RESP-2300: BASIC THERAPEUTIC PROCEDURES

Cuyahoga Community College

Viewing: RESP-2300 : Basic Therapeutic Procedures

Board of Trustees:
June 2020

Academic Term:
Fall 2020

Subject Code
RESP - Respiratory Care

Course Number:
2300

Title:
Basic Therapeutic Procedures

Catalog Description:
Theory, clinical application and analysis of basic respiratory care procedures. Emphasis on oxygen therapy, medical gas therapy, tracheal suctioning, humidity and aerosol therapy, chest physical therapy, incentive spirometry, intermittent positive pressure breathing, airway management, bronchoscopy, and thoracotomy tubes.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
3

Other Hour(s):
0

Requisites

Prerequisite and Corequisite
RESP-1330 Cardiopulmonary Assessment and Pulmonary Diseases.

Outcomes

Course Outcome(s):
Apply safe levels of medical gases and assess for patient hazards and positive outcomes.

Objective(s):
1. Perform an assessment of a patient's oxygenation status recognizing causes of hypoxia and physiologic response to the condition.
2. Assess symptoms, classifications and appropriate therapy related to asthma management.
3. Recognize the indications for insertion, and potential complications of an artificial airway, and properly execute the intubation procedure.
4. Identify the indications and goals of oxygen therapy, determine required oxygen concentrations, apply appropriate administration devices, and recognize potential hazards.
5. Describe the indications, physiologic effects, application techniques, and potential hazards of administering helium, and hyperbaric oxygen therapy.

Course Outcome(s):

Employ secretion removal from patients' airways using appropriate vacuum pressures, external chest wall vibrations, and gravity drainage techniques.

Objective(s):

1. Apply positive pressure adjuncts in a safe and effective manner.
2. Differentiate the techniques of orotracheal, nasotracheal, and tracheostomy intubation.
3. Identify, explain and perform postural drainage therapy techniques which promote bronchial hygiene, and improve breathing efficiency.
4. Instruct patient with demonstration back technique on proper breathing pattern and post-treatment cough.

Course Outcome(s):

Produce effective bronchial hygiene by administering appropriate inhaled medications, humidity therapy, positive expiratory pressure and educating the patients in effective coughing techniques.

Objective(s):

1. Describe the goals, clinical criteria, and indications for positive pressure therapy.
2. Discuss the hemodynamic effects, hazards and contraindications of positive airway pressure therapy.
3. Assess the effectiveness of the mucociliary escalator considering causes, physiologic responses, and clinical manifestations of a dysfunction in the system.
4. Apply basic therapy that assists in the removal of tracheobronchial secretions including suctioning, humidity therapy, identifying clinical indications, proper administration techniques, and potential complications.
5. Evaluate the necessity for aerosol therapy, identifying clinical signs, goals of therapy, and demonstrate an understanding of administration techniques, and hazards of therapy.
6. Differentiate aerosolized medications by nervous system response, mechanism of action, dosages, and potential side effects.
7. Instruct patient with demonstration back technique on proper breathing pattern and, post-treatment cough.

Course Outcome(s):

Demonstrate asthma care plans to patients utilizing assessments, classifications, and appropriate inhaled medications.

Objective(s):

1. Assess symptoms, classifications and appropriate therapy related to asthma management.
2. Evaluate the necessity for aerosol therapy, identifying clinical signs, goals of therapy, and demonstrate an understanding of administration techniques, and hazards of therapy.
3. Differentiate aerosolized medications by nervous system response, mechanism of action, dosages, and potential side effects.
4. Apply appropriate aerosol delivery devices in a safe and effective manner.
5. Instruct patient with demonstration back technique on proper breathing pattern, post-treatment cough, and bedside peak flow measurements.

Course Outcome(s):

Operate therapeutic devices utilized to increase alveolar ventilation, and decrease work of breathing.

Objective(s):

1. Describe the goals, clinical criteria, and indications for positive pressure therapy.
2. Discuss the hemodynamic effects, hazards and contraindications of positive airway pressure therapy.
3. Apply positive pressure adjuncts in a safe and effective manner.
4. Instruct patient with demonstration back technique on proper breathing pattern, post-treatment cough, and bedside peak flow measurements.

Course Outcome(s):

Manipulate artificial airways and associated adjuncts to produce patent airways in patients.

Objective(s):

1. Recognize the indications for insertion, and potential complications of an artificial airway
2. Properly execute the intubation procedure.

3. Differentiate the techniques of orotracheal, nasotracheal, and tracheostomy intubation.
4. Recognize hazards and complications of intubation given a patient scenario.

Course Outcome(s):

Select appropriate equipment and medications used for a bronchoscopy procedure.

Objective(s):

1. Demonstrate an understanding of the basic equipment function, indications, contraindications, and diagnostic value of performing a bronchoscopy.

Methods of Evaluation:

A. Quizzes

B. Exams

C. Comprehensive final

D. Laboratory quizzes

E. Equipment competency exams

F. Laboratory comprehensive final

Course Content Outline:

1. Oxygen therapy
    a. Goals of oxygen therapy
        i. treatment of hypoxemia
            1. causes of hypoxemia
            2. physiologic responses to hypoxemia
        ii. decrease work of breathing
        iii. decrease myocardial work
    b. Determination of required oxygen therapy
        i. current partial pressure of arterial oxygen (Pa02)
        ii. normal partial pressure of arterial oxygen (Pa02)
        iii. required fraction of inspired oxygen (Fi02)
        iv. need for high/low flow system
        v. specific delivery device
    c. Application of oxygen therapy
        i. baseline assessment information
        ii. assembly of equipment
        iii. explanation to patient
        iv. post assessment
        v. readjust and reevaluate
    d. Hazards of oxygen therapy
        i. absorption atelectasis
        ii. refractory hypoxia
        iii. pulmonary oxygen toxicity
            1. components of intracellular metabolism of oxygen
            2. duration/concentration resulting in damage
            3. pulmonary tissue damage
            4. clinical manifestations
        iv. retenopathy of prematurity
        v. oxygen induced hypoventilation
2. Medical gas therapy
    a. Hyperbaric oxygen therapy
        i. equipment
            1. multiplace chambers
            2. monoplace chambers
        ii. theory of use
        iii. physiologic effects
        iv. hazardous effects
        v. indications

b. Helium therapy
    i. characteristics of helium
    ii. indications for therapy
    iii. administration procedure
    iv. side effects
3. Pathophysiology of retained secretions
    a. Mucociliary escalator
        i. mucus blanket
        ii. ciliary activity
        iii. disturbance in action
        iv. mucus production
    b. Parenchymal hygiene
        i. alveolar fluid
        ii. macrophages
        iii. alveolar inflation volume
    c. Cough mechanism
        i. nerve innervation
        ii. inspiratory volume
        iii. glottic closure
        iv. intrathoracic pressure
        v. glottic opening
    d. Physiologic response to retained secretions
        i. inflammatory response
        ii. alterations in airflow
        iii. changes in work of breathing
        iv. distribution of gas
        v. decrease oxygenation
        vi. alterations in lung compliance
        vii. development of infection
    e. Clinical manifestations of retained secretions
        i. increased work of breathing
        ii. hypoxia
        iii. inadequate cough
    f. Etiology
        i. dehydration
        ii. acute pulmonary disease
        iii. tracheal foreign body
        iv. generalized muscle weakness
        v. bulbar malfunction
        vi. abdominal musculature limitations
4. Adjuncts to the mucociliary escalator
    a. Suctioning
        i. Indications of suctioning
            1. breath sounds
            2. visualize secretions
            3. patency of airways
        ii. preassessment of patient
            1. vital signs
            2. breath sounds
            3. patient position
        iii. equipment
            1. characteristics of catheters
            2. suction pressures
            3. suctioning kit
            4. manual resuscitator
            5. lavage solution
        iv. procedure - via artificial airway
            1. sterile technique
            2. assembly of equipment

3. manual ventilation
4. hyperoxygenation
5. hyperinflation
6. fraction of inspired oxygen (Fi02)
7. catheter insertion

v. procedure - nasopharyngeal route
1. sterile technique
2. assembly of equipment
3. hyperoxygenation
4. hyperinflation
5. catheter insertion
6. application of vacuum
7. monitoring patient

vi. complications
1. hypoxemia
2. dysrhythmia
3. hypotension
4. atelectasis
5. tissue damage

vii. sputum collection for culture/cytology

b. Humidity therapy
i. normal airway humidification
1. % humidity ambient air inspired nasally
2. % humidity ambient air inspired orally
3. insensible water loss

ii. alterations due to inadequate humidification
iii. indications for humidity therapy
iv. clinical application of humidifiers
v. systemic hydration
vi. pharmacologic interventions to factors affecting penetration and deposition

1. Bronchopulmonary hygiene
a. Aerosol therapy
i. particle stability
ii. penetration and deposition
iii. quantity of aerosol retention
iv. solutions effect on airway resistance
v. goals of aerosol therapy
vi. administration technique
vii. hazards of aerosol therapy

b. Aerosol pharmacology
i. categories of aerosolized medications
ii. nervous system affects
1. alpha
2. beta 1
3. beta 2

iii. clinical complaints of side affects
iv. bronchodilators via hand held nebulizer
1. generic and brand names
2. nervous system affects
3. percent solutions
4. mg/ml
5. normal dosages
6. specific medications
7. racemic epinephrine
8. short acting bronchodilators
9. long acting bronchodilators
10. inhaled corticosteroids

11. combination therapy
12. mucolytics

v. metered dose inhalers
1. technique
2. patient instruction

vi. dry powder inhalers
1. technique
2. patient instruction

vii. patient instruction for administration
viii. clinical indications
ix. complications in administration
x. calculation of dosages

2. Mechanical interventions to bronchopulmonary hygiene
a. General indications
i. ineffective cough
ii. quantity/quality of secretions

b. Clinical goals of therapy
i. effective cough
ii. supplement effective cough

c. Techniques promoting bronchial hygiene
i. clinical indications
ii. patient tolerance
iii. postural drainage
1. description of technique
2. positions for upper lobes
3. positions for middle lobes
4. positions for lower lobes
5. duration and frequency of therapy

iv. chest percussion
1. description of technique
2. mechanical percussors
3. areas percussed
4. precautions
5. complications
6. duration and frequency of therapy

v. chest vibration
1. description of technique
2. areas vibrated
3. precautions
4. complications
5. duration and frequency of therapy

vi. cough training
1. factors impairing cough
2. proper body position
3. physical support of patient
4. verbal support of patient
5. mechanical stimulation techniques

d. Techniques improving breathing efficiency
i. goals of breathing retraining
1. proper breathing patterns
2. decrease work of breathing

ii. causes of abnormal breathing patterns
1. poor muscle strength
2. anatomic changes

iii. description of techniques
1. pursed lip breathing
2. diaphragmatic breathing
3. segmental breathing

iv. breathing and activities of daily living

3. Hyperinflation techniques of bronchial hygiene
    a. Incentive spirometry
        i. goals of therapy
            1. recruit alveoli
            2. prevent atelectasis
        ii. criteria/indications for therapy
            1. post op-patients
            2. decreased FVC
            3. shallow breathing
            4. atelectais
        iii. description of technique
            1. determination of baseline volume goals
            2. proper explanation
            3. proper patient positioning
            4. administration
            5. frequency and duration
            6. evaluation of therapy
4. Asthma management
    a. Assessment
        i. patient
        ii. environment
    b. Definition of asthma
    c. Educate patient
        i. asthma pathology
        ii. treatment
        iii. signs and action steps
    d. Classifications of asthma
        i. intrinsic
        ii. extrinsic
    e. Treatment related to classifications
        i. action plan
        ii. asthma guidelines
5. Positive pressure adjuncts
    a. Physiology of positive expiratory pressure
    b. Patient education
    c. Chest wall vibrations
6. Airway management
    a. Pharyngeal airways
        i. oropharyngeal
            1. indications
            2. insertion technique
            3. complications
        ii. nasopharyngeal
            1. indications
            2. insertion technique
            3. complications
    b. Indications for artificial airways
        i. relief of airway obstruction
        ii. protection of the airway
        iii. facilitate suctioning
        iv. facilitate mechanical ventilation
    c. Tracheostomy vs. endotracheal tube
        i. time considerations
        ii. patient comfort
        iii. communication
        iv. hazards
    d. Oral intubation
        i. Equipment
        ii. assessment of patient
        iii. patient positioning

iv. laryngoscope insertion
v. glottic landmarks
vi. tube insertion
vii. patient monitoring
viii. post intubation assessment

e. Nasal intubation
i. techniques
1. blind
2. direct vision
ii. tube position
iii. advantages over oral tube
iv. hazards specific to nasal route

7. Artificial airways
a. Management of the intubated patient
i. contamination of the airway
ii. humidification of the airway
b. Extubation technique
i. indications
ii. proper explanation to patient
iii. equipment preparation
iv. suctioning the airway
v. removal of tube
vi. post extubation assessment
vii. post extubation therapy
c. Tracheostomy
i. advantages over endotracheal tube
ii. immediate complications procedure
iii. late complications of procedure
iv. cleaning and changing the tube
v. extubation
d. Artificial airway emergencies
i. cuff leaks
ii. inadvertent extubation
iii. obstructed tubes
e. Complications of tracheal intubation
i. Obstructed airways
ii. Cough
iii. By-pass normal humidification/warming
f. Emergency airways
i. esophageal
ii. cricothyroid

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Resources

Cairo, JM. (2017) *Mosby's Respiratory Care Equipment*, St.Louis: Elsevier.

Kacmarek, RM, et.al. (2020) *Egan's Fundamentals of Respiratory Therapy*, St.Louis: Elsevier .

Gardenhire, DS. (2019) *Rau's Respiratory Care Pharmacology*, St.Louis: Elsevier .

Hess, DR. (2019) *Respiratory Care Principles and Practice*, New York: McGraw Hill.

White, GC. ({ts '2012-01-17 00:00:00'}) *Basic Clinical Lab Competencies for Respiratory Care: An Integrated Approach*,

Will Beechey. (2018) *Respiratory Care Anatomy and Physiol;ogy*, St. Louis: Elsevier.

Resources Other

http://www.rcjournal.com/cpgs/index.cfm (http://www.rcjournal.com/cpgs/)
http://www.nhlbi.nih.gov/guidelines/asthma/

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