ICU EARLY MOBILIZATION AT UCSF
Acceptable Outcomes After an ICU Stay?

- **ICU Acquired Weakness**
  - Rapid onset
  - Pervasive weakness
  - Immobility myopathy – myosin filament atrophy and sarcomere collapse
  - Axonal polyneuropathy
  - Difficulty liberating from mechanical ventilator


The combination of 18 to 69 hours of complete diaphragmatic inactivity and mechanical ventilation results in marked atrophy of human diaphragm myofibers


Patients over 65 years of age surviving hospitalization with MV vs hospitalization without, experience 30% greater ADL disability

Long Term Problem

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


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.

Early Physical and Occupational Therapy

Randomized Control Trial: 104 patients on mechanical ventilation

- Intervention Group: PT median of 1.5 days intubation
- Control Group: PT median of 7.4 days

Results

- Intervention Group: less days of delirium and MV and 59% return to independent function at hospital discharge versus 35% in control group

Factors Associated with Readmission

- Retrospective Survey of 280 Acute respiratory failure survivors
- Factors associated with readmissions or death during the first year-
  - Tracheostomy
  - Female gender
  - Higher Charlson Comorbidity Index
  - Lack of early ICU mobility

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

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

ICU Early Mobilization Requires

- Find your champions and supporters
- Develop a multidisciplinary committee
  - Establish guidelines
  - Cross discipline education
  - Problem solve barriers
  - Promotion
Barriers to ICU Early Mobilization

Provider Barriers

- Knowledge
- Fearful attitude
- Patient Sedation
- Culture of immobility
- Unfamiliar professions

Solutions

- Education, promotion
- Start small, evolution
- Treat pain, target sedation
- Find your champions
- Learn to speak their language

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

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 > 0.8 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 unresponsive to verbal stimuli
- Patients with unstable spine or extremity fractures
- 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
Inter-professional Approach to Patient Mobilization in the ICU

PT
- Provide appropriate PT treatments
- Provide mobility recommendations
- Update mobility vitals and status

30 minutes prior to PT treatment
- Clear secretions
- Adjust ventilator settings
- Reduce work of breathing

RT

Patient mobilization
- Rounding
- Patient/ family education
- Monitoring
- Cognitive assessment

RN
- Patient preparation for PT
- Pre-medication
- Scheduling
- Advocate for PT referral
- Optimize sedation for patient participation

MD/NP
- Provide PT orders
- Optimize sedation for patient participation
ICU: Prelude to Mobility Activity

- Talk to the patient and the family—who are they?
- Deflate the mattress
- Open the blinds
- Make a path to the window
- Unplug, disconnect, create slack in the lines, examine patient skin
UCSF ICU: Step 1 - Untangling
UCSF ICU: Step 2 - Bed Exercise
UCSF ICU: Step 3-Sitting on EOB
UCSF ICU: Step 4-Assisted Sit to Stand
UCSF ICU: Step 5 - Walking
UCSF ICU: Step 6-
Sit and Rest as Needed
Activity Intensity and Dosage

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

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?

- Lines, catheters and drains can be accommodated, secured
- EVD line stationary bike
What About All Those Critical Lines?

- Patient lines and drains can be accommodated
- Mechanical ventilation and CVVH lines
What About All Those Critical Lines?

**Adult Extra Corporeal Life Support (ECLS)**

**VV Cannulation via the Double Lumen Cannula**
What About Those Critical Lines?
Family Participation in Early Mobility

- Positive feedback from family members
- Less stress to family members
- Less patient delirium
What Are the Expectations?
Preventing deconditioning is as important as preventing skin breakdown, VAP, line infections.

Be flexible, yet firm - postpone mobility within the day, but do not cancel mobility due to tests, transfers, or lack of patient readiness.

**Safety:** Adverse events - rectal tubes, peripheral IV access and NG tubes dislodged, no central lines, catheters, or ET tubes dislodged.

**Safety:** No falls, syncope episodes or cardiac events during mobility with PT.
UCSF ICU Early Mobilization

Improvements in discharge outcome correlate to:

- Earlier mobility
- More intense intervention
- Greater distance walked
UCSF ICU Early Mobilization

- Improves patient satisfaction and outcomes
- Higher percentage discharge to home: 55% of ICU PT patients versus 71%
- Decreased length of stay: 2 ICU days and 5 hospital days
The Ounce of Prevention Reward
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
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