RSPT 50C: THERAPEUTICS & INTRODUCTION TO MECHANICAL VENTILATION

Foothill College Course Outline of Record

Heading	Value
Units:	4
Hours:	3 lecture, 3 laboratory per week (72 total per quarter)
Prerequisite:	RSPT 50B.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	CSU
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable

Student Learning Outcomes

- The student will be able to explain concepts and theory related to the initiation, monitoring, and discontinuing of ventilatory support.
- The student will be able to perform procedures pertaining to mechanical ventilation by completing all lab competencies and a lab practical with a 70% or higher.

Description

Topics to be covered include respiratory failure, introduction to invasive and non-invasive mechanical ventilation. Intended for students in the Respiratory Therapy Program; enrollment is limited to students accepted in the program.

Course Objectives

The student will be able to:
A. Define acute respiratory failure.
B. Discuss the causes of respiratory failure.
C. Differentiate between Type I, Type II, and Type I and Type II respiratory failure.
D. Discuss the indications for ventilatory support.
E. Classify ventilators and describe how they work.
F. Classify and define different modes of ventilation.
G. Identify the physiologic effects of ventilatory support.
H. Initiate and manage invasive ventilatory support.
I. Discuss application of noninvasive ventilation (NIV).
J. Discuss the principle of monitoring the patient in the intensive care unit.
K. Describe discontinuing ventilatory support.

Course Content

A. Define acute respiratory failure
1. Definition
2. Sign and symptoms
3. Arterial blood gas analysis
B. Discuss the causes of respiratory failure
1. Hypoxemic respiratory failure (Type I)
2. Hypercapneic respiratory failure (Type II)
3. Chronic respiratory failure (Type I and Type II)
C. Differentiate between Type I, Type II, and Type I and Type II respiratory failure
1. Hypoxemic respiratory failure (Type I)
a. Ventilation/perfusion mismatch
b. Shunt
c. Alveolar hypoventilation
d. Diffusion impairment
e. Perfusion/diffusion impairment
f. Decreased inspired oxygen
g. Venous admixture
h. Differentiating the causes of acute hypoxemic respiratory failure
2. Hypercapneic respiratory failure (Type II)
a. Insidious exposure
b. Increased carbon dioxide production
c. Impairment in respiratory control
d. Impairment in respiratory effectors
3. Chronic respiratory failure (Type I and Type II)
a. Acute-on-chronic respiratory failure
b. Complications of acute respiratory failure
c. Clinical presentation
D. Indications for ventilatory support
1. Inadequate alveolar ventilation
2. Inadequate lung expansion
3. Inadequate muscle strength
4. Increased work of breathing
5. Hypoxemia
E. Ventilators
1. How they work
a. Input power
b. Power transmission and conversion
c. Control system
2. Output waveforms
a. Pressure
b. Volume
c. Flow
3. Operator interface
a. Input displays
b. Output displays
4. Types of ventilators
a. Critical care
b. Conventional
c. Subacute care
d. Home care
e. Transport
f. Noninvasive
F. Modes of ventilation
1. Control variables
a. Pressure control
b. Volume control
2. Breath sequence
a. Spontaneous breaths
b. Mandatory breaths
c. Continuous mandatory ventilation (CMV)
d. Intermittent mandatory ventilation (IMV)
e. Continuous spontaneous ventilation (CSV)
f. Breathing pattern
3. Targetting scheme
a. Open loop control
b. Closed loop control
G. Physiologic effects of ventilatory support
1. Pressure and pressure gradients
2. Effects of mechanical ventilation on ventilation

3. Effects of mechanical ventilation on oxygenation
4. Effects of mechanical ventilation on lung mechanics
5. Minimizing adverse pulmonary effects of positive pressure mechanical ventilation
6. Physiologic effects of ventilatory modes
7. Cardiovascular effects of positive pressure mechanical ventilation
8. Effects of positive pressure mechanical ventilation on other body systems
9. Complications of mechanical ventilation
H. Initiating and adjusting invasive ventilatory support
1. Goals
2. Initial ventilator settings
3. Adjusting ventilatory support
4. Oxygenation
5. Ventilation
I. Application of noninvasive ventilation (NIV)
1. History and development of NIV
2. Indications for NIV
3. Patient selection
4. Equipment selection
5. Management of NIV
6. Complications of NIV
J. Monitoring the patient in the intensive care unit
1. Respiratory monitoring
2. Cardiac monitoring
3. Neurologic monitoring
4. Renal and liver function monitoring
5. Nutritional monitoring
6. Global monitoring indices
K. Discontinuing ventilatory support
1. Ventilator dependance
2. Patient evaluation
3. Methods
4. Monitoring the patient during weaning
5. Extubation

Lab Content

A. Ventilators
1. How they work
a. Input power
b. Power transmission and conversion
c. Control system
2. Output waveforms
a. Pressure
b. Volume
c. Flow
3. Operator interface
a. Input displays
b. Output displays
4. Types of ventilators
a. Critical care
b. Conventional
c. Subacute care
d. Home care
e. Transport
f. Noninvasive
B. Modes of ventilation
1. Control variables
a. Pressure control
b. Volume control
2. Breath sequence
a. Spontaneous breaths
b. Mandatory breaths
c. Continuous mandatory ventilation (CMV)
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f. Breathing pattern
3. Targetting scheme
a. Open loop control
b. Closed loop control
C. Initiating and adjusting invasive ventilatory support
1. Goals
2. Initial ventilator settings
3. Adjusting ventilatory support
4. Oxygenation
5. Ventilation
D. Application of noninvasive ventilation (NIV)
1. History and development of NIV
2. Indications for NIV
3. Patient selection
4. Equipment selection
5. Management of NIV
6. Complications of NIV
E. Monitoring the patient in the intensive care unit
1. Respiratory monitoring
2. Cardiac monitoring
3. Neurologic monitoring
4. Renal and liver function monitoring
5. Nutritional monitoring
6. Global monitoring indices
F. Discontinuing ventilatory support
1. Ventilator dependance
2. Patient evaluation
3. Methods
4. Monitoring the patient during weaning
5. Extubation

Special Facilities and/or Equipment

A. Ventilators, ventilator tubing, and lung simulators.

Method(s) of Evaluation

A. Lab performance
B. Written exams
C. May include:
1. Quizzes
2. Midterm
3. Final exam
4. Laboratory final

Method(s) of Instruction

A. Lecture
B. Discussion
C. Laboratory
D. Demonstration
E. Lab competencies demonstrated in skills

Representative Text(s) and Other Materials

Kacmarek, Stoller, and Heuer. Egan's Fundamentals of Respiratory Care. 11th ed. St. Louis: Elsevier, 2017. ISBN: 9780323341363

Kacmarek, Stoller, and Heuer. Workbook for Egan's Fundamentals of Respiratory Care. 11th ed. St. Louis: Elsevier, 2017. ISBN: 9780323358521

Hinski. Respiratory Care Clinical Competency Lab Manual. St. Louis: Elsevier, 2014. ISBN:9780323100571

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

A. Reading assignments

B. Workbook assignments

C. Competencies related to course content

Discipline(s)

Respiratory Technologies