deterioration and a diagnosis of severe ARDS increases the possibility of a poor prognosis, patients can still benefit from skilled therapeutic services depending upon medical stability. Early intervention for patients in critical care is strongly encouraged and has been shown to improve long term health outcomes as opposed to interventions initiated following discharge from acute care services. The clinician should carefully weigh the above factors and consult other members of the healthcare team in order to make an informed decision.

2. *Once the patient is medically stabilized, what would be some appropriate outcomes to measure her current functional status?*

   The following test and measures may be indicated for this patient based upon her level of acuity: state of consciousness/arousal level, respiratory rate, vital signs, oxygen saturation/ventilator settings, passive joint range of motion. While observing the patient's ability to participate in transfers and upright mobility is most applicable to functional tasks, those may not be medically appropriate to assess at this time.

3. *How does an understanding of the potential long-term effects of mechanical ventilation affect the physical therapy plan of care for this patient?*

   Understanding the pathology, presentation, and prognosis of PICS and ICU-acquired weakness is helpful in creating a comprehensive plan of care for this patient. Armed with the knowledge that deficits related to these conditions can span across the spectrum of settings, the clinician should identify an appropriate time to initiate therapeutic services in order to optimize the patient's health outcomes and prognosis for functional recovery. Lastly, knowledge of the long-term effects of mechanical ventilation can prepare the clinician to screen for potential cardiorespiratory complications during exercise, and/or identify a need for respiratory training in future settings.

Case Study 2

A 41 year-old-male with a 20-year history of smoking two packs per day presented to an outpatient physical therapy clinic with a new onset of lower extremity muscle weakness and difficulty completing his daily morning runs. Imaging was negative for structural deformity in the spine and extremities. Past medical history was positive for COVID-19 which required a 14-day hospitalization prior to being released home.

Case Study 2 Discussion

1. *How does the patient's history of smoking affect his prognosis and health outcomes?*

   People with COPD are at increased risk for complications during recovery from COVID-19. Smoking increases one's risk of COPD and, given the patient's age and packs smoked per day, may strongly affect his prognosis and increase the risk of poor health outcomes. COPD also increases the patient's risk for airway clearance dysfunction requiring aerosol-generating procedures following recovery.

2. *What additional questions, relative to the diagnosis and hospitalization, should be included in the patient's initial interview?*

   Emphasis should be placed on the length of hospitalization and time spent in critical care, whether the patient required mechanical ventilation, early mobilization efforts, and screening questions for potential PICS, ICU-acquired weakness, and other complications secondary to prolonged critical care stays.

3. *Name 2-4 outcome measures that would be appropriate to administer for this patient.*

   Based upon the information provided, any outcome measures that address the patient's current function, level of disability, and participation in daily activities would be appropriate. Specific to this case, physical examination may focus on strength testing, pulmonary reserve, and exercise capacity.

4. *Which contraindications for exercise might be most applicable to this patient scenario?*

   The patient's personal history of smoking and subjective reports could reasonably lead to the assumption that this patient would exhibit low exercise capacity and endurance upon physical examination. Given the patient's recent hospitalization and positive COVID-19 diagnosis, he may also suffer from mild ICU-acquired weakness and/or PICS. These factors warrant close observation of the patient's activity tolerance by monitoring for:

   - Resting heart rate greater than 120 BPM
   - Resting blood pressure greater than 140/90 or less than 90/60mmHg
   - Oxygen saturation less than 95%
   - Dyspnea with no relief after resting

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- Chest pain, chest tightness, aggravated cough, dizziness, headache, blurred vision, palpitation, night sweats with exercise

Conclusion

The pandemic affected millions and caused enormous disruptions to the delivery of healthcare across every setting. Confirmed understanding of the virus's presentation and its acute effects on multiple body systems can provide insight and guidance for the timing of physical therapy interventions and appropriate outcome measures to quantify changes. Uncertainty regarding the long-term sequelae of COVID-19 still exists, leaving many healthcare professionals in post-acute care settings without specific guidance for treatment and recovery expectations. However, reasonable conclusions can be drawn from similar recovery trajectories like Post-ICU Syndrome and ICU-acquired weakness. Interventions aimed at improving health outcomes and avoiding hospital readmission should be prioritized across the spectrum of settings. Physical therapists and physical therapy assistants play a critical part in prescribing exercise and effective rehabilitation techniques to restore function in survivors of COVID-19 and enable their return to society.

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