Research to Reality: Evidence and Outcomes to Change Critical Care Culture, Part II

Jennifer Cline PT, MS
Deanna Dye PT, PhD

CSM San Diego; January 22, 2013; 11:00am – 1:00 pm.

Objectives

- Recognize conditions that may contraindicate early mobilization.
- Using current research, cite possible adverse events and the frequency in which they occur when mobilizing patients in the ICU.
- Identify outcome measures that have prognostic value within and outside the ICU.
- Recognize modifications of commonly used functional outcome measures to enable application within the ICU.
- Identify components needed to enhance test-retest reliability of a functional outcome measure.

ICU: Examining the Evidence

Long-term Consequences

Those who survive a critical illness face long term issues of:

- Neuromuscular weakness
- Neuropsychiatric dysfunction
- Impeding ability to return to work, decreasing quality of life, and a decrease in physical function
- Delirium is associated with increased mortality, longer length of stay in the ICU and hospital, increased time spent on the vent.

10 weeks of PT after 6 weeks bed rest

- ICU & Acute Care PT (7:30)
  - [http://www.youtube.com/watch?v=rAEjjcjob-Y](http://www.youtube.com/watch?v=rAEjjcjob-Y)


University of Alabama Study

2176 patients retrospective cohort

900 bed Level I trauma center

28 bed Trauma/burn ICU (TBICU)

Results

• Ambulation with endotracheal tube was safe
• Mean hospital days decreased
• A reduction in DVT, ventilator acquired pneumonia, pulmonary and vascular complications

What does the research show?

Lancet Article
• 2009 Randomized control study, intervention group received PT/OT, while the control group did not
  Results showed 59% of patients in treatment group returned to independent functional status
  Out of 498 therapy sessions only one adverse event (O2 sat <80%)


Critical Care Medicine 2008
Bailey et al

1,449 activity events in 103 patients

There were less than 1% adverse events which included falls to knees without injury, feeding tube removal. Systolic blood pressure >200, systolic BP< 90, O2 sat less than 80%


Critical Care Medicine 2008

Mobility group
• Spent less time on the ventilator (10.2 versus 8.8)
• Spent less time in the ICU (6.9 vs. 5.5)
• Spent less time in the hospital (14.5 vs. 11.2)

Biggest Threat to Success?

Sedation
• Diprivan (Propofol)
• Haloperidol (Haldol)
• Lorazepam (Ativan)

Neuromuscular Blockers
• (Nimbex)

If Successful:

What is skilled?
• Just being on a ventilator?

How do we move past PROM?

What is the preferred treatment?
### Treatment ideas

- Teach family/nursing PROM
- Positioning
- Pair breathing exercises with AAROM
- VAP bundle

Notes from Mary Massery: "If You Can't Breathe, You Can't Function"

### Treatment Advances

- Use of the Wii
- 42 rehab treatment sessions used for balance and endurance training
  - No safety issues noted
  - Could standardize therapy sessions not routinely done in the ICU


### Treatment Advances con’t

- Femoral Arterial Catheters (Chris Perme)
  - 30 patients underwent 47 therapy sessions to include sitting edge of bed, transferring, and ambulating
  - No adverse events noted
  - Bed rest with this catheter appears to be “strongly linked to culture of a medical institution”

### MOVEO

- ICU Weakness (3:30)

- ICU Pancreatitis – use of Moveo (1:30)

### Safe Test

- Can the patient follow commands?
- Can they sit in midline?
- Can the perform a straight leg test independently?
- Are they hemodynamically stable?

### Lab Values:

**Guidelines**
- What is the risk benefit?
- Experiences outside the guidelines?
- INR
- Platelets
- Hgb
Lines/Tubes
- To mobilize or not? That is the question:
- Imperative to know hospital policy-
- Swan Ganz Catheter
- Art Lines
- IABP

Pharmacology
- Vasopressors
  - Dopamine, Vasopressin, Epinephrine, Phenylephrine, Norepinephrine
- ECHMO
  - Extracorporeal membrane oxygenation
  - Veno-venous vs. Atrial-venous

Conditions
- ICP
- Surgical Evaluation
- Neurostorming
- Dialysis
- Glucose monitoring

Johns Hopkins
- Johns Hopkins
  - http://www.youtube.com/watch?v=D53pygWRhLM

How can you show the change was worth it?

Measuring Effectiveness
- Macro Measures: Facility generated outcomes
- Micro Measures: Patient performance outcomes
- Micro Measures: Patient reported outcomes
Macro Measures

- Length of Stay
- Discharge placement
- 30 day re-admission rate
  - Will Medicare pay?
- Morbidity and mortality rates
- Successful weaning

Micro Measures: monitoring and scales

- Rate of Perceived Exertion
  - 0-10
  - 6-20
- Per ACSM
  - Low
  - Moderate
  - High
- If unable to obtain a number, get a descriptor

- Vital Signs
  - With exertion
  - HR, BP, O2
  - At least with initial exertion

- Morbidity and mortality rates
- Successful weaning

Micro Measures: Functional tests

- FIM
  - Standardized scoring
  - Can compare over time and across patients
  - Outcome:
    - Score >80 = 94% sensitivity to return home
    - Correlates to BI
  - Primary research on patients post CVA

- Barthel Index
  - Large ceiling effect
  - Standardized scoring
  - Relates to self report
  - Outcome
    - Score >95 = self reported independence
    - Score < 80 = self reported dependence
    - In general favorable outcomes if score >75

RPE category scale

<table>
<thead>
<tr>
<th>RPE category</th>
<th>RPE category-ratio scales</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0 - Nothing at all</td>
</tr>
<tr>
<td>7</td>
<td>0.3 - Extrememly weak</td>
</tr>
<tr>
<td>8</td>
<td>0.5 - Just noticeable</td>
</tr>
<tr>
<td>9</td>
<td>0.7 - Very weak</td>
</tr>
<tr>
<td>10</td>
<td>1 - Weak</td>
</tr>
<tr>
<td>11</td>
<td>1.5 - Light</td>
</tr>
<tr>
<td>12</td>
<td>2 - Moderate</td>
</tr>
<tr>
<td>13</td>
<td>2.5 - Strong</td>
</tr>
<tr>
<td>14</td>
<td>3 - Heavy</td>
</tr>
<tr>
<td>15</td>
<td>4 - Very strong</td>
</tr>
<tr>
<td>16</td>
<td>5 - Extreme strong</td>
</tr>
<tr>
<td>17</td>
<td>6 - Highest possible</td>
</tr>
</tbody>
</table>

Angina and Dyspnea Scales

- 0 - none
- 1 - light, barely noticeable
- 2 - moderate, bothersome
- 3 - severe, very uncomfortable
- 4 - most severe

Dyspnea Index
Count to 15
If 1-2 breaths = normal at rest
3 = normal with activity

Micro Measures: Functional tests

- Physiotherapy Clinical Outcome Variables Scale (COVS)
  - Similar to FIM but all mobility specific
  - 13 items
  - Score >41 at admit = d/c home (92%)
  - For purchase (like the FIM)
    - http://www.mtc.ca/covs/

- Items include
  - Rolling R & Rolling L
  - Lying to sit
  - Sitting balance
  - Horizontal transfer
  - Vertical transfer
  - Ambulation perform
  - Ambulation A.D.
  - Endurance
  - Velocity
  - W/c Mobility
  - R & L Arm function

### Micro Measures: Functional tests

**Micro Measures: NIH Stroke Scale**
- 0: no stroke
- 1-4: minor stroke
- 5-15: moderate stroke
- 15-20: moderate/severe stroke
- 21-42: severe stroke

**Outcomes**
- NIHSS<5: 81% discharged home
- NIHSS 6-13: 48% rehabilitation center
- NIHSS >13: 50% nursing facility


### Micro Measures: Functional tests

**Micro Measures: Functional tests**

- **Functional Status Score for the ICU (FSS-ICU)**
  - Modified FIM
  - Use same 0 – 7 scoring criteria for different tasks
  - May predict d/c placement

**Tasks Include**
- Grooming
- Bathing
- Ambulation
-Rolling
- Transfer supine to sit
- Sitting at edge of bed
- Transfer sit to stand


### Micro Measures: Functional tests

**Micro Measures: University of Rochester Acute Care Evaluation (URACE)**
- Modified FIM
- Use same 0 – 7 scoring but then add additional scoring for environment

**Only 4 tasks**
- Supine to sit
- Transfer
- Locomotion
- Stairs

**Can be complicated to score**
- Link to tool


### Micro Measures: Functional tests

**Micro Measures: Functional tests**

- **PFIT (Physical function in the ICU) modified**
  - Sit to stand
  - Marching Cadence
  - Shoulder flexion
  - Knee extension and shoulder flexion

- **Correlated with d/c placement; MMT; and QOL**
- No established cut score


### Micro Measures: Functional tests

**Micro Measures: MMT**

- MMT
  - Using 0 – 5 scale
  - Score <49/60
    - Indicates increased risk of mortality and morbidity
    - Defines ICU – AW
  - Decreased reliability in presence of sedation


**Muscles used for scoring**
- Shoulder abduction
- Elbow flexion
- Wrist extension
- Hip flexion
- Knee extension
- Ankle dorsiflexion

**<49 would = <4 in all muscle groups tested**

### Micro Measures: Functional tests

**Micro Measures: Walk Tests**

- **TUG**
  - 10 – 15 sec cut-off
  - BUT
    - In acute care reason for not being able to complete more indicative of fall risk

- **Walking Velocity**
  - General norm 1.2 m/sec
  - Change of 0.10 m/sec is significant


Micro Measures: Balance

- **Sit and Reach**
  - Researched in SCI and CVA
  - No set scores yet
  - Does correlate with d/c placement; BERG; and FIM
  - Not a stand alone measure


Micro Measures: Sit to Stand

- **5X Sit to Stand**
  - 43 cm height
  - Not much data in acute care setting
  - Scores can indicate:
    - fall risk;
    - improved strength;
    - improved function;
    - cognitive deficit

- **Alternatives**
  - 10X Sit to Stand
  - 20 sec Sit to Stand
  - 30 second Sit to Stand
    - Used as part of Senior fitness test
  - 60 sec Sit to Stand
    - Change of 4 rep may be significant

Micro Measures: Step

- **Step Test**
  - 20 steps
  - Can predict VO2 max
  - Size of step can vary (20 cm used in study)


- **Step (touch) Test**
  - A component of the Berg
  - Can be used independently to predict falls
  - <7 touches in 15 seconds
  - Step height 7.5 cm (3 inches) used in study


Micro Measures: Step Test

- **March Test**
  - Number of steps in 2 min.
    - Normal pace
    - Hip to 90 degrees
    - Norms
      - 60-64 yrs = 75-107 / 87-115
      - 85-90 yrs = 55 – 85 / 59-91
    - NOTE: within PFIT
      - 80 step / min goal

Picture taken directly from: http://beaumontseniorfitness.com/2MinuteStepTest.aspx

Micro Measures: Patient reported

- **Medical Outcomes Study (SF-36)**
  - Can compare with norms
    - Domain norm score of 50 +/- 10
    - MID for norm converted scores
      - 3 point if score <40
      - 4 points if score >40
  - **Perceived Quality of Life (PQOL)**
    - 11 items of satisfaction
    - Score 0 – 100 on each item
  - **Sickness Impact Profile (SIP)**
    - 68 items (short version); 136 items (full version)

Bergner M et al. The sickness impact profile: development and final revision of a health status measure. Med Care 1983;21:747-772

“Culture changes only after you have successfully altered people’s actions, after the new behavior produces some group benefit for a period of time and after people see the connection between the new actions and the performance improvement.”

Putting it together

- Recognize your role within the organizational structure.
- Recognize the need for all people to feel respected, valued, and honored for their contribution.
- Recognize the political ramifications of not being aware of the structure and giving credit due.
- Recognize the need for unification through same language / symbols / mapping.

Remember – it is hard to move a brick wall

- Why change? It must have high value for all stakeholders!

http://monjalou.com/tactile_sense

Make a change

- Use the evidence to establish agreed upon goals and show the benefit
- Pick your team well
  - Recognize structural as well as political people of influence
- Reach beyond boundaries
  - Smooth those possible places of conflict
- Set benchmarks
- Celebrate success!!

Summary

- http://youtu.be/ebtGRvP3ILg