ICU Liberation: How Physical Therapy Is Part of Reducing the Harms of Critical Illness

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Objectives

• Explain the importance of providing early physical rehabilitation to patients in the ICU
• Reinforce and define the role of Physical Therapists in providing care to critically ill patients as part of an inter-professional collaborative care ICU team
• Define the barriers to ICU early physical rehabilitation and suggest solutions to overcome those barriers
• Cite patient case studies that illustrate Physical Therapy clinical decision making in the ICU setting
Course Outline

• Complex ICU case presentation emphasizing unique psycho-social aspects of ICU early physical rehabilitation
• Consequential harms to patients as a result of an ICU stay: weakness, immobility, delirium, long term functional and cognitive impairments
• Recommendations from Society of Critical Care Medicine outlined
• Example ICU early rehabilitation programs
• Assessing how we are doing
• Barriers: looking at 3 issues at the bedside keeping patients immobile: immobility is safety, timing and priorities, staffing and equipment
• ICU case presentation illustrating unique role of Physical Therapists

Society of Critical Care Medicine ICU Liberation - Free Your Patients from Potential Harms

ICU Acquired Weakness (ICUAW)
Immobility
Delirium
Long term cognitive impairments
Functional decline
Inability to return to previous employment or activities of daily living

Why Early ICU Patient Mobility?

Diaphragm muscle thinning and atrophy begins within 18 to 48 hours after intubation

Rectus Femoris protein breakdown begins within 24 hours of ICU admission, cross sectional area declining rapidly during first week
ICU Acquired Weakness

Change in architecture of muscle fibers within 18 to 69 hours

Loss of bone mineral density, bone adapts to the load placed on it, ALI patients have 19% greater risk of fracturing, 10 day study with average patient age of 55.

Frailty: Fried Frailty Index, hallmark is neuromuscular weakness, every 1 pt increase equal to 3X increased risk of 6 month mortality, 82% of older ICU survivors qualify as frail


Baldwin MR, Reid MC, Westlake AA, Rowe JW, Granieri EC, Wunsch H, Dam TT, Rabinowitz D, Goldstein NE, Maurer MS et al. (2014).

Why Early ICU Patient Mobility?

The duration of bed rest during critical illness was consistently associated with weakness throughout 24-month follow-up.


Based on available evidence, early exercise/PT seems to be the only treatment yet shown to improve long-term physical function of ICU survivors.


Interpretation of PAD Guidelines

Quality of evidence: statements and recommendations

- High (A)
- Moderate (B)
- Low/Very Low (C)

Strength of recommendations: recommendations only

- Either strong (1), weak (2), or none (0)
- Either in favor of an intervention (+) or against an intervention (-)
Outcomes Associated with Delirium in ICU Patients

i. Delirium is associated with increased mortality in adult ICU patients (A).

ii. Delirium is associated with prolonged ICU and hospital lengths of stay in adult ICU patients (A).

iii. Delirium is associated with the development of post-ICU cognitive impairment in adult ICU patients (B).

Depth of Sedation in ICU Patients

i. Light levels of sedation associated with improved clinical outcomes (e.g., shorter duration of mechanical ventilation and a shorter ICU length of stay) (B).

ii. Light levels increase physiologic stress response, but is not associated with an increased incidence of myocardial ischemia (B).

iii. The association between depth of sedation and psychological stress in these patients remains unclear (C).

iv. Recommend that sedative medications be titrated to maintain a light rather than a deep level of sedation, unless contraindicated (+1B).

v. Recommend routinely using either daily sedation interruption or targeting light level of sedation in MV patients (+1B).
Delirium Prevention

*We recommend performing early mobilization of adult ICU patients whenever feasible to reduce the incidence and duration of delirium (+1B)*


 Functional Decline Related to ICU Stay

Long Term Problem

- 3.3 year median follow up after discharge from trauma ICU 100 patients
  - 70% consider themselves less active than pre-injury
  - 49% returned to work.

Livingston DH, Tripp T, Biggs C, Lavery RF (2009).

More than 6 years after a surgical ICU admission, HRQOL is largely reduced. Many patients still have a variety of health problems, including decreased cognitive functioning.


ICU Liberation Project of SCCM

www.iculiberation.org & www.icudelirium.org
Neurocognitive and Functional Benefits to ICU Patients


RCT- 104 patients on mechanical ventilation
   intervention group- PT median of 3.5 days intubation
   control group- PT median of 7.4 days
   Intervention group-
      less days of delirium and MV
      59% return to independent function at hospital discharge
      35% in control group

Role Models- LDS Medical Center

- LDS Medical Center Mobility Protocol
- Walk 200' prior to extubation
- Walk 400' prior to ICU discharge
   - When patients appear not to have strength to do both reconditioning
     and weaning, support reconditioning first, then weaning.
   - Support work of breathing during physical activity.
   - Advance activity aggressively NOT progressively, patients will do
     the most that they can do at any given time.

UCSF ICU Early Mobilization Started
March 1st, 2010 9 ICU

- Physical Therapy coverage 8 hours/day
  5 or 6 days/week in 9 ICU
- Objective- referrals for physical therapy within 48 hours of
  patient admission to the ICU
- Objective- most ICU patients ambulating during their ICU stay
- Goals-
  - patients wean ventilators faster
  - sleep better/experience less delirium
  - leave the ICU sooner
Staffing and Equipment

UCSF - one full time PT added
No additional RN or RT staff
ICU platform walker, ear plugs, eye masks, seating cushions
PTs mobilize patients to higher level than RNs


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 in an acute neurological event (CVA, SAH, ICH) with re-assessment for mobility every 24 hours
Patients with RASS less than -3 or greater than +2
Patients with unstable spine or extremity fractures
Patients with a grave prognosis (transferring to comfort care)
Patients with open abdomen, or risk for dehiscence

How Are We Doing?

Point Prevalence Studies:


In this 1-day point-prevalence study conducted across Germany only 24% of all mechanically ventilated patients OOB only 8% of patients with an endotracheal tube were mobilized out of bed as part of routine care.
How Are We Doing?
Point Prevalence Studies:

45% were mechanically ventilated
140 patients (28%) completed an in-bed exercise regimen
93 (19%) sat over the side of the bed
182 (37%) sat out of bed
124 (25%) stood
89 (18%) walked
Predefined adverse events occurred on 24 occasions (5%)
No patient requiring mechanical ventilation sat out of bed or walked

How Are We Doing?
Point Prevalence Studies:

Terri Hough University of Washington Medical Center, Presenting at The 7th International Physical Medicine and Rehabilitation of Critically Ill Patients Meeting 5/17/2014, Across the US:

64% of ICU patients experienced any activity
50% of those were bed level activity
20% of those were transfers to a chair
10% of those were walking

Profoundly variable practice patterns

How Are We Doing?
ICU Early Mobility Protocols

Critical Care Medicine February 2014
Survey of 69 ICUs across the United States looking at structure, process, and outcomes

97-99% have protocols for ventilator management, infection control, nutrition, and VTEs

36% have an Early Mobility protocol, all requiring a MD Order to initiate (A Process Barrier)

Resulting Harm to Patients

“Tracheostomy, female gender, higher Charlson Comorbidity Index and lack of early ICU mobility were associated with readmissions or death during the first year. Although the mechanisms of increased hospital readmission are unclear, these findings may provide further support for early ICU mobility for patients with acute respiratory failure.”


How are we doing in the hospital overall?

32% of older patients not engaged by an RN in ANY mobility event during an 8-hour period.
Mean duration of ambulation was less than 2 minutes.
Mean age 74.6, 55.3% using an assistive device, 95.6% had an MD order for out of bed activity, none met criteria for dependent patient.
Average length of stay 6.7 days

Doherty-King B, Yoon J, Fossene K, Beseth J, Mahoney J (2014)

After Patients Leave the ICU?

Of the 72 patients who participated in the study
65 had either a physical therapy consultation or a request for nursing assistance with ambulation at ward transfer (90%)
Activity level decreased in 40 participants (55%) on the first day
Of the 61 participants who ambulated 100 ft or more on the last ICU day (95%)
14 did not ambulate, 22 ambulated less than 100 ft (55%)
25 ambulated 100 ft or more on the first ward day (41%)

Mobility is Medicine

Health Benefits of Physical Activity
- Improves blood sugar homeostasis
- Enhances cardiovascular function
- Enhances endothelial function
- Decreases chronic inflammation
- Regulates hormone levels
- Preserves musculoskeletal and neuromuscular integrity
- Decreases depression and improves cognition

Barriers to Implementation
- Nervous or skeptical clinicians
- Minimal resources allocated
- Awkward equipment
- PT referrals still too late
- Unclear protocol
- Mobility prior to extubation is difficult concept
- Rotating and changing personnel
- Variations in sedation practices
- New hospital and discharge course predictions required for ICU and floor personnel

3 Common Issues Keeping an ICU Patient Immobile

Are we patient centered or screen centered in our practices?

Immobility is Safety
Timing and Priorities
Staffing and Equipment
Issue # 1. Immobility is Safety:

TRUE: The patient is too sick, or too big
New onset sepsis or respiratory distress (think of hours NOT days)
Unstable bleeding or surgical site
Terminal disease (comfort care measures)
Comatose
Acute unstable cardiovascular event

Solution # 1. Awake and Mobile is Safer

Collaborate with RN, RT, MD
Use clinical judgment
Every diagnosis in context
Delay increases risk later

Essential Information to Share

• Medical History- impact of the chronic, plus current level of acuity
• Physiologic Reserve
• Motivation and Goals- what are patient expectations?
• Cognition- anxiety, delirium, co-morbidity
• Pain
• Sedation- why is this patient being sedated?
• Extubation- how is the patient tolerating breathing trials?
• Procedures- dialysis, IR, CT scan?
Context
Is it a beautiful sunny day after so much rain, or are we in the middle of a drought?

Solution # 1. Awake and Mobile is Safer

The patient is too sick, or too big
FALSE: The patient has a DVT (reference the American College of Chest Physicians 2012 guidelines: people with acute DVT do not need a period of bed rest)
FALSE: The obese patient was admitted able to walk at home (think of how crucial prevention can be)
FALSE: The patient is on ARDS Net Protocol
FALSE: The patient is a new admit to the ICU

Consider the Patient Physiologic Reserve, their Personal Fitness Account

Did this patient walk into your hospital?
What has the patient done in the past 2 days, 2 weeks, 2 months, 2 years?
What are your assumptions?
Issue #1. Immobility is Safety

Excuse: The patient is too lethargic, tired?

RASS -2 to -4
Hypoactive delirious

Target RASS vs Actual RASS
Goal targeted sedation?

Richmond Agitation Sedation Scale (RASS) icudelirium.org

-5 Unarousable No response to voice or physical stimulation

-4 Deep sedation No response to voice, but movement or eye opening to physical stimulation

-3 Moderate sedation Movement or eye opening to voice (but no eye contact)

-2 Light sedation Briefly sedated with eye contact to voice (<10 seconds)

0 Alert and calm

-1 Drowsy Not fully alert, but has sustained awakening (>10 seconds)

+1 Restless Anxious but movements not aggressive vigorous

+2 Agitated Frequent non-purposeful movement, fights ventilator

+3 Very agitated Pulls or removes tube(s) or catheter(s); aggressive

+4 Combative Overtly combative, violent, immediate danger to staff

Solution to when the patient is too lethargic

Collaborate with RN, RT, MD
Use Clinical judgment
Every level of delirium in context
Consider the environment, disease, medications
Delirium is treated with mobility

* Target RASS Zero
ICU Sleep Promotion Programs

Consider the Noise level
Lighting
Night time routines
Circadian Rhythms


Solution # 2. Mobility will re-orient and decrease lethargy
The patient may respond well to being up and communicating
Include the family in patient care activities

Solution # 3. The patient is too agitated, awake and re-oriented helps

Society of Critical Care Medicine Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium

“We recommend performing early mobilization of adult ICU patients whenever feasible to reduce the incidence and duration of delirium” (+1B)

What About All Those Critical Lines?

Patient lines and drains can be accommodated

Including Femoral Lines

Mechanical ventilation and CVVH lines


Issue #2 Timing and Priorities: The patient is leaving

The patient is going for:

A procedure
A CT scan
Transferring to the floor
Will be extubated soon

Solution: Mobility Is High Priority

Activity Trumps Extubation:

A pre- and post-activity rest period with assist-control ventilation for 30 min was employed as needed to support early activity.

If the patient was intubated and able to participate in activity, the FIO2 was increased by 0.2 before initiation of activity. We deferred ventilator weaning in support of activity, as necessary.

Issue #2 Timing and Priorities: The patient needs a nap

The patient
Had a bad night
Feels tired
Didn’t sleep last night
Wants to sleep now to make up for it


Solution for Timing and Priorities: The Patient Needs a Short Rest

Schedule a time
Create a sleep hygiene program in your ICU
Address night staff as well as day
Set circadian rhythms

Issue #3 Staffing/Equipment: No one is available to manage the lines

No portable ventilator
No high back chairs
No minimal lift equipment
No full time PT
Where are family members?
Solution for Staffing/Equipment: Overcome the Barriers

Establish the program for your local culture
Begin with the easier smaller success stories
Collect data to evaluate and re-evaluate
Make a Financial case


Solution: Consider Patients Expectations and Patient Centered Goals

Returning to life as they knew it
Not a new life of disability or perpetual patient
Include Family in patient care activities


Solution to Staffing Equipment: the PT is not here

• Seeing is believing
• Create learning opportunities
• Build the case for a full time dedicated ICU PT
• Collect Data!

• Plan ahead and coordinate care
Sitting on the Edge of the Bed

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

Walking in the ICU

Allowing our patients to communicate their needs

- Assessing and treating pain first
- Preventing PTSD
- Journaling the experience
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 (mostly walking) 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.

References


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