

**CARDIAC TECHNICIAN
TO
INTERMEDIATE
TRANSITION PROGRAM**

MEDICAL: 5

RESPIRATORY EMERGENCIES: 1

Comments:

UNIT TERMINAL OBJECTIVE

5-1 At the end of this unit, the EMT-Intermediate student will be able to utilize the assessment findings to formulate a field impression and implement the treatment plan for the patient with respiratory emergencies.

COGNITIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate will be able to:

- 5-1.1 Identify and describe the function of the structures located in the upper and lower airway. (C-1)
- 5-1.2 Discuss the physiology of ventilation and respiration. (C-1)
- 5-1.3 Identify common pathological events that affect the pulmonary system. (C-1)
- 5-1.4 Discuss abnormal assessment findings associated with pulmonary diseases and conditions. (C-1)
- 5-1.5 Compare various airway and ventilation techniques used in the management of pulmonary diseases. (C-3)
- 5-1.6 Review the pharmacological preparations that EMT-Intermediates use for management of respiratory diseases and conditions. (C-1)
- 5-1.7 Review the use of equipment used during the physical examination of patients with complaints associated with respiratory diseases and conditions. (C-1)
- 5-1.8 Describe the epidemiology, pathophysiology, assessment findings, and management for the following respiratory diseases and conditions: (C-1)
 - a. Bronchial asthma
 - b. Chronic bronchitis
 - c. Emphysema
 - d. Pneumonia
 - e. Pulmonary edema
 - f. Spontaneous pneumothorax
 - g. Hyperventilation syndrome
 - h. Pulmonary thromboembolism

AFFECTIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate will be able to:

- 5-1.9 Recognize and value the assessment and treatment of patients with respiratory diseases. (A-2)
- 5-1.10 Indicate appreciation for the critical nature of accurate field impressions of patients with respiratory diseases and conditions. (A-2)

PSYCHOMOTOR OBJECTIVES

At the completion of this unit, the EMT-Intermediate will be able to:

- 5-1.11 Demonstrate and record pertinent assessment findings associated with pulmonary diseases and conditions. (P-1)
- 5-1.12 Review proper use of airway and ventilation devices. (P-1)
- 5-1.13 Conduct a simulated history and patient assessment, record the findings, and report appropriate management of patients with pulmonary diseases and conditions. (P-3)

DECLARATIVE

- I. Introduction
- II. Anatomy and physiology review
 - A. Anatomy review
 - 1. Upper airway
 - 2. Lower airway
 - B. Global physiology of the pulmonary system
 - 1. Function
 - a) The respiratory system functions as a gas exchange system
 - b) 10,000 liters of air are filtered, warmed, humidified, and exchanged daily in adults
 - c) Oxygen is diffused into the bloodstream for use in cellular metabolism by the body's 100 trillion cells
 - d) Wastes, including carbon dioxide, are excreted from the body via the respiratory system
 - 2. Physiology
 - a) Ventilation
 - b) Diffusion
 - c) Perfusion
- III. General system pathophysiology, assessment, and management
 - A. Pathophysiology
 - 1. A variety of problems can impact the pulmonary system's ability to achieve its goal of gas exchange to provide for cellular needs and excretion of wastes
 - 2. Understanding these problems globally can enable the EMT-Intermediate to quickly and effectively pinpoint probable causes and necessary interventions
 - 3. Specific pathophysiologies
 - a) Ventilation
 - (1) Upper airway obstruction
 - (a) Trauma
 - (b) Epiglottitis
 - (c) Foreign body obstruction
 - (d) Inflammation of the tonsils
 - (2) Lower airway obstruction
 - (a) Trauma
 - (b) Obstructive lung disease
 - (c) Mucous accumulation
 - (d) Smooth muscle spasm
 - (e) Airway edema
 - (3) Chest wall impairment
 - (a) Trauma
 - (b) Hemothorax
 - (c) Pneumothorax
 - (d) Empyema
 - (e) Pleural inflammation
 - (f) Neuromuscular diseases (such as multiple sclerosis or muscular dystrophy)
 - (4) Problems in neurologic control
 - (a) Brainstem malfunction
 - (i) CNS depressant drugs
 - (ii) CVA or other medical neurologic condition
 - (iii) Trauma
 - (b) Phrenic/ spinal nerve dysfunction

- (i) Trauma
- (ii) Neuromuscular diseases

- b) Diffusion
 - (1) Inadequate oxygen concentration in ambient air
 - (2) Alveolar pathology
 - (a) Asbestosis, other environmental lung diseases
 - (b) Blebs/ bullae associated with chronic obstructive lung disease
 - (c) Inhalation injuries
 - (3) Interstitial space pathology
 - (a) Pulmonary edema
 - (i) High pressure (also known as cardiogenic)
 - (a) Left heart failure
 - (b) Idiopathic pulmonary hypertension
 - (ii) High permeability (also known as non-cardiogenic)
 - (a) Acute Respiratory Distress Syndrome (ARDS)
 - (b) Environmental lung diseases i.e. asbestosis,
 - (c) Near-drowning
 - (d) Post-hypoxia
 - (e) Inhalation injuries
- c) Perfusion
 - (1) Inadequate blood volume/ hemoglobin levels
 - (a) Hypovolemia
 - (b) Anemia
 - (2) Impaired circulatory blood flow
 - (a) Pulmonary embolus
 - (3) Capillary wall pathology
 - (a) Trauma

B. Assessment Findings

- 1. Scene size up
 - a) Pulmonary complaints may be associated with exposure to a wide variety of toxins, including carbon monoxide, toxic products of combustion, or environments which have deficient ambient oxygen (e.g., silos, enclosed storage spaces)
 - b) It is critical to assure a safe environment for all EMS personnel before initiating patient contact
 - c) If necessary, individuals with specialized training and equipment should be utilized to remove the patient from a hazardous environment
- 2. Initial assessment
 - a) A major focus of the initial assessment is the recognition of life-threat; there are a variety of pulmonary conditions which may offer a very real risk for patient death
 - b) Recognition of life-threat and the initiation of resuscitation takes priority over detailed assessment
 - c) Signs of life-threatening respiratory distress in adults, listed from most ominous to least severe
 - (1) Alterations in mental status
 - (2) Severe cyanosis
 - (3) Absent breath sounds
 - (4) Audible stridor
 - (5) 1-2 word dyspnea
 - (6) Tachycardia > 130 beats/ minute

- (7) Pallor and diaphoresis
- (8) The presence of retractions/ use of the accessory muscles
- 3. Focused history and physical examination
 - a) Chief complaint
 - (1) Dyspnea
 - (2) Chest pain
 - (3) Cough
 - (a) Productive
 - (b) Non-productive
 - (c) Hemoptysis
 - (4) Wheezing
 - (5) Signs of infection
 - (a) Fever/ chills
 - (b) Increased sputum production
 - b) History
 - (1) Previous experiences with similar/ identical symptoms
 - (a) The patient's subjective description of acuity is an accurate indicator of the acuity of this episode if the pathology is chronic
 - (b) Asking the patient "what happened the last time you had an attack this bad" is an extremely useful predictor of this episode's course
 - (2) Known pulmonary diagnosis
 - (a) If the diagnosis is not known to the EMT-Intermediate, an effort should be made to learn whether it is primarily related to ventilation, diffusion, perfusion, or a combination
 - (3) History of previous intubation is an accurate indicator of severe pulmonary disease, and suggests that intubation may be required again
 - (4) Medication history
 - (a) Current medications
 - (b) Medication allergies
 - (c) Pulmonary medications
 - (i) Sympathomimetic
 - (a) Inhaled
 - (b) Oral
 - (c) Parenteral
 - (ii) Corticosteroid
 - (a) The presence of corticosteroid in the patient's home regimen strongly suggests severe, chronic disease
 - (b) Inhaled
 - (c) Oral (daily versus during exacerbations only)
 - (d) Chromolyn sodium
 - (e) Methylxanthines (theophylline preparations)
 - (f) Antibiotics
 - (d) Cardiac-related drugs
 - (5) History of the present episode
 - (6) Exposure/ smoking history
 - c) Physical exam
 - (1) General impression
 - (a) Position
 - (i) Sitting

- (ii) "Tripod" position
 - (iii) Feet dangling
 - (b) Mentation
 - (i) Confusion is a sign of hypoxemia or hypercarbia
 - (ii) Restlessness and irritability may be signs of fear and hypoxemia
 - (iii) Severe lethargy or coma is a sign of hypercarbia
 - (c) Ability to speak
 - (i) 1-2 word dyspnea versus ability to speak freely
 - (ii) Rapid, rambling speech is a sign of anxiety and fear
 - (d) Respiratory effort
 - (i) Hard work indicates obstruction
 - (ii) Retractions
 - (iii) Use of accessory muscles
 - (e) Color
 - (i) Pallor
 - (ii) Diaphoresis
 - (iii) Cyanosis
 - (a) Central
 - (b) Peripheral
- (2) Vital signs
 - (a) Pulse
 - (i) Tachycardia is a sign of hypoxemia and the use of sympathomimetic medications
 - (ii) In the face of a pulmonary etiology, bradycardia is an ominous sign of severe hypoxemia and imminent cardiac arrest
 - (b) Blood pressure
 - (i) Hypertension may be associated with sympathomimetic medication use
 - (c) Respiratory rate
 - (i) The respiratory rate is not a very accurate indicator of respiratory status unless it is very slow
 - (ii) Trends are essential in evaluating the chronic patient.
 - (a) Slowing rate in the face of an unimproved condition suggests exhaustion and impending respiratory insufficiency
 - (d) Respiratory patterns
 - (i) Eupnea
 - (ii) Tachypnea
 - (iii) Cheyne-Stokes
 - (iv) Central neurogenic hyperventilation
 - (v) Kussmaul
 - (vi) Ataxic (Biot's)
 - (vii) Apneustic
 - (viii) Apnea
- (3) Head/ neck
 - (a) Pursed lip breathing
 - (b) Use of accessory muscles
 - (c) Sputum
 - (i) Increasing amounts suggest infection
 - (ii) Thick, green, or brown sputum suggests infection and/ or pneumonia

- (iii) Yellow or pale gray sputum may be related to allergic or inflammatory etiologies
- (iv) Frank hemoptysis often accompanies severe tuberculosis or carcinoma
- (v) Pink, frothy sputum is associated with severe, late stages of pulmonary edema
- (d) Jugular venous distention may accompany right-sided heart failure, which may be caused by severe pulmonary obstruction
- (4) Chest
 - (a) Signs of trauma
 - (b) Barrel chest demonstrates the presence of long-standing chronic obstructive lung disease
 - (c) Retractions
 - (d) Symmetry
 - (e) Breath sounds
 - (i) Normal
 - (ii) Abnormal
 - (a) Stridor
 - (b) Wheezing
 - (c) Rhonchi (low wheezes)
 - (d) Rales (crackles)
- (5) Extremities
 - (a) Peripheral cyanosis
 - (b) Carpopedal spasm may be associated with hypoxemia resulting from periods of rapid, deep respiration
- d) Diagnostic testing
 - (1) Pulse oximetry
 - (a) Used to evaluate or confirm the adequacy of oxygen saturation
 - (b) May be inaccurate in the presence of conditions which abnormally bind hemoglobin, including carbon monoxide poisoning or methemoglobinemia
 - (2) Peak flow
 - (a) Provides a baseline assessment of airflow for patients with obstructive lung disease
 - (3) Capnometry
 - (a) Provides ongoing assessment of endotracheal tube position; end-tidal CO₂ drops immediately when the tube is displaced from the trachea
 - (b) Quantitative versus qualitative

C. Management

- 1. Airway and ventilatory support
 - a) Manual airway opening maneuvers
 - b) Oropharyngeal airway
 - c) Nasopharyngeal airway
 - d) Nasal cannula
 - e) Simple oxygen mask
 - f) Non-rebreather mask
 - g) Multi-lumen airway
 - h) Bag-valve-mask
 - i) Suctioning
 - j) Endotracheal tube
 - k) Oxygen powered manually triggered ventilators

- l) Automatic transport ventilator
 - 2. Circulatory support
 - 3. Pharmacological interventions
 - a) Oxygen
 - b) Sympathomimetic
 - (1) Beta 2 agonists (e.g., albuterol - Proventil, Ventolin, metaproterenol sulfate - Alupent)
 - (2) Epinephrine
 - 4. Non-pharmacological interventions
 - a) Positioning - sitting up
 - b) Back blows
 - 5. Monitoring and devices
 - a) Pulse oximetry
 - b) Peak flow
 - c) Capnometry
 - 6. Transport considerations
 - a) Appropriate mode
 - b) Appropriate facility
 - 7. Psychological support/ communication strategies
- IV. Specific illness
- A. Obstructive airway disease
 - 1. A spectrum of diseases which affect a substantial number of individuals worldwide
 - 2. Diseases include asthma, COPD (which includes emphysema and chronic bronchitis)
 - 3. Epidemiology
 - a) Morbidity/ mortality
 - (1) Overall
 - (2) Asthma - 4-5% of US population
 - (3) 20% of adult males have chronic bronchitis
 - b) Causative factors
 - (1) Cigarette smoking
 - (2) Exposure to environmental toxins
 - (3) Genetic predisposition
 - c) Factors which may exacerbate underlying conditions
 - (1) Intrinsic
 - (a) Stress is a significant exacerbating factor, particularly in adults
 - (b) Upper respiratory infection
 - (c) Exercise
 - (2) Extrinsic
 - (a) Tobacco smoke
 - (b) Allergens (including foods, animal danders, dusts, molds, pollens)
 - (c) Drugs
 - (d) Occupational hazards
 - 4. Pathophysiology overview
 - a) Obstruction occurs in the bronchioles, and may be the result of
 - (1) Smooth muscle spasm
 - (a) Beta receptors
 - (2) Mucous
 - (a) Goblet cells
 - (b) Cilia
 - (3) Inflammation
 - b) Obstruction may be reversible or irreversible

- c) Obstruction causes air trapping through the following mechanism
 - (1) Bronchioles dilate naturally on inspiration
 - (2) Dilation enables air to enter the alveoli despite the presence of obstruction
 - (3) Bronchioles naturally constrict on expiration
 - (4) Air becomes trapped distal to obstruction on exhalation
- 5. Specific pathophysiology
 - a) Asthma
 - (1) Reversible obstruction
 - (2) Obstruction caused by a combination of smooth muscle spasm, mucous, and edema
 - (3) Exacerbating factors tend to be extrinsic in children, intrinsic in adults
 - (4) Status asthmaticus - prolonged exacerbation which does not respond to therapy
 - b) Chronic bronchitis
 - (1) Reversible and irreversible obstruction
 - (2) Characterized by hyperplasia and hypertrophy of mucous-producing glands
 - (3) Clinical definition - productive cough for at least 3 months per year for 2 or more consecutive years
 - (4) Typically associated with cigarette smoking, but may also occur in non-smokers
 - c) Emphysema
 - (1) Irreversible airway obstruction
 - (2) Diffusion defect also exists because of the presence of blebs
 - (3) Because blebs have extremely thin walls, they are prone to collapse
 - (4) To prevent collapse, the patient often exhales through pursed lips, effectively maintaining a positive airway pressure
 - (5) Almost always associated with cigarette smoking or significant exposure to environmental toxins
- 6. Assessment findings
 - a) Signs of severe respiratory impairment
 - (1) Altered mentation
 - (2) 1-2 word dyspnea
 - (3) Absent breath sounds
 - b) Chief complaint
 - (1) Dyspnea
 - (2) Cough
 - (3) Nocturnal awakening with dyspnea and wheezing
 - c) History
 - (1) Personal or family history of asthma and/ or allergies
 - (2) History of acute exposure to pulmonary irritant
 - (3) History of prior similar episodes
 - d) Physical findings
 - (1) Wheezing may be present in ALL types of obstructive lung disease
 - (2) Retractions and/ or use of accessory muscles
 - e) Diagnostic testing
 - (1) Pulse oximeter to document degree of hypoxemia and response to therapy
 - (2) Peak flow to establish baseline airflow
- 7. Management
 - a) Airway and ventilatory support
 - (1) Intubation as required

- (2) Assisted ventilation may be necessary
 - (3) High flow oxygen
 - b) Circulatory support
 - (1) Intravenous therapy may be necessary to
 - (a) Improve hydration
 - (b) Thin and loosen mucous
 - c) Pharmacological interventions
 - (1) Beta 2 agonists
 - d) Transport considerations
 - (1) Appropriate mode
 - (2) Appropriate facility
 - (3) Continue monitoring
 - (4) Contact medical direction
 - e) Psychological support/ communication strategies
- B. Pneumonia
- 1. Epidemiology
 - a) Incidence
 - (1) Fifth leading cause of death in the US
 - (2) Not a single disease, but a group of specific infections
 - b) Risk factors
 - (1) Cigarette smoking
 - (2) Alcoholism
 - (3) Exposure to cold
 - (4) Extremes of age (old or young)
 - 2. Anatomy and physiology review
 - a) Cilia
 - b) Causes and process of mucous production
 - 3. Pathophysiology
 - a) Ventilation disorder
 - b) Infection of lung parenchyma
 - (1) Most commonly bacterial
 - (2) May also be viral or fungal
 - c) May cause alveolar collapse (atelectasis)
 - d) Localized inflammation/ infection may become systemic, leading to sepsis and septic shock
 - e) Community acquired versus hospital acquired
 - 4. Assessment findings
 - a) Typical pneumonia
 - (1) Acute onset of fever and chills
 - (2) Cough productive of purulent sputum
 - (3) Pleuritic chest pain (in some cases)
 - (4) Pulmonary consolidation on auscultation
 - (5) Location of bronchial breath sounds
 - (6) Rales
 - b) Atypical pneumonia
 - (1) Non-productive cough
 - (2) Extra-pulmonary symptoms
 - (3) Headache
 - (4) Myalgias
 - (5) Fatigue
 - (6) Sore throat
 - (7) Nausea, vomiting, diarrhea
 - (8) Fever and chills

5. Management
 - a) Airway and ventilatory support
 - (1) Intubation may be required
 - (2) Assisted ventilation as necessary
 - (3) High flow oxygen
 - b) Circulatory support
 - (1) Intravenous access
 - (2) Administration of IV fluids
 - (a) Improve hydration
 - (b) Thin and mobilize mucous
 - c) Pharmacological interventions
 - (1) Beta 2 agonists may be required if airway obstruction is severe or if the patient has accompanying obstructive lung disease
 - d) Non-pharmacological interventions
 - (1) Cool if high fever
 - e) Transport considerations
 - (1) Appropriate mode
 - (2) Appropriate facility
 - f) Psychological support/ communication strategies

C. Pulmonary edema

1. Not a disease, but a pathophysiological condition
 - a) High pressure (cardiogenic)
 - b) High permeability (non-cardiogenic)
2. Epidemiology
 - a) Risk factors vary based on type
 - (1) High pressure (cardiogenic)
 - (a) Acute myocardial infarction
 - (b) Chronic hypertension
 - (c) Myocarditis
 - (2) High permeability (non-cardiogenic)
 - (a) Acute hypoxemia
 - (b) Near-drowning
 - (c) Post cardiac arrest
 - (d) Post shock
 - (e) High altitude exposure
 - (f) Inhalation of pulmonary irritants
 - (g) Adult Respiratory Distress Syndrome (ARDS)
3. Anatomy and physiology review
4. Pathophysiology
 - a) Diffusion disorder
 - b) High pressure (cardiogenic)
 - (1) Left-sided heart failure
 - (2) Increase pulmonary venous pressure
 - (3) Increase in hydrostatic pressure
 - (4) Engorgement of pulmonary vasculature
 - (5) Failure of cough and lymphatics to drain fluids
 - (6) Excessive accumulation of fluid in the interstitial space
 - (7) Widening interstitial space impairs diffusion
 - (8) In severe cases, fluid may accumulate in the alveoli
 - c) High permeability (non-cardiogenic)
 - (1) Disruption of the alveolar-capillary membranes caused by
 - (a) Severe hypotension

- (b) Severe hypoxemia (post drowning, post cardiac arrest, severe seizure, prolonged hypoventilation)
 - (c) High altitude
 - (d) Environmental toxins
 - (e) Septic shock
 - (2) Disrupted membranes leak fluid into the interstitial space
 - (3) Widened interstitial space impairs diffusion
5. Assessment findings
- a) High pressure (cardiogenic)
 - (1) Refer to Cardiac Emergencies unit
 - b) High permeability (non-cardiogenic)
 - (1) History of associated factors
 - (a) Hypoxic episode
 - (b) Shock (hypovolemic, septic, or neurogenic)
 - (c) Chest trauma
 - (d) Recent acute inhalation of toxic gases or particles
 - (e) Recent ascent to high altitude without acclimatizing
 - (2) Dyspnea
 - (3) Orthopnea
 - (4) Fatigue
 - (5) Reduced exercise capacity
 - (6) Pulmonary rales, particularly in severe cases
 - c) Diagnostic testing
6. Management
- a) High pressure (cardiogenic)
 - (1) Airway and ventilatory support
 - (a) Intubation as necessary
 - (b) Assisted ventilation as necessary
 - (c) High flow oxygen
 - (2) Circulatory support
 - (a) Avoid fluid excess; monitor IV flow rates carefully
 - (3) Pharmacological interventions
 - (a) Nitroglycerine
 - (b) Furosemide
 - (c) Morphine sulfate
 - (4) Non-pharmacological interventions
 - (a) Position the patient in an upright position with legs dangling
 - (5) Transport decisions
 - (a) Appropriate mode
 - (b) Appropriate facility
 - (6) Psychological support/ communication strategies
 - b) High permeability (non-cardiogenic)
 - (1) Airway and ventilatory support
 - (a) Intubation as necessary
 - (b) Assisted ventilation as necessary
 - (c) High flow oxygen
 - (2) Circulatory support
 - (a) Avoid fluid excess; monitor IV flow rates carefully
 - (3) Pharmacological interventions
 - (4) Non-pharmacological interventions
 - (a) Position the patient in an upright position with legs dangling
 - (b) Rapid removal from any environmental toxins

- (c) Rapid descent in altitude if high altitude pulmonary edema (HAPE) is suspected
 - (5) Transport considerations
 - (a) Appropriate mode
 - (b) Appropriate facility
 - (6) Psychological support/ communication strategies
- D. Pulmonary thromboembolism
- 1. Epidemiology
 - a) Incidence
 - (1) Responsible for 50,000 death annually
 - (2) 5% of sudden deaths
 - b) Morbidity/ mortality
 - (1) Less than 10% of pulmonary emboli result in death
 - c) Risk factors
 - (1) Recent surgery
 - (2) Pregnancy
 - (3) Oral contraceptives
 - (4) Infection
 - (5) Cancer
 - (6) Sickle cell anemia
 - (7) Long bone fractures
 - (8) Prolonged inactivity
 - (9) Bedridden
 - 2. Anatomy and physiology review
 - 3. Pathophysiology
 - a) Perfusion disorder
 - b) Deep vein stasis
 - c) Injury to vein wall
 - d) Hypercoagulability
 - e) Platelet aggregation
 - f) Embolism size
 - g) Embolism location in the legs
 - h) Embolism location in the lungs
 - i) Complete loss of perfusion in some area of lungs
 - j) Other causes of pulmonary circulation obstruction
 - (1) Air
 - (2) Fat
 - (3) Foreign objects
 - (4) Venous catheters
 - (5) Amniotic fluid
 - 4. Assessment findings - depend on size and location of the clot
 - a) Evidence of significant life-threatening embolus in a proximal location
 - (1) Altered mentation
 - (2) Severe cyanosis
 - (3) Profound hypotension
 - (4) Cardiac arrest
 - b) Chief complaint
 - (1) Chest pain
 - (2) Dyspnea
 - (3) Cough (typically non-productive)
 - c) History
 - (1) Sudden onset
 - (2) Identification of risk factors

- d) Physical findings
 - (1) Normal breath sounds or, in severe cases, rales
 - (2) Pleural friction rub
 - (3) Tachycardia
 - (4) Clinical evidence of thrombophlebitis (found in less than 50%)
 - (5) Tachypnea
 - (6) Hemoptysis (fairly rare)
- 5. Management - prevention has major role in management
 - a) Depends on the size of the embolism
 - b) Airway and ventilatory support
 - (1) Intubation as necessary
 - (2) Positive pressure ventilation as necessary
 - (3) High flow oxygen
 - c) Circulatory support
 - (1) CPR as necessary
 - (2) IV therapy; hydration based on clinical symptoms
 - d) Pharmacological interventions
 - e) Non-pharmacological interventions
 - (1) Support body systems
 - (2) Most severe cases will be managed as a cardiac arrest of unknown origin
 - f) Transport considerations
 - (1) Appropriate mode
 - (2) Appropriate facility
 - g) Psychological support/ communication strategies
- E. Spontaneous pneumothorax
 - 1. Epidemiology
 - a) Incidence
 - (1) 18 per 100,000
 - b) Morbidity/ mortality
 - (1) 15-20% partial pneumothorax may be well tolerated
 - c) Risk factors
 - (1) Males
 - (2) Younger age
 - (3) Thin body mass
 - (4) History of COPD (secondary spontaneous pneumothorax)
 - 2. Assessment findings
 - a) Chief complaint
 - (1) Shortness of breath
 - (2) Chest pain
 - (3) Sudden onset
 - b) Physical findings
 - (1) Typically minor
 - (a) Pallor
 - (b) Diaphoresis
 - (c) Tachypnea
 - (2) Severe
 - (a) Altered mentation
 - (b) Cyanosis
 - (c) Tachycardia
 - (d) Decreased unilateral breath sounds
 - (e) Local hyperresonance to percussion
 - (f) Subcutaneous emphysema

- 3. Management
 - a) Airway and ventilatory support
 - (1) Intubation as necessary
 - (2) Assisted ventilation as necessary
 - (3) Oxygen - administration levels based on symptoms and pulse oximetry
 - (4) Watch for the development of a tension pneumothorax
 - b) Circulatory support
 - (1) IV initiation if severe symptoms present
 - c) Pharmacological interventions
 - (1) Not typically necessary; treat symptomatically
 - d) Non-pharmacological interventions
 - (1) Position of comfort/ best ventilation
 - (2) Needle decompression if progression to a tension pneumothorax occurs
 - e) Transport considerations
 - (1) Appropriate mode
 - (2) Appropriate facility
 - f) Psychological support/ communication strategies
- F. Hyperventilation syndrome
 - 1. Epidemiology
 - a) Incidence is unknown
 - 2. Pathophysiology
 - a) Tachypnea without physiologic demand for increased oxygen causes respiratory alkalosis
 - b) Tachypnea caused by anxiety resulting in respiratory alkalosis
 - c) Carbon dioxide is washed out and carbonic acid is reduced
 - (1) Shift in the acid/ base balance occurs toward base
 - 3. Assessment findings
 - a) Chief complaint
 - (1) Dyspnea
 - (2) Chest pain
 - b) Physical findings
 - (1) Rapid breathing with high minute volume
 - (2) Varying depending on cause of syndrome
 - (3) Carpopedal spasms
 - c) Caution there are multiple causes of tachypnea that are not hyperventilation syndrome but cause increased oxygen demand
 - (1) Hypoxia
 - (2) High altitude
 - (3) Pulmonary disorders
 - (4) Pneumonia
 - (5) Pulmonary emboli, vascular disease
 - (6) Bronchial asthma
 - (7) Cardiovascular disorders
 - (8) Congestive heart failure
 - (9) Hypotension/ shock
 - (10) Metabolic disorders
 - (11) Acidosis
 - (12) Hepatic failure
 - (13) Neurologic disorders
 - (14) Central nervous system infection, tumors
 - (15) Drugs
 - (16) Fever, sepsis
 - (17) Pain

- (18) Pregnancy
- 4. Management
 - a) Depends on cause of syndrome
 - b) Airway and ventilatory support
 - (1) Oxygen, rate of administration based on symptoms and pulse oximetry
 - (2) If anxiety hyperventilation is confirmed (especially based on patient's prior history) coached ventilation/ rebreathing techniques might be considered
 - c) Circulatory support
 - (1) Intervention rarely required
 - d) Pharmacological interventions
 - (1) Intervention rarely required
 - e) Non-pharmacological interventions
 - (1) Intervention rarely required
 - (2) Patients with anxiety hyperventilation will require psychological approaches to calm them
 - (3) Have them mimic your respiratory rate and volume
 - (4) Do not place bag over mouth and nose
 - f) Transport considerations
 - (1) Appropriate mode
 - (2) Appropriate facility
 - g) Psychological support/ communication strategies
 - (1) Depend on cause of hyperventilation

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MEDICAL: 5

CARDIOVASCULAR EMERGENCIES: 2

Comments:

UNIT TERMINAL OBJECTIVE

- 5-2 At the completion of this unit, the EMT-Intermediate student will be able to utilize the assessment findings to formulate a field impression, implement and evaluate the management plan for the patient experiencing a cardiac emergency.

COGNITIVE OBJECTIVES

At the completion to this unit, the EMT-Intermediate student will be able to:

- 5-2.1 Describe the incidence, morbidity, and mortality of cardiovascular disease. (C-1)
- 5-2.2 Review cardiovascular anatomy and physiology. (C-1)
- 5-2.3 Discuss prevention strategies that may reduce morbidity and mortality of cardiovascular disease. (C-1)
- 5-2.4 Identify the risk factors most predisposing to coronary artery disease. (C-1)
- 5-2.5 Identify and describe the components of assessment as it relates to the patient with cardiovascular compromise. (C-1)
- 5-2.6 Describe how ECG wave forms are produced. (C-1)
- 5-2.7 Correlate the electrophysiological and hemodynamic events occurring throughout the entire cardiac cycle with the various ECG wave forms, segments and intervals. (C-2)
- 5-2.8 Identify how heart rates may be determined from ECG recordings. (C-1)
- 5-2.9 List the limitations to the ECG. (C-1)
- 5-2.10 Describe a systematic approach to the analysis and interpretation of cardiac arrhythmias. (C-2)
- 5-2.11 Explain how to confirm asystole using more than one lead. (C-1)
- 5-2.12 List the clinical indications for defibrillation. (C-1)
- 5-2.13 Identify the specific mechanical, pharmacological and electrical therapeutic interventions for patients with arrhythmias causing compromise. (C-1)
- 5-2.14 List the clinical indications for an implanted defibrillation device. (C-1)
- 5-2.15 Define angina pectoris and myocardial infarction (MI). (C-1)
- 5-2.16 List other clinical conditions that may mimic signs and symptoms of angina pectoris and myocardial infarction. (C-1)
- 5-2.17 List the mechanisms by which an MI may be produced by traumatic and non-traumatic events. (C-2)
- 5-2.18 List and describe the assessment parameters to be evaluated in a patient with chest pain. (C-1)
- 5-2.19 Identify what is meant by the OPQRST of chest pain assessment. (C-1)
- 5-2.20 List and describe the initial assessment parameters to be evaluated in a patient with chest pain that may be myocardial in origin. (C-1)
- 5-2.21 Identify the anticipated clinical presentation of a patient with chest pain that may be angina pectoris or myocardial infarction. (C-3)
- 5-2.22 Describe the pharmacological agents available to the EMT-Intermediate for use in the management of arrhythmias and cardiovascular emergencies. (C-2)
- 5-2.23 Develop, execute, and evaluate a treatment plan based on the field impression for the patient with chest pain that may be indicative of angina or myocardial infarction. (C-3)
- 5-2.24 Define the terms “congestive heart failure” and “pulmonary edema.” (C-1)
- 5-2.25 Define the cardiac and non-cardiac causes and terminology associated with pulmonary edema and pulmonary edema. (C-2)
- 5-2.26 Describe the early and late signs and symptoms of pulmonary edema. (C-1)
- 5-2.27 Explain the clinical significance of paroxysmal nocturnal dyspnea. (C-1)
- 5-2.28 List and describe the pharmacological agents available to the EMT-Intermediate for use in the management of a patient with cardiac compromise. (C-1)
- 5-2.29 Define the term “hypertensive emergency.” (C-1)
- 5-2.30 Describe the clinical features of the patient in a hypertensive emergency. (C-3)
- 5-2.31 List the interventions prescribed for the patient with a hypertensive emergency. (C-1)
- 5-2.32 Define the term “cardiogenic shock.” (C-1)
- 5-2.33 Identify the clinical criteria for cardiogenic shock. (C-1)
- 5-2.34 Define the term “cardiac arrest.” (C-1)
- 5-2.35 Define the term “resuscitation.” (C-1)

- 5-2.36 Identify local protocol dictating circumstances and situations where resuscitation efforts would not be initiated. (C-1)
- 5-2.37 Identify local protocol dictating circumstances and situations where resuscitation efforts would be discontinued. (C-1)
- 5-2.38 Identify the critical actions necessary in caring for the patient in cardiac arrest. (C-2)
- 5-2.39 Synthesize patient history, assessment findings to form a field impression for the patient with chest pain and cardiac arrhythmias that may be indicative of a cardiac emergency. (C-3)

AFFECTIVE OBJECTIVES

At the completion of this unit the EMT-Intermediate will be able to:

- 5-2.40 Value the sense of urgency for initial assessment and intervention as it contributes to the treatment plan for the patient experiencing a cardiac emergency. (A-3)
- 5-2.41 Defend patient situations where ECG rhythm analysis is indicated. (A-3)
- 5-2.42 Value and defend the sense of urgency necessary to protect the window of opportunity for reperfusion in the patient with chest pain and arrhythmias that may be indicative of angina or myocardial infarction. (A-3)
- 5-2.43 Value and defend the urgency in rapid determination and rapid intervention of patients in cardiac arrest. (A-3)

PSYCHOMOTOR OBJECTIVES

At the completion of this unit the EMT-Intermediate will be able to:

- 5-2.44 Demonstrate a working knowledge of various ECG lead systems. (P-3)
- 5-2.45 Set up and apply a transcutaneous pacing system. (P-3)
- 5-2.46 Given the model of a patient with signs and symptoms of pulmonary edema, position the patient to afford comfort and relief. (P-2)

DECLARATIVE

- I. Introduction
 - A. Epidemiology
 - 1. Incidence
 - a) Prevalence of cardiac death outside of a hospital
 - (1) Supportive statistics
 - b) Prevalence of warning signs and symptoms for cardiac emergencies
 - (1) Supportive statistics
 - c) Increased recognition of need for early reperfusion
 - 2. Morbidity/ mortality
 - a) Reduced with early recognition
 - b) Reduced with early access to EMS system
 - 3. Risk factors
 - a) Age
 - b) Family history
 - c) Hypertension
 - d) Lipids
 - e) Male sex
 - f) Smoking
 - g) Carbohydrate intolerance
 - 4. Possible contributing risks
 - a) Diet
 - b) Female sex
 - c) Obesity
 - d) Oral contraceptives
 - e) Sedentary living
 - f) Personality type
 - g) Psychosocial tensions
 - 5. Prevention strategies
 - a) Early recognition
 - b) Education
 - c) Alteration of life style
 - B. Review cardiovascular anatomy and physiology
 - 1. Anatomy of the heart
 - 2. Location
 - a) Layers
 - (1) Myocardium
 - (2) Endocardium
 - (3) Pericardium
 - b) Chambers
 - (1) Atria
 - (2) Ventricles
 - c) Valves
 - (1) Atrioventricular (AV) valves
 - (a) Tricuspid (right)
 - (b) Mitral (left)
 - (2) Semilunar valves
 - (a) Pulmonary (right)
 - (b) Aortic (left)
 - d) Papillary muscles
 - e) Chordae tendineae
 - 3. Cardiac cycle
 - a) Phases

- (1) Systole
 - (a) Atrial
 - (b) Ventricular
- (2) Diastole
 - (a) Atrial
 - (b) Ventricular
- b) Cardiac output
 - (1) Stroke volume
 - (a) Heart rate
 - (b) Contractility
 - (c) Starling's law

4. Vascular system

- a) Aorta
 - (1) Ascending
 - (2) Thoracic
 - (3) Abdominal
- b) Arteries
- c) Capillaries
- d) Veins
- e) Vena cava
 - (1) Superior
 - (2) Inferior
- f) Venous return (preload)
 - (1) Skeletal muscle pump
 - (2) Thoracoabdominal pump
 - (3) Respiratory cycle
 - (4) Gravity
- g) Resistance (afterload) and capacitance (preload)
- h) Pulmonary veins

5. Coronary circulation

- a) Arteries
 - (1) Left coronary artery
 - (a) Anterior descending branch (LAD)
 - (i) Distribution to the conduction system
 - (b) Circumflex
 - (i) Distribution to the conduction system
 - (2) Right coronary artery
 - (a) Distribution to the conduction system
- b) Veins
 - (1) Coronary sinus
 - (2) Great cardiac vein

6. Electrophysiology

- a) Conduction system overview
 - (1) Sinoatrial node or sinus node (SA node)
 - (2) Atrioventricular (AV) junction
 - (a) AV node
 - (b) Bundle of His
 - (3) His-Purkinje System
 - (a) Bundle branches
 - (i) Right
 - (ii) Left anterior fascicle
 - (iii) Left posterior fascicle
 - (4) Characteristics of myocardial cells
 - (a) Automaticity

- (b) Excitability
- (c) Conductivity
- (d) Contractility
- b) Electrical potential
 - (1) Action potential
 - (a) Depolarization
 - (b) Repolarization
 - (c) Important electrolytes
 - (i) Sodium
 - (ii) Potassium
 - (iii) Calcium
 - (iv) Chloride
 - (2) Excitability
 - (a) Thresholds
 - (b) Depolarization
 - (c) Repolarization
 - (i) Relative refractory period
 - (ii) Absolute refractory period
- c) Autonomic nervous system relationship to cardiovascular system
 - (1) Medulla
 - (2) Carotid sinus and baroreceptor
 - (a) Location
 - (b) Significance
 - (3) Parasympathetic system
 - (4) Sympathetic
 - (a) Alpha - vasoconstrictive effect on systemic blood vessels
 - (b) Beta
 - (i) Inotropic
 - (ii) Dromotropic
 - (iii) Chronotropic
 - (5) Systemic circulation

- II. Initial cardiovascular assessment
- A. Level of consciousness
 - 1. Alert and responsive
 - 2. Dizziness
 - 3. Unresponsive
 - B. Airway
 - 1. Patent
 - 2. Debris, blood
 - 3. Frothy sputum
 - C. Breathing
 - 1. Absent
 - 2. Present
 - a) Rate and depth
 - (1) Effort
 - (2) Breath sounds
 - (a) Characteristics
 - (b) Significance
 - D. Circulation
 - 1. Pulse
 - a) Absent
 - b) Present
 - (1) Rate and quality

- (2) Pulse deficit
- (3) Apical
- (4) Peripheral
- 2. Skin
 - a) Color
 - b) Temperature
 - c) Moisture
 - d) Turgor
 - e) Mobility
 - f) Edema
- 3. Blood pressure

- III. Focused history
 - A. SAMPLE format
 - B. Chief complaint
 - 1. Pain
 - a) OPQRST
 - (1) Onset/ origin
 - (a) Pertinent past history
 - (b) Time of onset
 - (2) Provocation
 - (a) Exertional
 - (b) Non-exertional
 - (3) Quality
 - (a) Patient's narrative description
 - (i) For example - sharp, tearing, pressure, heaviness
 - (4) Region/ radiation
 - (a) For example - arms, neck, back
 - (5) Severity
 - (a) "1-10" scale
 - (6) Timing
 - (a) Duration
 - (b) Worsening or improving
 - (c) Continuous or intermittent
 - (d) At rest or with activity
 - 2. Dyspnea
 - a) Continuous or intermittent
 - b) Exertional
 - c) Non-exertional
 - d) Orthopneic
 - e) Paroxysmal Nocturnal Dyspnea (PND)
 - f) Cough
 - (1) Dry
 - (2) Productive
 - (3) Frothy
 - (4) Bloody
 - 3. Related signs and symptoms
 - a) Level of consciousness (LOC)
 - b) Diaphoresis
 - c) Restlessness, anxiety
 - d) Feeling of impending doom
 - e) Nausea/ vomiting
 - f) Fatigue
 - g) Palpitations

- h) Edema
 - (1) Extremities
 - (2) Sacral
 - i) Headache
 - j) Syncope
 - k) Behavioral change
 - l) Anguished facial expression
 - m) Activity limitations
 - n) Trauma
- C. Past medical history
- 1. Coronary artery disease (CAD)
 - 2. Atherosclerotic heart disease
 - a) Angina
 - b) Previous MI
 - c) Hypertension
 - d) Congestive heart failure (CHF)
 - 3. Valvular disease
 - 4. Aneurysm
 - 5. Pulmonary disease
 - 6. Diabetes
 - 7. Renal disease
 - 8. Vascular disease
 - 9. Inflammatory cardiac disease
 - 10. Previous cardiac surgery
 - 11. Congenital anomalies
 - 12. Current/ past medications
 - a) Prescribed
 - (1) Compliance
 - (2) Non-compliance
 - b) Borrowed
 - c) Over-the-counter
 - d) Recreational
 - (1) Cocaine
 - 13. Allergies
 - 14. Family history
 - a) Stroke, heart disease, diabetes, hypertension
 - b) Age at death
 - 15. Known cholesterol levels

IV. Detailed physical examination

- A. Inspection
 - 1. Tracheal position
 - a) Neck veins
 - (1) Appearance
 - (2) Pressure
 - (3) Clinical significance
 - b) Thorax
 - (1) Configuration
 - (a) A-P diameter
 - (b) Movement with respirations
 - (2) Clinical significance
 - c) Epigastrium
 - (1) Pulsation
 - (2) Distention

(3) Clinical significance

- B. Auscultation
 - 1. Breath sounds
 - a) Depth
 - b) Equality
 - c) Adventitious sounds
 - (1) Crackles
 - (2) Wheezes
 - (a) Gurgling
 - (b) Frothing (mouth and nose)
 - (i) Blood tinged
 - (ii) Foamy

C. Palpation

- 1. Areas of crepitus or tenderness
- 2. Thorax
- 3. Epigastrium
 - a) Pulsation
 - b) Distention

V. Electrocardiographic (ECG) monitoring

- A. Wave forms
 - 1. Origination
 - 2. Production
 - 3. Relationship of cardiac events to wave forms
 - 4. Intervals
 - a) Normal
 - b) Clinical significance
 - 5. Segments
- B. Leads and electrodes
 - 1. Electrode
 - 2. Leads
 - a) Anatomic positions
 - b) Correct placement
 - 3. Surfaces of heart and lead systems
 - 4. Artifact
- C. Standardization
 - 1. Amplitude (mV)
 - 2. Height (mm)
 - 3. Rate
- D. Terminology
 - 1. Isoelectric
 - 2. Positive
 - 3. Negative
 - 4. Duration
 - 5. Segment
 - 6. Complex
 - 7. Interval
- E. Calculation of ECG heart rate
 - 1. Regular rhythm
 - a) ECG strip method
 - b) "300" method
 - 2. Irregular rhythm
 - a) ECG strip method
 - b) "300" method

- F. Lead systems and heart surfaces
 - 1. ECG rhythm analysis
 - a) Value
 - b) Limitations
- G. Cardiac arrhythmias
 - 1. Approach to analysis
 - a) P wave
 - (1) Configuration
 - (2) Duration
 - (3) Atrial rate and rhythm
 - b) P-R (P-Q) interval
 - (1) Duration
 - (2) Clinical significance
 - c) QRS complex
 - (1) Configuration
 - (2) Duration
 - (3) Ventricular rate and rhythm
 - d) S-T segment
 - (1) Elevation
 - (2) Depression
 - (3) Clinical significance
 - e) Q-T interval
 - (1) Duration
 - (2) Implication of prolongation
 - f) Relationship of P waves to QRS complexes
 - (1) Consistent
 - (2) Progressive prolongation
 - (3) No relationship
 - g) T waves
 - h) U waves
 - 2. Interpretation of the ECG
 - a) Origin of complex
 - b) Rate
 - c) Rhythm
 - 3. Arrhythmias originating in the sinus node
 - a) Sinus bradycardia
 - b) Sinus tachycardia
 - c) Sinus arrhythmia
 - d) Sinus arrest
 - 4. Arrhythmias originating in the atria
 - a) Premature atrial complex
 - b) Supraventricular tachycardia
 - (1) Automatic atrial tachycardia
 - (2) Multifocal atrial tachycardia
 - c) Atrial flutter
 - d) Atrial fibrillation
 - (1) Atrial flutter or atrial fibrillation with junctional rhythm
 - 5. Arrhythmias originating within the AV junction
 - a) First degree AV block
 - b) Second degree AV block
 - (1) Narrow-complex QRS
 - (2) Wide-complex QRS
 - c) Complete AV block (third degree block)
 - (1) Narrow-complex QRS

- (2) Wide-complex QRS
- 6. Arrhythmias sustained or originating in the AV junction
 - a) AV nodal re-entrant tachycardia
 - b) Junctional escape rhythm
 - c) Accelerated junctional rhythm
 - d) Premature junctional complex
 - e) Junctional tachycardia
- 7. Arrhythmias sustained or originating because of an accessory pathway (by history)
 - a) Narrow-QRS complex tachycardia
 - b) Wide-QRS complex tachycardia
 - c) May be confused with ventricular tachycardia
- 8. Arrhythmias sustained or originating because of aberrant ventricular conduction
 - a) Wide-QRS complex tachycardia
 - b) May be confused with ventricular tachycardia
- 9. Arrhythmias originating in the ventricles
 - a) Idioventricular rhythm
 - b) Accelerated idioventricular rhythm
 - c) Premature ventricular complex (PVC)
 - (1) R on T phenomenon
 - (2) Paired/ couplets
 - (3) Multifomed
 - (4) Frequent uniform
 - d) Ventricular tachycardia
 - (1) Monomorphic
 - (2) Polymorphic (including torsades de pointes)
 - e) Ventricular fibrillation
 - f) Ventricular standstill
 - g) Asystole
 - (1) Confirmation using using at least two ECG leads
- 10. Abnormalities originating within the bundle branch system
- 11. Pulseless electrical activity (PEA)
 - a) Electrical mechanical dissociation
 - b) Mechanical impairments to pulsations/ cardiac output
 - c) Other possible causes
- 12. ECG changes due to electrolyte imbalances
 - a) Hyperkalemia
 - b) Hypokalemia
- 13. ECG changes in hypothermia

VI. Management of the patient with arrhythmias

A. Assessment

- 1. Symptomatic
- 2. Hypotensive
- 3. Hypoperfusion

B. Treatment

1. Mechanical interventions

- a) Vagal maneuvers - if the heart rate is too fast
- b) Stimulation - if heart rate is too slow
- c) Precordial thump
- d) Cough

2. Pharmacological interventions (for example)

- a) Aspirin
- b) Atropine
- c) Adenosine

- d) Epinephrine
- e) Furosemide
- f) Lidocaine
- g) Morphine
- h) Nitroglycerin
- i) Oxygen

- 3. Electrical
 - a) Defibrillation
 - b) Transcutaneous pacing
 - (1) Implanted pacemaker functions
 - (a) Characteristics
 - (b) Pacemaker artifact
 - (c) ECG tracing of capture
 - (d) Failure to sense
 - (i) ECG indications
 - (ii) Clinical significance
 - (e) Failure to capture
 - (i) ECG indications
 - (ii) Clinical significance
 - (f) Failure to pace
 - (i) ECG indications
 - (ii) Clinical significance

- 4. Transport considerations

- 5. Psychological support/ communications strategies
 - a) Explanation for patient, family, significant others
 - b) Communication and transfer of data to the physician

VII. Chest pain that may be myocardial in origin

- A. Define angina pectoris and myocardial infarction
 - 1. Epidemiology
 - 2. Precipitating causes
- B. Morbidity/ mortality
 - 1. Not a self-limiting disease
 - 2. Chest pain may dissipate, but myocardial ischemia and injury can continue
 - 3. A single anginal episode may be a precursor to myocardial infarction
 - 4. May not be cardiac in origin
 - 5. Must be diagnosed by a physician
 - 6. Related terminology
 - a) Defined as a brief discomfort, has predictable characteristics, and is relieved promptly - no change in this pattern
 - b) Stable
 - (1) Occurs at a relative fixed frequency
 - (2) Usually relieved by rest and/ or medication
 - c) Unstable
 - (1) Occurs without fixed frequency
 - (2) May or may not be relieved by rest and/ or medication
 - d) Initial - first episode
 - e) Progressive - accelerating in frequency and duration
 - f) Preinfarction angina
 - (1) Pain at rest
 - (2) Sitting or lying down

- 7. Other possible causes of chest pain
 - a) Cholecystitis
 - b) Aneurysm

- c) Hiatal hernia
- d) Pleurisy
- e) Esophageal and gastrointestinal diseases
- f) Pulmonary embolism
- g) Pancreatitis
- h) Respiratory infections
- i) Aortic dissection
- j) Pneumothorax
- k) Herpes zoster (shingles)
- l) Chest wall tumors
- m) Blunt trauma

- C. Initial assessment findings
 - 1. Level of consciousness
 - a) Anxiety and restlessness
 - b) Near syncopal episodes
 - c) Fatigue
 - d) Vertigo
 - 2. Airway/ breathing
 - a) Labored breathing may or may not be present
 - 3. Circulation
 - a) Peripheral pulses
 - (1) Quality
 - (2) Rhythm
 - b) Changes in skin
 - (1) Color
 - (2) Temperature
 - (3) Moisture
- D. Focused history
 - 1. Chief complaint
 - a) Angina - typically sudden onset of discomfort, usually of brief duration, lasting three to five minutes, maybe five to 15 minutes; usually relieved by rest and/ or medication
 - b) Myocardial infarction - may be sudden onset, lasting more than five minutes, unrelieved by rest and/ or medications
 - c) May be referred to as chest pressure
 - d) Epigastric pain or discomfort
 - e) Atypical
 - 2. Denial
 - 3. Contributing history
 - a) Onset
 - (1) Exertional
 - (2) Non-exertional
 - b) Initial recognized event
 - c) Recurrent event
 - d) Increasing frequency and/ or duration of event
 - e) Prior use of nitroglycerin
 - f) Prior use of aspirin
 - g) Other medications
 - (1) Prescribed
 - (2) Borrowed
 - (3) Over-the-counter
 - h) Allergy to medications
- E. Detailed physical exam
 - 1. Airway

- 2. Breathing
 - a) May or may not be labored
 - (1) Sounds
 - (a) May be clear to auscultation
 - (b) May be congested in the bases
 - 3. Circulation
 - a) Alterations in heart rate and rhythm may occur
 - b) Peripheral pulses are usually not affected
 - c) Blood pressure may be elevated during the episode and normalize afterwards
 - d) ECG Devices
 - (1) Monitor
 - (2) Transmission
 - (3) Documentation
 - (4) Computerized pattern identification
 - (a) Pitfalls
 - (b) Common errors
 - (5) Findings
 - (a) ST segment changes are often not specific
 - (b) Arrhythmias and ectopy may not be present
- F. Management
- 1. Position of comfort
 - 2. Pharmacological interventions(for example)
 - a) Oxygen
 - b) Aspirin
 - c) Nitroglycerin
 - d) Morphine
 - 3. ECG
- G. Transport considerations
- 1. Sense of urgency for reperfusion
 - a) No relief with medications
 - b) Hypotension/ hypoperfusion
- H. Psychological support/ communications strategies
- 1. Explanation for patient, family, significant others
 - 2. Communication and transfer of data to the physician

VIII. Cardiac arrhythmias

- A. Common management modalities
 - 1. Assessment of LOC, airway, breathing, and circulation (ABCs)
 - 2. High flow oxygen
 - 3. Question medical and medication history, allergies
 - 4. Communicate with the physician
 - 5. Intravenous (IV) access
 - 6. Consider aspirin
 - 7. Pain management
 - a) Nitroglycerin
 - b) Morphine
 - 8. Transport considerations common to all conditions
 - 9. Psychological support/ communication strategies common to all conditions
 - a) Explanation for patient, family, significant others
 - b) Communication and transfer of data to the physician
- B. Tachycardias, narrow-QRS complex
 - 1. Sinus tachycardia
 - a) Management - ABCs, oxygen (as in VIII. A.)
 - b) Identify and treat the cause - e.g., fever, pain, anxiety, anger

- c) Transport and support (as in VIII.A.8.and 9)
 - 2. Supraventricular tachycardia
 - a) Management - ABCs, oxygen (as in VIII. A.)
 - (1) Vagal maneuvers
 - (2) Consider adenosine
 - (a) Ventricular rate greater than 150
 - (b) Use with caution, if at all, in atrial flutter
 - (i) Fear of catastrophic event resulting from acceleration of ventricular rate, that is, from 2:1 to 1:1 conduction
 - (ii) Every attempt must be taken to clarify that the patient is not in atrial flutter
 - (c) When in doubt, do not use adenosine
 - b) Transport and support (as in VIII.A.8.and 9)
 - 3. Wide-complex (see Ventricular Tachycardia)
 - 4. Bradycardia
 - 5. Narrow complex
 - a) Sinus
 - b) Junctional
 - c) AV blocks
 - 6. Management - ABCs, oxygen (as in VIII. A.)
 - a) Consider atropine if symptomatic, hypotensive and hypoperfusing
 - (1) Transport and support (as in VIII.A.8.and 9)
 - 7. Wide complex
 - a) May have a preexisting complication (identified by history)
 - (1) Accessory pathway
 - (2) Bundle branch block
 - b) New onset
 - (1) AV blocks
 - 8. Management - ABCs, oxygen (as in VIII. A.)
 - a) Atropine may be contraindicated
 - 9. Transport for pacemaker
 - 10. Support (as in VIII.A.9)
- C. Ventricular arrhythmias
 - 1. Ectopics (PVCs)
 - a) Management - ABCs, oxygen (as in VIII. A.)
 - b) Consider lidocaine
 - c) Transport and support (as in VIII.A.8.and 9)
 - 2. Ventricular tachycardia
 - a) Stable, LOC, blood pressure not impaired
 - (1) Management- ABCs, oxygen, (as in VIII. A.)
 - (2) Consider lidocaine
 - (3) Consider adenosine
 - (4) Transport and support (as in A.VIII.A. 8. and 9)
 - b) Unstable
 - (1) LOC altered, diminished, or unresponsive
 - (2) Chest pain/ pressure
 - (3) Consider sedation
 - (4) Consider defibrillation
 - (5) Transport and support (as in A.VIII.A. 8. and 9)
 - c) Pulseless
 - (1) Defibrillation as soon as possible
 - (2) Transport and support (as in A.VIII.A. 8. and 9)
 - 3. Ventricular fibrillation
 - a) Management

- (1) Confirm pulselessness
 - (2) Cardiopulmonary resuscitation (CPR) until defibrillation is available
 - (a) Confirm pulses with CPR
 - (b) High flow oxygen
 - (i) Bag-valve-mask
 - (ii) Intubate
 - (3) Defibrillation as soon as possible
 - (a) Energy dosage
 - (i) In accordance with local medical protocol
 - (ii) In accordance with type and model of defibrillator
 - (4) Medications (for example)
 - (a) Epinephrine
 - (b) Lidocaine
 - (5) Transport and support (as in A.VIII.A. 8. and 9)
- D. Pulseless electrical activity (PEA)
- 1. Management
 - a) Confirm pulselessness
 - b) Cardiopulmonary resuscitation (CPR)
 - c) Confirm pulses with CPR
 - d) High flow oxygen
 - (1) Bag-valve-mask
 - (2) Intubation
 - e) Monitor ECG
 - (1) Basic ECG rhythm, sinus, atrial, junctional, AV blocks
 - (2) Ventricular rate
 - f) Intravenous fluids
 - (1) Fluid challenge
 - (a) Normal saline
 - (b) Lactated ringer's
 - g) Pharmacological interventions (for example)
 - (1) Epinephrine
 - (2) Atropine if rhythm is bradycardic
 - h) Attempt to identify and treat the cause (for example)
 - (1) Hypovolemia
 - (2) Pneumothorax
 - (3) Tamponade
 - (4) Hypothermia
 - (5) Pulmonary embolus
 - (6) Drug overdose
 - 2. Transport and support (as in A.VIII.A. 8. and 9)
- E. Asystole (confirmed in a second ECG lead)
- 1. Management
 - a) Cardiopulmonary resuscitation (CPR)
 - b) Confirm pulses with CPR
 - c) Airway management
 - (1) High flow oxygen
 - (2) Bag-valve-mask
 - (3) Intubation
 - d) Monitor ECG
 - (1) Basic ECG rhythm, sinus, atrial, junctional, AV blocks
 - (2) Ventricular rate
 - e) Intravenous fluids
 - (1) Fluid challenge
 - (a) Normal saline

- (b) Lactated ringer's
- f) Pharmacologic (for example)
 - (1) Epinephrine
 - (2) Atropine
- g) Attempt to identify and treat the cause (for example)
 - (1) Hypovolemia
 - (2) Pneumothorax
 - (3) Tamponade
 - (4) Hypothermia
 - (5) Hyperkalemia
 - (6) Hypokalemia
 - (7) Drug overdose
- 2. Transport and support (as in A.VIII.A. 8. and 9)

IX. Complications of cardiovascular compromise

- A. Define pulmonary edema
- B. Epidemiology
 - 1. Precipitating causes
 - a) Left-sided failure
 - b) Right-sided failure
 - c) Myocardial infarction
 - d) Pulmonary embolism
 - e) Hypertension
 - f) Cardiomegaly
 - 2. Related terminology
 - a) Preload
 - b) Afterload
 - c) Congestive heart failure
 - (1) Loss of contractile ability which results in fluid overload
 - d) Chronic versus acute
 - (1) First time event
 - (2) Multiple events
- C. Morbidity/ mortality
 - 1. Pulmonary edema
 - 2. Respiratory failure
 - 3. Death
- D. Initial assessment
 - 1. Airway/ breathing
 - a) Labored breathing may or may not be present
 - 2. Circulation
 - a) Peripheral pulses
 - (1) Quality
 - (2) Rhythm
 - b) Changes in skin
 - (1) Color
 - (2) Temperature
 - (3) Moisture
- E. Focused history
 - 1. Chief complaint
 - a) Progressive or acute SOB
 - b) Progressive accumulation of edema
 - c) Weight gain over short period of time
 - d) Episodes of paroxysmal nocturnal dyspnea
 - e) Medication history

- (1) Prescribed
 - (a) Compliance
 - (b) Non-compliance
 - (2) Borrowed
 - (3) Over-the-counter
 - f) Home oxygen use
 - F. Detailed physical exam
 - 1. Level of consciousness
 - a) Unconscious
 - b) Altered level of consciousness
 - 2. Airway/ breathing
 - a) Dyspnea
 - (1) Most common, often with activity
 - (2) Paroxysmal nocturnal dyspnea (PND)
 - (3) Tripod position
 - (4) Adventitious sounds
 - (a) Wheezing
 - (b) Rales
 - (5) Frothy sputum
 - (6) Retraction
 - (7) Cyanosis in advanced stages
 - b) Productive cough
 - c) Labored breathing
 - 3. Circulation
 - a) Heart rate/ rhythm
 - (1) Rapid, “thready” pulse
 - (2) Any tachycardia with ectopy
 - (3) Any bradycardia with ectopy
 - (4) Atrial arrhythmias
 - b) Changes in skin
 - (1) Color
 - (2) Temperature
 - (3) Moisture
 - c) Peripheral pulses
 - (1) Quality
 - (2) Rhythm
 - d) Edema
 - (1) Pitting versus non-pitting
 - (2) Extremities
 - (a) Localized in ankles
 - (b) To the midcalf
 - (c) To the knees
 - (d) Obliteration of pulses
 - (3) Ascites
 - (4) Sacral
- G. Management
 - 1. Position of comfort
 - 2. Pharmacological interventions (for example)
 - a) Oxygen
 - b) Nitroglycerin
 - c) Lasix
 - d) Morphine
- H. Transport considerations
- I. Psychological support/ communications strategies

1. Explanation for patient, family, significant others
2. Communication and transfer of data to the physician

- X. Hypertensive emergencies
- A. Define hypertensive emergencies
 - B. Epidemiology
 1. Precipitating causes
 - a) History of hypertension
 - b) Non-compliance
 - c) Toxemia of pregnancy
 - C. Morbidity/ mortality
 1. Hypertensive encephalopathy
 2. Stroke
 - D. Initial assessment
 1. Airway/ breathing
 - a) Labored breathing may or may not be present
 2. Circulation
 - a) Peripheral pulses
 - (1) Quality
 - (2) Rhythm
 - b) Changes in skin
 - (1) Color
 - (2) Temperature
 - (3) Moisture
 - E. Focused history
 1. Chief complaint
 2. As in precipitating causes above
 3. Medication history
 - a) Prescribed
 - (1) Compliance
 - (2) Non-compliance
 - b) Borrowed
 - c) Over-the-counter
 4. Home oxygen use
 - F. Detailed physical examination
 1. Airway
 2. Breath sounds
 3. Circulation
 - a) Pulse
 - b) Vital signs
 - (1) Blood pressure
 - (a) Systolic greater than 160 mmHg
 - (b) Diastolic greater than 94 mmHg
 4. Diagnostic signs/ symptoms
 - a) General appearance
 - b) Level of consciousness
 - (1) Unconscious
 - (2) Altered level of consciousness
 - (3) Responsive
 - c) Skin color
 - d) Skin temperature
 - e) Skin hydration
 - f) Peripheral pulses
 - g) Edema

- h) Paroxysmal nocturnal dyspnea
 - i) Labored breathing (SOB)
 - j) Orthopnea
 - k) Vertigo
 - l) Epistaxis
 - m) Tinnitus
 - n) Changes in visual acuity
 - o) Nausea/ vomiting
 - p) Seizures
- G. Management
- 1. Pharmacological interventions
 - a) Oxygen
 - 2. Non-pharmacological interventions
 - a) Position of comfort
 - b) Airway and ventilation
 - 3. Transport considerations
 - 4. Psychological support/ communications strategies
 - a) Explanation for patient, family, significant others
 - b) Communication and transfer of data to the physician

XI. Cardiogenic Shock

- A. Define cardiogenic shock
- B. Epidemiology
 - 1. Differential from hypovolemic shock by one or more of the following
 - a) Chief complaint (chest pain, dyspnea, tachycardia)
 - b) Heart rate (bradycardia or excessive tachycardia)
 - c) Signs and symptoms of congestive heart failure
 - d) Arrhythmias
- C. Morbidity/ mortality
- D. Initial assessment
- E. Focused History
 - 1. Chief complaint
 - a) As in precipitating causes above
 - b) Chest pain
 - c) Dizziness
 - d) Syncopal episodes
 - 2. Medication history
 - a) Prescribed
 - (1) Compliance
 - (2) Non-compliance
 - b) Borrowed
 - c) Over-the-counter
- F. Detailed physical exam
 - 1. Level of consciousness
 - a) Altered level of consciousness
 - b) Unresponsive
 - 2. Airway
 - a) Dyspnea
 - b) Productive cough
 - c) Labored breathing
 - (1) Paroxysmal nocturnal dyspnea (PND)
 - (2) Tripod position
 - (3) Adventitious sounds
 - (4) Retractions

3. ECG rhythm analysis
 - a) Any tachycardia
 - b) Atrial arrhythmias
 - c) Ectopics
 4. Skin condition
 5. Edema
 - a) Pedal pulses may be obliterated
 - b) Pretibial
 - c) Sacral
 - d) Other anatomical locations
 6. Circulation
 - a) Peripheral pulses
 - (1) Bradycardia
 - (2) Tachycardia
 - (3) Weak/ “thready”
- G. Management
1. Position of comfort
 - a) May prefer sitting upright with legs in dependent position
 2. Pharmacological interventions (for example)
 - a) Oxygen
 - b) Nitroglycerin
 - c) Lasix
 - d) Antiarrhythmic as indicated
 - e) Fluid therapy
 3. Transport considerations
 4. Psychological support/ communications strategies
 - a) Explanation for patient, family, significant others
 - b) Communication and transfer of data to the physician

XII. Cardiac arrest

- A. Precipitating causes
1. Trauma
 2. Medical conditions (for example)
 - a) End stage renal disease
 - b) Hyperkalemia with renal disease
 - c) Hypothermia
 3. Pediatric/ neonatal
 4. Geriatric
- B. Morbidity and mortality
- C. Initial assessment
1. Critical findings
 - a) Unresponsive
 - b) Apneic
 - c) Pulseless
 - d) Heart rate/ rhythm
 - (1) Ventricular fibrillation
 - (2) Ventricular tachycardia
 - (3) Asystole
 - (4) PEA
- D. Focused history
1. Witnessed event
 2. Witnessed by EMS personnel
 3. Bystander cardiopulmonary resuscitation (CPR)
 4. Time from discovery to activation of CPR

5. Time from discovery to activation of EMS
6. Past medical history
- E. Management
 1. Related terminology
 - a) Resuscitation - to provide efforts to return spontaneous pulse and breathing to the patient in full cardiac arrest
 - b) Survival - patient is resuscitated and survives to hospital discharge
 - c) Return of spontaneous circulation (ROSC) - patient is resuscitated to the point of having pulse without CPR; may or may not have return of spontaneous respirations; patient may or may not go on to survive
 2. Indications for NOT initiating resuscitative techniques
 - a) Signs of obvious death
 - (1) Rigor, fixed lividity, decapitation
 - b) Local protocol
 - (1) Out-of-hospital advance directives
 3. Airway and ventilatory support
 - a) High flow oxygen
 - (1) Bag-valve system
 - (2) Intubation
 4. Circulatory support
 - a) CPR in conjunction with defibrillation
 - b) IV therapy
 5. Pharmacological interventions (for example)
 - a) Oxygen
 - b) Epinephrine
 - c) Lidocaine
 6. Transport considerations
 7. Psychological support/ communications strategies
 - a) Explanation for patient, family, significant others
 - b) Communication and transfer of data to the physician

- F. Termination of resuscitation
 1. Identify local protocols
 2. Criteria for inclusion (for example)
 - a) 18 years old or older
 - b) Arrest is presumed cardiac in origin and not associated with a condition potentially responsive to hospital treatment (e.g., hypothermia, drug overdose, toxicologic exposure)
 - c) Endotracheal intubation has been successfully accomplished and maintained
 - d) Standard advanced cardiac life support measures have been applied throughout the resuscitative effort
 - e) On-scene ALS resuscitation efforts have been sustained for 25 minutes or the patient remains in asystole through four rounds of appropriate ALS drugs
 - f) Patient has a cardiac rhythm of asystole or agonal rhythm at the time the decision to terminate is made and this rhythm persists until the arrest is actually terminated
 - g) Victims of blunt trauma in arrest whose presenting rhythm is asystole or who develop asystole while on scene
 3. Exclusion criteria - for example
 - a) Under the age of 18
 - b) Etiology for which specific in-hospital treatment may be beneficial
 - c) Persistent or recurrent ventricular tachycardia or fibrillation
 - d) Transient return of pulse
 - e) Signs of neurological viability
 - f) Arrest was witnessed by EMS personnel

- 4. Criteria NOT to be considered as inclusionary or exclusionary
 - g) Family or responsible party opposed to termination
 - a) Patient age (e.g., geriatric)
 - b) Time of collapse prior to EMS arrival
 - c) Presence of a non-official do-not-resuscitate (DNR) order
 - d) Quality of life valuations
- 5. Procedures (according to local protocol)
 - a) Direct communication with on-line medical direction
 - (1) Medical condition of the patient
 - (2) Known etiologic factors
 - (3) Therapy rendered
 - (4) Family present and apprised of the situation
 - (5) Communicate any resistance or uncertainty on the part of the family
 - (6) Maintain continuous documentation to include the ECG
 - (7) Mandatory review after the event
 - (a) Grief support (according to local protocol)
 - (i) EMS assigned personnel
 - (ii) Community agency referral
 - (b) Law enforcement (according to local protocol)
 - (i) On-scene determination if the event/ patient requires assignment of the patient to the medical examiner
 - (ii) On-scene law enforcement communicates with attending physician for the death certificate
 - (iii) If there is any suspicion about the nature of the death or if the physician refuses or hesitates to sign the death certificate
 - (iv) No attending physician is identified (the patient will be assigned to the medical examiner)

XIII. Integration

- A. Apply pathophysiological principles to the assessment of a patient with cardiovascular disease
- B. Formulation of field impression; decisions based on
 - 1. Initial assessment
 - 2. Focused history
 - 3. Detailed physical examination
- C. Develop and execute a patient management plan based on field impression
 - 1. Initial management
 - a) Airway support
 - b) Ventilation support
 - c) Circulation support
 - d) Non-pharmacologic
 - e) Pharmacologic
 - f) Electrical
 - 2. On-going assessment
 - 3. Transport Decisions
 - a) Appropriate mode
 - b) Appropriate facility
 - 4. Non-transport criteria
 - 5. Advocacy
 - 6. Communications
 - 7. Prevention
 - 8. Documentation
 - 9. Quality assurance

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Conover, M.B., Understanding Electrocardiography, 8th Edition, 1996, Mosby, St. Louis.

**CARDIAC TECHNICIAN
TO
INTERMEDIATE
TRANSITION PROGRAM**

MEDICAL: 5

DIABETIC EMERGENCIES: 3

Comments:

3

UNIT TERMINAL OBJECTIVE

5-3 At the completion of this unit, the EMT-Intermediate student will be able to utilize the assessment findings to formulate a field impression and implement a treatment plan for the patient with a diabetic emergency.

COGNITIVE OBJECTIVE

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-3.1 Describe the pathophysiology of diabetes mellitus. (C-1)
- 5-3.2 Describe the effects of decreased levels of insulin on the body. (C-1)
- 5-3.3 Correlate abnormal findings in assessment with clinical significance in the patient with a diabetic emergency. (C-3)
- 5-3.4 Discuss the management of diabetic emergencies. (C-1)
- 5-3.5 Describe the mechanism of ketone body formation and its relationship to ketoacidosis. (C-1)
- 5-3.6 Describe the effects of decreased levels of insulin on the body. (C-1)
- 5-3.7 Discuss the pathophysiology of hypoglycemia. (C-1)
- 5-3.8 Recognize the signs and symptoms of the patient with hypoglycemia. (C-1)
- 5-3.9 Describe the management of a hypoglycemic patient. (C-1)
- 5-3.10 Integrate the pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the patient with hypoglycemia. (C-3)
- 5-3.11 Discuss the pathophysiology of hyperglycemia. (C-1)
- 5-3.12 Recognize the signs and symptoms of the patient with hyperglycemia. (C-1)
- 5-3.13 Describe the management of the hyperglycemic patient. (C-1)
- 5-3.14 Differentiate between diabetic emergencies based on assessment and history. (C-3)
- 5-3.15 Correlate abnormal findings in the assessment with clinical significance in the patient with a diabetic emergencies. (C-3)
- 5-3.16 Develop a patient management plan based on field impression in the patient with a diabetic emergency. (C-3)

AFFECTIVE OBJECTIVES

None identified for this unit.

PSYCHOMOTOR OBJECTIVES

None identified for this unit.

3

DECLARATIVE

I. Introduction

A. Define

1. Diabetes mellitus
2. Hypoglycemia
3. Hyperglycemia

II. Specific illnesses

A. Diabetes mellitus

1. Epidemiology

- a) Incidence
- b) Morbidity/ mortality
- c) Long term complications
- d) Risk factors

2. Pathophysiology

- a) Types
 - (1) Type I-insulin dependent
 - (2) Type II-non insulin dependent
- b) A chronic system syndrome characterized by hyperglycemia caused by a decrease in the secretion or activity of insulin
- c) Normal insulin metabolism
- d) Abnormal metabolism/ ketone formation
 - (1) When insulin supply is insufficient, glucose cannot be used for cellular energy
 - (2) Response to cellular starvation
 - (3) Body releases and breaks down stored fats and protein to provide energy
 - (4) Fatty acids produce ketones
 - (5) Excess ketones upset pH balance and acidosis develops (DKA)

3. Assessment findings

- a) History
 - (1) Has insulin dosage changed recently?
 - (2) Has the patient had a recent infection?
 - (3) Has the patient suffered any psychologic stress?
- b) Signs and symptoms
 - (1) Altered mental status
 - (2) Abnormal respiratory pattern (Kussmaul's breathing)
 - (3) Tachycardia
 - (4) Hypotension
 - (5) Breath has a distinct fruity odor
 - (6) Abnormal increase in urination
 - (7) Warm dry skin
 - (8) Weight loss
 - (9) Weakness
 - (10) Dehydration
- c) Blood glucose analysis

4. Management

- a) Airway and ventilation
- b) Circulation
- c) Pharmacological interventions
- d) Non-pharmacological interventions
- e) Transport considerations
 - (1) Appropriate mode

- (2) Appropriate facility
- f) Psychological support/ communication strategies
- B. Hypoglycemia**
 - 1. Epidemiology
 - a) Morbidity/ mortality
 - b) Risk factors
 - 2. Pathophysiology
 - a) Blood glucose levels fall below that required for normal body functioning
 - b) Cellular/ organ death can occur
 - 3. Assessment
 - a) History
 - (1) Diabetes
 - (2) Prolonged fasting
 - (3) Alcoholism
 - b) Signs and symptoms
 - (1) Weakness
 - (2) Irritability
 - (3) Hunger
 - (4) Confusion
 - (5) Anxiety
 - (6) Bizarre behavior
 - (7) Tachycardia
 - (8) Normal respiratory pattern
 - (9) Cool, pale skin
 - (10) Diaphoresis
 - c) Blood glucose analysis**
 - 4. Management
 - a) Airway and ventilation
 - b) Circulation
 - c) Pharmacological interventions
 - (1) Oral glucose
 - (2) D50
 - d) Non-pharmacological interventions
 - e) Transport considerations
 - (1) Appropriate mode
 - (2) Appropriate facility
 - f) Psychological support/ communication strategies
- C. Hyperglycemia**
 - 1. Epidemiology
 - a) Mortality/ morbidity
 - b) Risk factors
 - 2. Pathophysiology
 - a) Occurs in patients with diabetes who are able to produce enough insulin to prevent DKA but not enough to prevent severe hyperglycemia
 - b) Hyperosmolar non-ketotic coma is characterized by severe hyperglycemia, hyperosmolality, and dehydration, but no ketoacidosis
 - 3. Assessment
 - a) History
 - (1) Diabetes
 - (2) Inadequate fluid intake
 - b) Signs and symptoms
 - (1) Neurologic abnormalities
 - (a) Altered level of consciousness
 - (b) Coma

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- (c) Seizures
- (d) Hemiparesis
- (e) Aphasia
- (f) Increasing mental depression
- (g) Dehydration
- (h) Abnormal increase in urination

- c) Management
 - (1) Airway and ventilation
 - (2) Circulation
 - (3) Pharmacological interventions
 - (a) Rehydration
 - (4) Non-pharmacological interventions
 - (5) Transport considerations
 - (a) Appropriate mode
 - (b) Appropriate facility
 - (6) Psychological support/ communication strategies

D. Diabetic ketoacidosis

1. Epidemiology

- a) Incidence
- b) Mortality/ morbidity
- c) Risk factors
- d) Prevention strategies
- e) Anatomy and physiology review

2. Pathophysiology

- a) Hyperglycemia
- b) Ketonemia
- c) Relative insulin insufficiency
- d) Counterregulatory hormone excess

3. Assessment findings

- a) History
 - (1) General health
 - (2) Previous medical conditions
 - (3) Medications
 - (4) Previous experience with complaint
 - (5) Time of onset

b) Physical

- (1) Dehydration
- (2) Hypotension
- (3) Reflex tachycardia
- (4) Acetone (fruity) odor on breath
- (5) Nausea
- (6) Vomiting
- (7) Abdominal pain
- (8) Hyperventilation
- (9) Kussmaul's respiration

4. Management

- a) Airway and ventilation
 - (1) Oxygen
 - (2) Positioning
 - (3) Suction
 - (4) Assisted ventilation
 - (5) Advanced airway devices
- b) Circulatory support
 - (1) Venous access

3

- (2) Blood analysis
- c) Pharmacological interventions
 - (1) Rehydration
- d) Non-pharmacological interventions
 - (1) General comfort measures
- e) Transport considerations
 - (1) Appropriate mode
 - (2) Appropriate facility
- f) Psychological support/ communications strategies

CARDIAC TECHNICIAN TO INTERMEDIATE TRANSITION PROGRAM

MEDICAL: 5

ALLERGIC REACTIONS: 4

Comments:

This is totally review.

UNIT TERMINAL OBJECTIVE

- 5-4 At the completion of this unit, the EMT-Intermediate student will be able to utilize the assessment findings to formulate a field impression and implement a treatment plan for the patient with an allergic or anaphylactic reaction.

COGNITIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-4.1 Define allergic reaction. (C-1)
- 5-4.2 Define anaphylaxis. (C-1)
- 5-4.3 Define allergens. (C-1)
- 5-4.4 Describe the common methods of entry of substances into the body. (C-1)
- 5-4.5 List common antigens most frequently associated with anaphylaxis. (C-1)
- 5-4.6 Describe physical manifestations in anaphylaxis. (C-1)
- 5-4.7 Recognize the signs and symptoms related to anaphylaxis. (C-1)
- 5-4.8 Differentiate among the various treatment and pharmacological interventions used in the management of anaphylaxis. (C-3)
- 5-4.9 Integrate the pathophysiological principles of the patient with anaphylaxis. (C-3)
- 5-4.10 Correlate abnormal findings in assessment with the clinical significance in the patient with anaphylaxis. (C-3)
- 5-4.11 Develop a treatment plan based on field impression in the patient with allergic reaction and anaphylaxis. (C-3)

AFFECTIVE OBJECTIVES

None identified for this unit.

PSYCHOMOTOR OBJECTIVES

None identified for this unit.

DECLARATIVE

- I. Introduction
 - A. Anatomy
 - 1. Review of cardiovascular system
 - 2. Review of respiratory system
 - B. Terminology
 - 1. Allergic reaction
 - 2. Anaphylaxis
 - 3. Allergen

 - II. Pathophysiology
 - A. Routes of entry
 - 1. Oral ingestion
 - 2. Injected/ envenomation
 - 3. Inhaled
 - 4. Topical
 - B. Common allergens
 - 1. Drugs
 - 2. Insects
 - 3. Foods
 - 4. Animals
 - 5. Other
 - C. Allergic response
 - 1. Histamine or histamine-like substance release
 - 2. Biphasic response
 - a) Acute reaction
 - b) Delayed reaction
 - 3. Immunity
 - 4. Sensitivity
 - 5. Hypersensitivity
 - 6. Redness of skin
 - 7. Swelling/ edema of the skin
 - 8. Anaphylactic shock
 - a) Cardiovascular system
 - b) Respiratory system

 - III. Assessment findings
 - A. Not all signs and symptoms are present in every case
 - B. History
 - 1. Previous exposure
 - 2. Previous experience to exposure
 - 3. Onset of symptoms
 - 4. Dyspnea
 - C. Level of consciousness
 - 1. Unable to speak
 - 2. Restless
 - 3. Decreased level of consciousness
 - 4. Unresponsive
 - D. Upper airway
 - 1. Hoarseness
 - 2. Stridor
 - 3. Pharyngeal edema/ spasm
 - E. Lower airway
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1. Tachypnea
 2. Hypoventilation
 3. Labored - accessory muscle use
 4. Abnormal retractions
 5. Prolonged expirations
 6. Wheezes
 7. Diminished lung sounds
- F. Skin
1. Redness
 2. Rashes
 3. Edema
 4. Moisture
 5. Itching
 6. Pallor
 7. Cyanotic
- G. Vital signs
1. Tachycardia
 2. Hypotension
 3. Assessment tools
 4. Cardiac monitor
- IV. Management of anaphylaxis
- A. Remove offending agent (i.e., stinger)
 - B. Airway and ventilation
 1. Positioning
 2. Oxygen
 3. Assist ventilation
 4. Advanced airway
 - C. Circulation
 1. Venous access
 2. Fluid resuscitation
 - D. Pharmacological interventions
 1. Oxygen
 2. Epinephrine - mainstay of treatment
 - a) Bronchodilator
 - b) Decreases vascular permeability
 - c) Vasoconstriction
 3. Bronchodilator
 - E. Transport considerations
 - F. Psychological support/ communications strategies
- V. Management of acute allergic reaction without dyspnea or hypotension
- A. Remove offending agent (i.e., stinger)
 - B. Airway and ventilation
 - C. Circulation
 - D. Transport considerations
 - E. Psychological support/ communications strategies

CARDIAC TECHNICIAN TO INTERMEDIATE TRANSITION PROGRAM

MEDICAL: 5

POISONING/OVERDOSE EMERGENCIES: 5

Comments:

All of this material must be covered as first time exposure.

UNIT TERMINAL OBJECTIVE

5-5 At the completion of this unit, the EMT-Intermediate student will be able to utilize assessment findings to formulate a field impression and implement a treatment plan for the patient with a toxic exposure.

COGNITIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-5.1 Identify appropriate personal protective equipment and scene safety awareness concerns in dealing with toxicologic emergencies. (C-1)
- 5-5.2 Identify the appropriate situations in which additional non-EMS resources need to be contacted. (C-1)
- 5-5.3 Review the routes of entry of toxic substances into the body. (C-1)
- 5-5.4 Discuss the role of the Poison Control Center in the United States. (C-1)
- 5-5.5 List the toxic substances that are specific to your region. (C-1)
- 5-5.6 Identify the need for rapid intervention and transport of the patient with a toxic substance emergency. (C-1)
- 5-5.7 Review the management of toxic substances. (C-1)
- 5-5.8 Differentiate among the various treatments and pharmacological interventions in the management of the most common poisonings by inhalation, ingestion, absorption, and injection. (C-1)
- 5-5.9 Utilize assessment findings to formulate a field impression and implement a treatment plan for patients with the most common poisonings by inhalation, ingestion, absorption, and injection. (C-3)
- 5-5.10 Review poisoning by overdose. (C-1)
- 5-5.11 Review the signs and symptoms related to the most common poisonings by overdose. (C-1)
- 5-5.12 Correlate the abnormal findings in assessment with the clinical significance in patients with the most common poisonings by overdose. (C-3)
- 5-5.13 Differentiate among the various treatments and pharmacological interventions in the management of the most common poisonings by overdose. (C-3)
- 5-5.14 Utilize assessment findings to formulate a field impression and implement a treatment plan for patients with the most common poisonings by overdose. (C-3)

AFFECTIVE OBJECTIVES

- 5-5.15 Appreciate the psychological needs of victims of drug abuse or overdose. (A-2)

PSYCHOMOTOR OBJECTIVES

None identified for this unit.

DECLARATIVE

- I. General toxicology, assessment and management
 - A. Types of toxicological emergencies
 - 1. Unintentional poisoning
 - a) Dosage errors
 - b) Idiosyncratic reactions
 - c) Childhood poisoning
 - d) Environmental exposure
 - e) Occupational exposures
 - f) Neglect/ abuse
 - 2. Drug/ alcohol abuse
 - 3. Intentional poisoning/ overdose
 - a) Chemical warfare
 - b) Assault/ homicide
 - c) Suicide attempts
 - B. Provider safety and resources identification
 - 1. Need for appropriate personal protective equipment and scene safety awareness
 - a) Airway protection
 - b) Body surface absorption isolation
 - c) Specialized equipment
 - 2. Need for additional resources
 - a) Hazardous Materials Teams
 - b) Police
 - c) Fire
 - d) Rescue
 - 3. Equipment and environmental decontamination
 - C. Use of Poison Control Centers
 - D. Routes of absorption
 - 1. Ingestion
 - 2. Inhalation
 - 3. Injection
 - 4. Absorption
 - E. Poisoning by ingestion, inhalation, injection, and absorption
 - 1. Examples
 - 2. Anatomy and physiology review
 - a) Absorption
 - b) Distribution
 - 3. Assessment findings
 - 4. General management considerations
 - F. Geographically-specific toxic emergencies
 - 1. Discuss regional variances in possible toxic exposures
 - 2. Examples
 - a) Venomous snakes, spiders, sea creatures
 - b) Chemical manufacturing/ transportation
 - G. Specific toxicology, assessment, and management
 - 1. Definition/ advantages
 - a) Grouping of toxicologically-similar agents
 - b) Useful for remembering the assessment and management of toxicological emergencies
 - c) Does not consider how or why the toxin has been introduced to the body
 - d) Be sure to include the general management based on route of entry in addition to specific treatments

-
2. Cholinergics
 - a) Common causative agents - pesticides (organophosphates, carbamates) and nerve agents (sarin, Soman)
 - b) Assessment findings
 - (1) Headache
 - (2) Dizziness
 - (3) Weakness
 - (4) Nausea
 - (5) SLUDGE (Salivation, Lacrimation, Urination, Defecation, GI upset, Emesis)
 - (6) Bradycardia, wheezing, bronchoconstriction, myosis, coma, convulsions
 - (7) Diaphoresis, seizures
 - c) Management
 - (1) Decontamination
 - (2) Airway and ventilation
 - (a) Aggressive airway management
 - (3) Circulation
 - (4) Pharmacological
 - (a) Atropine
 - (b) Diazepam
 - (c) Activated charcoal
 - (5) Non-pharmacological
 - (6) Transport considerations
 - (a) Appropriate mode
 - (b) Appropriate facility
 - (7) Psychological support/ communication strategies
 3. Anticholinergic
 - a) Common causative agents
 - b) Assessment findings
 - c) Management
 - (1) Airway and ventilation
 - (2) Circulation
 - (3) Pharmacological
 - (4) Non-pharmacological
 - (5) Transport considerations
 - (a) Appropriate mode
 - (b) Appropriate facility
 - (6) Psychological support/ communication strategies
 4. Narcotics/ opiates
 - a) Common causative agents - heroin, morphine, codeine, meperidine, propoxyphene, fentanyl
 - b) Assessment findings
 - (1) Euphoria
 - (2) Hypotension
 - (3) Respiratory depression/ arrest
 - (4) Nausea
 - (5) Pinpoint pupils
 - (6) Seizures
 - (7) Coma
 - c) Management
 - (1) Airway and ventilation
 - (2) Circulation
-

- (3) Pharmacological
 - (a) Naloxone- opiate specific antidotal therapy
 - (4) Non-pharmacological
 - (5) Transport considerations
 - (a) Appropriate mode
 - (b) Appropriate facility
 - (6) Psychological support/ communication strategies
5. Carbon monoxide
- a) Source
 - b) Common causative agents
 - c) Pharmacodynamics
 - d) Pharmacokinetics
 - e) Assessment findings
 - f) Management
 - (1) Airway and ventilation
 - (2) Circulation
 - (3) Pharmacological
 - (4) Non-pharmacological
 - (a) Hyperbaric treatment
 - (5) Transport considerations
 - (a) Appropriate mode
 - (b) Appropriate facility
 - (6) Psychological support/ communication strategies
6. Psychiatric medications
- a) Tricyclic antidepressants
 - (1) Clinical use
 - (2) Common causative agents - amitriptyline amoxapine, clomipramine, doxepin, imipramine, nortpyline
 - (3) Pharmacodynamics
 - (4) Pharmacokinetics
 - (5) Assessment findings
 - (a) Early findings (dry mouth, confusion, hallucinations)
 - (b) Late findings (delirium, respiratory depression, hypotension, hyperthermia, seizures, coma)
 - (c) Cardiotoxicity - dysrhythmias
 - (6) Management
 - (a) Airway and ventilation
 - (b) Circulation
 - (c) Non-pharmacological
 - (d) Transport considerations
 - (i) Appropriate mode
 - (ii) Appropriate facility
 - (d) Psychological support/ communication strategies
7. Bites and stings
- a) Common offending organisms - hymenoptera, spiders, other arthropods, snakes, marine animals
 - b) Pharmacodynamics
 - c) Pharmacokinetics
 - d) Assessment findings
 - e) Management
 - (1) Airway and ventilation
 - (2) Circulation
 - (3) Pharmacological

- (4) Non-pharmacological
- (5) Transport considerations
 - (a) Appropriate mode
 - (b) Appropriate facility
- (6) Psychological support/ communication strategies

CARDIAC TECHNICIAN TO INTERMEDIATE TRANSITION PROGRAM

MEDICAL: 5

NEUROLOGICAL EMERGENCIES: 6

Comments:

Mostly a review.

UNIT TERMINAL OBJECTIVE

5-6 At the completion of this unit, the EMT-Intermediate student will be able to utilize the assessment findings to formulate a field impression and implement the treatment plan for the patient with a neurological emergency.

COGNITIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-6.1 Discuss the general pathophysiology of non-traumatic neurologic emergencies. (C-1)
- 5-6.2 Discuss the general assessment findings associated with non-traumatic neurologic emergencies. (C-1)
- 5-6.3 Identify the need for rapid intervention and transport of the patient with non-traumatic emergencies. (C-1)
- 5-6.4 Discuss the epidemiology, assessment findings, and management for stroke and intracranial hemorrhage. (C-1).
- 5-6.5 Discuss the epidemiology, assessment findings, and management for transient ischemic attack. (C-1).
- 5-6.6 Discuss the epidemiology, assessment findings, and management of epilepsy/seizure. (C-1).
- 5-6.7 Discuss the epidemiology, assessment findings, and management for non-specific coma or altered level consciousness/ syncope/ weakness/ headache. (C-1).
- 5-6.8 Develop a patient management plan based on field impression in the patient with neurological emergencies. (C-3)

AFFECTIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-6.9 Characterize the feelings of a patient who regains consciousness among strangers. (A-2)
- 5-6.10 Formulate means of conveying empathy to patients whose ability to communicate is limited by their condition. (A-3)

PSYCHOMOTOR OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-6.11 Perform an appropriate assessment of a patient with a non-traumatic neurological emergency. (P-3)

DECLARATIVE

- I. Introduction
- II. General system pathophysiology, assessment, and management
 - A. Physiology
 - 1. Alterations in cognitive systems
 - 2. Alterations in cerebral homeostasis
 - 3. Alterations in motor control
 - 4. Central nervous system disorders
 - a) Trauma
 - b) Cerebrovascular disorders
 - c) Tumors
 - d) Infection
 - e) Inflammation
 - f) Degenerative diseases
 - B. Assessment findings
 - 1. History
 - a) General health
 - b) Previous medical conditions
 - c) Medications
 - d) Previous experience with complaint
 - e) Time of onset
 - f) Seizure activity
 - 2. Physical
 - a) General appearance
 - b) Level of consciousness
 - (1) Mood
 - (2) Thought
 - (3) Perceptions
 - (4) Judgment
 - (5) Memory and attention
 - c) Speech
 - d) Skin
 - e) Posture and gait
 - f) Vital signs
 - (1) Hypertension
 - (2) Hypotension
 - (3) Heart rate/ fast or slow
 - (4) Ventilation rate/ quality
 - (5) Temperature/ fever
 - g) Head/ neck
 - (1) Facial expression
 - (2) Eyes
 - (a) Position & alignment
 - (b) Pupils
 - (3) Mouth
 - (a) Odors on breath
 - h) Thorax and lungs
 - (1) Auscultate
 - i) Cardiovascular
 - (1) Heart rate
 - (2) Rhythm

- (3) ECG monitoring
 - j) Nervous
 - (1) Motor system
 - (a) Muscle tone
 - (b) Muscle strength
 - (c) Coordination
 - k) Assessment tools
 - (1) Blood glucose
 - 3. Ongoing assessment
- C. Management
 - 1. Airway and ventilatory support
 - a) Oxygen
 - b) Positioning
 - c) Assisted ventilation
 - d) Suction
 - e) Advanced airway device
 - 2. Circulatory support
 - a) Venous access
 - b) Blood analysis
 - 3. Pharmacological interventions
 - a) Dextrose 50%
 - b) Narcan
 - c) Valium
 - 4. Non-pharmacological interventions
 - a) Positioning
 - b) Spinal precautions
 - 5. Transport considerations
 - a) Appropriate mode
 - b) Appropriate facility
 - 6. Psychological support/ communications strategies

III. Specific injuries/ illnesses

- A. Stroke and intracranial hemorrhage
 - 1. Epidemiology
 - a) Mortality/ morbidity
 - b) Risk factors
 - 2. Pathophysiology of regional disruption of cerebral blood flow
 - a) Thrombus
 - b) Hemorrhage
 - c) Embolus
 - 3. Assessment findings
 - a) History
 - (1) General health
 - (2) Previous medical conditions
 - (3) Medications
 - (4) Previous experience with complaint
 - (5) Time of onset
 - (6) Seizure activity
 - (7) Headache
 - (8) Nose bleed
 - (9) Others
 - b) Physical

- event
- (1) Standard physical exam for the patient with potential neurological
4. Management
- a) Airway and ventilatory support
 - (1) Oxygen
 - (2) Positioning
 - (3) Assisted ventilation
 - (4) Suction
 - (5) Advanced airway device
 - b) Circulatory support
 - (1) Venous access
 - (2) Blood analysis
 - c) Pharmacological interventions
 - (1) Dextrose
 - (2) Valium
 - (3) Narcan
 - d) Non-pharmacological interventions
 - (1) Positioning
 - (2) Spinal precautions
 - e) Transport considerations
 - (1) Appropriate mode
 - (2) Appropriate facility
 - f) Psychological support/ communications strategies
- B. Transient ischemic attack (TIA)
- 1. Epidemiology
 - a) Mortality/ morbidity
 - b) Risk factors
 - 2. Pathophysiology
 - a) Transient neurological deficits
 - b) Partial disruptions of blood flow
 - 3. Assessment findings
 - a) History
 - (1) General health
 - (2) Previous medical conditions
 - (3) Medications
 - (4) Previous experience with complaint
 - (5) Time of onset
 - (6) Seizures
 - (7) Headache
 - (8) Nosebleed
 - b) Physical
 - (1) Standard physical exam for the patient with potential neurological
- event
4. Management
- a) Airway and ventilatory support
 - (1) Oxygen
 - (2) Positioning
 - (3) Assisted ventilation
 - (4) Suction
 - (5) Advanced airway device
 - b) Circulatory support
 - (1) Venous access
 - (2) Blood analysis

- c) Pharmacological interventions
 - (1) Dextrose
 - d) Non-pharmacological interventions
 - (1) Positioning
 - (2) Spinal precautions
 - e) Transport considerations
 - (1) Appropriate mode
 - (2) Appropriate facility
 - f) Psychological support/ communications strategies
- C. Epilepsy/ seizures
- 1. Epidemiology
 - a) Mortality/ morbidity
 - b) Risk factors
 - 2. Pathophysiology
 - a) Unexpected electrical discharge of neurons in brain
 - b) Types
 - (1) Generalized
 - (a) Grand mal (tonic-clonic)
 - (b) Tonic
 - (c) Clonic
 - (d) Petit mal
 - (2) Partial
 - (a) Simple partial
 - (b) Complex partial
 - (3) Status epilepticus
 - c) Causes other than epilepsy
 - (1) Idiopathic
 - (2) Fever
 - (3) Neoplasms
 - (4) Infection
 - (5) Metabolic
 - (6) Drug intoxication
 - (7) Drug withdrawal
 - (8) Head trauma
 - (9) Eclampsia
 - (10) Cerebral degenerative diseases
 - 3. Assessment findings
 - a) History
 - (1) General health
 - (2) Previous medical conditions
 - (3) Medications
 - (4) Previous seizures
 - (5) Time of onset
 - (6) Seizure activity
 - (a) Duration
 - (b) Number of events
 - (c) Consciousness between
 - b) Physical
 - (1) Standard physical exam for the patient with potential neurological event
 - (2) Pertinent findings
 - (a) Tongue laceration(s)
 - (b) Head

- (i) Hemorrhage
 - (ii) Wounds
 - (c) GI/ GU
 - (i) Incontinence of bladder
 - (ii) Incontinence of bowel
4. Management
- a) Airway and ventilatory support
 - (1) Oxygen
 - (2) Positioning
 - (3) Assisted ventilation
 - (4) Suction
 - (5) Advanced airway device
 - b) Circulatory support
 - (1) Venous access
 - (2) Blood analysis
 - c) Pharmacological interventions
 - (1) Dextrose
 - (2) Valium
 - (3) Narcan
 - d) Non-pharmacological interventions
 - (1) Protection from injury
 - (2) Positioning
 - (3) Spinal precautions
 - e) Transport considerations
 - (1) Appropriate mode
 - (2) Appropriate facility
 - f) Psychological support/ communications strategies
- D. Non-specific coma or altered level of consciousness/ syncope/ weakness/ headache
- 1. Pathophysiology
 - a) Define coma
 - b) Define syncope
 - c) Headache
 - d) Describe potential causes
 - 2. Assessment findings
 - 3. Management
 - a) Airway and ventilatory support
 - (1) Oxygen
 - (2) Positioning
 - (3) Assisted ventilation
 - (4) Suction
 - (5) Advanced airway device
 - b) Circulatory support
 - (1) Venous access
 - (2) Blood analysis
 - c) Pharmacological interventions
 - (1) Dextrose
 - (2) Valium
 - (3) Narcan
 - d) Non-pharmacological interventions
 - (1) Protection from injury
 - (2) Positioning
 - (3) Spinal precautions
-

- e) Transport considerations
 - (1) Appropriate mode
 - (2) Appropriate facility
- f) Psychological support/ communications strategies

IV. Integration

- A. Develop management strategies, based on the chief complaint or problem, for the following patient presentations
 - 1. Coma/ decreased level of consciousness
 - 2. Stroke
 - 3. Seizure

CARDIAC TECHNICIAN TO INTERMEDIATE TRANSITION PROGRAM

MEDICAL: 5

NON-TRAUMATIC ABDOMINAL EMERGENCIES:

7

Comments:

Although there is a small section of this material that is new, this section can be taught as a review.

UNIT TERMINAL OBJECTIVE

5-7 At the completion of this unit, the EMT-Intermediate student will be able to utilize the assessment findings to formulate a field impression and implement the treatment plan for the patient with non-traumatic abdominal pain.

COGNITIVE OBJECTIVE

At the conclusion of this unit, the EMT-Intermediate student will be able to:

- 5-7.1 Discuss the pathophysiology of non-traumatic abdominal emergencies. (C-1)
- 5-7.2 Discuss the signs and symptoms of non-traumatic acute abdominal pain. (C-1)
- 5-7.3 Describe the technique for performing a comprehensive physical examination on a patient with non-traumatic abdominal pain. (C-1)
- 5-7.4 Describe the management of the patient with non-traumatic abdominal pain. C-1)

AFFECTIVE OBJECTIVES

None identified for this unit.

PSYCHOMOTOR OBJECTIVES

None identified for this unit.

DECLARATIVE

- I. Introduction
 - A. Define acute abdomen
 - B. Review anatomy and physiology
- II. General pathophysiology, assessment, and management
 - A. Pathophysiology of abdominal pain
 - 1. Bacterial contamination
 - 2. Chemical irritation
 - 3. Peritoneal inflammation
 - 4. Bleeding
 - 5. Obstruction
 - 6. Review causes of abdominal pain
 - a) Appendicitis
 - b) Pancreatitis
 - c) Gallbladder
 - d) Ulcer
 - e) Obstruction
 - f) Cholecystitis
 - g) Acute and chronic renal failure
 - h) Urinary stones
 - i) Urinary tract infection
 - B. Assessment findings
 - 1. Initial assessment
 - a) Airway
 - b) Breathing
 - c) Circulation
 - d) Disability
 - e) Chief complaint
 - 2. History
 - a) Onset
 - b) Provoking factors
 - c) Quality
 - d) Region/ radiation
 - e) Severity
 - f) Time
 - g) Previous history of same event
 - h) Nausea/ vomiting
 - (1) Excessive
 - (2) Blood
 - i) Change in bowel habits/ stool
 - (1) Constipation
 - (2) Diarrhea
 - (3) Dark tarry stool
 - j) Urination
 - (1) Pain
 - (2) Frequency
 - (3) Discoloration
 - (4) Odor
 - k) Weight loss
 - l) Last meal
 - m) Chest pain/ gas pain
 - 3. Focused physical examination

- a) Apparent state of health
- b) Skin
- c) Vital signs
 - (1) Tachycardia
 - (2) Hypotension
- d) Fever
- e) Inspect abdomen
 - (1) Distension
 - (2) Scars
 - (3) Discoloration
- f) Palpate abdomen
 - (1) Rigidity
 - (2) Guarding
 - (3) Location of pain
 - (4) Pulsating mass
- g) Check distal pulses bilaterally
 - (1) Present
 - (2) Equal

C. Management/ treatment plan

- 1. Airway and ventilatory support
 - a) Maintain an open airway
 - b) High flow oxygen
- 2. Circulatory support
 - a) Electrocardiogram
 - b) Monitor blood pressure
 - c) Consider MAST
- 3. Venous access
 - a) Consider fluid resuscitation
 - b) Avoid interventions which can mask signs and symptoms (pain medications)
- 4. Transport considerations
 - a) Persistent pain for greater than six hours requires transport
 - b) Gentle but rapid transport
- 5. Psychological support/ communications strategies
 - a) Actions reflect a calm, caring, competent attitude
 - b) Keep patient and significant others informed of your actions

**CARDIAC TECHNICIAN
TO
INTERMEDIATE
TRANSITION PROGRAM**

MEDICAL: 5

ENVIRONMENTAL EMERGENCIES: 8

Comments:

UNIT TERMINAL OBJECTIVE

5-8 At the completion of this unit, the EMT-Intermediate student will be able to utilize the assessment findings to formulate a field impression and implement the treatment plan for the patient with an environmentally-induced or exacerbated emergency.

COGNITIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-8.1 Define "environmental emergency." (C-1)
- 5-8.2 Identify risk factors most predisposing to environmental emergencies. (C-1)
- 5-8.3 Identify environmental factors that may cause illness or exacerbate a pre-existing illness. (C-1)
- 5-8.4 Identify environmental factors that may complicate treatment or transport decisions. (C-1)
- 5-8.5 List the principal types of environmental illnesses. (C-1)
- 5-8.6 Identify normal, critically high and critically low body temperatures. (C-1)
- 5-8.7 Describe several methods of temperature monitoring. (C-1)
- 5-8.8 Describe the body's compensatory process for over heating. (C-1)
- 5-8.9 Describe the body's compensatory process for excess heat loss. (C-1)
- 5-8.10 List the common forms of heat and cold disorders. (C-1)
- 5-8.11 List the common predisposing factors associated with heat and cold disorders. (C-1)
- 5-8.12 List the common preventative measures associated with heat and cold disorders. (C-1)
- 5-8.13 Define heat illness. (C-1)
- 5-8.14 Identify signs and symptoms of heat illness. (C-1)
- 5-8.15 List the predisposing factors for heat illness. (C-1)
- 5-8.16 List measures to prevent heat illness. (C-1)
- 5-8.17 Relate symptomatic findings to the commonly used terms: heat cramps, heat exhaustion, and heat stroke. (C-3)
- 5-8.18 Discuss how one may differentiate between fever and heat stroke. (C-1)
- 5-8.19 Discuss the role of fluid therapy in the treatment of heat disorders. (C-1)
- 5-8.20 Differentiate among the various treatments and interventions in the management of heat disorders. (C-3)
- 5-8.21 Integrate the pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the patient who has dehydration, heat exhaustion, or heat stroke. (C-3)
- 5-8.22 Define hypothermia. (C-1)
- 5-8.23 List predisposing factors for hypothermia. (C-1)
- 5-8.24 List measures to prevent hypothermia. (C-1)
- 5-8.25 Identify differences between mild and severe hypothermia. (C-1)
- 5-8.26 Describe differences between chronic and acute hypothermia. (C-1)
- 5-8.27 List signs and symptoms of hypothermia. (C-1)
- 5-8.28 Correlate abnormal findings in assessment with their clinical significance in the patient with hypothermia. (C-3)
- 5-8.29 Discuss the impact of severe hypothermia on standard BCLS and ACLS algorithms and transport considerations. (C-1)
- 5-8.30 Integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the patient who has either mild or severe hypothermia. (C-3)
- 5-8.31 Define near-drowning. (C-1)
- 5-8.32 List signs and symptoms of near-drowning. (C-1)
- 5-8.33 Discuss the complications and protective role of hypothermia in the context of near-drowning. (C-1)
- 5-8.34 Correlate the abnormal findings in assessment with the clinical significance in the patient with near-drowning. (C-3)
- 5-8.35 Differentiate among the various treatments and interventions in the management of near-drowning. (C-3)
- 5-8.36 Integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the near-drowning patient. (C-3)
- 5-8.37 Integrate pathophysiological principles of the patient affected by an environmental emergency. (C-3)

- 5-8.38 Differentiate between environmental emergencies based on assessment findings. (C-3)
- 5-8.39 Correlate abnormal findings in the assessment with the clinical significance in the patient affected by an environmental emergency. (C-3)
- 5-8.40 Develop a patient management plan based on the field impression the patient affected by an environmental emergency. (C-3)

AFFECTIVE OBJECTIVES

None identified for this unit.

PSYCHOMOTOR OBJECTIVES

None identified for this unit.

DECLARATIVE

- I. Environmental emergency
 - A. A medical condition caused or exacerbated by the weather, terrain, atmospheric pressure, or other local factors
 - 1. Instances of environmental emergencies
 - 2. Environmental impact on morbidity and mortality
 - a) Environmental stressors that induce or exacerbate other medical or traumatic conditions
 - B. Risk factors
 - 1. Age
 - 2. General health
 - 3. Fatigue
 - 4. Predisposing medical conditions
 - 5. Medications
 - a) Prescription
 - b) Over the counter (OTC)
 - C. Environmental factors
 - 1. Climate
 - 2. Season
 - 3. Weather
 - a) Wind
 - b) Rain
 - c) Snow
 - d) Humidity
 - e) Temperature
 - f) Radiation
 - g) Heat
 - h) Cold
 - 4. Atmospheric pressure
 - 5. Terrain
 - D. Types of environmental illnesses
 - 1. Heat illness
 - 2. Cold illness
 - 3. Localized injuries
 - a) Frostbite
 - b) Radiation burns, e.g., sunburn
- II. General pathophysiology, assessment, and management
 - A. Homeostasis
 - 1. "Normal" body temperatures
 - a) Core
 - b) Periphery
 - 2. Evaluation of body temperatures
 - a) Oral
 - b) Axillary
 - c) Tympanic
 - d) Rectal
 - e) Tactile
 - B. Thermolysis (Methods of heat loss)
 - 1. Conduction
 - 2. Convection
 - 3. Radiation

4. Evaporation
5. Respiration

- III. Specific pathology, assessment, and management - heat disorders
- A. Heat illness
1. Definition
 - a) Increased core body temperature (CBT) due to inadequate thermolysis
 2. General signs and symptoms
 - a) Signs of thermolysis
 - (1) Diaphoresis
 - (2) Posture
 - (3) Increased skin temperature
 - (4) Flushing
 - b) Signs of thermolytic inadequacy
 - (1) Altered mentation
 - (2) Altered level of consciousness
 3. Predisposing factors
 - a) Age
 - (1) Pediatric
 - (2) Geriatric
 - b) General health and medications
 - (1) Diabetes
 - a) Autonomic neuropathy interferes with vasodilation and perspiration
 - b) Autonomic neuropathy may interfere with thermoregulatory input
 - (2) Various medications
 - (3) Acclimatization
 - c) Length of exposure
 - d) Intensity of exposure
 - e) Environmental
 - (1) Humidity
 - (2) Wind
 4. Preventative measures
 - a) Maintain adequate fluid intake
 - (1) Thirst is an inadequate indicator of dehydration
 - b) Acclimatize
 - (1) Acclimatization results in more perspiration with lower salt concentration
 - (2) Increases fluid volume in body
 - c) Limit exposure
 5. Heat cramps
 - a) Muscle cramps due to dehydration and overexertion
 - b) Not specifically related to heat illness
 6. Heat exhaustion (mild heat illness)
 - a) Ill-defined term referring to milder forms of heat illness
 - b) Increased CBT with some neurologic deficit
 - c) Signs of active thermolysis usually present
 - d) Symptoms may be due solely to simple dehydration, combined with overexertion
 - (1) Result is orthostatic hypotension
 - (2) Symptoms resolve with rest and supine positioning
 - a) Fluids and elevation of knees beneficial

- e) Symptoms that do not resolve with rest and supine positioning may be due to increased CBT, are predictive of impending heat stroke and must be treated aggressively

7. Heat stroke

- a) Increased CBT with significant neurologic deficit
- b) Organ damage
 - (1) Brain
 - (2) Liver
 - (3) Kidneys
- c) Signs of active thermolysis may be present or absent
 - (1) Classic
 - (a) Commonly presents in those with chronic illnesses
 - (b) Increased CBT due to deficient thermoregulatory function
 - (c) Predisposing conditions include age, diabetes, and other medical conditions
 - (d) "Hot, red, dry" skin is common
 - (2) Exertional
 - (a) Commonly presents in those who are in good general health
 - (b) Excessive ambient temperature
 - (c) Excessive exertion
 - (d) Prolonged exposure
 - (e) Poor acclimatization
 - (f) "Moist, pale" skin is common

B. Treatment

- 1. Remove from environment
- 2. Active cooling
 - a) Misting and fanning
 - b) Moist wraps
 - c) Risks of over-cooling
 - (1) Reflex hypothermia
 - d) Use of tepid water for cooling
 - (1) Ice packs and cold water immersion may produce reflex vasoconstriction and shivering due to effect on peripheral thermoreceptors
- 3. Fluid therapy
 - a) Oral
 - (1) Some salt additive is beneficial
 - (2) Limited need for other electrolytes in oral rehydration
 - (3) Salt tablets
 - (a) May cause GI irritation and ulceration
 - (b) May cause hypernatremia
 - (c) Should be avoided
 - b) Intravenous
 - (1) Normal saline solution preferred

IV. Specific pathology, assessment, and management - cold disorders

A. Hypothermia

1. Definition

- a) Decreased CBT due to
 - (1) Inadequate thermogenesis
 - (2) Excess cold stress
 - (3) A combination of both

B. Mechanisms of heat loss

1. Physiological

- C. Predisposing factors
 - 2. Environmental
 - 1. Age
 - a) Pediatric
 - b) Geriatric
 - 2. General health and medications
 - a) Hypothyroidism
 - b) Malnutrition
 - c) Hypoglycemia
 - d) Medication may interfere with thermogenesis
 - 3. Fatigue and exhaustion
 - 4. Length of exposure
 - 5. Intensity of exposure
 - 6. Environmental
 - a) Humidity
 - b) Wind
 - c) Temperature
- D. Preventative measures
 - 1. Dress
 - 2. Rest
 - 3. Food
 - 4. Limit exposure
- E. Categories of hypothermia
 - 1. Severity
 - a) Mild
 - (1) Presence of signs and symptoms with a CBT that is greater than 90° F
 - b) Severe
 - (1) Presence of signs and symptoms with a CBT that is less than 90° F
 - c) Compensated
 - (1) Presence of signs and symptoms with a normal CBT
 - (2) CBT being maintained by thermogenesis
 - (3) As energy stores (liver and muscle glycogen) are exhausted, CBT will drop
 - 2. Onset
 - a) Acute (immersion)
 - b) Subacute (exposure)
 - c) Chronic (urban)
 - 3. Primacy
 - a) Primary cause of symptoms
 - b) Secondary presentation of other etiology
- F. Principal signs and symptoms
 - 1. No reliable correlation between signs or symptoms and specific CBT
 - 2. Signs of thermogenesis effort
 - 3. Diminished coordination and psychomotor function
 - 4. Altered mentation
 - 5. Altered level of consciousness
 - 6. Cardiac irritability
- G. Specific treatment
 - 1. Stop heat loss
 - a) Remove from environment
 - b) Dry
 - c) Wind/ vapor/ moisture barrier
 - d) Insulate

2. Rewarming

a) Passive external

- (1) Insulation
- (2) Wind/ vapor/ moisture barrier

b) Active external

- (1) Heat packs
 - (a) Placed over areas of high heat transfer with core
 - (i) Base of neck
 - (ii) Axilla
 - (iii) Groin
 - (b) Insulate underneath to prevent burning
- (2) Heat guns
- (3) Lights
- (4) Warm water immersion
 - (a) 102° F to 104° F
 - (b) Can induce rewarming shock
 - (c) Little application in out-of-hospital setting

c) Active internal

- (1) Warmed (102° F to 104° F) humidified oxygen
- (2) Warmed (102° F to 104° F) intravenous administration
- (3) Role of warmed administration
 - (a) Crucial, to prevent further heat loss
- (4) Limitations of warmed administration
 - (a) Actual heat transferred is minimal
 - (b) Limited contribution to rewarming

3. Rewarming shock

- a) Active external rewarming causes reflex vasodilation
- b) Requires more heat transference than is possible with methods available in out-of-hospital setting
- c) Easily prevented by IV fluid administration during rewarming

4. Cold diuresis and the need for fluid resuscitation

- a) Oral
- b) Intravenous

5. Resuscitation considerations

a) BCLS considerations

- (1) Increased time to evaluate vital signs
- (2) Use of normal chest compression and ventilation rates
- (3) Use of oxygen
- (4) AED recommendations

b) ACLS considerations

- (1) Effects of cold on cardiac medications
- (2) Considerations for airway management
 - (a) No increased risk of inducing ventricular fibrillation (V-fib) from orotracheal or nasotracheal intubation
- (3) AHA recommendations
- (4) Risks and management of V-fib
 - (a) Risks of V-fib related both to depth and duration of hypothermia
 - (b) Rough handling can induce V-fib
- (c) It is generally impossible to electrically defibrillate a hypothermic heart that is colder than 86° F
- (d) Lidocaine paradoxically lower fibrillatory threshold in a hypothermic heart and increase resistance to defibrillation

6. Transport considerations
 - a) Gentle transportation necessary due to myocardial irritability
 - b) Transport with patient level or head slightly down
 - c) General rewarming options of destination
 - d) Availability of cardiac bypass rewarming preferable in destination consideration
- V. Specific pathology, assessment, and management - near-drowning
- A. Definition
 1. Drowning
 - a) Suffocation due to submersion in water or other fluids
 2. Near-drowning
 - a) Near suffocation due to submersion in water or other fluids with a recovery event that last at least 24 hours
 - B. Pathophysiology
 1. Hypothermic considerations in near-drownings
 - a) Common concomitant syndrome
 - b) May be organ protective in cold water near-drownings
 - c) Always treat hypoxia first
 - d) Treat all near-drowning patients for hypothermia
 - C. Treatment
 1. Establish airway
 - a) Conflicting recommendations regarding prophylactic abdominal thrusts
 - b) Questionable scientific data to support prophylactic abdominal thrusts
 2. Ventilation
 3. Oxygen
 - D. Trauma considerations
 1. Immersion episode of unknown etiology warrants trauma management
 - E. Post-resuscitation complications
 1. Adult respiratory distress syndrome (ARDS) or renal failure often occur post-resuscitation
 2. Symptoms may not appear for 24 hours or more, post-resuscitation
 3. All near-drowning patients should be transported for evaluation
- VI. Locale-specific environmental emergencies
- A. Diving Emergencies
 - B. Altitude Illness
 - C. Local cold injuries
 1. Frostbite
 2. Trenchfoot
- VII. Integration
- A. Impact of the environment on human metabolism
 1. Heat gain or loss that exceeds the body's capacity to compensate
 2. Pressure changes that exceed the body's capacity to compensate
 - B. Assessment findings in patients with environmentally-induced illness
 1. Abnormal core body temperatures
 2. Signs of metabolic decompensation
 3. Development of shock state
 - C. Patient management
 1. Field stabilization
 - a) Removal of environmental influence
 - b) Support of metabolic compensation
 - c) Selection of definitive care location

CARDIAC TECHNICIAN TO INTERMEDIATE TRANSITION PROGRAM

MEDICAL: 5

BEHAVIORAL EMERGENCIES: 9

Comments:

Totally new material for CTs. All must be covered.

UNIT TERMINAL OBJECTIVE

5-9 At the end of this unit, the EMT-Intermediate student will be able to utilize assessment findings to form a field impression and implement a management plan for patients with behavioral emergencies.

COGNITIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-9.1 Distinguish between normal and abnormal behavior. (C-1)
- 5-9.2 Discuss the pathophysiology of behavioral emergencies. (C-1)
- 5-9.3 Discuss appropriate measures to ensure the safety of the patient, EMT-Intermediate, and others. (C-1)
- 5-9.4 Identify techniques for a physical assessment in a patient with behavioral problems. (C-1)
- 5-9.5 Describe therapeutic interviewing techniques for gathering information from a patient with a behavioral emergency. (C-1)
- 5-9.6 List factors that may indicate a patient is at increased risk for suicide. (C-1)
- 5-9.7 Describe circumstances in which relatives, bystanders, and others should be removed from the scene. (C-1)
- 5-9.8 Describe medical/ legal considerations for managing a patient with a behavioral emergency. (C-1)
- 5-9.9 List situations in which the EMT-Intermediate is expected to transport a patient against his will. (C-1)
- 5-9.10 Describe methods of restraint that may be necessary in managing a patient with a behavioral emergency. (C-1)
- 5-9.11 Formulate a field impression based on the assessment findings for patients with behavioral emergencies. (C-3)
- 5-9.12 Develop a patient management plan based on the field impression for patients with behavioral emergencies. (C-3)

AFFECTIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-9.13 Advocate for empathetic and respectful treatment for individuals experiencing behavioral emergencies. (A-3)

PSYCHOMOTOR OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-9.14 Demonstrate safe techniques for managing and restraining a violent patient. (P-1)

DECLARATIVE

- I. Introduction
 - A. Behavior
 - 1. How a person acts
 - 2. Concept of normal behavior
 - a) Disagreement exists over what is “normal”
 - b) No clear definition or ideal model
 - c) Ideas of normal vary by culture/ ethnic group
 - d) Society accepts it
 - 3. Concept of abnormal behavior
 - a) Maladaptive behavior is more useful term
 - b) Deviates from society’s norms and expectations
 - c) Interferes with well being and ability to function
 - d) Harmful to individual or group
 - 4. Concept of behavioral emergencies
 - a) Unanticipated behavioral episode
 - b) Behavior that is threatening to patient or others
 - c) Requires immediate intervention by emergency responders (police, EMS, etc.)
 - B. Behavioral emergencies
 - 1. Description
 - a) Covers a broad range of behavioral and psychiatric disorders of varying severity
 - b) Group of disorders characterized by abnormal or maladaptive behavior
 - (1) Disturbance in normal functioning
 - (2) May be caused by emotional or physiologic conditions
 - (3) Create undesirable consequences
 - 2. Epidemiology
 - a) Serious mental health problem
 - b) Incapacitates more people than all other health problems combined
 - 3. Common misconceptions
 - a) Abnormal behavior is always bizarre
 - b) All mental patients are unstable and dangerous
 - c) Mental disorders are incurable
 - d) Having a mental disorder is cause for embarrassment and shame
- II. Pathophysiology
 - A. Causes of behavioral emergencies
 - 1. Biological/ organic
 - a) Diseases and toxins
 - b) Heredity
 - 2. Psychosocial
 - a) Childhood trauma
 - b) Parental deprivation
 - c) Dysfunctional family structure
 - 3. Socio-cultural
 - a) Environmental violence
 - b) Death of a loved one
 - c) Economic/ employment problems
 - d) Prejudice and discrimination
- III. Assessment
 - A. Scene size-up
 - 1. Determine if a violent or potentially unsafe situation exists
 - (1) Highest priority

- (2) Consider need for assistance from public safety personnel
- (3) Avoid becoming a victim
- 2. In the absence of obvious danger, observe the scene for information to assist with patient assessment and care
 - a) Look for information to assist with patient assessment and care
 - (1) Signs of violence
 - (2) Evidence of substance abuse
 - (3) General environmental condition
- B. Initial assessment
 - 1. Limit number of people around patient, isolate patient if necessary
 - 2. Stay alert to potential danger
 - 3. Determine presence of life-threatening medical conditions
 - a) Rapid assessment of ABC's with intervention if required
 - 4. Observe overt behavior (affect) of patient and body language (posture, gestures, etc.)
 - a) Note evidence of rage, elation, hostility, depression, fear, anger, anxiety, confusion, etc.
- C. Focused history and physical examination
 - 1. Remove patient from crisis or disturbing situation
 - 2. Center questions on immediate problem
 - 3. Establish rapport
 - a) Utilize therapeutic interviewing techniques
 - (1) Engage in active listening
 - (2) Be supportive and empathetic
 - (3) Limit interruptions
 - (4) Respect patient's territory, limit physical touch
 - b) Avoid threatening actions, statements, and questions
 - c) Approach slowly and purposefully
 - 4. Evaluate the potential for suicide
 - a) Factors increasing risk
 - (1) Recent depression
 - (2) Recent loss of family or friend
 - (3) Financial setback
 - (4) Drug use
 - (5) Detailed plan
 - 5. Note assessment findings
 - a) Physical/ somatic complaints
 - b) Intellectual function
 - (1) Orientation
 - (2) Memory
 - (3) Concentration
 - (4) Judgment
 - c) Thought content
 - (1) Disordered thoughts
 - (2) Delusions, hallucinations
 - (3) Unusual worries, fears
 - (4) Suicide threat or threatening injury to others
 - d) Language
 - (1) Speech pattern and content
 - (2) Garbled or unintelligible
 - e) Mood
 - (1) Anxiety, depression, elation, agitation
 - (2) Level of alertness, distracted
 - f) Appearance, hygiene, dress
 - g) Motor activity

- IV. Management considerations
 - A. Treat existing medical problems
 - B. Maintain safety
 - C. Control violent situations
 - D. Medical/ legal considerations
 - 1. Standard of care
 - 2. Consent
 - 3. Limitations of legal authority
 - 4. Restraint
 - E. Remain with patient at all times
 - F. Avoid challenging personal space
 - G. Avoid judgments
 - H. Transport
 - 1. Transport patient against his or her will when
 - a) Patient presents threat to self or others
 - b) Ordered by medical direction
 - c) Implemented by law enforcement authorities, if at all possible
 - 2. Using restraints
 - a) Follow local protocols for use
 - b) Types of restraints
 - (1) Wrist/ waist/ ankle leather or velcro straps
 - (2) Full jacket restraint
 - (3) Other

CARDIAC TECHNICIAN TO INTERMEDIATE TRANSITION PROGRAM

MEDICAL: 5

GYNECOLOGICAL EMERGENCIES: 10

Draft Approved by MDC 10-17-2000 – Do not duplicate or distribute

Comments:

Totally new section and material.

UNIT TERMINAL OBJECTIVE

5-10 At the completion of this unit, the EMT-Intermediate student will be able to utilize assessment findings to formulate a field impression and implement the management plan for the patient experiencing a gynecological emergency.

COGNITIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-10.1 Review the anatomic structures and physiology of the female reproductive system. (C-1)
- 5-10.2 Describe how to assess a patient with a gynecological complaint. (C-1)
- 5-10.3 Explain how to recognize a gynecological emergency. (C-1)
- 5-10.4 Describe the general care for any patient experiencing a gynecological emergency. (C-1)
- 5-10.5 Describe the pathophysiology, assessment, and management of specific gynecological emergencies, including: (C-1)
 - a. Pelvic inflammatory disease
 - b. Ruptured ovarian cyst
 - c. Ectopic pregnancy
 - d. Vaginal bleeding
- 5-10.6 Describe the general findings and management of the sexually assaulted patient. (C-1)

AFFECTIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-10.7 Value the importance of maintaining a patient's modesty and privacy while still obtaining necessary information. (A-2)
- 5-10.8 Defend the need to provide care for a patient of sexual assault, while still preventing destruction of crime scene information. (A-3)
- 5-10.9 Serve as a role model for other EMS providers when discussing or caring for patients with gynecological emergencies. (A-3)

PSYCHOMOTOR OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 5-10.10 Demonstrate how to assess a patient with a gynecological complaint. (P-2)
- 5-10.11 Demonstrate how to provide care for a patient with: (P-2)
 - a. Excessive vaginal bleeding
 - b. Abdominal pain
 - c. Sexual assault

DECLARATIVE

- I. Introduction
 - A. Disorders in the female reproductive system can lead to gynecological emergencies
 - B. Etiology
 - 1. Acute or chronic infection
 - 2. Hemorrhage
 - 3. Rupture
 - 4. Ectopic pregnancy
 - C. Some conditions can be life-threatening without prompt intervention
- II. Review of the anatomy and physiology of the female reproductive system
 - A. Identification and physiology of specific body parts
 - 1. External genitalia (vulva)
 - a) Mons pubis
 - b) Labia
 - (1) Majora
 - (2) Minora
 - c) Prepuce
 - d) Clitoris
 - e) Vestibule
 - f) Urinary meatus
 - g) Orifice of urethra
 - h) Vaginal orifice
 - i) Hymen
 - j) Perineum
 - k) Anus
 - 2. Internal genitalia
 - a) Vagina
 - b) Cervix
 - (1) Cervical canal
 - c) Uterus
 - (1) Fundus
 - (2) Body
 - (3) Uterine cavity
 - (4) Endometrium
 - (5) Myometrium
 - d) Fallopian tubes
 - e) Ovaries
 - (1) Corpus luteum
 - (2) Follicles
 - (3) Oocytes
 - B. Normal physiology
 - 1. Menstruation
 - a) Normal discharge
 - (1) Blood, mucous, cellular debris from uterine mucosa
 - b) Approximately every 28 days
 - c) Menarche
 - (1) Initial onset occurring during puberty
 - d) Menopause
 - (1) Cessation of ovarian function
 - (2) Cessation of menstrual activity
 - (3) Average age: late 40's
 - 2. Ovulation

- a) Egg (ovum) released from ovary following breaking of follicle
- b) Usually occurs 14 days after the beginning of the menstrual cycle
- 3. Menstrual and ovarian cycles
 - a) Menstrual phase
 - (1) Occurs when ovum is not fertilized
 - (2) Discharge lasts on average 4-6 days
 - (3) Flow averages 25-60 ml
 - (4) Absent during pregnancy

III. General assessment findings of the patient with a gynecological emergency

- A. History of present illness
 - 1. SAMPLE
 - a) Associated symptoms
 - (1) Febrile
 - (2) Diaphoresis
 - (3) Syncope
 - (4) Diarrhea
 - (5) Constipation
 - (6) Urinary cramping
 - 2. Check for pain or discomfort
 - a) OPQRST
 - b) Abdominal
 - c) Dysmenorrhea - painful menstruation
 - d) Aggravation
 - (1) During ambulation
 - (2) Dyspareunia - pain during intercourse
 - (3) Defecation
 - e) Alleviation
 - (1) Positioning
 - (2) Ceasing activity
 - 3. Present health
 - a) Note any pre-existing conditions
- B. Obstetric history
 - 1. Gravida
 - a) Number of pregnancies
 - 2. Para
 - a) Number of pregnancies carried to term
 - 3. Previous cesarean sections
 - 4. Last menstrual period
 - a) Date
 - b) Duration
 - c) Normalcy
 - d) Bleeding between periods
 - e) Regularity
 - 5. Possibility of pregnancy
 - a) Missed or late period
 - b) Breast tenderness
 - c) Urinary frequency
 - d) Morning sickness
 - (1) Nausea and/ or vomiting
 - e) Sexually active
 - (1) Unprotected sex
 - 6. History of previous gynecological problems
 - a) Infections

- b) Bleeding
 - c) Miscarriage
 - d) Abortion
 - e) Ectopic pregnancy
 - 7. Present blood loss
 - a) Color
 - b) Amount
 - (1) Pads per hour
 - c) Duration
 - 8. Vaginal discharge
 - a) Color
 - b) Amount
 - c) Odor
 - 9. Use and type of contraceptive
 - 10. History of trauma to the reproductive system
 - 11. Emotional distress
 - a) Degree
 - C. Physical examination
 - 1. Comforting attitude
 - a) Protect modesty
 - b) Maintain privacy
 - c) Be considerate of reasons for patient discomfort
 - 2. Level of consciousness
 - 3. General appearance
 - a) Skin and mucous membrane color
 - (1) Cyanosis
 - (2) Pallor
 - (3) Flushed
 - b) Vital signs
 - (1) Orthostatic measurement discrepancies
 - c) Bleeding and discharge
 - (1) Color
 - (2) Amount
 - (3) Evidence of clots and/ or tissue
 - d) Palpate the abdomen
 - (1) Masses
 - (2) Areas of tenderness
 - (3) Guarding
 - (4) Distention
 - (5) Rebound tenderness
- IV. General management
 - A. Support airway, breathing
 - 1. Oxygen
 - a) High flow PRN
 - b) Ventilate as necessary
 - 2. Circulation
 - a) Intravenous access
 - (1) Typically not necessary
 - (2) If patient is demonstrating signs of impending shock or has excessive vaginal bleeding
 - (a) Large bore IV in a large vein
 - (b) Normal saline or lactated ringers
 - (c) Flow rate based on patient presentation

- (d) Consider a second line
 - b) Monitor and evaluate for serious bleeding
 - (1) Do not pack dressings in vagina
 - (2) Discourage use of tampon
 - (3) Keep count of pads used
 - c) Shock impending
 - (1) Trendelenburg
 - (2) Consider use of PASG
- 3. Pharmacological interventions
 - a) Analgesia typically not appropriate
 - (1) Masks symptoms for medical diagnosis
 - (2) May mask deteriorating condition (e.g., emergent shock)
- 4. Non-pharmacological interventions
 - a) Position of comfort and care
 - (1) Based on patient's presentation
 - (2) Left lateral recumbent
 - (3) Knee/ chest
 - (4) Hips raised/ knees bent
 - b) Cardiac monitoring PRN
 - c) Consider possibility of pregnancy
 - (1) Be prepared for delivery
 - (2) Consider ectopic pregnancy
- 5. Transport considerations
 - a) Physician evaluation necessary
 - b) Surgical intervention may be necessary
 - c) Consider emergency transport to an appropriate facility
- 6. Psychological support/ communications strategies
 - a) Calm approach
 - b) Maintain modesty/ privacy
 - c) Gentle care

V. Specific gynecological emergencies

A. Non traumatic abdominal pain

1. Pelvic inflammatory disease (PID)

- a) Cause
 - (1) Acute or chronic infection
- b) Organs affected by PID
 - (1) Initial access through vagina, ascends to other organs
 - (a) Cervix
 - (b) Uterus/ endometrium
 - (c) Fallopian tubes
 - (d) Ovaries
 - (e) Uterine and ovarian support structures
 - (f) Liver
- c) Complications
 - (1) Sepsis
 - (2) Infertility
- d) Specific assessment findings
 - (1) Lower abdominal pain
 - (2) Fever may be present
 - (3) Vaginal discharge
 - (4) Dyspareunia
 - (5) Patient doubled over when ambulating
 - (6) Abdominal guarding

period	(7)	Acute onset typically within approximately one week of menstrual
	(8)	Ill appearance
	e)	Management
	(1)	See "general management"
2.		Ruptured ovarian cyst
	a)	Organs affected
	(1)	Ovary
	b)	Complications
	(1)	Significant internal bleeding could occur, but is rare
	c)	Specific assessment findings
	(1)	May have sudden onset of severe lower abdominal pain
	(2)	Typically affects one side, may radiate to back
	(3)	Rupture may result in some vaginal bleeding
	d)	Management
	(1)	See "general management"
3.		Ectopic pregnancy
	a)	Incidence
	(1)	Consider possibility for any female of reproductive age with abdominal
pain		
	b)	Cause
	(1)	Ovum develops outside of the uterus
	(a)	Previous surgical adhesions
	(b)	Pelvic inflammatory disease
	(c)	Tubal ligation
	(d)	Use of an IUD
	c)	Organs affected
	(1)	Fallopian tubes
	d)	Complications
	(1)	May be life-threatening
	(2)	May lead to hypovolemic shock
	e)	Specific assessment findings
	(1)	Severe abdominal pain, may radiate to the back
	(2)	Amenorrhea - absence of monthly blood flow and discharge
	(3)	Vaginal bleeding absent or minimal
	(4)	Upon rupture, bleeding may be excessive
	(5)	Shock signs and symptoms
	(6)	Additional history
	(a)	Previous surgical adhesions
	(b)	Pelvic inflammatory disease
	(c)	Tubal ligation
	(d)	Use of an IUD
	(e)	Previous ectopic pregnancy
	(7)	Additional physical exam
	(a)	Check for impending shock, orthostatic vital signs
	(b)	Presence and volume of vaginal blood
	f)	Additional management
	(1)	See "general management"
	(2)	Second large bore IV line
	(3)	Trendelenburg, if shock impending
	(4)	Emergency transport to nearest surgically capable facility
4.		Vaginal bleeding
	a)	Causes
	(1)	Menstruation

- (a) Never assume that your emergency call for vaginal hemorrhage is due to normal menstruation
 - (b) Menorrhagia (heavy vaginal bleeding)
 - (2) Abortion/ miscarriage
 - (a) Assume always during first and second trimester of known or possible pregnancy
 - (b) Consider if last menstrual period > 60 days
 - (c) May have history of similar events
 - (d) Note particularly any tissue or large clots
 - (i) If possible, collect material for pathological review
 - (e) Emotional support extremely important
 - (3) Placenta previa/ placenta abruption
 - (a) Vaginal bleeding in third trimester
 - (b) Always a serious emergency
 - (4) Other causes
 - (a) Lesion
 - (b) PID
 - (c) Trauma
 - (d) Onset of labor
 - b) Organs affected
 - (1) Female sexual organs
 - c) Complications
 - (1) May be life-threatening
 - (2) May lead to hypovolemic shock and death
 - d) Specific assessment findings
 - (1) Onset of symptoms
 - (2) Additional physical examination
 - (a) Check for impending shock, orthostatic vital signs
 - (b) Presence and volume of vaginal blood
 - e) Management
 - (1) See "general management"
- B. Traumatic abdominal pain
- 1. Vaginal bleeding
 - a) Incidence
 - (1) Increasing
 - b) Causes
 - (1) Straddle injuries
 - (2) Blows to the perineum
 - (3) Blunt force to lower abdomen
 - (a) Assault
 - (b) Seat belt injuries
 - (4) Foreign bodies inserted into the vagina
 - (5) Abortion attempts
 - (6) Soft tissue injury
 - c) Organs affected
 - (1) Any or all of the pelvic organs
 - d) Complications
 - (1) Severe bleeding
 - (2) Organ rupture
 - (3) Hypovolemic shock
 - e) Specific assessment findings
 - (1) Consistent with severe internal injuries
 - f) Management
 - (1) See "general management"

- VI. Sexual assault
 - A. General findings and management
 - 1. History
 - a) Do not inquire regarding the patient's sexual history or practices
 - b) Do not ask questions that may cause patient to have guilt feelings
 - 2. Common reactions
 - a) May range from anxiety to withdrawal and silence
 - b) Denial, anger, and fear are normal behavior patterns
 - 3. Assessment
 - a) Examine the genitalia only if necessary
 - (1) Presence of severe injury
 - b) Explain all procedures before doing an examination
 - c) Avoid touching the patient without permission
 - d) Maintain the patient's privacy/ modesty
 - e) Check for other physical injury
 - 4. Management
 - a) Psychological support is very important
 - b) Provide a safe environment
 - c) Respond to victim's wishes to talk or not to talk
 - d) Do not use invasive procedures unless the situation is critical
 - e) This is a crime scene - preserve any evidence
 - (1) Handle clothing as little as possible
 - (2) Paper bag each item separately
 - (3) Ask the patient not to change clothes, bathe, or douche
 - (4) Do not disturb the scene if possible
 - (5) Do not clean wounds unless absolutely necessary
 - (6) Do not allow the patient to drink or brush his or her teeth
 - f) Maintain a non-judgmental/ professional attitude
 - (1) Be aware of your own feelings and prejudices
 - g) Have female personnel attend to the female patient whenever possible
 - (1) Ask if female personnel are preferred
 - h) Provide reassurance to patient
 - 1. Confidentiality is critical

UNIT TERMINAL OBJECTIVE

5-10 At the completion of this unit, the EMT-Intermediate student will be able to utilize assessment findings to formulate a field impression and implement the management plan for the patient experiencing a gynecological emergency.

COGNITIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

5-10.1 Review the anatomic structures and physiology of the female reproductive system. (C-1)

5-10.2 Describe how to assess a patient with a gynecological complaint. (C-1)

5-10.3 Explain how to recognize a gynecological emergency. (C-1)

5-10.4 Describe the general care for any patient experiencing a gynecological emergency. (C-1)

5-10.5 Describe the pathophysiology, assessment, and management of specific gynecological emergencies, including: (C-1)

- a. Pelvic inflammatory disease
- b. Ruptured ovarian cyst
- c. Ectopic pregnancy
- d. Vaginal bleeding

5-10.6 Describe the general findings and management of the sexually assaulted patient. (C-1)

AFFECTIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

5-10.7 Value the importance of maintaining a patient's modesty and privacy while still obtaining necessary information. (A-2)

5-10.8 Defend the need to provide care for a patient of sexual assault, while still preventing destruction of crime scene information. (A-3)

5-10.9 Serve as a role model for other EMS providers when discussing or caring for patients with gynecological emergencies. (A-3)

PSYCHOMOTOR OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

5-10.10 Demonstrate how to assess a patient with a gynecological complaint. (P-2)

5-10.11 Demonstrate how to provide care for a patient with: (P-2)

- a. Excessive vaginal bleeding
- b. Abdominal pain
- c. Sexual assault

DECLARATIVE

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 - A. Disorders in the female reproductive system can lead to gynecological emergencies
 - B. Etiology
 - 1. Acute or chronic infection
 - 2. Hemorrhage
 - 3. Rupture
 - 4. Ectopic pregnancy
 - C. Some conditions can be life-threatening without prompt intervention
- II. Review of the anatomy and physiology of the female reproductive system
 - A. Identification and physiology of specific body parts
 - 1. External genitalia (vulva)
 - a) Mons pubis
 - b) Labia
 - (1) Majora
 - (2) Minora
 - c) Prepuce
 - d) Clitoris
 - e) Vestibule
 - f) Urinary meatus
 - g) Orifice of urethra
 - h) Vaginal orifice
 - i) Hymen
 - j) Perineum
 - k) Anus
 - 2. Internal genitalia
 - a) Vagina
 - b) Cervix
 - (1) Cervical canal
 - c) Uterus
 - (1) Fundus
 - (2) Body
 - (3) Uterine cavity
 - (4) Endometrium
 - (5) Myometrium
 - d) Fallopian tubes
 - e) Ovaries
 - (1) Corpus luteum
 - (2) Follicles
 - (3) Oocytes
 - B. Normal physiology
 - 1. Menstruation
 - a) Normal discharge
 - (1) Blood, mucous, cellular debris from uterine mucosa
 - b) Approximately every 28 days
 - c) Menarche
 - (1) Initial onset occurring during puberty
 - d) Menopause
 - (1) Cessation of ovarian function
 - (2) Cessation of menstrual activity
 - (3) Average age: late 40's
 - 2. Ovulation

- a) Egg (ovum) released from ovary following breaking of follicle
 - b) Usually occurs 14 days after the beginning of the menstrual cycle
3. Menstrual and ovarian cycles
- a) Menstrual phase
 - (1) Occurs when ovum is not fertilized
 - (2) Discharge lasts on average 4-6 days
 - (3) Flow averages 25-60 ml
 - (4) Absent during pregnancy

III. General assessment findings of the patient with a gynecological emergency

- A. History of present illness
- 1. SAMPLE
 - a) Associated symptoms
 - (1) Febrile
 - (2) Diaphoresis
 - (3) Syncope
 - (4) Diarrhea
 - (5) Constipation
 - (6) Urinary cramping
 - 2. Check for pain or discomfort
 - a) OPQRST
 - b) Abdominal
 - c) Dysmenorrhea - painful menstruation
 - d) Aggravation
 - (1) During ambulation
 - (2) Dyspareunia - pain during intercourse
 - (3) Defecation
 - e) Alleviation
 - (1) Positioning
 - (2) Ceasing activity
 - 3. Present health
 - a) Note any pre-existing conditions
- B. Obstetric history
- 1. Gravida
 - a) Number of pregnancies
 - 2. Para
 - a) Number of pregnancies carried to term
 - 3. Previous cesarean sections
 - 4. Last menstrual period
 - a) Date
 - b) Duration
 - c) Normalcy
 - d) Bleeding between periods
 - e) Regularity
 - 5. Possibility of pregnancy
 - a) Missed or late period
 - b) Breast tenderness
 - c) Urinary frequency
 - d) Morning sickness
 - (1) Nausea and/ or vomiting
 - e) Sexually active
 - (1) Unprotected sex
 - 6. History of previous gynecological problems
 - a) Infections

- b) Bleeding
- c) Miscarriage
- d) Abortion
- e) Ectopic pregnancy
- 7. Present blood loss
 - a) Color
 - b) Amount
 - (1) Pads per hour
 - c) Duration
- 8. Vaginal discharge
 - a) Color
 - b) Amount
 - c) Odor
- 9. Use and type of contraceptive
- 10. History of trauma to the reproductive system
- 11. Emotional distress
 - a) Degree
- C. Physical examination
 - 1. Comforting attitude
 - a) Protect modesty
 - b) Maintain privacy
 - c) Be considerate of reasons for patient discomfort
 - 2. Level of consciousness
 - 3. General appearance
 - a) Skin and mucous membrane color
 - (1) Cyanosis
 - (2) Pallor
 - (3) Flushed
 - b) Vital signs
 - (1) Orthostatic measurement discrepancies
 - c) Bleeding and discharge
 - (1) Color
 - (2) Amount
 - (3) Evidence of clots and/ or tissue
 - d) Palpate the abdomen
 - (1) Masses
 - (2) Areas of tenderness
 - (3) Guarding
 - (4) Distention
 - (5) Rebound tenderness
- IV. General management
 - A. Support airway, breathing
 - 1. Oxygen
 - a) High flow PRN
 - b) Ventilate as necessary
 - 2. Circulation
 - a) Intravenous access
 - (1) Typically not necessary
 - (2) If patient is demonstrating signs of impending shock or has excessive vaginal bleeding
 - (a) Large bore IV in a large vein
 - (b) Normal saline or lactated ringers
 - (c) Flow rate based on patient presentation

- (d) Consider a second line
- b) Monitor and evaluate for serious bleeding
 - (1) Do not pack dressings in vagina
 - (2) Discourage use of tampon
 - (3) Keep count of pads used
- c) Shock impending
 - (1) Trendelenburg
 - (2) Consider use of PASG
- 3. Pharmacological interventions
 - a) Analgesia typically not appropriate
 - (1) Masks symptoms for medical diagnosis
 - (2) May mask deteriorating condition (e.g., emergent shock)
- 4. Non-pharmacological interventions
 - a) Position of comfort and care
 - (1) Based on patient's presentation
 - (2) Left lateral recumbent
 - (3) Knee/ chest
 - (4) Hips raised/ knees bent
 - b) Cardiac monitoring PRN
 - c) Consider possibility of pregnancy
 - (1) Be prepared for delivery
 - (2) Consider ectopic pregnancy
- 5. Transport considerations
 - a) Physician evaluation necessary
 - b) Surgical intervention may be necessary
 - c) Consider emergency transport to an appropriate facility
- 6. Psychological support/ communications strategies
 - a) Calm approach
 - b) Maintain modesty/ privacy
 - c) Gentle care

V. Specific gynecological emergencies

A. Non traumatic abdominal pain

1. Pelvic inflammatory disease (PID)

- a) Cause
 - (1) Acute or chronic infection
- b) Organs affected by PID
 - (1) Initial access through vagina, ascends to other organs
 - (a) Cervix
 - (b) Uterus/ endometrium
 - (c) Fallopian tubes
 - (d) Ovaries
 - (e) Uterine and ovarian support structures
 - (f) Liver
- c) Complications
 - (1) Sepsis
 - (2) Infertility
- d) Specific assessment findings
 - (1) Lower abdominal pain
 - (2) Fever may be present
 - (3) Vaginal discharge
 - (4) Dyspareunia
 - (5) Patient doubled over when ambulating
 - (6) Abdominal guarding

period		(7)	Acute onset typically within approximately one week of menstrual
		(8)	Ill appearance
		e)	Management
		(1)	See "general management"
	2.	Ruptured ovarian cyst	
		a)	Organs affected
		(1)	Ovary
		b)	Complications
		(1)	Significant internal bleeding could occur, but is rare
		c)	Specific assessment findings
	(1)	May have sudden onset of severe lower abdominal pain	
	(2)	Typically affects one side, may radiate to back	
	(3)	Rupture may result in some vaginal bleeding	
	d)	Management	
	(1)	See "general management"	
3.	Ectopic pregnancy		
	a)	Incidence	
	(1)	Consider possibility for any female of reproductive age with abdominal	
pain		b)	Cause
		(1)	Ovum develops outside of the uterus
		(a)	Previous surgical adhesions
		(b)	Pelvic inflammatory disease
		(c)	Tubal ligation
		(d)	Use of an IUD
		c)	Organs affected
		(1)	Fallopian tubes
		d)	Complications
		(1)	May be life-threatening
		(2)	May lead to hypovolemic shock
		e)	Specific assessment findings
		(1)	Severe abdominal pain, may radiate to the back
		(2)	Amenorrhea - absence of monthly blood flow and discharge
		(3)	Vaginal bleeding absent or minimal
		(4)	Upon rupture, bleeding may be excessive
		(5)	Shock signs and symptoms
		(6)	Additional history
		(a)	Previous surgical adhesions
		(b)	Pelvic inflammatory disease
	(c)	Tubal ligation	
	(d)	Use of an IUD	
	(e)	Previous ectopic pregnancy	
	(7)	Additional physical exam	
	(a)	Check for impending shock, orthostatic vital signs	
	(b)	Presence and volume of vaginal blood	
	f)	Additional management	
	(1)	See "general management"	
	(2)	Second large bore IV line	
	(3)	Trendelenburg, if shock impending	
	(4)	Emergency transport to nearest surgically capable facility	
4.	Vaginal bleeding		
	a)	Causes	
	(1)	Menstruation	

- (a) Never assume that your emergency call for vaginal hemorrhage is due to normal menstruation
 - (b) Menorrhagia (heavy vaginal bleeding)
 - (2) Abortion/ miscarriage
 - (a) Assume always during first and second trimester of known or possible pregnancy
 - (b) Consider if last menstrual period > 60 days
 - (c) May have history of similar events
 - (d) Note particularly any tissue or large clots
 - (i) If possible, collect material for pathological review
 - (e) Emotional support extremely important
 - (3) Placenta previa/ placenta abruption
 - (a) Vaginal bleeding in third trimester
 - (b) Always a serious emergency
 - (4) Other causes
 - (a) Lesion
 - (b) PID
 - (c) Trauma
 - (d) Onset of labor
 - b) Organs affected
 - (1) Female sexual organs
 - c) Complications
 - (1) May be life-threatening
 - (2) May lead to hypovolemic shock and death
 - d) Specific assessment findings
 - (1) Onset of symptoms
 - (2) Additional physical examination
 - (a) Check for impending shock, orthostatic vital signs
 - (b) Presence and volume of vaginal blood
 - e) Management
 - (1) See "general management"
- B. Traumatic abdominal pain
- 1. Vaginal bleeding
 - a) Incidence
 - (1) Increasing
 - b) Causes
 - (1) Straddle injuries
 - (2) Blows to the perineum
 - (3) Blunt force to lower abdomen
 - (a) Assault
 - (b) Seat belt injuries
 - (4) Foreign bodies inserted into the vagina
 - (5) Abortion attempts
 - (6) Soft tissue injury
 - c) Organs affected
 - (1) Any or all of the pelvic organs
 - d) Complications
 - (1) Severe bleeding
 - (2) Organ rupture
 - (3) Hypovolemic shock
 - e) Specific assessment findings
 - (1) Consistent with severe internal injuries
 - f) Management
 - (1) See "general management"

- VI. Sexual assault
 - A. General findings and management
 - 1. History
 - a) Do not inquire regarding the patient's sexual history or practices
 - b) Do not ask questions that may cause patient to have guilt feelings
 - 2. Common reactions
 - a) May range from anxiety to withdrawal and silence
 - b) Denial, anger, and fear are normal behavior patterns
 - 3. Assessment
 - a) Examine the genitalia only if necessary
 - (1) Presence of severe injury
 - b) Explain all procedures before doing an examination
 - c) Avoid touching the patient without permission
 - d) Maintain the patient's privacy/ modesty
 - e) Check for other physical injury
 - 4. Management
 - a) Psychological support is very important
 - b) Provide a safe environment
 - c) Respond to victim's wishes to talk or not to talk
 - d) Do not use invasive procedures unless the situation is critical
 - e) This is a crime scene - preserve any evidence
 - (1) Handle clothing as little as possible
 - (2) Paper bag each item separately
 - (3) Ask the patient not to change clothes, bathe, or douche
 - (4) Do not disturb the scene if possible
 - (5) Do not clean wounds unless absolutely necessary
 - (6) Do not allow the patient to drink or brush his or her teeth
 - f) Maintain a non-judgmental/ professional attitude
 - (1) Be aware of your own feelings and prejudices
 - g) Have female personnel attend to the female patient whenever possible
 - (1) Ask if female personnel are preferred
 - h) Provide reassurance to patient
 - 1. Confidentiality is critical