Acute Care
CLINICAL DECISION MAKING

Objectives

• Based on chart review and evaluation of patient, the learner will be able to determine if continued skilled PT is appropriate or not.
• The learner will be able to analyze lab values and determine if it is safe to treat or not based on information gathered.
• The learner will effectively communicate with the multi-disciplinary team his/her recommendations for the safest discharge plan based on a multitude of factors.
• The learner will develop a comfortable level with management of lines in ICU.

Core Competencies in Acute Care

• Developed by a task force of 6 PTs in 2015 for any diagnosis in acute care across the lifespan
• Recognizes acute care is medically complex requiring high level clinical decisions in a rapid and dynamic changing environment
• Goal to assist in providing safe, efficient and effective care by defining required knowledge, behaviors and actions of clinicians with unique and overlapping skills
• Developed not only for the clinicians, supervisors and educators – developed PRIMARILY for the patients receiving care
• Will discuss the 5 competencies (which are interconnected) with an emphasis on clinical decision making with a focus on ICU and lab values
Core Competencies in Acute Care

Core Competency #1 – Clinical Decision Making

- Clinical decision making is thinking about course of action and ability to anticipate outcome based on previous experience and knowledge of best practice
- Focus is that all behaviors, actions and skills are guided by best evidence
- Ability to shift and change thinking in medically complex and challenging environments
- Goal to be competent and confident in decision making, as well as collaboration with the medical team
- Selection of best measures to determine if PT appropriate for patient and assist in discharge planning
- This competency is the foundation of all the other competencies

Core Competency #1 – Clinical Decision Making examples

- Observe details of patient history, evaluation and environment
- Determine based on chart review if patient would benefit from PT services at that time and if not, the ability to communicate the rationale to the medical team
- Assess patient throughout session and adjust intervention based on patient response
- Utilize best practice and evidence to predict level of improvement to determine goals, discharge plans and prognosis
- Identifying personal factors, co-morbidities, participation restrictions/activity limitations and clinical presentation of patient – needed for new evaluation CPT codes
- Later in presentation will use lab values to demonstrate importance of clinical decision making
#1 – Clinical Decision Making Triage System

- Algorithm developed to determine who needs skilled therapy services in acute care
- Reduced number of inappropriate therapy evaluations by 29%
- Average number of patients per day reduced from 18.9 to 12.1 in one academic hospital and from 15.1 to 12.8 in another academic hospital, which results in increased skilled care for the patients that would benefit the most
- Missed visits decreased from 24% to 2% in one institution and 4% to 0.8% in the other

Core Competency #2

- Communication examples
  - Ability to communicate with the medical team, especially the patient and family
  - Alter communication style based on needs of patient
  - Communicate clinical decision making in regards to reason for evaluation and/or continuing, withholding or discontinuing treatment
  - Maintain professional communication especially in difficult situations
Core Competency #3 – Safety examples
- Create and maintain safe environment
- Awareness of precautions
- Communication with health care team of activity outside of therapy
- Determination if movement would compromise medical stability
- Infection control
- Management of lines – will discuss more in depth with ICU equipment
- Responding to an emergent situation

Core Competency #4 – Patient Management examples
- Importance of thorough chart review
- Ability to document clinical decision making for continuing or discontinuing services
- Ability to document rationale for holding treatment
- Documentation to support reimbursement and in a court of law
- Communication to other clinicians who may be treating patient in hospital or when transferred to a different level of care
- Determine when need to communicate with another discipline orally prior to written communication
- Supportive documentation for DME

Core Competency #5 – Discharge Planning examples
- Ability to communicate discharge recommendation to medical team, including patient and family
- Determine destination, continuity of care, DME needs in light of: safety/cognition, assistance available, PLOF, regulations/payment, environment
- Goal of cost containment and optimizing patient outcomes
- One study stated PT used 4 areas to determine: function/disability, patient’s plan, patient’s ability to participate in care and patient’s life context
#5 – Discharge Planning Retrospective Study

- 40 acute care PTs (average 9 years experience) – evaluated patient by day 4 with average LOS 11 days
- 762 patients – 48% medical, 27% surgical, 18% trauma/orthopedic, 7% neurology
- Discharge location – 44% home without therapy, 26% home with home PT, 19% sub-acute rehab, 6% acute rehab, 2% expired, home with OP PT 2%, ECF 1%
- 3 levels of discharge planning – match, mismatch with services lacking, mismatch with different services or extra services

#5 – Discharge Planning Retrospective Study cont’d

- Overall, PT recommendations followed 83% of time
- 2.9 times more likely to be re-admitted (within 30 days) if PT recommendations not followed (mismatch with services lacking or mismatch with different services)
- Readmission indicates a failure in discharge plan no matter the reason for returning
- Most frequent mismatch was home without home PT when it was recommended
- Reasons for mismatch: patient refusal, insurance, medical complexity precludes placement
- Study supports that PTs able to integrate many factors about discharge needs to make accurate and appropriate discharge disposition recommendations

# 5 – Discharge Planning Acute Rehab

- RED LIGHT
- Inability to participate
- Unwillingness to participate
- Poor rehabilitation potential
- Dementia
- Doesn’t need 2 therapy disciplines
- Acute illness
- Procedure or work up pending
# 5 – Discharge Planning Acute Rehab

**YELLOW LIGHT**

- Possible poor rehabilitation potential
- Mild dementia or chronic cognitive impairment
- Unclear benefit for acute rehab as compared to sub-acute rehab
- Unclear safe discharge plan
- Insurance denial
- Severe behavioral disorder
- Not one of 13 impairment categories approved by CMS

**GREEN LIGHT**

1. Medical necessity
   - Medical condition requiring consistent physician supervision
   - Able to tolerate 3 hours of therapy daily
   - Able to actively participate
   - Significant potential for improvement within 7-14 days
   - Discharge plan

2. Diagnosis code – CVA, SCI, congenital deformity, amputation, major multiple trauma, hip fracture, brain injury, neurological disorders, burns, arthritis, sepsis, severe or advanced OA, TIA

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**ICU Line Management**

- Count number of lines at beginning and end of treatment
- Preplan movement
- Detangle lines
- No tension on line
- Prevent occlusion
ICU Line Management

IV
- No contraindication to activity
- Ask nurse if can disconnect
- Accidental pull out > pressure and tell nursing

Catheter
- Drain tube before moving
- Clamp if put above bladder

ICU Line Management

Chest tube
- No contraindications to movement – can roll
- Keep pleuravac upright
- DC suction only if allowed by nursing
- Mediastinal – CABG, Pleural – Pneumothorax (suction keeps lung inflated)

Drains – Vacuum Evacuation, such as JP (Jackson-Pratt)
- Keep compressed

ICU Line Management

Central line
- Tunneled – 24 hour decreased activity at site of placement after surgically implanted

Arterial Access
- Pulmonary – watch PA pressure and watch transducer position to R atrium (1” below = 2 mmHg decrease in BP; 1” above = 2 mmHg increase in BP)
ICU Line Management

Telemetry
- Brown – chocolate (heart)
- Smoke (Black) above Fire (Red)
- Clouds (White) above grass (Green)


ICU Ventilator

- Normal breathing air pulled into lungs but ventilator PUSHES air into lungs
- Note point of attachment and how secured (should have one finger play between)
- Watch vitals
- Alarms
- Neutral head position
- Treat before spontaneous breathing trial

ICU Reasons to discontinue treatment

1. O2 sats below 88% when on supplemental oxygen
2. Drop in MAP
3. HR greater than maximum heart rate (220-age/60-80%)
4. Change in heart rhythm
5. Increased accessory muscle use for breathing
6. Respiration rate increase 20 breaths per minute above resting respirations
7. Extreme fatigue or pallor
8. Patient requesting to stop
Lab Values
TO GUIDE SAFE THERAPY INTERVENTIONS

Outline
1. Define laboratory values
2. Identify normal ranges
3. Recognize abnormal laboratory values
4. Specific Lab Values & Intervention Recommendation
5. Use laboratory values to guide safe interventions for patients
6. Case studies

Defining Lab Values
“Generally, statistically and biologically significant qualitative and/or quantitative measurements of cellular and clinical components of the body. The values derived from such measurements are based on averages of a survey of presumably healthy persons. The concept of individual normal values is based on an acceptable response (comparable with known evidence of health or disease) of an individual to a known alteration of cellular and/or chemical components or systems.” (2)
“Laboratory values reflect the overall health of an individual. They are generally used for diagnostic purposes, or for monitoring the effects of medications or other medical treatments.” (3)

Lab tests are also used for screening purposes, such as teenager lipid profile. (13)

Lab tests are used to confirm a diagnosis based on clinical presentation. (13)

Need to understand acute versus chronic change in value: With an acute change, the body has less time to compensate so interventions more conservative. (1)
How do we determine “Normal Values”?

Normal values are typically determined based on 95% of healthy people in a certain group. For many tests, normal ranges vary depending on your age, gender, race and other factors (such as body size, muscle mass). (3,5)

Normal values vary between labs due to the method used to test. (13)

Abnormal Lab Values

Abnormal is any value that is outside the reference range. (3)

If lab value is outside the reference range, need to consider risk of intervention versus the benefit of increased mobility. Therefore, it is beneficial to consult medical team. (3)

Abnormal Lab Values cont.

When a value is in the critical range, as opposed to high or low abnormal value, typically therapy should be deferred. (3)

A lab value can be abnormal/inaccurate due to fluids (such as patient is dehydrated) or drugs (NSAIDs can affect kidney or liver tests). Therefore, it is important to watch trends and compare to patient’s baseline. (13)
**INR (International Normalized Ratio)**

Used to determine adequacy of blood coagulation system - normal or prolonged time to clot (13)

Therapeutic range 2-3 (up to 4.5 for recurrent embolism)

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INR (International Normalized Ratio) cont.

INR > 4
- Edge of bed, bed mobility, ROM, ankle pumps. No resistive exercise.

INR > 5
- Hold exercise. Evaluate if appropriate to perform bed mobility, edge of bed.

INR > 6
- Consider bed rest.
Complete Blood Count (CBC)

Components of all the formed elements of venous blood: WBC, RBC, Hgb and Hct.

Evaluates the immune system and inflammatory responses, as well as bleeding.

Complete Blood Count (CBC) cont.

Increased Hct increases blood viscosity, which may limit blood flow to essential organs, such as the brain, or increase likelihood of blood clots.

Complete Blood Count (CBC) cont.

Intervention

WBC: <5,000 with fever = no exercise but can do positioning/breathing techniques, >5,000 = light exercise progressed to resistive exercise as patient tolerates
Complete Blood Count (CBC) cont.

**Intervention**

SLP aware of WBC and sputum as cues for possible pneumonia (10)

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Decreased RBC (anemia) - frequent rest breaks and monitor vital signs

Increased RBC (polycythemia) - consider hold due to increased risk of stroke or blood clot. (L7, 13)

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**Hgb:**

- <8 = No exercise but can do essential ADLs
- 8-10 = Light exercise (1-2 pounds), essential ADLs, assistance as needed for safety, light aerobics
- >8 = Resistive exercise, ambulation and self care as tolerated
Complete Blood Count (CBC) cont.

**Intervention**

Hct:

- **<25%** = No exercise but can do essential ADLs, assistance as needed for safety
- **25-35%** = Light exercise (1-2 pounds), essential ADLs, assistance as needed for safety, light aerobics
- **>35%** = Resistive exercise as tolerated, ambulation and self care as tolerated, aerobics

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**Retrospective Study – Hgb**

- **Purpose** – Objectify adverse events in acute care related to hemoglobin level <8 g/dl
- **Completed** by chart review of 4 months of PT
- **Adverse event** defined during activity as: systolic BP >200 mmHg, pulse ox < 90%, systolic BP drop more than 10 mmHg below resting, orthostatic response, HR increase >120 BPM
- **Total of 3334 sessions**
- **3216 with Hgb >8 g/dl** – 13.8% adverse event
- **78 with Hgb <8 g/dl** – 6.4% adverse event
- **Conclusion** – Due to low % adverse event, failure to support “no exercise/contraindicated” <8 g/dl. Recommendation – use caution.

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**Blood transfusions**

- **Hgb <6 g/dl** – recommended except in exceptional circumstances
- **Hgb 6-7 g/dl** – generally indicated
- **Hgb 7-8 g/dl** – consider for postop patients after clinical assessment if stable cardiovascular status
- **Hgb 8-10 g/dl** – not indicated except certain circumstances (such as anemia with symptoms, continued bleeding, ischemia in coronary disease)
- **Hgb >10 g/dl** – not indicated except in exceptional circumstances

Decision to transfuse should not be based on a single criterion – hemoglobin level AND each patient history and symptoms (such as weakness, fatigue, dizziness, dyspnea, decreased exercise tolerance, mental status change, bleeding time). Also consider benefits versus risks.

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**Platelets**

Major line of defense from bleeding by formation of plugs in blood vessels – indicator of ischemia and end organ inflammation

**Intervention**

- <10,000 and/or temperature >100.5 degrees = No exercise, hold therapy
- 10,000-20,000 = Light exercise (no PROM, but light AROM permitted)
- >20,000 = Resistive exercise

Decreased platelets associated with acute kidney injury post-operatively

(1, 13,16)

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**Arterial Blood Gases**

Assess the gas exchange functioning of the cardiopulmonary system (oxygenation, ventilation).

Indicates presence or degree of hypoxia at rest.

Includes pH, PCO2, HCO2, PO2 (measurement of oxygenation), and O2Sat.

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Results in acid-base disorders as follows: respiratory acidosis (CO2 retention), respiratory alkalosis (CO2 excretion), metabolic acidosis, metabolic alkalosis.

(1, 13)
Arterial Blood Gases cont.

Main focus in therapy is O2 Sat. As saturation drops below 90%, partial pressure of oxygen in arterial blood rapidly decreases. Less than 84%, hemoglobin’s ability to carry oxygen greatly impaired.

Study showed use of third or fourth finger gives most accurate readings for pulse oximetry. (1, 13)

O2 Saturation cont.

**Intervention**

Keep oxygen on during treatment. (1)

Maintain saturation greater than 90-92% for activity if possible. Modify treatment plan by rest breaks, upright posture and education in pursed lip/diaphragmatic breathing which moves CO2 out of lungs so increased oxygen can enter. (1)

O2 Saturation cont.

**Intervention**

If there is an order to titrate oxygen to keep saturations above 90-92%, increase oxygen until reach that O2 sat level then reduce back to original liters.

COPD patients due to destroyed alveolar septum have air trapping, decreased gas exchange and CO2 retention. (6, 13)

SLP monitor to explain abnormal respiratory signs (10)
O2 Saturation cont.

### Intervention

<table>
<thead>
<tr>
<th>Flow rate</th>
<th>FiO2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room air</td>
<td>21% O2</td>
</tr>
<tr>
<td>1 L/Min</td>
<td>24% O2</td>
</tr>
<tr>
<td>2 L/Min</td>
<td>28% O2</td>
</tr>
<tr>
<td>3 L/Min</td>
<td>32% O2</td>
</tr>
<tr>
<td>4 L/Min</td>
<td>36% O2</td>
</tr>
<tr>
<td>5 L/Min</td>
<td>40% O2</td>
</tr>
<tr>
<td>6 L/Min</td>
<td>44% O2</td>
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</tbody>
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MAP (Mean Arterial Pressure)

Normal values - 70 to 105 mmHg

It is a mathematical calculation of the systolic and diastolic blood pressure due to ⅔ of the cardiac cycle are in diastole.

It is an indicator of tissue perfusion of coronary arteries, brain and kidneys.

Adequate tissue perfusion >60.

Therefore, recommendation not to treat if less than 60 MAP.  

(11, 12)
Cardiac Markers

**CPK-MB**

Creatine Phosphokinase - found in cardiac muscle

Released into circulation after MI; it rises 4-6 hours after acute MI, peaks in 12-24 hours and returns to normal in 48-72 hours

CPK can also be elevated to 1,000-5,000 after trauma indication acute compartment syndrome (17)

Creatine only increase can indicate rhabdomyolysis (troponin can be elevated also)

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**Intervention**

Contraindicated until levels begin to decrease, then continue as patient tolerates with close monitoring of vitals and frequent rest breaks.

If patient has dysrhythmia, angina or hypotension (as examples), consider holding treatment.

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**Troponin**

Preferred test for myocardial injury since they are the contractile proteins of the myofibril

Rises 4-6 hours post injury and remain elevated for a week or more (good late marker)

Can be false positive if kidney dysfunction (13)
Electrolytes

Potassium
Affects skeletal muscles function and nerve conduction, as well as rate and force of heart contraction.

Potassium cont.

Intervention

<2.8 or >5.1 = hold therapy due to possibility of arrhythmia or muscle spasms, could be life threatening

Exception - Patients with CHF who can tolerate increased levels.

Consult nurse due to medications quick acting and can change quickly due to hydration status.

Sodium
Functions to transmit nerve impulses. Reflects changes in salt and water balance.
Decreased value can be due to alcohol consumption.
Electrolytes cont.

**Sodium**

**Intervention**
- <120 (weakness, neurological symptoms)
- or >155 (seizures) are life threatening.
- Therapy contraindicated.

**BUN (Blood Urea Nitrogen)**

Measures how well the liver and kidneys are functioning. Can be influenced by GI bleeding.

**Intervention**
- If increased, monitor for light headedness and dizziness, as well as confusion.

Liver Dysfunction

Use standard precautions and monitor vital signs due to increased risk of infection and bleeding.

Ammonia - elevated significantly affects brain function, such as confusion, delirium, seizures or coma.
Blood Glucose

Monitors diabetes diet and medication, as well as, altered levels of consciousness

HbA1c (Glycosylated hemoglobin) - average blood sugar level over a 2-3 month period of time prior to the test. Used to evaluate treatment of diabetes.

Blood Glucose cont.

Intervention

If low (symptoms: labile, irritable, nervous, difficulty concentrating/speaking, shaky, hungry, headache, dizziness, pallor, sweating), need sugar (juice, candy, etc). <60 will have poor tolerance to exercise and may show mental status change; notify RN.

If high (symptoms: lethargic, confused, thirsty, weak, nausea, vomiting, flushed), need immediate medical attention. >300 exercise may increase glucose levels even more; treatment contraindicated.

Ejection Fraction

Amount of blood pumped divided by amount of blood ventricle contains

Normal is 50% or higher

Intervention

Monitor vital signs
Progressively increase activity as patient tolerates
Do not treat if less than 20%
New lab test

- Lab test been developed to detect concussions
- Will measure proteins that indicate TBI
- First need to determine baseline level of proteins
- Should be available in 2010 per Powering Precision HealthSummit

Using Lab Values to Guide Safe Interventions

Know your facility guidelines/policies if applicable, as well as the individual physician who may be more aggressive or conservative in his/her approach based on his/her research or preference. (4, 5)

The goal is EITHER not over stressing unstable/fragile patients OR not under exercising stable patients who could tolerate increased physical activity (1)

Using Lab Values cont.

Modify the intervention by one or more of the following: decrease frequency of repetitions, decrease intensity of exercise/activity, increase rest breaks. (3)

Monitor the patient’s response to therapy if lab values abnormal. Consider the individual based on prior interactions. (4)
Using Lab Values cont.

“Pawlik et al states in a 2013 article that patients with acute illness “require timely and accurate assessment and modification of activity by the intervening PT (or OT) and titration of activity in response to changes in physiological status.”” (5)
Overall, use clinical judgement by thorough chart review, review of lab trends and review with clinical team then monitoring patient if you are treating! (4, 5)

“...interpret available lab values as a component of examination and evaluation of the patient/client, to suggest lab testing when indicated, and to use lab values to guide the determination of safe and effective intervention.”

APTA 2012

Other areas for Clinical Decision Making

• Imaging
• Spinal instability
• Pharmacology
References


References cont’d


Lab References


Lab References cont’d

7. CEU

8. Cardiac considerations handout


18. Perez AJ. Blood tests to diagnose concussions to be discussed at summit on Monday. USA Today Sports. September 26, 2016.