very difficult to perform double-blind, placebo-controlled trials of rehabilitation techniques
Constraint Induced Movement Therapy (CIMT)

- Patient’s unaffected arm is restrained, forcing use of the affected arm
- Combined with task-oriented training
- Requires at least wrist extension and some arm and hand movement
- Therapy lasts 6 hours/day, 5 days/week, for 3 weeks
- Modified CIMT – reduced time spent training
- Forced Use – restraint without training
- Most studied in chronic stroke
- Appears to be effective

Early CIMT

- VECTORS trial
  - Constraint-induced movement therapy (CIMT) was equally as effective but not superior to an equal dose of traditional therapy during inpatient stroke rehabilitation. Higher intensity CIMT resulted in less motor improvement at 90 days, indicating an inverse dose-response relationship. Motor intervention trials should control for dose, and higher doses of motor training cannot be assumed to be more beneficial, particularly early after stroke. Neurology. 2009 Jul 21; 73(3): 195–201.

Body Weight Supported Treadmill Training

People after stroke who receive treadmill training with or without body weight support are not more likely to improve their ability to walk independently compared with people after stroke not receiving treadmill training, but walking speed and walking endurance may improve. Cochrane Database Syst Rev. 2014 Jan 24;3
Locomotor Experience Applied Post-Stroke (LEAPS) Trial

- Early (2 mos post stroke)
- Late (6 mos post stroke)
- Early home exercise

- Results suggest that there are not any differences between body-weight-supported treadmill devices and a home-based physical therapy program. There were not any differences in outcomes in terms of the timing of therapy, but
- the earlier therapy groups seemed to recover faster than the later therapy group.

Brain Stimulation

- Repetitive transcranial magnetic stimulation (rTMS)
- Transcranial direct current stimulation (tDCS)

How does it work?

- Local affect on stimulated cortex
- Remodels functional network; rebalances interactions between damaged and nondamaged hemispheres
- Increases noise level which improves signal processing in certain brain systems

Brain Stimulation

- Transcranial Brain Stimulation to Promote Functional Recovery After Stroke Curr Opin Neurol. 2014;27(1):54-60

- Meta-analyses show that the value of NIBS as a therapeutic intervention to promote motor stroke recovery is promising, but still needs to be confirmed in large multicentre trials with an effort of standardization of the measured outcome variables to better understand the effect of NIBS on different components of stroke recovery: from hand functions to more global scales.
Transcranial direct current stimulation facilitates motor learning post-stroke: a systematic review and meta-analysis

- (1) stimulation protocols: anodal on the ipsilesional hemisphere, cathodal on the contralesional hemisphere, or bilateral;
- (2) recovery stage: subacute or chronic stroke;
- (3) stimulation timing: tDCS before or during motor practise; and
- (4) task-specific training or conventional rehabilitation protocols.

This robust meta-analysis identified novel long-term motor learning effects with tDCS and motor practise post-stroke.

Pharmacologic Treatment – most promising

- Dopaminergics (carbidopa/levodopa)
  - may promote neuroplasticity
  - combined with active therapy – mixed results
- SSRIs – fluoxetine, citalopram
  - may modulate neuronal plasticity
  - may be involved in neurogenesis and cortical motor activation
  - seem to be associated with an improvement in dependence, disability, neurological impairment and depression

Pharmacologic Treatment - others

- Acetylcholinesterase inhibitors (donepezil) – may have benefit in chronic aphasia
- Mammantine – may aid aphasia and cognitive impairment
- Amantadine – consciousness and cognition
- Methylphenidate – helps depression, may improve ADL function and motor recovery
- Modafinil – may help with wakefulness, especially in vertebro-basilar stroke
- Dextro-amphetamine – mixed results, more promising for language recovery
Measures of Successful Rehabilitation

- Normalized health patterns
- Freedom from physical pain, emotional distress, and impairments
- Retention of cognitive and communicative abilities
- Mobility and independence in ADL
- IMPROVED QUALITY OF LIFE

QUESTIONS?