Acute Management of the Patient with Critical Illness: Applied Clinical Decision Making and Knowledge Translation
Part II: Clinical Decision Making and Treatment Considerations
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Optimal Treatment Planning

- Complex patient population - need for high level of clinical decision-making and ability to integrate many variables in a hectic environment
- Successful intervention requires pre-planning, flexibility, and team coordination
- Teamwork is a must!!


Treatment Principles

- Need to assess a patient’s “readiness” to participate in activity
  - Cognitive status allows for patient participation
  - Stable hemodynamics and resp status
- Clinical decision-making on optimal type of activity based on medical status

Things to Consider….

- Overall appearance
- Recent events/HPI
- Recent Labs (current and trends)
- Vitals/ECG (current and trends)
- Meds/Infusions

Is the patient medically stable?

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Overall Appearance

- “Quick look”
- ? Alert
- Breathing pattern/rate
- Skin color
- Pertinent life support equipment
- Current Vitals/ vent settings

Recent Events/HPI

- Anything that would set off a “red flag”?
  - Recent episodes of hemodynamic instability
  - Recent evidence of respiratory instability
  - Acute DVT/PE
  - Concern for spinal stability
  - Current bleeding
  - etc, etc...

Vitals/ECG (current and trends)

- Vitals and ECG should be within parameters for that pt
  - BP
  - MAP
  - HR (rate and rhythm)
  - O2 sats
  - Resp rate

Lab Values (current and trends)

- Consider acute vs. chronic findings
- Consider risk vs. benefit

  - Great resource: Acute Care Section’s Lab value interpretation resources. Find at….

Meds/Infusions

- Is the patient requiring pressors?
  - Single agent vs. multiple agents?
- Be aware of pts on insulin drips if holding tube feeds for PT treatment
- General pharmacology considerations for those meds that may cause changes in hemodynamics, coagulation status, immune function, electrolyte balance and fluid balance, etc

Medical Stability Guidelines

Team discussion about appropriateness of mobilization of patients with the following scenarios:

**Poor oxygenation:**
- Pulse oximetry <88% (with supplemental O2), OR
- FiO2 > 0.6 and PEEP>10 cmH2O

**Tachypnea:** respiratory rate >45 bpm

**Acidosis:** recent arterial pH <7.25

**Acute PE/DVT**

Zanos JR, Needham DM. (2010, May 22). PT in Motion, 22-28

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Medical Stability Concerns

Hemodynamic Instability
- New or increased vasopressor or vasodilator support in the past 2 hours
- Evidence of new dysrhythmias
- Evidence of cardiac ischemia
- Significant bleeding

Certain Medical Equipment
- IABP
- ECMO (femorally cannulated)

Remember- There is very little black and white. Just many shades of gray…

Optimal Treatment Planning

- Work as a team on modifying those factors that may limit a patient’s ability to work with PT
- Sedation, delirium, and sleep are areas that need to be addressed by all ICU team members to allow max patient participation with rehab activities

Just a bit on ICU Delirium

- Why assess for delirium?
  - Associated with worse outcomes
  - A measure of “brain failure” to be considered with signs of other organ impairments (hypoxemia, hypotension, etc.)
  - Need to identify the presence of ICU delirium in order to try and treat it (CAM-ICU) www.icudelirium.org

Delirium and Patient Outcomes

- Independently associated with 2-3x increase in mortality
- Also associated with:
  - Increased MV duration (9 vs. 4 days)
  - Increased ICU length of stay (8 vs. 5 days)
  - Increased hospital length of stay (21 vs. 11 days)
  - Higher medical costs
Risk Factors for Delirium

- Advanced age (?)
- Electrolyte disturbances
- ICU meds (benzodiazepines)
- Sleep deprivation
- Physical restraints
- Lack of visible daylight
- Absence of visitors

Prevention/Intervention

- Adequate hydration
- Limit noise exposure
- Promote normal sleep-wake cycle
- Orient to surroundings, situation, time
- Targeted management of pain and sedation
- Pharmacological management
- Early mobilization!!!

Early Rehab Reduces Delirium

- RCT evaluating early mobility (PT and OT) combined with daily interruption of sedation decreased duration of ICU delirium by 2 days when compared to just daily interruptions of sedation
- Deep sedation is not always needed
- Delirium rates can be improved with changes to sedation practices and initiation of early mobility

Optimal Treatment Planning

- Team communication is key!
  - About current medical status and recent events
  - Planning rehab around other ICU activities (procedures, HD, vent weaning)
  - Establishing a plan and goals for the day (team, patient, and family)

Treatment Progression

- Start slow and progress activity in stages and monitor a patient's response
- May begin with bed activities and progress to sitting at the edge of the bed, standing, pre-gait activities, and transfer to the chair
- Ambulation can be initiated when pts are able to weight bear and demonstrate stable hemodynamics and resp function

Try to avoid an "all or nothing" scenario. If the patient is deemed to be unable to mobilize out of bed (i.e. pressor requirement, equipment limitations, poor oxygenation, etc) consider those activities that can be done in supine.
Treatment Considerations

• Each treatment is really an evaluation and assessment of a patient's tolerance to activity - this may change each session

• Goal is to ensure that the physiological demands of the activity do not exceed what the patient's ability to respond to those demands

• Consider using RPE to assess pt's perceived exertion


Mechanical Ventilation

• Who are slow to liberate form the vent pose a special challenge for planning rehabilitation activities around weaning from mech vent

• Mobilization activities may interfere with spontaneous breathing trials and the assessment for ability to extubate


Treatment Considerations - Equipment

• Less portable pieces of equipment
  – Continuous dialysis
  – High flow nasal cannula systems
  – ECMO

• Lines that may potentially limit mobility
  – Pedal lines
  – Femoral HD lines

[Reference: Perme C et al. JACPT. 2011, 2(1), Spring, 32-36]

Mechanical Ventilation

• Patients weaning from mechanical ventilation
  – Consider each patient's case and determine their ability to tolerate both spontaneous breathing trials (SBTs) and rehab sessions
  – May be optimal to treat prior to SBT or after they are rested
  – Consider mobility and strengthening 1st, then weaning


Femoral Arterial Lines

• 30 pts, 156 activity events of sitting edge of bed or greater

• No adverse events
  – Bleeding
  – Dislodgement
  – Non-functioning
  – Acute limb ischemia in 24 hours

[Reference: Perme C et al. JACPT. 2011, 2(1), Spring, 32-36]
**Guidelines to Stop or Modify Activity**

- Drop in O2 sats below 88% which is persistent despite increased FiO2
- Significant increased work of breathing/accessory muscle use
- Evidence of hemodynamic instability
  - ↓BP/MAP
  - Change in EKG rhythm
  - Chest pain


**Guidelines to Stop or Modify Treatment**

- HR greater than age predicted max
- Increased resp rate >20 bpm over resting
- Pt reports significant pain or fatigue
- Patient requests to stop


**Systematic Review: Early Mobility**

- 15 Studies
  - 10 safety/feasibility
  - 10 on functional outcomes
- RCTs account only for 171 total patients
- Safety and feasibility seen in all studies
- Activity related increases in HR, BP, resp rate, tidal volume, and minute ventilation within acceptable ranges and well tolerated by pts


**Clinical Scenarios**