ICU Early Mobility Lessons Learned, Patient Benefits

Heidi Engel, PT, DPT
heidi.engel@ucsfmedctr.org

ICU Early Mobilization Considerations

- How to start a new program of early mobility
- How to determine if patients can tolerate mobility
- What level of activity is therapeutic
- Barriers and solutions
- Prevention for the long term

Cognitive, Psychological, and Physically Disabling Side Effects of ICU Stay

- 49% of patients unable to return to their previous work
- Delirium- inattentive and disorganized thinking in up to 75% of ICU patients
- Long term disruption of executive functioning and short term memory
- Post traumatic stress disorder in 44% of ICU survivors at time of discharge
- Weakness in 50% of patients with prolonged mechanical ventilation, sepsis, or multi-organ failure

The Evidence

What Can This Patient Tell Us?

- Assess for pain
- Assess for delirium
- Look at degree of weakness and tolerance for activity
- Assess for previous activity
- Learn about family and social support

Starting an Early Mobility Program

- Institute a structured Quality Improvement project
  - Institute for Healthcare Improvement Plan-Do-Study-Act Model
  - Collect preliminary data
  - Creating practice change through engagement of leadership and frontline staff, educate and collaborate, execute, and evaluate

Literature Describing QI Projects


Create a Business Model


OBJECTIVE: To evaluate the potential annual net cost savings of implementing an ICU early rehabilitation program. DESIGN: Using data from existing publications and actual experience with an early rehabilitation program in the Johns Hopkins Hospital Medical ICU, we developed a model of net financial savings/costs and presented results for ICUs with 200, 600, 900, and 2,000 annual admissions, accounting for both conservative- and best-case scenarios. Our example scenario provided a projected financial analysis of the Johns Hopkins Medical ICU early rehabilitation program, with 900 admissions per year, using actual reductions in length of stay achieved by this program. SETTING: U.S.-based adult ICUs

CONCLUSIONS: A financial model, based on actual experience and published data, projects that investment in an ICU early rehabilitation program can generate net financial savings for U.S. hospitals. Even under the most conservative assumptions, the projected net cost of implementing such a program is modest relative to the substantial improvements in patient outcomes demonstrated by ICU early rehabilitation programs.
What Practices Can Be Standardized

- ICU Early Mobilization Requires:
  - Admit to ICU with activity as tolerated orders
  - Physical Therapy referrals are included in MD orders
  - 60-80% of ICU patients receive consistent Physical Therapy daily
  - Patients are awake and as mobile as possible
  - Delirium minimized, sleep facilitated, sedatives targeted
  - Work of breathing is minimized during activity


<table>
<thead>
<tr>
<th>QI for Early Mobility</th>
<th>Wake Forest</th>
<th>Johns Hopkins</th>
<th>UCSF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
<td>Reduce immobility and weakness with early PT For MICU patients</td>
<td>Optimize patient sedation</td>
<td>Provide earlier and more frequent PT in the ICU for MICU and SICU patients</td>
</tr>
<tr>
<td>Planning time frame</td>
<td>1 year</td>
<td>1.5 years</td>
<td></td>
</tr>
<tr>
<td>Comparison Group</td>
<td>n=165 Control group</td>
<td>n=27 retrospective comparison</td>
<td>n=279 retrospective comparison</td>
</tr>
<tr>
<td>Intervention group and time frame</td>
<td>n=165 patients on MV 2004 to 2006 3/week mobility</td>
<td>n=30 on MV 2007 6/day mobility</td>
<td>n=298 all ICU patients 2010 3 days/week mobility</td>
</tr>
<tr>
<td>Number of added personnel and titles</td>
<td>1 RN, 1 CNA, 1 PT, 1 project manager</td>
<td>1 PT, 1 OT, 1 technician, 1 coordinator, 1 part time assistant coordinator</td>
<td>1 PT, 1 part time aide</td>
</tr>
<tr>
<td>Equipment added</td>
<td>2 wheelchairs</td>
<td>ICU platform walker</td>
<td></td>
</tr>
<tr>
<td>Outcome measures</td>
<td>Days to out of bed</td>
<td>Frequency of therapy</td>
<td>Percentage of ICU patients receiving PT</td>
</tr>
<tr>
<td></td>
<td>Frequency of therapy</td>
<td>ICU hospital LOS</td>
<td>ICU/hospital LOS</td>
</tr>
<tr>
<td></td>
<td>Adverse events</td>
<td>Adverse events</td>
<td>Pain/ delirium scores</td>
</tr>
</tbody>
</table>

Can This Patient Tolerate Activity?

Evidence of Safety


UCSF Exclusion Guidelines

- Patients with immediate plans to transfer to outside hospital
- Patients who require significant doses of vasopressors for hemodynamic stability (maintain MAP > 60)
- Mechanically ventilated patients who require FiO2 > 8 and/or PEEP > 12, or have acutely worsening respiratory failure
- Patients maintained on neuromuscular paralytics
- Patients with a grave prognosis
- Patients with unstable spine or extremity fractures
- Patients with open abdomen, at risk for dehiscence
- Patients in an acute neurological event (CVA, SAH, ICH) with re-assessment for mobility every 24 hours
- Patients unresponsive to verbal stimuli
- Patients with a grave prognosis- transferring to comfort care
- Patients with a femoral dialysis catheter
- Patients with open abdomen, at risk for dehiscence

Legend

- Can This Patient Tolerate Activity?
- Yes
- No
- Consult with MD
- Does the patient meet all of the following (+)?
- Does the patient open eyes to verbal or manual stimulation
- Does the patient present with any of the exclusion criteria?
(See the chart* below)
- Does the patient appropriately open eyes to manual stimulation?
- Do vital signs within acceptable parameters
- Demonstrating trunk control
- Remaining alert and oriented
- Bed rest order
- Active bleeding process
- Open abdomen
- Grave prognosis
- Unstable spine or extremity fractures
- Currently in an acute neurological event (CVA,SAH, ICH)
- Mechanically ventilated with FiO2 > 8 and/or PEEP > 12
- Significant dose of vasopressors for hemodynamic stability
- Patients maintained on neuromuscular paralytics
- Patients with a grave prognosis
- Patients with unstable spine or extremity fractures
- Patients with open abdomen, at risk for dehiscence
- Patients with immediate plans to transfer to outside hospital
- Patients who require significant doses of vasopressors for hemodynamic stability (maintain MAP > 60)
- Mechanically ventilated patients who require FiO2 > 8 and/or PEEP > 12, or have acutely worsening respiratory failure
- Patients maintained on neuromuscular paralytics
- Patients with a grave prognosis
- Patients with unstable spine or extremity fractures
- Patients with open abdomen, at risk for dehiscence
- Patients in an acute neurological event (CVA, SAH, ICH) with re-assessment for mobility every 24 hours
- Patients unresponsive to verbal stimuli
- Patients with a grave prognosis- transferring to comfort care
- Patients with a femoral dialysis catheter
- Patients with open abdomen, at risk for dehiscence
ICU: Prelude to Mobility Activity

- Physical Therapist Rounding in ICU
  - Look in on the patient
  - Set an appointment time with the patient and family
  - Talk to the RN, RT, OT
  - Medication needs prior to PT
  - Find that optimal window of time for the patient


Sitting on the Edge of the Bed

- Why is this therapeutic?
- What makes this different from using a lift device to transport a patient to a chair?
- What makes this different from placing the bed in a chair position?

Trunk control
Vestibular training
Joint compression
Joint/muscle stretching
Lung expansion
Airway clearance
Aerobic exercise? (Yes!)
GI motility
Orientation, mental status
Endurance

Sitting on the Edge of the Bed - Now What?

- Talk to patient and family- interview them
- Go SLOW
- Calm and reassure patient and family — Anxiety is normal
- Don’t forget the importance of upper body exercise

Activity Intensity and Dosage

- Patient baseline activity level
- Patient activity history including distant
- Patient most recent activity
- Passive turning doesn’t count

When Is It Time to Stop and Rest?

- Patient remains unresponsive
- Fatigued, pale appearance
- Respiratory rate consistently > 10 bpm above baseline
- Decreasing muscle recruitment
- Loss of balance
- Decreasing weight bearing ability
- Diaphoresis

What About All Those Critical Lines?

- Patient lines and drains can be accommodated
- Mechanical ventilation and CVVH lines

UCSF ICU Early Mobilization

Improvements in discharge outcome with decreased length of stay and greater percentage able to discharge to home correlate to:

- Earlier mobility
- More intense intervention
- Greater distance walked
Patients Expectations and Patient Centered Goals

Can This Patient Tolerate Activity?

Mobility is Life

- Early mobility is profoundly beneficial to your patients
- Don’t be afraid, they do better than you expect
- It is a MULTIDISCIPLINE task

In Summary

- Critical illness is catabolic and depleting, rapidly and potentially lasting for years
- A prolonged ICU stay can cause delirium and cognitive changes for most patients
- Mobility combined with minimal or no sedation started at the beginning of an ICU stay is protective and preventative
- Approach the task with structured QI project, collaboration, barrier identification