Application of Early Mobility Protocols in the ICU

PRESENTED BY
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Objectives

► Identify which patients are appropriate for early mobilization in the ICU;
► Discuss pros and cons of individual ventilator settings in regards to early mobility;
► Present a feasible plan for mobilizing someone who is dependent on the ventilator;
► Apply the early mobility model to case studies;
► Defend early mobility with evidence-based studies.
► Articulate the benefits and barriers of early mobility and its outcomes to their stakeholders;
Disclaimer

- Not all ICUs are created equally.
- Depending on your location geographically, urban vs rural and your hospital's level of acuity, you may have a 4-bed ICU that treats primarily PNA, or a level 1 trauma unit with 30 beds and the support system to make changes.
- Ultimately, you will need the buy-in of all of the following disciplines:
  - Intensivist
  - Nursing
  - Rehab staff and manager
  - Respiratory Therapy

Let's start with a frequent scenario:

- PJ is a 54 y/o male admitted to ICU with ALOC and ARDS. PJ lives with his wife. She called EMS when she could not wake him up the morning after their anniversary party.
- PJ is on a ventilator, currently sedated and intubated, and is at high risk for ETOH withdrawal.
- PLOF: Independent with function, works construction when he can find work. PMH: COPD, daily ETOH intake

Why did I get this referral?

- Nursing Health Assessment may have triggered a PT/OT Eval based on PMH, CLOF, etc.
- ICU team may anticipate patient will be extubated by the next morning and they want them seen sooner than later.
- Sometimes, pt may be appropriate at the time of PT/OT being ordered, and then deteriorate and demonstrate a different presentation than when the order of PT/OT went in.
Paradigm Shift

- The reality is, people are surviving their ICU stays!
- The management of people who are critically ill has essentially extended life expectancies in cases where 20 years ago, those same people would not have survived their critical illness.
- Our role then, is to ensure once patients are medically stable and able to leave the ICU, that they have the ability to do so…

WHO IS GETTING ADMITTED TO THE ICU???

ICU Admission Characteristics and Mortality Rates

- n=7265
- Medical ICU/Surgical ICU non-planned admissions
- 3 age groups:
  - 65-74 years
  - 75-84 years
  - 85+ years
- Endpoints: 28 days and 1 year mortality

(Fuchs L, Chronaki CE, Polak S, et al; 2012)
Results

- As the age groups increase, the following occurs:
  - Increased prevalence of:
    - Heart failure (25.0-40.3%)
    - Cardiac arrhythmia (24.6-43.5%)
    - Valvular heart disease (7.5-15.8%)
  - Reduced prevalence of:
    - Diabetes complications (7.5-2.4%)
    - Alcohol abuse (4.1-0.6%)
    - COPD (24.4-17.4%)
    - Liver failure (5.0-1.0%)

(Fuchs L, Chronaki CE, Park S, et al; 2012)

Results continued

- Out of 7265 Admissions
  - 1898 patients (26%) died within the first 28 days
- Out of the 5367 survivors of ICU admission
  - 1357 patients (25%) died between 28 days and 1 year
- Mortality rates in the ICU, in hospital, at 28 days and to 1 year increase with increasing age.

(Fuchs L, Chronaki CE, Park S, et al; 2012)

Conclusions

- High proportion of elderly patients form total ICU population
- As age increases, pre-existing co-morbidities and primary reasons for admission to ICU changes.
- Advanced age (>75 years) is shown here to be a significant independent risk factor for mortality in the ICU population.
- NOTE BENE: This study has several self-cited limitations in regards to mortality, but it’s accuracy on the ICU admission characteristics is profound.

(Fuchs L, Chronaki CE, Park S, et al; 2012)
Ventilator Settings and Early Mobility

When is it appropriate?

<table>
<thead>
<tr>
<th>Ventilator Setting</th>
<th>PRO</th>
<th>CON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assist Control/CMV</td>
<td>Non-weaning pt tolerates</td>
<td>Most likely has ET tube</td>
</tr>
<tr>
<td>SIMV</td>
<td>none</td>
<td>Weaning mode**</td>
</tr>
<tr>
<td>CPAP</td>
<td>Therapy may help or hinder</td>
<td>Can be Weaning mode</td>
</tr>
<tr>
<td>BIPAP</td>
<td>Therapy may help or hinder</td>
<td>Can be weaning mode</td>
</tr>
<tr>
<td>Pressure Support</td>
<td>Bridge to less support</td>
<td>Adjunctive</td>
</tr>
</tbody>
</table>

**Questions to ask:**
- Will an increase in WOB help or hinder the patient from being extubated?
- Extra WOB could be what the lungs need to allow extubation, but it could also be why they need to go back on a higher level of ventilation support.
- Sometimes place on CPAP for awhile and then place on AC or CMV for pulmonary rest. (Similar to interval training).
- Are they making progress?
- Will they tolerate a ventimask for early mobilization?
- Are they in a state of decline?
- Is intubation trying to be avoided?
- Used on the way to extubation and intubation. Find out which direction the patient is headed. They can also be stable on bipap mask.
- Must communicate with NSG and RT!!

**CPAP**
- Spontaneous mode of ventilation
- Weaning mode
- PS augments pH, tidal volume

**BIPAP (NIPPV)**
- Mask instead of artificial airway
- Used when short term ventilation is expected or on residents who are DNI or difficult to intubate.

**Questions to ask:**
- Are they making progress?
- Will they tolerate a ventimask for early mobilization?
- Are they in a state of decline?
- Is intubation trying to be avoided?
- Used on the way to extubation and intubation. Find out which direction the patient is headed. They can also be stable on bipap mask.
- Must communicate with NSG and RT!!
PEEP: Positive End Expiratory Pressure

- Pressure left in the lungs at the end of expiration
- PEEP increases functional residual capacity
- Increases lung volume to prevent or correct atelectasis
- Increases mean airway pressure to improve oxygenation
- Prevents airways from collapsing
- Also part of the criteria to determine if early mobility is appropriate for a patient.

FiO2: Fraction of Inspired Oxygen

- Supplemental oxygen delivered by the ventilator expressed as a percentage.
- It works great to compare oxygenation needs in the case that the oxygen delivery device changes.
- It also becomes part of the determination of whether or not we will begin physical therapy with someone.
- This will be part of the inclusion/exclusion criteria for the early mobility protocols.

WHAT IS EARLY MOBILITY??
Effects of Immobility

Dietrich, 1948
- Postural hypotension
- Bone demineralization
- Contractures
- Skin breakdown
- PNA
- Helplessness

Brower, 2009
- Muscle weakness
- Systemic inflammation
- Atelectasis
- Insulin resistance
- Thromboembolic disease

LeBlanc, 1992/Bloomfield 1997
Reported antigravity leg muscles are first to weaken, muscle atrophy, and rapid loss of strength. Strength can decline up to 3% day in a healthy individual. (Trees DW, Smith Jr, & Mackert S, 2013)

Purpose of Critical Care Medicine
- Restoration of physiological or hemodynamic stability
- Prevention of death
- Historically, an unfavorable byproduct of critical care medicine has been prolonged immobility and bedrest.
- How do we combat it?
  - Reduce dosage and frequency of sedation
  - Begin Early mobility once physiological and hemodynamic stability has been restored.

(Adler J and Malone D, 2013)

What is early mobility?
- "Early" refers to the time that activity is started on a patient once they become physiologically stable.
- In "early times" (pun intended), activity was held until the patient left the ICU, however this has been shown to be detrimental to patients' functional status at discharge from the hospital

(Martin, 2005; Bailey, 2007)
Is Early Mobility necessary?

- Back in 2005, mortality was 30-70% at one year survival.
- Profound morbidity with decreased quality of life and functional status.
- $9 million/day spent in the ICU costs in the US alone.
- Pathologies include PNA, heart failure, ARDS, sepsis, acute on chronic renal failure, COPD

(Martin UJ, Hincapie L, Nimchuk M, et al., 2005)

Results of impact of whole-body rehab in pts receiving chronic MV

- Severely weak and deconditioned patients unable to change position, stand or walk found benefit from whole body and respiratory muscle rehab techniques.
- Weakness affected the PROXIMAL muscles more than the distal muscles
- Large muscle groups were severely more affected than the small muscle groups.
- Weaning outcome is dependent on skeletal muscle strength!!

(Martin UJ, Hincapie L, Nimchuk M, et al., 2005)

Early activity is feasible and safe!

- Prospective cohort study of patients requiring MV for >4 days and in the RICU.
- Patients requiring MV for ≤4 days were excluded.
- 7 months of data in 8-bed RICU. Patients were seen BID
- Activity events included EOB sitting, Chair sitting, and ambulation.
- Adverse events defined as fall to knees, tube removal, SBP >200 mmHg and <90 mmHg, oxygen desaturation < 80%, and extubation.
- Parameters to begin:
  - Neurological: patient response to verbal stimulation.
  - Respiratory status: FIO2 ≤0.6 and PEEP ≤10 cm H2O.
  - Circulatory criteria: absence of orthostatic hypotension and catecholamine drips.

(Bailey P, Thomsen GE, Spuhler VJ, et al., 2007)
Results

- Total of 1449 activity events in 193 patients (BID treatments)
  - 233 (16%) EOB sitting
  - 454 (31%) sit in chair
  - 762 (53%) ambulation!!
- Patients with endotracheal tube activity
  - 593 activity events - 249 (42%) were ambulation!
  - <1% activity related adverse events
- NO PATIENT WAS EXTUBATED DURING AMBULATION!!

Findings: Early mobility is feasible and safe in resp failure patients. 69% were able to ambulate >100 feet at RICU d/c. (goal of study)

(Bailey P, Thommen GE, Spuhler VJ, et al., 2007)
Proposed BENEFITS of early mobility

<table>
<thead>
<tr>
<th>INCREASE</th>
<th>DECREASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESPIRATORY FUNCTION</td>
<td>MUSCLE WASTING</td>
</tr>
<tr>
<td>FUNCTIONAL MOBILITY</td>
<td>ICU LOS</td>
</tr>
<tr>
<td></td>
<td>HOSPITAL LOS</td>
</tr>
<tr>
<td></td>
<td>DELIRIUM</td>
</tr>
</tbody>
</table>

HOW DO WE APPLY EARLY MOBILITY AND TO WHOM?
Early Mobility: Getting started

- Bedrest accounts for 89% of a patient’s time in ICU.
- Passive turning is the most consistent therapeutic intervention performed.
- 482 PTs representing 49 states surveyed indicated that only 10% had established criteria for initiating PT in the ICU.
- Patients with critical illness including those with resp failure benefit from early mobility. Bailey’s study (2007) had an age range between 18-91 years of age. In fact 23 people in this study over the age of 65 ambulated greater than 100 feet by the time they got discharged from the RICU.
- Maybe a better question is “Who may NOT benefit from early mobility in the ICU?”

(Engel HJ; 2013)

Early Mobility Inclusion Criteria

- Initial physiological stabilization
- Neurologic criteria included a patient response to verbal stimuli. Activity was not started in comatose patients.
- Circulatory criteria included no evidence of orthostatic hypotension and no use of catecholamine drips.
- Respiratory criteria included FiO2 ≤ .6 and PEEP ≤ 10 cm H20.


ABCD’s of Early Mobility!!

<table>
<thead>
<tr>
<th>MNEMONIC</th>
<th>What it means to you</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>(they are) ALRIGHT!  Physiologically and Hemodynamically stable</td>
</tr>
<tr>
<td>B</td>
<td>BRAIN AWAKE! Neurologically intact – responds to verbal stimuli</td>
</tr>
<tr>
<td>C</td>
<td>Circulation Good No orthostatic or vasopressors</td>
</tr>
<tr>
<td>D</td>
<td>Dial it In! FiO2 &lt; 60% and PEEP &lt; 10</td>
</tr>
</tbody>
</table>
Early Mobility Exclusion Criteria

- Significant dose of vasopressors (to keep MAP >60 mmHg)
- MV with FiO2 >.8 and /or PEEP >12, or acutely worsening respiratory failure
- Neuromuscular paralytics
- Currently in an acute neurological event (CVA, SAH, ICH)
- Unstable spine or extremity fractures
- Grave prognosis, transitioning to comfort care
- Open abdomen at risk for dehiscence
- Active bleeding process
- Bed rest order

[Engel HJ; 2013]
PT-Established ICU early mobility program - QI Project

- QI project in large facility that used previous research to establish their criteria and apply to their facility between 2009-2011.
- Goal was to reduce ICU length of stay by increasing the number of PT consults in this population; also to decrease the time from ICU admission to PT consult.
- 9 month retrospective study compared to usual care that occurred the previous year.
- Utilized a dedicated PT in a 16-bed ICU, with a goal of starting PT within 48 hours of admission to ICU.
- OUTCOMES: Consults increased from 179 to 294 in the same time frame. Time to PT consult was decreased from 3 days to 1 day. And the number of ambulatory patients discharged to home increased from 55% to 77%.

[Engel HJ; 2013]

Richmond Agitation Sedation Scale (RASS)

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-5</td>
<td>Unarousable</td>
</tr>
<tr>
<td>-4</td>
<td>Deep sedation</td>
</tr>
<tr>
<td>-3</td>
<td>Moderate sedation</td>
</tr>
<tr>
<td>-2</td>
<td>Light sedation</td>
</tr>
<tr>
<td>-1</td>
<td>Drowsy</td>
</tr>
<tr>
<td>0</td>
<td>Alert and Calm</td>
</tr>
<tr>
<td>1</td>
<td>Restless</td>
</tr>
<tr>
<td>2</td>
<td>Agitated</td>
</tr>
<tr>
<td>3</td>
<td>Very agitated</td>
</tr>
<tr>
<td>4</td>
<td>Comatose</td>
</tr>
</tbody>
</table>

CASE STUDIES
Remember PJ??

On Admission to ICU
PT/OT Eval

- PJ is a 54 y/o male admitted to ICU with ALOC and ARDS. PJ lives with his wife. She called EMS when she could not wake him up the morning after their anniversary party.
- PJ is on a ventilator, currently sedated and intubated, at is at high risk for ETOH withdrawal.
- PLOF: Independent with function, works construction when he can find work. PMH: COPD

The Next Day

- Pt is awake, following commands, but intubated.
- Peep 8 FiO2 .45 (assist control)
- Arterial BP s 110/72
- On 2 mcg of Levophed
- What’s the plan?
  a. Nothing
  b. EOB sitting
  c. OOB to chair
  d. Walking with vent

Heather S.

- 18 y/o female experimented with heroine with her "boyfriend". Resp distress at the scene, intubated to protect airway.
- Pt on light sedation drip, FiO2 .4, PEEP 5 (assist control)
- No pressors (catecholamines)
- HR 100, SpO2 98%, BP 132/68
- What’s the plan?
  a. Nothing
  b. EOB sitting
  c. OOB to chair
  d. Walking on vent

Mona Lisa

- 72 y/o female admitted after MVA with AMS, agitated, and GCS = 7 (E2,V2, M3).
- Sedated for safety, intubated to protect airway. CT/MRI of head/C-spine shows bruising of brain, bone structures are intact.
- FiO2 30%, PEEP 5, (continuous/CMV)
- Prior level of function was independent.
- BP 114/62, HR 78, SpO2 100% ICP 19
- What’s the plan?
  a. Nothing
  b. EOB sitting
  c. OOB to chair
  d. Walk with vent
Jim Bob

- 56 y/o male 355#, out 4 wheeling with family. Sudden cardiac arrest. PT/OT eval ordered once ’stabilized’.
- On Bipap @ 50% FiO2; no pressors on board.
- Bariatric bed, ht is 5’4.
- Moving all extremities appropriately. BP 152/80, HR 108, SpO2 95% RR 23
- What’s the plan?
  - A. Nothing
  - B. OB Sitting
  - C. OOB to chair
  - D. Walk on Bipap
Samantha

- 25 y/o female admitted with respiratory failure. Currently on high flow nasal cannula at FiO2 of 70%.
- BP is 95/55, HR 110, SpO2 94%, RR 22
- Lives at home with mom, goes to community college. PMH: Asthma
- Pt is alert and oriented, and playing cards in her room.
- What’s the plan?
  A. Nothing
  B. EOB sitting
  C. OOB to chair
  D. Walk on high flow nasal cannula
Samantha

- 25 y/o female admitted with respiratory failure. Currently on high flow nasal cannula at FiO2 70%.
- BP is 95/55, HR 110, SpO2 94%, RR 22
- Lives at home with mom, goes to community college. PMH: Asthma
- Pt is alert and oriented, and playing cards in her room.
- What’s the plan?
  - Nothing
  - EOB sitting
  - OOB to chair
  - Walk on high flow nasal cannula

Cleo

- 75 y/o male admitted with COPD exacerbation. Currently on BiPAP (NIPPV) at 40% FiO2, PEEP=10
- BP is 125/65, HR 110, SpO2 97%, RR 17
- Lives alone, active in the local senior center. PMH: DM, HTN, Diverticulitis
- Pt is alert and oriented, in no distress. Wants to get to the bathroom.
- What’s the plan?
  - Nothing
  - EOB sitting
  - OOB to bedside commode
  - Walk to the bathroom
Cleo

- 75 y/o male admitted with COPD exacerbation. Currently on BIPAP (NIPPV) at 40% FIO2, PEEP=10
- BP is 125/65, HR 110, SpO2 97%, RR 17
- Lives alone, active in the local senior center. PMH: DM, HTN, Diverticulitis
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  - EOB sitting
  - OOB to bedside commode
  - Walk to the bathroom

EVIDENCE AT WORK
Early PT/OT in MV, critically ill patients; RCT.

- One of the first RCTs regarding mobilizing people in the ICU, despite being on a ventilator.
- Introduction of sedation vacation, and criteria for mobility protocols.
- Population: sedated adults on vent for less than 72 hours and expected to remain intubated for the next 24 hours. N= 104 patients randomized between 2 hospitals for early mobilization and standard ordering per physician determination.
- Endpoints:
  - Primary: # of patients returning to independent functional status at hospital discharge.
  - Secondary: Duration of delirium and ventilator free days during the first 28 days of hospital stay.

(Schweikert WD, Pohlman MC, Pohlman AS, et al., 2009)

Results

Early Mobility Protocol

- n=49
- 59% (29) returned to independent status at discharge (p=0.02; odds ratio 2.7 [95% CI, 1.2-6.1])
- Duration of delirium median 2 days (p=0.02)
- Ventilator free days 23.5 days (p<0.05)

Standard Protocol

- n=55
- 35% (19) returned to independent status at discharge.
- Duration of delirium median 4 days
- Ventilator free days 21.1 days

Findings: Interruption of sedation for PT/OT interventions in the early days of critical illness is safe and well tolerated, including better functional outcomes at discharge - compared to standard protocol.

(Schweikert WD, Pohlman MC, Pohlman AS, et al., 2009)

Earlier Mobilization decreases the LOS in the ICU.

- Mobility Protocol (MP) vs Standard PT (SPT) for patients with resp failure
- Retrospective review of 28 charts comparing
  - Total days in ICU
  - Time spent on a ventilator
  - Days before PT was ordered
  - Mobility protocol is an interdisciplinary approach
  - Non-neurological patients
  - 100% of the MP (n=19) and 93% of the SPT (n=21) were independent prior to hospital admission.

(Ronnebaum JA, Weed JP, & Hibbard TA, 2012)
Results

MP Group
- Days in ICU = 13.3 ± 6.3 days (p=.007, d=1.11)
- Time spent on Vent = 14.5 days ± 8.7 days (p=.007, d=1.09).
- Therapy started 1.9 days sooner in the MP group vs the SPT group
- Functional assist at d/c = moderate assist
- Gait mean 65 feet at d/c
- Nonambulatory status at d/c =2

SPT Group
- Days in ICU = 24.9 ± 13.7 days
- Time spent on Vent = 30.9 days ± 20.6 days
- Functional Assist at d/c = Max assist
- Gait mean 45 feet at d/c
- Nonambulatory status at d/c =4

Findings: Early mobilization in patients with resp failure has better outcomes including less days on vent, saving a mean of $22K per patient in ICU.

Positive effects of exercise in intubated adults in ICU

- Prospective study looking at the optimal timing to start mobility and the progression of mobility.
- Inflammation and immobility have been blamed for functional loss. The following cytokines were also studied.
  - IL-6 – PRO-inflammatory cytokine
    - Affects muscle health negatively
  - IL-10 – ANTI-inflammatory cytokine
    - Down-regulates the inflammatory cascade

Positive effects of exercise in intubated adults in ICU

3 phases of the study

- Control Phase – standard care
  - Exercise by nurse. If no exercise documented, turning was used as the standard of care. 20 subjects
- Run-in phase
  - 5 more subjects – intervention was refined for feasibility within the specific environment, and RAs were trained in the refined protocol.
- Research protocol
  - 55 new subjects, 20 min of exercise by RAs, 1x/day for 2-7 days/wk
Findings

- Statistically significant association between change in IL-10 and duration of exercise.
- 20 min of low level exercise translated to an increase in IL-10 which is the anti-inflammatory biomarker.
- Exercise is safe in hemodynamically stable intubated adults.
- Exercise does NOT contribute to IL-6.
- Protocol promoted early and progressive mobility and decreased LOS.
- DVTs and delirium were minimized in research group.

(Winkelman C, Johnson KD, Haji R, et al., 2012)

Moveo Mobile Leg Press

(Trees DW, Smith JM, Hockett S., 2013)

MOTOMed
Serious about Early Mobility

Outcome Measures
PFIT-s

<table>
<thead>
<tr>
<th>Assistance</th>
<th>Cadence (Steps/Min)</th>
<th>Shoulder Strength</th>
<th>Knee Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 = unable</td>
<td>0 = unable</td>
<td>0 = grade 0, 1, or 2</td>
<td>0 = grade 0, 1, or 2</td>
</tr>
<tr>
<td>1 = assist x 2</td>
<td>1.5 ≤ 49</td>
<td>1 = assess</td>
<td>1 = grade 3</td>
</tr>
<tr>
<td>2 = assist x 1</td>
<td>2 ≤ 50-80</td>
<td>2 = grade 4</td>
<td>2 = grade 4</td>
</tr>
<tr>
<td>3 = no assist</td>
<td>3 ≤ 80+</td>
<td>3 = grade 5</td>
<td>3 = grade 5</td>
</tr>
</tbody>
</table>

Results of PFIT-s

- Displayed moderate convergent validity with the:
  - Timed Up and Go test (r=-.60),
  - six minute walk test (r=.41),
  - MRC sum score (ρ=.49)
- The Effect Size Index (ESI) was 0.82
- Minimally Clinically Important Difference (MCID) = 1.5 (interval score = 0-10)
- Higher admission PFIT-s score was PREDICTIVE of:
  - MRC score of ≥48,
  - increased likelihood of discharge home,
  - reduced likelihood of discharge to inpatient rehab and
  - reduced acute care hospital LOS.
- Valid, responsive to change, and predictive of key outcomes.

Medical Research Council (MRC) Sum Strength Score

- Combined strength score for 12 specified muscle groups (bilateral hip flexors, knee extensors, dorsiflexion, shoulder abduction, elbow flexion, and wrist extension).
- Previous populations studied: GBS and ICU survivors after hospital discharge.
- Score of <48/60 indicates average strength is limited to movement against gravity and partial resistance.
- This study investigated the feasibility of use for critically ill patients and was found to have high intra-observer agreement, but was unable to detect ICU-acquired neuromuscular dysfunction at an early stage of critical illness.
- Deemed unreliable for patients in critical care.
MRC Sum Strength Score

- SR indicated that it was used in 4 other studies and conclusively did not demonstrate improvement in strength after leaving the ICU, but strength was shown to increase at the time of HOSPITAL DISCHARGE.
- Further, in patients with prolonged mechanical ventilation (22-80 days in LTAC), an INCREASE was seen in both upper and lower extremities, as well as RESPIRATORY MUSCLE STRENGTH.
- This translates to better outcomes and time is needed to reap those benefits.

(Adler J & Malone D, 2012)

Functional Mobility Outcomes

- Mobility Milestones
- Barthel Index
- FIM
- FSS-ICU – Only includes:
  - Rolling
  - Transfer from supine to sit
  - Sitting EOB
  - Transfer from sit<>stand
  - Ambulation
- Scores are then combined to make a cumulative FSS-ICU score.

(Adler J & Malone D, 2012)

Quality of Life Measures

- SF-36 – Physical Functioning Subset
- Dyspnea

- Bottom line: Improvements in quality of life cannot be determined at this time.

(Adler J & Malone D, 2012)
Systematic Review Findings

- Overall, only a few RCTs
- Strength of evidence is limited
- Early mobility is safe and feasible
- Mobility milestones are achieved in ICUs that promote early mobility
- Monitored activity programs can lead to statistically significant improvements in ambulation, decreased time on MV, improved ADL abilities and improved respiratory function. (Adler J & Malone D, 2012)

BARRIERS to EARLY MOBILITY

Issues affecting the delivery of PT services for individuals with critical illness

- PT competence for practice in the ICU
- Personnel Resources
- Prioritization of patients
- Critical illness across the continuum of care

(Fromk AJ & Kress JP, 2013)
Barriers to providing therapy in ICU

- Insufficient staffing
- Lower prioritization
- Lack of consultation criteria
- Inadequate training of PTs
- Lack of perceived importance
- Sedation of patients


PT Competence for practice in the ICU

- Academic Preparation of PT Students
  - APTA Minimum Required Skills at Entry Level
  - Normative Model of PT Professional Education
  - APTA PT Clinical Education Principles
  - 10-12 weeks of clinical education for ICU management
  - Limited availability of clinical sites
- Clinical Competence of Practicing PTs
  - Consider critical care competency program in addition to clinical competencies.
- No specialist certification available ... YET!

(Pawlik AJ & Kress JP; 2013)

ICU ENVIRONMENT

- ICU beds tend to be different than regular med/surg beds.
  - They have special features to prevent skin breakdown, can apply bed cartridges in order to perform percussion and vibration, and turning protocols.
  - Usually the beds are higher than med/surg beds. They won’t go as low as needed to be “therapeutic”.
  - Also the beds may be full of air baffles again to help with skin breakdown and patient comfort.
  - Of course your monitoring equipment is right there in the room, as well as oxygen.
  - For the record, if you plan on working in the ICU, you should really take an ECG course to learn to read those monitors. That way you know when bad things are about to happen. Dave Dubin is a classic workbook.
  - Usually seating equipment is available, and if you are lucky, an overhead lift can be a nice feature.
Controlling the ENVIRONMENT

- Bed Controls
  - For IOD sitting, the bed should be flattened, put on max inflate, and the side rails down for safety.

- Oxygen
  - Have the appropriate oxygen device ready if you are planning on using something different than what the patient has. Please consult with respiratory therapy for any questions.

- Lines [VERY IMPORTANT]
  - Identify each line from origin to insertion site, look under the covers for drains, eyeball dressings to make sure they are intact, watch for rectal tubes and chest tubes.
  - Please consult with nursing regarding any equipment you are not familiar with.

- Seating/Lift Equipment
  - Make sure brakes work on any equipment, batteries are in good working condition and that you have been trained to use each piece of equipment.

Where do we begin?

Sarah Stander and Walker
Liko Sabina II

STANDER with FOOT PLATE

STANDER

Gait training

LIKO VIKING

GOLVO

Personnel Resources

- Dedicated personnel
- Team resources
- Outcomes assessed by Morris
  - Cost reduction associated with noted decreased ICU and hospital lengths of stay could offset the cost of resources
- “If you build it, they will come” mentality
  - Healthcare workers want to see people get better!
  - If they see that what you are doing is having a SAFE impact on their patients, they will participate – but you need to communicate with them AND negotiate with them.

(Pawlik AJ & Kress JP; 2013)
Prioritization of patients

- Prioritization of all patients in the hospital
  - Vital with decreasing hospital LOS
  - Timely discharges requiring attention
  - ICU may not be a priority (however)
- Prioritization of ICU patients
  - Evidence does support improved outcomes and decreased ICU and hospital LOS with early mobility in the ICU.
  - Coordinate care with sedation vacations to improve outcomes
  - Determine triage needs based on baseline functional independence.

(Pawlik AJ & Kress JP; 2013)

Critical Illness Across the Continuum of Care

- Long term implications - 5 years later, pts still suffering from decreased functional capacity and decreased quality of life.
- Role of Post-hospital Settings - education for therapists practicing in these settings regarding the long term implications of critical illness.
- Survivors of Critical Illness have special needs - similar to those found in outpatient cardiac and pulmonary rehab programs
- PTSD is real in critical illness survivors. Includes anxiety and depression
- Home-based therapy via telemedicine was not effective in improving quality of life or function.

(Pawlik AJ & Kress JP; 2013)

PICS – Post Intensive Care Syndrome

- Decreased ADL ability
- Decreased ambulation
- Depression
- Post Traumatic Stress Syndrome
- Anxiety
- Decreased QOL
- Decreased long term survival

GOAL: REDUCE THE SEVERITY OF PICS symptoms

(Berre-A Doughtery AR & Smith JM, 2013)
PT on the Wards after ICU
Early Mobility

- A cohort study was published regarding the amount of physical therapy on the wards after early mobility in the ICU.
- Activity levels decreased in 55% of the participants on their first full day on the ward.
- Among the 61 patients who were ambulating 100 feet in the ICU,
  - 14 did not ambulate on the first ward day
  - 22 ambulated less than 100 feet
  - And 25 ambulated 100 ft or more on the first ward day.

This study suggested that there is a need for education regarding ICU debilitation, enhanced communication among care providers and focus on importance of patient-centered outcomes during and following ICU treatments.


Future Research Questions

- Do published papers reflect current practice?
- How much experience is required to safely work in a critical care environment?
- What is the right amount of exercise to achieve optimal patient outcomes?
- Can any generalizations be made to other patient populations?
- Should all patients who require mechanical ventilation or ICU admission be referred to physical therapy?
- Are there optimal patient populations who would benefit most from early mobilization or as well as populations for whom physical therapy is clearly contraindicated?

Clearly, we still have a long way to go

(Adler J, Malone D; 2012)

Works Cited


Questions??
Thanks for joining me today! I hope this helps in your endeavor to practice in the ICU. Please contact me if you have other clinical questions... Have a great day!! Rhonda