Miami Dade College

Course Description

RET2284L |Principles of Mechanical Ventilation Laboratory | 2.00 credits

Laboratory for RET 2284. This course will provide an in depth study of the operation of mechanical ventilation devices and associated monitors. Patient safety, troubleshooting, and application are stressed. Corequisite: RET2284.

Course Competencies

Competency 1: The student will demonstrate procedures for initiating noninvasive positive pressure ventilation by:

1. Demonstrating how to gather and assemble the equipment needed to initiate NPPV (ventilator, circuit, humidification device, and patient adjunct)
2. Demonstrating how to perform an Operation Verification Procedure (OVP) to verify the functionality of the ventilator and the integrity of the breathing circuit – commonly referred to as "system leak test
3. Identifying and adjust/set all controls and alarms on the ventilator
4. Demonstrating how to apply the appropriate initial CPAP and Bi-PAP settings, including alarms and backup ventilation
5. Demonstrating how to select and fit the patient with the appropriate type/size interface (nasal or full-face mask)
6. Demonstrating how to initiate NPPV and evaluate the effectiveness of ventilation via ventilator/patient synchrony, VT, system leak, vital signs, breath sounds, SpO2, and arterial blood gases (ABG)
7. Demonstrating how to troubleshoot system malfunctions, e.g., circuit leak, poorly fitted patient interface, etc
8. Demonstrating how to adjust settings to correct oxygenation/ventilation abnormalities
9. Demonstrating how to record relevant data in the medical record and communicate pertinent information regarding the patient's clinical status to the appropriate members of the health care team

Competency 2: The student will demonstrate procedures for initiating mechanical ventilation by:

1. Identifying the controls, alarms, and monitors on various brands and types of mechanical ventilators
2. Demonstrating how to gather and assemble the equipment needed to initiate mechanical ventilation (ventilator, circuit, humidification device, etc.)
3. Demonstrating how to perform an Operation Verification Procedure (OVP) to verify the functionality of the ventilator and the integrity of the breathing circuit (commonly referred to as "system leak test")
4. Calculating and implementing initial ventilator settings in various ventilator modes using "ideal body weight"
5. Demonstrating how to initiate mechanical ventilation evaluate the safety and effectiveness of settings, and make corrections as needed
6. Demonstrating how to set monitoring alarms appropriately
7. Demonstrating how to adjust ventilator settings to correct oxygenation/ventilation requirements and or meet ARDS Network protocols
8. Demonstrating how to troubleshoot system malfunctions, e.g., circuit leaks, disconnects, kinks, etc.
9. Demonstrating how to record relevant data in the medical record and communicate pertinent information regarding the patient's clinical status to the appropriate members of the healthcare team

Competency 3: The student will demonstrate the ability to perform a patient–ventilator systems check by:

1. Demonstrating and describing how to identify data in the patient's medical record that would be clinically pertinent to the care of the patient on mechanical ventilation
2. Demonstrating how to perform an appropriate physical assessment:
    a. Sensorium b. Vital signs, EKG, SpO2, ETCO2, breath sounds
    b. Determine the need for tracheal suctioning and perform it if necessary,
    c. Physical examination of the thorax and extremities
3. Demonstrating how to assess and adjust endotracheal/tracheostomy tube cuff pressure/volume

4. Describing the importance of elevating the head of the bed 30$_o$, mouth care, and subglottic suctioning in preventing ventilator acquired pneumonia
5. Demonstrating how to perform humidifier maintenance
6. Demonstrating how to evaluate and record mechanical and spontaneous respiratory rates, volumes and pressures (PIP, PPLAT, PMEAN) and recommend adjustments as needed to meet ARDS Network Protocols
7. Demonstrating how to analyze and interpret waveforms
8. Calculating and evaluate dynamic compliance (CD), static compliance (CS), and airway resistance (Raw), P(A-a) O2, P/F ratio, and Oxygen Index (OI);
9. Demonstrating how to perform and interpret ABG, SpO2, ETCO2, VD/VT ratio and recommend ventilator changes to correct oxygenation/ventilation requirements, and/or meet ARDS Network protocols
10. Demonstrating how to detect and measure auto-PEEP and recommend and / or implement strategies to correct
11. Demonstrating how to administer bronchodilators to a mechanically ventilated patient via SVN or MDI
12. Demonstrating how to change ventilator circuit for a mechanically ventilated patient
13. Demonstrating how to record relevant data in the medical record and communicate pertinent information regarding the patient's clinical status to the appropriate members of the health care team

Competency 4: The student will demonstrate and describe the procedures and techniques related to the discontinuation of a mechanical ventilator by:

1. Demonstrating how to gather and assemble the equipment needed to measure spontaneous breathing parameters (minute ventilation, respiratory frequency [f], tidal volume [VT], vital capacity [VC], and maximum inspiratory pressure [MIP])
2. Demonstrating how to measure spontaneous breathing parameters on a mechanically ventilated patient (VE, VT, and calculating & interpret a rapid, shallow breathing index (RSBI), as well as perform and interpret the vital capacity (VC)
3. Describing the patient's potential for successful ventilator discontinuation based on spontaneous breathing parameters, RSBI, and other clinical and laboratory findings, e.g., chest radiograph, complete blood count (CBC), electrolytes, vital signs, etc.
4. Demonstrating how to implement strategies to begin ventilator discontinuation, e.g., spontaneous breathing trial (SBT).
5. Demonstrating how to determine if ventilator discontinuation strategies are successful
6. Demonstrating strategies to implement should ventilator discontinuation fail
7. Demonstrating how to gather the necessary equipment and perform extubation

Learning Outcomes:

1. Communication
2. Computer / Technology Usage
3. Critical Thinking
4. Ethical Issues
5. Information Literacy
6. Numbers / Data