Surgery/Trauma

Year
R-1

Location
Miami Valley Hospital (MVH)

Duration
1 Month

Faculty
Randy J. Woods, MD

Clinical Curriculum: R1 – MVH/Red Team
The curriculum features defined clinical experiences as well as longitudinal and independent experiences to meet the goals and objectives of the residency and to become competent in the general areas defined by the ACGME. The areas addressed in each residency year are listed below. The specified sections of the curriculum must be reviewed at www.apds.org/curricsurgical_resident1.htm at the beginning of each rotation.

R-1 Goals and Objectives
- Demonstrate knowledge of human anatomy.
- Demonstrate skill in basic bedside and surgical procedures.
- Demonstrate proficiency in basic surgical skills such as knot tying and retracting.
- Identify methods of reviewing literature for practice-based learning.
- Understand the evaluation and management of common acute and chronic surgical diseases.
- Review Part One – Fundamentals of Surgical Education
- Review Part Two – Basic Sciences

R-1 Clinical Curriculum
- Surgical Critical Care: MVH-R
  - 2.6/2.6G – Nutrition
  - 3.1/3.1G (A) – Shock and Resuscitation
  - 3.1/3.1G (B) – Surgical Critical Care
  - 7.4/7.4G – Ethical and Legal Issues in Surgery Patients
- Emergency and Trauma Surgery: MVH-R
  - 2.10/2.10G – Wound Healing/Wound Healing in Elderly Patients
  - 3.1/3.1G (A) – Shock
  - 3.2/3.2G – Emergency Medicine
  - 3.3/3.3G – Trauma/Geriatric Trauma
  - 5.4/5.4G – Neurosurgery
  - 5.5/5.5G – Orthopedic Surgery
  - 5.6/5.6G – Ophthalmology
  - 5.8/5.8G – Urology
- Subspecialty Experiences: MVH-R
  - 2.8/2.8G – Pathology
  - 3.2/3.2G – Emergency Medicine
  - 5.3/5.3G (A) – Otolaryngology
  - 5.4./5.4G – Neurosurgery

- 5.5/5.5G – Orthopedic Surgery
- 5.8/5.8G – Urology
- 5.9/5.9G (A) – Gynecology
- 5.9/5.9G (B) – Obstetrics
- 6.3/6.3G – Anesthesiology/Anesthesia for the Elderly Patient

UNIT 2.6/2.6G
NUTRITION

UNIT OBJECTIVES:

Demonstrate a working knowledge of the methods of nutritional assessment and routes of nutritional support.

Demonstrate an understanding of the metabolic consequences of surgical disease and the need for nutritional support.

Demonstrate an understanding of the unique nutritional concerns for specific clinical conditions.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Discuss risk factors contributing to malnutrition in the hospitalized patient, including:
   a. Low nutritional reserve
   b. Extensive preoperative studies
   c. Lack of oral (PO) intake secondary to underlying disease
   d. High stress conditions

2. Summarize the characteristics of the indicators for nutritional assessment, including:
   a. Weight loss greater than 10% of body weight
   b. Serum albumin less than 3.4 gm/dl
   c. Impaired immunologic response: anergic response and total lymphocyte count (TLC) less than 1500/cc
   d. Specific physical signs

3. Analyze methods of nutritional assessment using:
   a. Pertinent history
   b. Anthropomorphic measurements
   c. Laboratory measurements
   d. Immunologic measurements

4. Analyze and be prepared to explain potential problems associated with primary nutritional problems affecting older people, including:
   a. Protein-energy undernutrition
   b. Vitamin deficiencies
   c. Trace mineral deficiencies
   d. Obesity

5. Explain methods of calculating energy requirements, including:
   a. Simple estimate (resting: 20 kcal/kg-d; moderate stress: 30 kcal/kg-d; severe stress: 40 kcal/kg-d)
   b. Harris-Benedict Equation
   c. Nitrogen balance
   d. Basal metabolic cart

6. Analyze the metabolic responses to starvation and stress/trauma.

7. Provide general guidelines for determining nutritional composition:
   a. Non-protein calorie to protein ratio
   b. Protein requirements
   c. Carbohydrate/fat balance
   d. Ventilation issues (effect on respiratory quotient)

8. Summarize factors that can lead to problems in elderly patients, resulting from effects of mild vitamin deficiencies, especially in those institutionalized elderly patients that are associated with:
   a. Cognitive impairment
   b. Poor wound healing
   c. Anemia
   d. Bruising
   e. Increased risk of infections
   f. Increased risk of developing certain cancers

9. Discuss the indications, contraindications, and benefits of enteral feedings: describe sites of delivery and potential complications and their treatment.

10. Discuss the indications, contraindications, and disadvantages of parenteral feeding; describe the details of initiating total parenteral nutrition (TPN), monitoring delivery, and managing potential complications.

11. Summarize content and rationale for special formulations used in patients with:
   a. Congestive heart failure
   b. Liver failure
   c. Renal failure
   d. Respiratory failure
   e. Glucose intolerance

12. Explain recent advances in surgical nutrition, including:
   a. Role of glutamine
   b. Role of arginine
   c. Growth factors
   d. Omega-3 fatty acids

13. Analyze the potential implications of nutritional deficiencies in certain disease states, and define the role of nutritional components in preventing acquired and malignant disease.

14. The following examples are conditions that can result from protein-energy undernutrition. Discuss the significance of each to the elderly surgical patient:
   a. Cognitive dysfunction
   b. Decreased muscle strength
   c. Pressure sores
   d. Altered thyroid function

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Perform nutritional assessment of hospitalized patients.

2. Select appropriate methods of nutritional support, and provide necessary monitoring.

3. Calculate nutritional requirements for patients with:
   a. Malignancy
   b. Stress/trauma
   c. Pancreatitis
   d. Enterocutaneous fistula

4. Insert enteral and parenteral tubes and lines.

5. Manage nutritional support in patients with specific clinical conditions listed above.

6. Recognize and correct the subtle caloric and vitamin imbalances in patients receiving TPN.

7. Perform operative gastrostomies, jejunostomies, and percutaneous endoscopic gastrostomies.

8. Recognize and treat complications of enteral and parenteral feeding, including:
   a. Diarrhea
   b. Dehydration
   c. Line sepsis
   d. Fatty metamorphosis of liver
   e. Glucose intolerance

9. Become familiar with the use of the "SCALES" protocol for evaluating risk of malnutrition in elderly patients, using these variables:
   a. Sadness
   b. Cholesterol level
   c. Albumin level
   d. Loss of weight
   e. Eating problems
   f. Shopping and food preparation problems

The Nutrition unit was revised by Jeffrey W. Hazey, MD, Walter E. Pofahl, II, MD, and J. Scott Roth, MD, from the Curriculum, third edition, by Timothy N. Patselas, MD.

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UNIT 2.8/2.8G
CLINICAL, LABORATORY, AND SURGICAL PATHOLOGY

UNIT OBJECTIVES:

Demonstrate an understanding of the pathogenesis of benign and malignant surgical disease.

Develop competency in the diagnosis and management of human organ pathology.

Demonstrate a working understanding of the principles of surgical pathology.

Demonstrate competence in the acquisition and interpretation of surgical specimens.

Apply clinical and laboratory data to diagnose disease processes and to institute appropriate disease management.

SECTION ONE: CLINICAL PATHOLOGY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Describe the basic principles of:
   a. Pathogenesis of reversible and irreversible cell injury
   b. Acute and chronic inflammatory responses

2. Discuss the pathogenesis, clinical significance, signs and symptoms, and therapy for:
   a. Derangements of normal wound healing
   b. Fluid and hemodynamic derangements including shock, edema, congestive heart failure
   c. Disorders of coagulation and hemostasis, including complications of: hemorrhage, disseminated intravascular coagulation (DIC), deep venous thrombosis (DVT), pulmonary embolism (PE)
   d. Disorders of the immune system, especially hypersensitivity reactions and autoimmune disease
   e. Infectious diseases involving bacteria, viruses, fungi, or parasites
   f. Neoplastic disease

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Recognize the early signs and symptoms and initiate therapy for the following:
   a. Alterations of normal wound healing including infection and disruption
   b. Fluid and hemodynamic derangements
   c. Disorders of coagulation and hemostasis
   d. Disorders of the immune system
   e. Infectious diseases involving bacteria, viruses, fungi, or parasites
   f. Neoplastic disease

2. Participate in deciding the appropriate surgical procedure for benign and malignant disease.

3. Monitor patients for possible postoperative complications and institute appropriate diagnostic studies and therapy for such conditions as:
    a. Wound infections
    b. Atelectasis/respiratory compromise
    c. Cardiac dysrhythmias/myocardial infarction
    d. Ileus
    e. Urinary retention
    f. Deep venous thrombosis/pulmonary embolus
    g. Systemic infection

4. Teach medical students and more junior residents about basic pathologic principles while on rounds and in the operating room.

SECTION TWO: LABORATORY PATHOLOGY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Describe appropriate containers for storing blood and other body fluids during laboratory transport to sites where common serum chemistry studies are to be performed.

2. Discuss the relative sensitivity, specificity, and accuracy of common laboratory studies.

3. Demonstrate competency in interpreting:
    a. Abnormal urinalysis
    b. Abnormal thyroid function studies
    c. Steroid suppression tests

4. Outline the standard components of a coagulation profile, including the common clinical conditions associated with their abnormalities.

5. Identify significant components for each of the following:
    a. A complete blood count
    b. The meaning of "left shift"
    c. Common clinical conditions causing elevations in each component

6. Analyze causes for artificially abnormal laboratory values, including:
    a. Specimen hemolysis
    b. Impact of hyperglycemia
    c. Impact of hypoalbuminemia

7. Identify potential adverse effects of repeated phlebotomies, and discuss potential remedies for the following concerns:
    a. Patient pain
    b. Anemia
    c. Thrombophlebitis
    d. Arterial thrombosis
    e. Patient and hospital costs

8. Discuss the typical presentation of microbiologic data, and the importance of the following:
    a. Specimen identification and timing of sample
    b. Organism identification
    c. Drug sensitivity profile
    d. Minimum inhibitory concentration
    e. Beta-lactam resistance
    f. Resistance
    g. Colonization
    h. Contaminated specimen

9. Explain the importance of laboratory quality control in the hospital and outpatient setting. Clarify the meaning of role reference laboratory.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Identify the indications for routine preoperative laboratory studies, recognize clinically significant abnormalities, and provide appropriate management.

2. Manage the postoperative course of patients, using relevant laboratory studies (including their indication, relevance to clinical condition, and continued need).

3. Manage the anticoagulation status of patients using heparin and Coumadin, while considering the patient's prothrombin time (PT) and partial thromboplastic time (PTT).

4. With the assistance of medical consultation, investigate and diagnose a new coagulation defect in a surgical patient.

5. Modify patient's infectious disease treatment plan using data from a microbiology report.

SECTION THREE: SURGICAL PATHOLOGY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Discuss the indications, contraindications, and limitations of the following biopsy techniques:
    a. Fine-needle aspiration (FNA)
    b. Stereotactic biopsy
    c. Core biopsy
    d. Incisional biopsy
    e. Excisional biopsy

2. Explain the methods of handling and transporting tissue obtained by the methods listed above.

3. Describe the role of needle aspiration in the diagnosis and management of:
    a. Breast pathology
    b. Thoracic pathology
    c. Abdominal pathology
    d. Thyroid pathology
    e. Head and neck malignancy

4. Discuss principles and indications for the following methods of tissue preparation:
    a. Hematoxylin and eosin stains
    b. Immunohistochemistry
    c. Specific stains (enolase, argentaffin)
    d. Polymerase chain reaction

5. Discuss the use and interpretation of genetic analysis of neoplastic tissue, including:
    a. Ploidy status
    b. Mitotic activity
    c. Cell-cycle phase

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Perform FNA, core, incisional, and excisional biopsies; and discuss the results and implications of each with the attending surgeon, the pathologist, and then the patient.

2. Review and discuss the details of a surgical pathology report with the attending surgeon.

3. Discuss intraoperative gross findings, and guide differential diagnosis formulation with the surgical pathologist and surgical team.

4. Review intraoperative frozen section and postoperative permanent section histology with the surgical pathologist and surgical team.

5. Participate in autopsies performed for deaths following acquired disease and trauma.

6. Participate in a multidisciplinary conference including surgeon, pathologist, radiologist, and oncologist by discussing pertinent patient history, operative findings, pathophysiology, and proposed treatment.

The Clinical, Laboratory, and Surgical Pathology unit was revised by Jeffrey W. Hazey, MD, Walter E. Pofahl, II, MD, and J. Scott Roth, MD, from the Curriculum, third edition, by Timothy N. Patselas, M.D.

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UNIT 2.10
WOUND HEALING

UNIT OBJECTIVES:
Demonstrate an understanding of the physiology of wound healing.

Demonstrate the ability to manage complex wound care in a variety of settings.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level

1. Describe the physiological process of normal wound healing, including the healing relationship to:
   a. Anatomy
   b. Physiology
   c. Biology
   d. Biochemistry
   e. Microbiology
   f. Immunology
   g. Molecular Biology

2. Explain the effect of the following factors on wound healing:
   a. Nutrition
   b. Pathologic metabolic states (including diabetes mellitus)
   c. Hematologic status
   d. Radiation
   e. Immune response
   f. Growth factors
   g. Super oxide radical formation
   h. Pharmacologic manipulation
   i. Infection/sepsis
   j. Chemotherapeutics
   k. Trauma

3. Describe the steps of normal of wound healing, including:
   a. Inflammation
   b. Proliferation
   c. Remodeling
   d. Epithelialization
   e. Contracture/contraction

4. Discuss the pathophysiology of delayed wound healing due to microbial physiology, virulence, and host defenses.

5. Differentiate between the pathophysiology of thermal, chemical, and electrical burns.

6. Discuss the principles of aseptic technique in uncomplicated cases related to the following procedures:
   a. Incision making
   b. Debridement
   c. Wound closures
   d. Dressings, splints, and casts

7. Describe the common chemical agents which are classically discussed in relation to burns and their antidotes.

8. Explain the principles of wound care as they relate to:
   a. Debridement
   b. Traumatic wounds
   c. Burn wounds
   d. Chronic wounds
   e. High-pressure injection injury
   f. Medication infiltration

9. Summarize the principles of wound protection and subsequent healing using:
   a. Dressings
      (1) Occlusive
      (2) Non-occlusive
      (3) Alginates
      (4) Casting
   b. Other wound dressing materials
      (1) Collodium
      (2) Petroleum gauze
      (3) Xeroform
      (4) Scarlet Red
      (5) Dakin's solution
      (6) Acetic acid solution
      (7) Silvadene, sulfamylon
      (8) Iodine, Bacitracin
   c. The concept of "moist wound healing"
   d. Adjunctive therapies: hyperbaric oxygen, electrical stimulation, vacuum assisted wound management, pulse irrigation

10. Discuss potential problems in complicated wound healing, including such challenges as snake, animal, insect, and human bites; electric burns; deep space infections of the hand; penetrating wounds; and radiation.

11. Define and describe the causes of postoperative wound complications such as:
   a. Dehiscence
   b. Evisceration
   c. Fasciitis and abscess formation

12. Discuss the concept of the reconstructive ladder.

13. Describe the microbiology of gangrene and necrotizing fasciitis.

14. Explain the principles associated with the selection of appropriate incisions applying surgical anatomy to include:
   a. Blood supply
   b. Lines of tension
   c. Access
   d. Strength
   e. Cosmesis/aesthetics

15. Describe the rationale for selection of appropriate wound closure and reconstruction as it relates to wound healing in:
   a. Primary and delayed primary closure
   b. Secondary healing
   c. Skin graft, split and full thickness
   d. Local flaps
   e. Regional flaps
   f. Microvascular flaps
   g. Composite grafts

16. Assess the properties and uses of different types of suture material, including those that are absorbable and non-absorbable.

17. Analyze the therapeutic options for treatment of abnormal or delayed wound healing because of:
    a. Host resistance
    b. Infection
    c. Diabetes mellitus
    d. Radiation
    e. Ischemia

18. Discuss treatment choices for the following wound healing problems:
    a. Dehiscence
    b. Infection
    c. Hernia

19. Identify the resources needed to assist with wound healing outside the hospital and outline methods for resource acquisition to include home healthcare and equipment rental.

20. Describe the use of pressure relief devices and beds to prevent pressure ulcerations.

21. Differentiate between fetal wound healing and adult wound healing. Discuss the possible applications of fetal wound healing.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level

1. Provide basic care to wounds from abrasions and small lacerations, including acute debridement, closure, and dressing placement.

2. Provide care for complex traumatic injuries considering:
    a. Management of hemorrhage
    b. Acute pain control
    c. When to explore operatively
    d. Debridement
    e. Acute closure or coverage
    f. Secondary reconstruction

3. Evaluate the progress of wound healing.

4. Apply all types of dressings and casts.

5. Make and close common incisions in the outpatient clinic, outpatient emergency department, and in the operating room.

6. Remove casts and complex dressings.

7. Assess thermal and non-thermal burns and initiate treatment.

8. Debride and care for wounds of low to intermediate complexity, including traumatic injuries.

9. Apply all types of complex dressings, including body casts.

10. Make and close incisions of low to intermediate complexity.

11. Debride complex wounds and provide postdebridement care of such wounds.

12. Manage wounds of low to intermediate complexity, and alter therapy as indicated.

13. Perform complex procedures for the closure of difficult wounds, including various local and regional skin flaps and grafts.

14. Manage the care of various complex wound complications such as dehiscence, wound infections, and incisional hernias.

15. Analyze the use and need for complex reconstructive flaps and grafts; (e.g., application of the "reconstructive ladder").

The Wound Healing unit was revised by William M. Meadows, Jr., MD, and William A. Wooden, MD, from the Curriculum, third edition.

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UNIT 3.1/3.1G
SHOCK, RESUSCITATION, AND SURGICAL CRITICAL CARE

UNIT OBJECTIVES:
Demonstrate an understanding of the pathophysiology of shock, common surgical etiologies, and its categorizations.

Demonstrate an understanding of the mechanisms and pathophysiology of cardiopulmonary arrest.

Demonstrate the ability to manage the treatment of shock and cardiopulmonary arrest.

Part A: SHOCK AND RESUSCITATION

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Define shock, categorize it based upon type, explain the etiology and pathophysiology of each type of shock:
   a. Cardiogenic
   b. Hypovolemic
   c. Distributive (septic, anaphylactic, neurogenic, and adrenal insufficiency mediated)
   d. Obstructive (cardiac tamponade, tension pneumothorax, pulmonary embolus)

2. Summarize the clinical presentation and hemodynamic parameters associated with each type of shock using clinical terms, such as heart rate, respiratory rate, and blood pressure and filling pressures.

3. Propose an algorithm for diagnosing and initiating treatment for each shock type.
   a. Cardiogenic
   b. Hypovolemic
   c. Distributive (septic, anaphylactic, neurogenic, and adrenal insufficiency mediated)
   d. Obstructive (cardiac tamponade, tension pneumothorax, pulmonary embolus)

4. Discuss the pathophysiology, including the mechanism of arrest, for each of the following situations:
   a. Acute myocardial infarction
   b. Acute dysrhythmia
   c. Congestive heart failure
   d. Hypovolemic shock (blood loss, dehydration)
   e. Burns
   f. Hemorrhagic shock (non-traumatic)
   g. Septic shock
   h. Anaphylactic shock (envenomation, drug related)
   i. Acute adrenal insufficiency
   j. Penetrating or blunt trauma
      (1) Tension pneumothorax
      (2) Pericardial tamponade
      (3) Hemorrhagic shock
   k. Hypothermia
   l. Substance abuse
   m. Electrical injury
   n. Suffocation
   o. Acute stroke

5. Explain the indications for and the pharmacokinetics of each of the following drugs:
   a. Lidocaine
   b. Digoxin
   c. Metoprolol
   d. Diltiazem
   e. Pronestyl
   f. Amiodarone
   g. Dopamine
   h. Dobutamine
   i. Adenosine(Adenocard®)
   j. Vasopressin
   k. Nitroglycerin
   l. Amrinone
   m. Milrinone
   n. Levophed
   o. Phenylephrine
   p. Epinephrine

6. Summarize the indication and appropriate technique for cardiac support, pressors, and Circulatory Assist Devices (IABP, LVAD, RVAD).

7. Outline the signs and symptoms of acute airway obstruction and define the appropriate intervention in adult and pediatric patients.

8. Outline the surgical housestaff role on the "code team."

9. Explain the physiological impact of mechanically assisted ventilation on the cardiovascular/respiratory system.

10. Analyze methods for initiating and maintaining ventilator/ weaning support.

11. Describe the indications and potential complications for the following surgical interventions:
   a. Bag mask ventilation, endotracheal intubation (oral and nasal)
   b. Cricothyrotomy
   c. Thoracostomy tube
   d. Central venous catheter
   e. Peripheral vein cutdown
   f. Arterial line
   g. Pulmonary artery catheter
   h. Diagnostic peritoneal lavage (DPL)
   i. Resuscitative thoracotomy
   j. Pericardiocentesis
   k. Thoracentesis
   l. Ultrasound
   m. Wound exploration

12. Review the importance of serial physical examinations, hemodynamic monitoring, and serial laboratory evaluations, including urine output and lactic acidosis, in assessing patient response to specific resuscitation treatment.

13. Outline the clinical and laboratory indications for transfusion of the following blood products:
   a. Packed red cells
   b. Fresh frozen plasma
   c. Platelets
   d. Cryoprecipitate
   e. Whole blood
   f. Specific clotting factor concentrates (VIII, IX, XII)
   g. Recombinant erythropoietin

14. Analyze the potential complications from use of the above products.

15. Older patients represent a special population, presenting key differences in emergency situations. Analyze and use examples to describe the significance of the following characteristics that are more frequent in the older patient:
    a. Vague, imprecise symptoms
    b. Atypical disease presentation
    c. Co-morbidity
    d. Polypharmacy (multiple organ specific physician input)
    e. Possibility of cognitive impairment
    f. Diagnostic tests with different normal values (age adjustments for normal values)
    g. Likelihood of decreased functional reserve
    h. Inadequate social support systems

16. Describe the role and indications (if any) for the following products in acute resuscitation:
    a. Recombinant activated Protein C
    b. Hespan and similar products
    c. Albumin

17. Assess the indications, guidelines, and potential complications of the following cardiovascular drugs:
    a. Dopamine
    b. Dobutamine
    c. Phenylephrine
    d. Vasopressin
    e. Epinephrine
    f. Norepinephrine
    g. Amrinone
    h. Nitroglycerine
    i. Esmolol
    j. Nipride
    k. Diltiazem

18. Analyze and explain factors involved in blood pressure overestimation in the older patient (pseudohypertension, arteriosclerosis, arm size cuff discrepancies).

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Complete and pass Advanced Cardiac Life Support (ACLS), Advanced Trauma Life Support (ATLS), and Fundamentals of Critical Care Support (FCCS) training.

2. Manage the unconscious patient (seizure).

3. Serve on the code team and the trauma team.

4. Recognize and manage airway obstruction.

5. Perform endotracheal and nasotracheal intubation.

6. Use disposable airway equipment, (e.g., bags, gloves) as transmissible infection precautions.

7. Perform cricothyrotomy and tracheostomy.

8. Manage mechanical ventilator equipment.

9. Manage flail chest (pneumothorax, hemothorax, obstructive shock states).

10. Manage carbon monoxide poisoning.

11. Diagnose cardiac arrest and rhythm disturbances

12. Apply closed chest cardiac massage (CPR).

13. Perform closed chest defibrillation.

14. Perform venous access procedures, including subclavian and jugular and femoral vein catheterizations and saphenous vein cutdown.

15. Determine the indication, dosage, contraindications, and method of administration of the following medications:
    a. Morphine
    b. Lidocaine and Procainamide
    c. Propranolol
    d. Atropine
    e. Diltiazem
    f. Epinephrine and norepinephrine
    g. Dopamine and dobutamine
    h. Amrinone
    i. Adenosine (Adenocard ®)
    j. Cardiac glycosides
    k. Nitroglycerin and nitroprusside
    l. Furosemide, Mannitol, Bumex, Diamox
    m. Sodium bicarbonate
    n. Calcium
    o. Amiodarone
    p. Labetalol

16. Estimate volume requirements in acute trauma, burns, and hemorrhage; and institute replacement therapy.

17. Control external blood loss.

18. Perform pulmonary artery catheterization, including determining catheter position by pressure wave recording and electrocardiogram (EKG).

19. Manage cardiogenic and septic shock.

20. Use pneumatic antishock garments.

Part B: SURGICAL CRITICAL CARE

UNIT OBJECTIVES:

Demonstrate knowledge of the principles associated with the diagnosis and management of critically ill patients, including knowledge of simple and complex multiple organ system normalities and abnormalities.

Demonstrate the ability to appropriately diagnose and treat patients with interrelated system disorders in the intensive care unit.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level

Complete the coursework and testing to obtain Basic and Advanced Cardiac Life Support (BCLS and ACLS) and Fundamental Critical Care Support (FCCS) and Advanced Trauma Life Support (ATLS) certification.

Section One: Administration

1. Define and describe the role of the surgeon in the critical care setting to include these aspects:
   a. Unit administration/management (surgeon as unit director)
      (1) Triage of patients
      (2) Economic concerns
      (3) Data collection and computer usage
      (4) Infection control and total quality management (TQM) issues
      (5) Ethical concerns (consent, durable power of attorney, living wills)
      (6) Local laws for referral to Medical Examiner
   b. Management/consultation for specific surgical conditions
   c. Coordination of multidisciplinary consultants relating and interpreting information between non-surgical consultants

2. Identify and outline criteria for admitting patients to the intensive care unit (ICU) to include:
   a. Medical indications (related to specific diseases, e.g., pulmonary, cardiac, renal)
   b. Surgical indications directly related to specific surgical illness

3. Identify and outline criteria for discharging patients from the ICU, to include:
   a. Medical indications
   b. Surgical indications
   c. Patients unacceptable for ICU (e.g., futile care, do not resuscitate [DNR] orders)

4. Identify and explain the considerations surgeons must make when working with consultants in managing critical care situations.

5. Identify potential Organ, Tissue Donor candidates, as well as the hospital specific procedure for contacting families for potential donation.

Section Two: General Pathophysiology--Body as a Whole

1. Describe the normal physiologic response to a variety of insults such as sepsis, trauma, or surgery by associating the adaptation of the following systems from their pre-stress to post-stress states:
   a. Respiratory
   b. Hemodynamic
   c. Renal
   d. Metabolic
   e. Endocrine

2. Describe the concept of the Systemic Inflammatory Response Syndrome (SIRS).

3. Describe prophylactic measures routinely used in critical care such as:
   a. Gastrointestinal (GI) bleeding prophylaxis, including neutralizing, inhibitory compounds, and surface agents
   b. Prophylactic antibiotics (demonstrate differences between true prophylaxis, empiric and therapeutic uses)
   c. Pulmonary morbidity prophylaxis (incentive spirometry)
   d. Prophylaxis against venous thromboembolic events
   e. Aseptic technique
   f. Universal precautions
   g. Skin care protocols
   h. Guidewire catheter changes for work-up of fever or change in clinical status

4. Discuss the pharmacotherapeutics of drugs used for support and treatment of the critically ill patient with emphasis on 1) mode of action, 2) physiologic effects, 3) spectrum of effects, 4) duration of action, 5) appropriate doses, 6) means of metabolism or excretion, 7) complications, and 8) cost:
   a. Vasopressors
   b. Vasodilators
   c. Inotropic agents
   d. Bronchodilators
   e. Diuretics
   f. Antibiotics/antifungal agents
      (1) Distinguish between empiric, therapeutic, and prophylactic
      (2) Demonstrate knowledge of classes of anti-infectives
   g. Antidysrhythmics
   h. Antihypertensives
      (1) Predict applicability of different classes in a particular situation:
         (a) Use of beta blockers in hypertensive tachycardic patient
         (b) Use of ace inhibitors in hypertensive patient with congestive heart failure
         (c) Use of calcium channel blockers in hypertensive patient with angina

5. Outline the indications and methods for providing nutritional support by completing the following activities:
   a. Discuss indications, selection of formulations, cost, route of administration of parenteral versus enteral forms of nutrition
   b. Explain complications of parenteral and enteral routes of feeding as well as select methods to avoid the complications
   c. Interpret findings associated with abnormalities in levels of glucose, chloride, sodium, phosphate, magnesium, trace metals/elements, and vitamins in the critically-ill patient receiving enteral or parenteral feedings; prepare recommendations for elderly patients under these same conditions
   d. Estimate protein calorie requirements for patients of varying degrees of illness, and be able to analyze adequacy of nutritional support using commonly obtainable laboratory values

6. Outline the principles of postoperative fever with respect to causes, empiric diagnostic modalities, and specific therapy. How useful are these principles when considering the elderly patient?

7. Describe, apply, and revise appropriate treatment interventions based upon analysis of changes in the patient's clinical and laboratory parameters:
    a. Adjustment of intravenous fluids with respect to expected stress response, including metabolic, hormonal, cardiovascular, and renal responses to replacement of fluid losses (Describe association between high levels of stress hormones and alterations of glucose metabolism remembering: do not volume resuscitate patients with excessive amounts of glucose.)
    b. Efficacy of prophylactic measures for PE, stress ulceration and infection
    c. Adequacy of nutritional support in a patient with multiple sites of protein losses (e.g., fistulas, drain sites, or metabolic stressors [infection, acute lung injury {ALI}, hyperthermia, respiratory failure])
    d. Analysis and treatment of postoperative fever and methods of treatment
    e. Events leading to and responsible for initiation of ventilatory support
    f. Differentiate low cardiac output, hypotensive/hypertensive states in terms of preload, pump, or afterload
    g. Analysis and treatment of seizures or acute change in mental status, including the role of:
        (1) ABC's (airway, breathing, circulation); draw electrolytes/blood-urea-nitrogen (BUN)/ creatinine/glucose/calcium, magnesium
        (2) Glucose/thiamine intravenously
        (3) Evaluate medication record for new drugs or interactions (Ativan, Versed, phenobarbital, Dilantin [not applicable in the acute event])
    h. Analysis and treatment of acute respiratory failure from changes in the airway, pump, or lung

8. Review the management and diagram a plan for the care of the critically ill surgical patient with multiple medical problems such as:
    a. Cardiac dysrhythmias
    b. Pulmonary insufficiency from airway, bellows (pump), or parenchymal problems
    c. Acute/chronic renal failure with hemodynamic instability or need of specific fluid therapy (TPN), renal replacement therapy, high output GI fistulas
    d. Diabetes mellitus and its special problems in the realm of nutritional support
    e. Hemodynamic instability in the face of acute/chronic renal or pulmonary insufficiency

Section Three: Airway-Respiration

1. Describe the commonly used indications for initiation of ventilation support, including:
    a. Indications and commonly acceptable values for initiation of mechanical ventilation
    b. Evaluation of airway
    c. Evaluation of adequacy of thoracic pump (muscle strength)
    d. Evaluation of lung parenchymal characteristics (arterial blood gases and chest x-ray)
    e. Analysis of commonly used pulmonary values (e.g., tidal volume [Vt], maximum ventilatory volume [MVV], compliance static and dynamic, functional residual capacity [FRC], PEEP, auto PEEP, airway pressures)
    f. Indications and commonly acceptable values for weaning from mechanical ventilation

2. Review respiratory physiology, and describe the specific pathology involved in ventilation and perfusion deficits.

3. Discuss the association of airway obstruction with age, giving consideration to each of the following:
    a. Repeated disruption of the balance of inflammatory mediators and humoral protection (elastase and antielastase, oxidant and antioxidant)
    b. Neutrophil recruitment
    c. Tissue repair culminating in flammatory lung destruction
    d. Accumulated environmental oxidant injuries

4. Analyze and compare the principles of ventilator mechanics, including modes of ventilation, triggering mechanisms, and possible uses.

5. Describe the pathophysiology of acute lung injury (ALI, with spectrum from mild to severe ALI, also known as ARDS) and the management of the long-term ventilator-dependent patient to include:
    a. Pneumonias (aspiration or nosocomial)
    b. Acute renal failure
    c. Cardiac failure
    d. Prevention of malnutrition or restitution of body stores
    e. Systemic Inflammatory Response syndrome (SIRS, MODS- Multiple Organ Dysfunction Syndrome the most severe form known as MSOF- Multi-System Organ Failure)
    f. Sepsis
    g. Skin care problems
    h. Physical therapy (maintenance of muscle mass and function, prevention of contractions)
    i. Psychological support for both patient and family

6. Review management of the following complex respiratory problems:
    Mechanically ventilated patient with:
    1. Areas of differing compliance
    2. Bronchopleural or bronchoesophageal fistula
    3. Borderline cardiac reserve (non-compliant left ventricle, recent myocardial infarction, valvular dysfunction)

7. Explain why otherwise healthy elders may be more vulnerable to poor outcomes from diseases affecting diffusion (producing lower oxygen levels, e.g., pneumonia, COPD). Consider these factors in your explanation:
    a. Heart rate
    b. Ventilatory response to hypoxia
    c. Ventilatory response to hypercapnia

8. Analyze the pros and cons of the use of the following drugs to improve respiratory function:
    a. Bronchodilators (aerosols vs. parenteral medications)
    b. Membrane stabilizing agents (cromolyn sodium, steroids)
    c. Diuretics
    d. Venodilators
    e. Analgesics and sedatives
    f. Mucolytics

Section Four: Circulation

1. Describe and compare the following cardiac function parameters:
   a. Preload
   b. Afterload
   c. Myocardial contractility

2. Define the information obtained from the use of the following invasive/non-invasive monitoring devices. Specify: 1) which information is directly/indirectly measured or calculated, 2) the accuracy and 3) cost of obtaining the information, and 4) review the hemodynamic principles associated with the use of each device:
   a. Arterial catheters
   b. Central venous catheters
   c. Swan-Ganz catheters
   d. Intracranial pressure monitors
   e. End tidal carbon dioxide monitors
   f. Pulse oximetry
   g. Peripheral nerve stimulators (for testing adequacy of neuromuscular blockade)
   h. Foley catheters
   i. Intestinal pH monitors
   j. Bioelectric impedance

3. Outline the protocols for definition of patterns and management of hemodynamically unstable patients, and analyze the selection of appropriate therapy by completing these activities:
   a. Predict improvements in hemodynamic status with manipulation of definable variables, including fluid and drug therapies.
   b. Detect and revise therapies based on the use of invasive/non-invasive monitoring devices.

4. Review cardiac function and hemodynamic monitoring from the following standpoints. Interpret changes in accuracy of values obtained from hemodynamic monitoring devices in:
   a. Patients with severe pulmonary insufficiency who have low compliances or high PEEP
   b. Patients with severe valvular insufficiency/stenosis
   c. Various shock states (hypovolemic, septic, spinal, or cardiogenic)
   d. High dose vasopressors

5. Summarize the effects of appropriate volume and drug therapies to manipulate the cardiovascular system in the following patients:
   a. Hypovolemic hypotensive patient
   b. Hypotensive euvolemic patient
   c. Hypotensive hypervolemic patient
   d. Hypotensive oliguric patient
   e. Hypotensive, hypervolemic oliguric patient
   f. Hypovolemic oliguric patient
   g. Hypotensive, oliguric hypoxic patient

6. Discuss the significant patient characteristics in a geriatric population associated with increased risk of thromboembolic disease, including:
   a. Underlying congestive heart failure
   b. Prolonged immobility before surgery
   c. Paralysis
   d. Previous DVT
   e. Hypercoagulable states (due to malignancy or coagulation factor deficiency)

Section Five: Renal

1. Review acid-base and electrolyte abnormalities common in critically-ill patients.

2. Identify, define, and classify the major categories of acid-base disturbance (metabolic acidosis and/or alkalosis, respiratory acidosis and/or alkalosis) in the context of the patient's altered physiology. Cite common clinical scenarios for their appearance:
   a. Metabolic acidosis (hypovolemic shock, chloride excess resuscitation, occult ischemia)
   b. Metabolic alkalosis (contraction alkalosis excessive diuretic use)
   c. Respiratory acidosis
   d. Respiratory alkalosis (early sign of sepsis vs. ventilator complication)

3. Discuss the identification and correction of complex acid-base problems such as choice of intravenous fluids for electrolyte replacement in the:
   a. Hyperchloremic, metabolically-acidotic patient
   b. Hypochloremic, metabolically-alkalotic patient
   c. Stuporous, dehydrated, hyponatremic patient
   d. Stuporous dehydrated hypernatremic patient
   e. Patient with central diabetes insipidus
   f. Hyponatremic, volume overloaded patient with carbon dioxide retention

Section Six: Neurologic

1. Describe the initial evaluation, ongoing, acute monitoring and long-term management of possible neurologic or behavioral abnormalities occurring in the ICU setting:
   a. Seizures
   b. Coma
   c. Stroke
   d. Multifactorial effects of “postoperative confusion”
   e. Delirium
   f. Brain death

Section Seven: Gastrointestinal/Hepatic

1. Discuss specific fluid compositions and the effect of the losses of such fluids as gastric, pancreatic, biliary, and succus entericus from intestinal fistulas of various levels. (Fluid should be described in terms of volume, electrolyte composition, and replacement fluid of choice.)

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level

1. Provide initial evaluation and management of the critically-ill postoperative patient.

2. Institute the following therapeutic interventions:
   a. Manage fluid orders
   b. Determine ventilator settings
   c. Order pharmacologic support drugs
   d. Determine the need for and duration of antibiotic therapy

3. Obtain ACLS, FCCS, and ATLS certification.

4. Perform the following procedures:
    a. Orotracheal and nasotracheal intubation, nasogastric and bladder intubation
    b. Arterial catheter insertion
    c. Central venous and pulmonary artery catheter insertion
    d. Placement of tube thoracotomy
    e. Cricothyrotomy
    f. Pericardiocentesis

5. Serve on code and trauma team.

6. Manage critically ill patients in the intensive care unit:
    a. Determine need for ventilation and select situation appropriate airway and initial ventilator settings
    b. Compute initial and ongoing fluid requirements
    c. Analyze need for operative intervention
    d. Initiate rehabilitation process after stabilization of injuries, including:
        (1) Attention to possible altered body habitus
        (2) Requirements for special devices (physical, occupational, or speech therapy)
        (3) Maintain nutritional status
        (4) Provide support, interaction, and information for the family
    e. Establish intravenous access and maintain with appropriate sterile techniques for evaluation of fever
    f. Determine need for ongoing ICU management
    g. Identify appropriate antibiotic therapy distinguishing between prophylactic, empiric, and therapeutic uses
    h. Monitor hemodynamic data

The Shock, Resuscitation, and Surgical Critical Care unit was revised by Douglas F. Naylor, Jr., MD from the Curriculum, third edition, by Douglas F. Naylor, Jr., MD.

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The author has recommended this resource:

Healthcare Financing Administration, 42 CFR, Part 482 [HCFA-3005-F], RIN: 0938-AI95. Medicare and Medicaid Programs; Hospital Conditions of Participation; Identification of Potential Organ, Tissue, and Eye Donors and Transplant Hospitals' Provision of Transplant-Related Data. AGENCY: Healthcare Financing Administration (HCFA), HHS.

ACTION: Final Rule

SUMMARY: This final rule addresses only provisions relating to organ donation and transplantation. It imposes several requirements a hospital must meet that are designed to increase organ donation. One of these requirements is that a hospital must have an agreement with the Organ Procurement Organization (OPO) designated by the Secretary, under which the hospital will contact the OPO in a timely manner about individuals who die or whose death is imminent in the hospital. The OPO will then determine the individual's medical suitability for donation. As well, the hospital must have an agreement with at least one tissue bank and at least one eye bank to cooperate in the retrieval, processing, preservation, storage, and distribution of tissues and eyes, as long as the agreement does not interfere with organ donation. The final rule requires a hospital to ensure, in collaboration with the OPO with which it has an agreement, that the family of every potential donor is informed of its option to donate organs or tissues or not to donate. Under the final rule, hospitals must work with the OPO and at least one tissue bank and one eye bank in educating staff on donation issues, reviewing death records to improve identification of potential donors, and maintaining potential donors while necessary testing and placement of organs and tissues take place. In addition, transplant hospitals must provide organ-transplant-related data, as requested by the OPTN, the Scientific Registry, and the OPOs. The hospital must also provide, if requested, such data directly to the Department.

DATES: These regulations are effective on August 21, 1998 .

UNIT 3.2/3.2G
EMERGENCY MEDICINE

UNIT OBJECTIVES:
Manage a variety of surgical conditions in an emergency setting.

Demonstrate knowledge of patient stabilization, transport, and physician-to-physician communication in an emergency situation.

Demonstrate the ability to evaluate and effectively manage all acute or life-threatening conditions, including major trauma in an emergency setting.

Demonstrate knowledge of disaster management, including the role of triage; and display the ability to apply this knowledge to the emergency setting.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level

1. Complete the coursework and testing to obtain Basic and Advanced Cardiac Life Support (BLS and ACLS), Advanced and Trauma Life Support (ATLS), and Fundamental Critical Care Support (FCCS) certification.

2. Describe the initial management of the injured patient(s) in the following stages of care:
   a. Care in pre-hospital setting including BLS
   b. Triage in emergency department
   c. Serve as team leader and member during ATLS
   d. Coordinate patient transport to tertiary facility

3. Outline the basic principles of triage in the emergency department, including:
   a. Immediate treatment
   b. Ambulatory treatment
   c. Delayed treatment
   d. Expectant treatment
   e. Psychiatric considerations

4. Explain priorities for the diagnosis and/or assessment of illness/injury for patients presenting to the emergency department, keeping the following issues in mind:
   a. Discuss requests for diagnostic studies comparing the urgency of the need to know with:
      (1) The time required to obtain results
      (2) Potential danger to unstable patient
      (3) Quality of information obtained if a stat procedure compromises preparation of the patient
   b. Compare the need for provision of expedient, cost effective work-ups against the appropriateness of using the emergency setting for extensive work-ups at the risk of over utilizing limited resources.

5. Explain the ATLS protocol for the emergency resuscitation and stabilization of a seriously ill or injured patient:
    a. Cite working knowledge of the ABC's of resuscitation
    b. Define the essentials of *AMPLE* history (Allergy, Medications, Past illnesses, Last meal, Events of illness/injury)
    c. Define the essentials of the Primary and Secondary Surveys

6. Describe the considerations for establishing an airway appropriate to the patient's condition, including:
    a. Nasal trumpets/nasopharyngeal airway
    b. Bag-mask assistance
    c. Endotracheal tube
    d. Surgically Created Airways (cricothyrotomy-needle or tube)

7. Describe the typical case scenarios for the following life-threatening problems requiring appropriate urgent/emergent action:
    a. Multiple system trauma
    b. Shock (cardiogenic, neurogenic, septic, and hypovolemic)
    c. Traumatic neurological injuries
        (1) Head injury without altered consciousness
        (2) Head injury with altered consciousness, including deteriorating mental status
        (3) Subarachnoid/subdural hemorrhage
        (4) Penetrating head trauma
    d. Chest injuries (penetrating and blunt)
    e. Abdominal and pelvic injuries (penetrating and blunt)
    f. Vascular injuries (penetrating and blunt)
    g. Myocardial infarction
        (1) Complicated (with congestive heart failure [CHF], hypotension, dysrhythmia)
        (2) Uncomplicated
    h. Pulmonary embolus
    i. Diabetic ketoacidosis and other metabolic derangements
        (1) Hyper- and hypo- kalemia
        (2) Hyper- and hypo- natremia
        (3) Hyper- and hypo- calcemia
    j. Gastrointestinal bleeding
    k. Pancreatitis
    l. Ectopic pregnancy
    m. Phlebitis
    n. Burns, including inhalation injury
    o. Poisoning
    p. Hypothermia

8. Describe the principles of evaluation and management for the following less-serious problems:
    a. Drug abuse and suicide attempts
    b. Seizures/coma
    c. Facial injuries
        (1) Lacerations of face and scalp
        (2) Fractures of facial bones and jaw
        (3) Epistaxis
    d. Pneumonia
    e. Cardiac versus other chest pain
    f. Acute abdominal pain
    g. Hand injuries
    h. Long bone fractures

9. Discuss the principles of evaluation and management for the following common minor problems:
    a. Laceration evaluation
    b. Tetanus prophylaxis
    c. Wound treatment
    d. Surgical repair of wounds
    e. Appropriate dressings
    f. Soft tissue infections
    g. Headache
    h. Eye, ear, nose, and throat infections
    i. Bronchitis
    j. Gastroenteritis
    k. Hemorrhoids
    l. Wildlife injuries (animal bites, insect and marine envenomations)
    m. Follow-up instructions

10. Explain the indications and appropriate methods for:
    a. Peritoneal lavage
    b. Insertion of chest tubes
    c. Pericardiocentesis
    d. Suprapubic catheter insertion
    e. Central line insertion
    f. External/transvenous pacemaker placement
    g. Cricothyrotomy
    h. Rapid rewarming BAIR Hugger, CAVR (Continuous arterial venous rewarming)

11. Recommend ways in which the ED physical environment can be adapted to better meet the special needs of elderly patients. Discuss these problems:
    a. Little privacy or confidentiality
    b. Poor lighting
    c. High ambient noise level
    d. Lack of adequate communication and/or reassuring dialogue

12. Analyze the medicolegal responsibilities of the physician in the field as an accepting physician coordinating transport.

13. Define the requirements for informed consent in the emergency setting:
    a. Life-threatening conditions
    b. Minor surgery
    c. Patients who are minors
    d. Patients unable to provide informed consent (*non compis mentis*)
        (1) Amnesia for event
        (2) Drug or alcohol use
        (3) Dementia

14. Summarize significant steps in the examination for and treatment of dental/oral emergencies with which a general surgeon should be familiar:
    a. Toothache
    b. Gingival bleeding (gingivitis, periodontitis, HIV-related hemorrhagic conditions)
    c. Buccolingually displaced tooth or teeth
    d. Dental or periodontal abscess or fistulous tract
    e. Cellulitis, including Ludwig's Angina
    f. Peritonsillar abscess (Quinsy)

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level

Under the guidance and supervision of more senior residents, attending surgeons, or emergency department attendings:

1. Perform triage of emergency trauma patients.

2. Establish emergency stabilization of the traumatized patient via the following precautions:
    a. Fracture management/stabilization
    b. Cervical spine protection
    c. Prevention of hypothermia

3. Assess patients presenting emergency conditions using the appropriate diagnostic protocol.

4. Prioritize requests for diagnostic studies based on need to know and the time required to obtain results.

5. Establish the following airways:
    a. Perform bag-mask ventilation
    b. Insert nasopharyngeal or oropharyngeal airways
    c. Perform endotracheal intubation (oro- and naso- pharyngeal)
    d. Perform a cricothyrotomy

6. Establish access to the central venous system.

7. Assist with acute resuscitation procedures as indicated.

8. Discuss patient's condition and future care with family.

9. Provide appropriate treatment for non-emergency problems presenting to the emergency department.

Under the guidance and supervision of senior residents, attending surgeons, or emergency department attendings:

1. Function as a surgical consultant, assessing and developing differential diagnoses and discussing recommendations with senior resident or attending.

2. Ascertain the severity of injury and identify patients requiring operative intervention.

3. Perform emergency diagnostic and therapeutic procedures such as:
   a. Peritoneal lavage
   b. Insertion of chest tubes
   c. Pericardiocentesis
   d. Suprapubic catheter insertion
   e. Central line insertion
   f. External/ transvenous pacemaker
   g. Insertion of intracranial pressure monitoring device

4. Perform minor surgical procedures such as:
   a. Drainage of abscesses
   b. Wound closure
   c. Removal of foreign bodies
   d. Wound debridement
   e. Bladder catheterization

5. Perform emergent dental procedures prior to referral to a dentist, oral surgeon, or maxillofacial prosthodontist, including:
   a. Examination and recommendation of palliative treatment for toothache
   b. Reinsertion of avulsed tooth
   c. Recognition and stabilization of fractured tooth/teeth
   d. Alleviation and/or prescription preparation for abscess or fistula
   e. Diagnosing and immediately managing cellulitis, especially extending to the neck

6. Explain patient's condition and proposed therapy to his/her family and obtain appropriate informed consent.

7. Discuss management options with the patient and his/her family.

8. Recommend further diagnostic and/or radiographic studies to clarify diagnosis and focus patient management.

9. Communicate the importance of injury prevention to patients, patient families, and staff in the quest for control of trauma as a disease of modern society.

The Emergency Medicine unit was revised by Douglas F. Naylor, Jr., MD, from the Curriculum, third edition, by Douglas F. Naylor, Jr., MD.

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UNIT 3.3
TRAUMA

UNIT OBJECTIVES:

Demonstrate an understanding of the pathophysiologic effect of blunt and penetrating trauma.

Demonstrate the ability to effectively manage the surgical care of a patient with complex multisystem injuries.

Demonstrate knowledge of, and the ability to, manage a variety of healthcare services for trauma patients such as pre-hospital transportation, emergency department care, in-hospital care, and rehabilitation

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level

1. Describe the anatomy, and physiology of all body systems affected by trauma, including the initial functional evaluation of the:
   a. Central nervous system
   b. Cardiovascular system
   c. Pulmonary system
   d. Gastrointestinal system
   e. Genitourinary system
   f. Extremity function
   g. Nutritional status

2. Review the anatomy, physiology, and pathology applicable to the general management of trauma patients, including:
   a. Central nervous system
   b. Musculoskeletal system
   c. Hand/forearm
   d. Ear, nose, and throat
   e. Ophthalmology

3. Outline the basic techniques of evaluation and resuscitation of trauma patients using the American College of Surgeons (ACS) Advanced Trauma Life Support (ATLS) protocol.

4. Specify the trauma services needed for initial evaluation and resuscitation in the hospital setting. Categorize appropriate pre-hospital or emergency medicine system levels of care.

5. Discuss wound care management in the emergency department and other settings. Outline the management of the following drains and tubes: nasogastric tube (NGT), urinary bladder catheter, chest tube (CT), central venous line (CVL), arterial line (AL).

6. Explain the characteristics of basic surgical skill, including:
   a. Sterile technique
   b. Incisions
   c. Wound closures
   d. Knot tying
   e. Handling of tissues
   f. Selection/use of operating instruments
   g. Universal precautions

7. Discuss the management of trauma involving the musculoskeletal system, including the need for casts, splints, and traction.

8. Summarize basic critical care management principles.

9. Analyze pharmacological support for trauma, resuscitation, and intensive care unit patients.

10. Identify the management principles for a trauma patient in the intensive care unit.

11. Outline the factors associated with rehabilitation as they apply to initial and early patient care.

12. Discuss the indications for, and the provision of, nutritional support for elderly patients sustaining trauma.

13. Outline the indications for such basic surgical procedures as:
    a. Laparotomy
    b. Debridement of injured tissues
    c. Ultrasound
    d. Medical antishock trousers (MAST)
    e. HARE traction splint
    f. Splinting
    g. Diagnostic peritoneal lavage (DPL)
    h. Thoracotomy/thoracostomy
    i. Hemorrhage control

14. Discuss the primary causes/mechanisms of injury in the following list that contribute to making trauma the fifth leading cause of death in those aged 65 and older:
    a. Falls
    b. Motor vehicle crashes
    c. Pedestrian injuries
    d. Burns
    e. Domestic abuse

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level

1. Complete an ACS ATLS course as a provider.

2. Participate in trauma evaluation, resuscitation, operative management, and intensive care unit (ICU) supervision of a multiply-injured patient.

3. Evaluate the patient to determine quality of emergency medical service (EMS) care.

4. Insert a variety of tubes:
    a. Endotracheal
    b. Thoracostomy
    c. Intravenous
    d. Intra-arterial
    e. Diagnostic peritoneal lavage(DPL)
    f. Urinary bladder catheter
    g. Nasogastric tube

5. Apply and remove all types of dressings and splints, including the vacuum pack dressing.

6. Make and close a variety of incisions and tie knots using sterile technique.

7. Evaluate critical care parameters and make decisions, under direct supervision, regarding change in care.

8. Direct the evaluation of an acutely-injured patient to include resuscitation and the decision for operation.

9. Assess nutritional needs and institute necessary nutritional support.

10. Formulate rehabilitation plans for trauma patients.

11. Monitor the trauma patient in the intensive care unit, suggesting changes in management as indicated.

12. Manage pharmacologic treatment plans for patients during resuscitation and in the critical care unit.

13. Perform basic surgical procedures such as:
    a. Laparotomy
    b. Wound debridement
    c. Application of traction devices for both head and extremities

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UNIT 3.3G
GERIATRIC TRAUMA

UNIT OBJECTIVES:

Demonstrate an understanding of the epidemiology and pathophysiology of injury in elderly patients.

Demonstrate an ability to utilize these concepts for improved assessment and management of the elderly trauma patient.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Epidemiology of Elderly Patient Trauma

The resident will know the:

1. Demographics of the elderly population in the total population of the United States
2. Leading cause of injury death in the elderly population
3. Other major causes of injury death in the elderly population
4. Risk factors for trauma in older people
5. Increase in injury mortality in elderly people compared to younger cohorts
6. The cost of trauma care for elderly patients

Pathophysiology of Elderly Trauma Patients

The resident will be prepared to explain the:

1. Need for obtaining an accurate medical history
2. Impact of comorbidities on outcomes
3. Effects of various common medications on the elderly trauma patient
4. Concept of cerebral atrophy and possible delays in diagnosis of closed head injury (CHI)
5. Poor outcomes in severe CHI in elderly patients
6. Decreased pulmonary reserve in elderly people and the need for aggressive pulmonary care
7. Decreased cardiovascular reserve and the need for early and aggressive monitoring of the elderly trauma patient
8. Decreased renal function and the need for adjusting medication doses and volume resuscitation for this
9. Loss of bone mass in elderly people and the risk of severe injury with only minor impacts
10. High incidence of complications in the elderly trauma patients
11. Need for a thorough evaluation of the context of the injury and the pre-morbid condition of the patient
12. Rehabilitation of elderly trauma patients.

The Geriatric Trauma unit was revised by Scott G. Sagraves, MD, from the Curriculum, third edition, by Lori J. Morgan, MD, Lucy A. Wibbenmeyer, MD, and G. Patrick Kealey, MD.

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UNIT 5.3/5.3G
OTOLARYNGOLOGY AND HEAD AND NECK SURGERY

PART A: OTOLARYNGOLOGY

UNIT OBJECTIVES:
Demonstrate knowledge of the anatomy, physiology, and pathophysiology of the ear, nose, and throat pertinent to the practice of general surgery.

Demonstrate the ability to manage ear, nose, and throat problems associated with the practice of general surgery.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Identify the anatomy and explain the physiology of the ear, nose, oral cavity, and throat.

2. Summarize the essential components of a focused history and physical examination for common otolaryngologic problems.

3. Discuss the significance of the cornerstones of the physical examination, including:
   a. Visual inspection
   b. Auscultation
   c. Palpation
   d. Percussion

4. Analyze the clinical management of ear, nose, and throat (ENT) patients in the intensive care unit (ICU), including:
   a. Respiratory infection management
   b. Airway management
   c. Wound care

5. Describe and compare the pathophysiology of the following common ENT diseases:
   a. Sinusitis
   b. Sialadenitis
   c. Neck abscess
   d. Epiglottitis

6. Describe and explain the pathophysiology of presbycusis as it can be:
   a. Conductive
   b. Metabolic and toxic
   c. Neural
   d. Cochlear
   e. Tumor-related
   f. Age-dependent

7. Explain how physical examination differs for delineation of conductive versus neurosensory hearing loss.

8. Explain the principal causes of simple epistaxis and describe its management.

9. Evaluate patients with facial trauma and develop a treatment plan for the management of:
   a. Fractures
   b. Lacerations
   c. Hemotympanum
   d. Epistaxis

10. Describe the indications for tracheostomy in adults and children.

11. Discuss the indications for biopsy of lesions of the skin of the face, neck, and oral cavity.

12. Compare the use of the following procedures in evaluating ENT problems:
    a. Radiography
    b. Contrast studies
    c. Ultrasound

13. Describe the indications for simple endoscopy and its diagnostic contributions such as:
    a. Nasopharyngoscopy
    b. Direct laryngoscopy
    c. Esophagoscopy

14. Summarize the characteristics of the common neoplasms of the ear, nose, and throat, and describe appropriate surgical intervention.

15. Outline the diagnostic approaches to otolaryngologic neoplasia, including:
    a. Direct visualization
    b. Indirect visualization
    c. Use of radiography
    d. Fine-needle biopsy

16. Describe diagnostic and therapeutic procedures utilized in treating the following:
    a. Abscess
    b. Neck mass
    c. Oral ulcer
    d. Salivary gland mass

17. Describe and demonstrate methods for removing foreign bodies from the trachea, bronchus, and esophagus.

18. Compare surgical approaches using surgical flaps for repair of ENT defects and trauma of the lip, alar rim, and helix.

19. Outline the diagnosis and repair of facial fractures of the mandible, nose, and frontal sinus.

20. Summarize diagnostic and therapeutic considerations in the management of caustic injury to the mouth, nasopharynx, trachea, and esophagus.

21. Discuss the management of airway in patients with terminal carcinoma of the thyroid and trachea.

22. Describe the signs and symptoms and discuss the healthcare significance to elderly patients from the pathophysiology of:
    a. Tinnitus
    b. Vertigo
    c. Cerumen impaction
    d. Basilar artery stenosis

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Perform and record a focused ENT history and physical examination.

2. Manage the emergent/elective airway; using visual inspection, radiographic evaluation, indirect invasive and non-invasive visualization techniques (direct speculum and indirect mirror evaluations, direct fiberoptic and rigid evaluations); with consideration for:
    a. Nose, nasal passages
    b. Nasopharynx
    c. Oropharynx
    d. Larynx
    e. Trachea

3. Be prepared to manage airway obstruction as the result of:
    a. Edema
    b. Secretion
    c. Benign and malignant tumors (including, vascular malformations and infectious processes)
    d. Anaphylaxis
    e. Foreign body

4. Evaluate patients with facial trauma, including fractures, lacerations, hemotympanum, and epistaxis.

5. Perform tracheostomy on adults under direct supervision.

6. Perform biopsies of lesions of skin of face, neck, and oral cavity.

7. Perform evaluation of a neck mass, and provide appropriate treatment.

8. Correctly differentiate between the indications for and management of cricothyroidotomy and tracheostomy, demonstrating varying techniques and choice of instrumentation for emergent airway management and ventilation in each.

9. Interpret radiologic examinations of sinuses.

10. Perform simple endoscopy including:
    a. Nasopharyngoscopy
    b. Direct laryngoscopy
    c. Esophagoscopy

11. Evaluate head and neck tumor patients, and be prepared to perform a tumor biopsy.

12. Perform tracheostomy on children with supervision.

13. Evaluate radiologic studies of the head and neck, including computed axial tomography (CAT) scanning.

14. Evaluate and treat head and neck abscesses and other masses.

15. Remove esophageal foreign bodies endoscopically.

16. Perform diagnostic bronchoscopy.

17. Reconstruct facial and neck defects with transposition and myocutaneous flaps.

18. Manage facial fractures with appropriate consultation.

19. Evaluate and treat caustic injury.

20. Manage airway in patients with terminal thyroid or tracheal carcinoma.

UNIT 5.4/5.4G
NEUROSURGERY

UNIT OBJECTIVES:
Demonstrate the ability to recognize neurological or neurosurgical disease or injury so that appropriate consultation/referral can be obtained.

Demonstrate the ability to manage neurological or neurosurgical problems which require attention prior to, or in conjunction with, consultation or referral.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Demonstrate knowledge of and skills in neurological examination of patients with neurological or neurosurgical disease or injury so that:
   a. An accurate history can be taken
   b. A sufficient physical examination can be performed
   c. Logical conclusions can be drawn regarding location and nature of neuropathology

2. Apply basic knowledge of the following neuroradiological methods in terms of deciding, after conducting the neurological history and examination, which diagnostic tests or interventions would provide the least risk and most useful information for subsequent interpretation:
   a. Plain skull and spine radiographs
   b. Computed axial tomography of the head and spine
   c. Magnetic resonance imaging (MRI)

3. Demonstrate an understanding of the management of head injuries to include:
   a. Selection, prioritizing, and performance of resuscitation efforts
   b. Analyzing components and results of baseline neurological examination to determine and evaluate changes in patient neurological status
   c. Treatment of a scalp wound
   d. Initial treatment of compound depressed skull fractures
   e. Management of increased intracranial pressure
   f. Recognition of cerebral herniation syndromes
   g. Initiation, management, and interpretation of intracranial pressure monitoring
   h. Recognition and initial management of post-traumatic intracranial hemorrhage

4. Apply knowledge of cervical and thoracolumbar spine injuries, including:
   a. Means of stabilization of spine (sandbags, tongs, halo)
   b. Recognition of level of injury by neurological deficit found on physical examination
   c. Pathophysiological responses in quadriplegic or paraplegic patient

5. Demonstrate the ability to assess and manage diseases of the cervical and lumbar discs according to:
   a. Anatomical structures involved: disc (cartilage), annulus (ligament), joint capsule, pedicle, nerve root, foramen
   b. Conservative management: traction, rest, physical therapy, and analgesic medications
   c. Selection and usefulness of radiological modalities: plain spine films, CT, MRI, myelography
   d. Indications for surgical management: intractable radicular pain, neurological deficit

6. Demonstrate the ability to describe and diagnose intracranial and intraspinal mass lesions (neoplasm, abscess, hematoma) utilizing:
    a. Signs and symptoms of intracranial and intraspinal mass lesions
    b. Classification of intracranial and intraspinal tumors
    c. Pathophysiology of intracranial and intraspinal abscess
    d. Pathophysiology of cerebral aneurysms and vascular lesions
    e. Pathophysiology of spontaneous intracranial and intraspinal hemorrhage
    f. Pathophysiology of hydrocephalus

7. Summarize several factors to consider when making critical decisions about treatment options for the elderly neurosurgical patient, to include:
    a. Patient views
    b. Quality of life issues
    c. Acceptable risks

8. Demonstrate an understanding of important non-surgical problems and postoperative complications relating to neurosurgery, including:
    a. Closed head injury: problems related to coma, brain swelling, increased intracranial pressure (ICP), ICP monitoring
    b. Spinal cord injury: problems related to paralysis, sensory deficit, roto bed, tongs, halo
    c. Airway and respiratory problems secondary to coma or high cord injury: arterial blood gases, respirator, endotracheal tube, tracheostomy
    d. Vascular problems: hypo- and hyper- tension, cerebral circulation, cerebral ischemia
    e. Bladder problems: secondary to brain, cord, or cauda pathology
    f. Metabolic problems: hypopituitary, hypoadrenal, hyponatremia, water intoxication

9. Clarify and explain the challenge of making an accurate diagnosis for the elderly patient who exhibits signs of the following disorders. Suggest diagnostic tools for making a differential diagnosis.
    a. Alterations of consciousness
    b. Personality changes
    c. Focal neurologic deficits to cerebrovascular disease
    d. Senile dementia

10. Discuss ethical and socioeconomic issues relating to neurosurgery (e.g., brain death, mental incompetence, dysphasia, compensation neuroses, and intractable or chronic pain).

11. Demonstrate an understanding of the importance of early referral of head and spinal cord injury patients to rehabilitation services; recognize the potential impact of these services for long-term prognosis.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Perform neurological history and examination of patients at various levels of consciousness; obtain appropriate radiologic studies, and plan operative and medical management with appropriate supervision.

2. Assist during neurosurgical procedures, gaining exposure to and hands-on experience with:
    a. Craniotomy, laminectomy
    b. Hemostasis
    c. Protection of neural tissues
    d. Removal of specific lesions: tumor, abscess, hematoma, disc
    e. Vascular repair: carotid endarterectomy, clipping of aneurysm
    f. Problems related to cerebrospinal fluid circulation: hydrocephalus
    g. Repair/replacement of dura and bone

3. Perform limited neurosurgical procedures under direction such as:
    a. Diagnostic lumbar puncture
    b. Insertion of ICP monitor
    c. Repair of scalp lacerations
    d. Burr hole for sub-dural hematoma
    e. Elevation of simple depressed skull fracture
    f. Application and management of skeletal traction by tongs or halo

4. Manage patients with closed head injuries.

5. Formulate appropriate postoperative care, including:
    a. Address potential complications
    b. Provide information/instructions to patient and family
    c. Prepare a discharge plan
    d. Plan adequate post hospital care

The Neurosurgery unit was revised by Michael H. Handler, MD, John C. Fitzpatrick, MD, and Jeffrey C. Pence, MD, from the Curriculum, third edition.

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UNIT 5.5/5.5G
ORTHOPEDIC SURGERY

UNIT OBJECTIVES:
Demonstrate knowledge of the anatomy, physiology, and pathophysiology of the musculoskeletal system.

Demonstrate the ability to manage preoperative, operative, and postoperative care of surgical patients with orthopedic disorders in a variety of settings.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Describe the gross anatomical structures of the skeletal system.

2. Explain the physiology and biochemistry of bone growth and maturation.

3. Describe the function of the specific bones of the body.

4. Analyze the orthopedic role in evaluation of the following:
   a. Musculoskeletal trauma
   b. Inflammatory, infectious, and metabolic disorders (rheumatoid arthritis, systemic lupus erythematosus, pyogenic arthritis, osteomyelitis, osteomalacia, hypothyroidism)
   c. Musculoskeletal tumors
   d. Degenerative conditions (osteoarthritis, traumatic arthritis, osteoporosis)

5. Outline a protocol for the assessment of the skeletal system using appropriate skills of history taking and physical examination.

6. Discuss the use of radiographic imaging such as magnetic resonance imaging (MRI), computed axial tomography (CAT) scan, radionucleotide, arteriography, and plain films in the evaluation and management of the following orthopedic pathology:
   a. Musculoskeletal tumors
   b. Isolated extremity injury
   c. Spinal injury or fracture
   d. Pelvic trauma
   e. Vascular injury
   f. Urologic injury

7. Identify considerations for basic care of patients with acute trauma to the musculoskeletal system, including accurate assessment and documentation of the neurovascular status of all extremities.

8. Discuss specific areas of concern when considering total hip replacement for the elderly patient, including:
   a. Comorbid conditions
   b. Thromboembolic disease
   c. Urinary retention
   d. Bleeding dyscrasias
   e. Occult infections

9. Explain the fundamental principles of management of orthopedic trauma, including:
   a. Compartment pressure problems and use of fasciotomy
   b. Indications and limitations of closed reduction and casting
   c. Indications for open reduction and internal fixation of fractures
   d. Indications and methods for application of skeletal traction
   e. Principles of early mobilization and rehabilitation
   f. Diagnosis and management of fat embolism

10. Explain the management of open fractures, including:
    a. Timing
    b. Stabilization priorities
    c. Irrigation and debridement
    d. Early fixation
    e. Mobilization

11. Discuss the role of arthroscopy in the evaluation and therapy of orthopedic pathology (specifically for the knee).

12. Determine the management of selected congenital and developmental musculoskeletal defects and fractures in children to include:
    a. Epiphyseal fractures: Salter-Harris Classification
    b. Supracondylar elbow fractures in children
        (1) Risk of Volkmann's ischemic contracture
        (2) Role of the vascular surgeon in evaluation and treatment
    c. Supracondylar femur fracture (adjacent role of the vascular surgeon)
    d. Cervical spine congenital deformity versus pseudosubluxation in a young child
    e. Developmental hip dislocation
    f. Talipes equinovarus (club foot)

13. Discuss common causes of deterioration in elderly patients that most frequently lead to the need for total knee replacement. Include: (1)frequency of occurrence, (2)associated medications, (3)pain and degeneration, and (4)quality of life decisions for:
    a. Osteoarthritis
    b. Rheumatoid arthritis
    c. Post-traumatic arthritis
    d. Osteonecrosis of femoral condyles

14. Describe contraindications to knee replacement in the elderly patient with advanced arthritis of the knee.

15. Explain the management of the following kinds of diseases affecting the musculoskeletal system:
    a. Inflammatory diseases (rheumatoid arthritis, systemic lupus erythematosus [SLE], psoriatic arthritis, Reiter's syndrome)
    b. Infectious diseases (septic arthritis, osteomyelitis)
    c. Metabolic diseases (osteomalacia, hyperparathyroidism, hyperthyroidism)

16. Describe the following fracture classifications:
    a. Malgaigne
    b. Complex extremity and soft tissue
    c. Pelvic

17. Diagram gross and roentgenographic characteristics of histological and pathological conditions of the musculoskeletal system, including:
    a. Osteoporosis
    b. Metastatic disease of the skeleton
    c. Primary tumors
    d. Trauma

18. Outline the management of musculoskeletal tumors, including:
    a. Evaluation and staging: Enneking Classification
    b. Selection and performance of appropriate biopsy such as:
        (1) Open- versus fine- needle aspiration
        (2) Frozen section versus permanent section
    c. Adjuvant therapy options
        (1) Chemotherapy
        (2) Radiation

19. Explain the management of nerve injury associated with musculoskeletal trauma and other pathology, including:
    a. Response of nervous tissue to injury
    b. Evaluation of nerve injury
    c. Transmission of impulses at various points in the peripheral nervous system
    d. Operative repair options

20. Analyze the principal concepts of pain causation and perception.

21. Demonstrate the evaluation of back and leg pain using a standard algorithm.

22. Fractures in the elderly population typically occur as the result of low-energy impacts. Discuss the significance of frequency and outcome of the following disease entities/abnormalities:
    a. Osteoporosis (include gender)
    b. Paget's disease
    c. Infection
    d. Malignancy
    e. Marrow dysplasias
    f. Osteomalacia
    g. Metabolic derangements (hyperthyroidism, hyperparathyroidism)
    h. Elder abuse and neglect

23. Compare the indications and contraindications for joint aspiration.

24. Analyze the indications for and surgical approaches to amputation in the following situations:
    a. Trauma
    b. Ischemia
    c. Infection
    d. Tumors
    e. Prostheses

25. Summarize the role of joint replacement in the management of orthopedic pathology.

26. Summarize the characteristics of infection/sepsis secondary to prosthetic implants or orthopedic hardware; discuss treatment strategies.

27. Explain the importance and timing of physical therapy in the care of postoperative orthopedic repairs.

28. Describe the surgical technique utilizing a "clean air" environment, covering these broad aspects of control:
    a. Needs assessment regarding procedure
    b. Consideration of laminar flow systems
    c. Use of ultraviolet light
    d. Operating room traffic
    e. Soft tissue handling
    f. Use of prophylactic antibiotics

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Perform and record a focused history and physical examination of orthopedic disorders, including:
    a. Trauma
    b. Congenital malformations
    c. Degenerative diseases
    d. Inflammatory processes
    e. Neoplasia

2. Request and interpret appropriate diagnostic imaging and laboratory studies of orthopedic pathology:
    a. Preoperative laboratory evaluation as needed for safe surgical intervention
    b. Plain film analysis (specifically cervical spine and major skeleton films)
    c. CT scan for spinal fracture, pelvis, and extremity injury
    d. MRI spine and knee

3. Perform immobilization of cervical spine.

4. Triage patients with musculoskeletal injuries in a mass casualty situation.

5. Participate in the management of orthopedic trauma to extremities, including such procedures as:
    a. Splinting closed fractures
    b. Closed reduction of fractures
    c. Reducing dislocations
    d. Applying traction
    e. Applying casts
    f. Débriding and irrigating open extremity fractures
    g. Open reduction and internal fixation of extremity fractures

6. Monitor compartment pressure in orthopedic trauma and begin appropriate therapy, including the performance of fasciotomy, if indicated.

7. Monitor trauma patients for indications of fat embolism syndrome and begin appropriate therapy.

8. Perform joint aspirations in appropriate situations.

9. Participate in diagnostic and therapeutic arthroscopy procedures such as:
    a. Partial meniscectomy (knee)
    b. Arthroscopy of shoulder (diagnostic)

10. Participate in the management of amputations:
    a. Determine amputation level
    b. Perform lower extremity amputation in appropriate cases
    c. Direct rehabilitation of an amputee in appropriate cases

11. Participate in the management of musculoskeletal tumors, including:
    a. Planning and performing an incisional biopsy of a soft tissue tumor
    b. Performing preoperative evaluation and staging of soft tissue tumors
    c. Assisting in the planning and resection of soft tissue tumors and considerations for limb salvage

12. Assist in prosthetic joint replacement.

13. Participate in the management of congenital, developmental, and other musculoskeletal deficiencies in children such as:
    a. Cerebral palsy
    b. Myelomeningocele
    c. Muscular dystrophy
    d. Developmental hip/dislocation
    e. Talipes equinovarus

The Orthopedic Surgery unit was revised by Jeffrey C. Pence, MD, and John C. Fitzpatrick, MD, from the Curriculum, third edition.

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UNIT 5.6/5.6G
OPHTHALMOLOGY

UNIT OBJECTIVES:
Demonstrate an understanding of the anatomy and function of the eye.

Demonstrate working knowledge of the pathophysiology of common eye problems relevant to the practice of general surgery.

Demonstrate the ability to initiate management and arrange appropriate care of eye problems associated with the practice of general surgery.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Describe the anatomy of the eye and its surrounding structures, including:
    a. Adnexa (lids, tarsal plates, gray line, levator muscles, orbital septum, innervation, vascular supply, nasolacrimal system, orbital bones, lacrimal gland)
    b. Extraocular muscles and innervation
    c. Anterior Segment (conjunctiva, cornea, anterior chamber, iris, lens)
    d. Posterior Segment (ciliary body, vitreous, optic nerve, retina, macula, fovea, choroid)
    e. Retrobulbar Structures (optic nerve, optic canal, chiasm, sella turcica)

2. Diagram and summarize the principles of vision, including:
    a. Refraction caused by lenses (tear film, cornea, lens, vitreous)
    b. Encoding of image (retina, including fovea and macula)
    c. Transmission of image (nerve fiber layer, optic disc, optic nerve, chiasm, optic radiations, occipital lobe)
    d. Muscle control centers (cranial nerves III, IV, VI)
    e. Pupillary control (cranial nerve III and parasympathetic nerves)

3. Explain fundamental ocular physiology by considering the following questions:
    a. How do the adnexal structures ensure that the eye is lubricated and shielded from trauma?
    b. What would a paresis of any of the innervating cranial nerves do to the movement of the eye?
    c. When the cornea is damaged, what effect is there upon comfort or vision? Knowing the innervation of the iris, what information might an anisocoria indicate? What is a Marcus Gunn, afferent pupillary defect, or a Horner's pupil?
    d. What purpose do the ciliary body and the vitreous serve? What do the macula, the fovea, and the optic nerve do?
    e. What difference would it make in the examination of the eye (vision, visual field, and appearance of the nerve) if damage occurred at the site of the optic nerve, optic canal, optic chiasm, or in a retrochiasmal location?

4. Outline common eye pathology, including:
    a. Trauma to eye, orbit, and supporting structure
        (1) Diagnosing a perforated globe
        (2) Indications for referral and repair of a blow out fracture
        (3) Diagnosing a corneal epithelial defect
        (4) Identifying a hyphema
        (5) Treatments for severe loss of vision with optic nerve trauma
    b. Infections of the eye (blepharitis, hordeola, chalazia, corneal ulcers, endophthalmitis, conjunctivitis, keratoconjunctivitis, iritis, uveitis)

c. Burns of the eye (different effects of a thermal, alkali, or acid burn of the cornea)
d. Anisocoria (Horner's syndrome, iatrogenic, belladonna induced, diabetic, third cranial nerve, Marcus Gunn, afferent pupillary defect)
e. Sudden loss of vision (from migraine, traumatic neuropathy, ischemic optic neuropathy, temporal arteritis, optic neuritis, central retinal vein or artery occlusion)
f. Eye pain (different descriptions of pain from iritis vs. corneal abrasion vs. herpes simplex keratitis)
g. Eye donation (methods of tissue removal: whole eye and anterior segment)

5. Discuss the following important microbiologic considerations of the eye and its surrounding structures:
   a. Indications for cultures:
      (1) Hyperpurulent or unresponsive conjunctivitis
      (2) Neonatal conjunctivitis
      (3) Corneal ulcers
      (4) Localized lid infections
      (5) Suspected orbital cellulitis
      (6) Penetrating trauma
   b. Sampling technique
      (1) Swab and transport media (acceptable for mild infections)
      (2) Direct culture on agar plates (for more serious disease)
      (3) Spatula scraping and direct agar plating (for corneal ulcers by ophthalmologist)
      (4) Blood cultures for orbital cellulitis
   c. Risks for patients who cannot blink fully (as in eyes drying in intensive care unit)
      (1) Predisposes to severe infection
      (2) Possible globe perforation by *Pseudomonas* or *N. gonorrhea*

6. Outline the essential elements of a focused eye examination for each of the problems in #5 above to include significant aspects of the following:
   a. History
   b. Visual acuity and confrontational visual fields
   c. External exam (appearance of adnexa)
   d. Anterior segment (cornea, iris, anterior chamber)
   e. Pupillary exam (direct, consensual, indirect, afferent)
   f. Extraocular muscles (ductions, vergences, exotropia, esotropia, convergence)
   g. Posterior segment (including red reflex, direct ophthalmoscopy)

7. Discuss the pros and cons of performing elective or emergency eye operations on elderly patients who also present with comorbidity.

8. What is the level of importance of these elderly patient situations to the outcome of eye surgery?
   a. Renal transplant recipient
   b. Bone marrow transplant recipient
   c. End-stage renal patient
   d. Insulin-dependent diabetes mellitus patient

9. Summarize the criteria for appropriate referral and follow-up for the management of common eye problems to include the following questions:
   a. Is there information that will help me assess the systemic condition of the patient? (vascular and neurologic information especially important)
   b. Is there a vision-threatening problem? (consultation with ophthalmologist is essential if patient is obtunded, does not blink, and there is a developing corneal ulcer)
   c. What is the source of the patient's ocular complaint or condition? Is it acute (inpatient consult) or chronic (outpatient consult)?

10. Explain the principles of management for common eye problems to include the following:
   a. Exposure keratopathy
   b. Conjunctivitis
   c. Herpes simplex keratitis
   d. Iritis
   e. Blow out fracture
   f. Corneal abrasion

11. Describe the etiology (include appropriate racial differences), signs and symptoms of, and primary treatment or rehabilitative strategy for the following disorders as they affect the vision of the elderly population:
   a. Presbyopia
   b. Essential blepharospasm
   c. Ptosis
   d. Glaucoma
   e. Cataracts
   f. Noncicatricial ectropion; entropion
   g. Retinal detachment
   h. Macular degeneration
   i. Diabetic retinopathy
   j. Herpes zoster
   k. Pterygium

12. Determine appropriate surgical management of common eye problems utilizing precepts such as the following:
   a. Indications for repair of blow out fracture
      (1) Persistent findings after approximately seven days of symptomatic diplopia, or symptomatic enophthalmos; positive forced traction test
      (2) Possible hypesthesia
      (3) Presence of a fracture by itself is not necessarily an indication
   b. Current controversy and possible therapy for sudden, profound vision loss associated with traumatic optic neuropathy

13. Describe the pathophysiology of uncommon eye problems associated with surgical practice, including:
   a. Tumors of the eye
      (1) Retinoblastoma
      (2) Melanoma
      (3) Metastatic
   b. Congenital abnormalities of the eye
      (1) Glaucoma
      (2) Cataract
      (3) Exotropia/esotropia

14. Determine the emergency surgical management of eye and orbital injuries, including:
   a. Blow out fracture
   b. Rupture of the globe
   c. Corneal laceration
   d. Corneal foreign bodies
   e. Hyphema
   f. Vitreous hemorrhage

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Complete a basic history and eye examination.

2. Apply eye dressings or appropriate eye medications for corneal abrasion and corneal perforation or globe rupture.

3. Apply local anesthetic, repair simple eyelid lacerations, and remove foreign bodies.
   a. Diagnose injuries
   b. Review special techniques for repair
   c. Call the ophthalmologist if the following situation(s) exists: laceration involving: margin of lid, levator muscle, canaliculus, or nasolacrimal system

4. Interpret imaging studies in the evaluation of common eye problems such as:
   a. Ocular prosthesis
   b. Ocular foreign body
   c. Blow out fracture
   d. Zygomatic fracture

5. Treat orbital injuries and assign priority in management in a multiple-injured patient.

6. Identify appropriate candidates and arrange for eye donation:
   Review criteria of the Eye Bank Association of America for donors
   (1) Essentially no age limits on donation
   (2) Tissue that is "too old" or "too young" for routine transplant may still be useful for emergency repairs or for research
   (3) Contagious diseases are contraindications (syphilis, AIDS, Creutzfeldt-Jacob, rabies, death from unknown causes)

7. Participate in enucleation for corneal harvesting under supervision.

8. Participate in management of orbital injuries.

9. Manage the treatment of common and uncommon eye problems with appropriate consultation.

The Ophthalmology unit was revised by John C. Fitzpatrick, MD, and Jeffrey C. Pence, MD, from the Curriculum, third edition, by Donald D. Bode, MD, PhD.

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UNIT 5.8/5.8G
UROLOGY

UNIT OBJECTIVES:
Demonstrate an understanding of the anatomy, physiology, and pathophysiology of the genitourinary system.

Demonstrate the ability to manage routine and emergency genitourinary problems in a variety of settings.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Describe the normal anatomy and physiology of the genitourinary system to include the following structures:
    a. Kidneys
    b. Ureters
    c. Bladder
    d. Prostate seminal vesicles and vas deferens
    e. Urethra (male and female)

2. Summarize the basic science of genitourinary disease to include the following:
    a. Anatomy, physiology, biology, biochemistry, microbiology, immunology, and embryology of the genitourinary system
    b. Pathophysiology of urinary tract disease
    c. Endocrine function of kidney

3. Discuss the components of a focused genitourinary history and physical examination to include:
    a. History
        (1) Pain (location)
        (2) Hematuria
            (a) Painful, painless
            (b) Initial, terminal, total
            (c) Presence of clots
        (3) Lower urinary
            (a) Irritative
            (b) Obstructive
        (4) Incontinence (stress, urge)
        (5) Sexual dysfunction
    b. Physical Examination
        (1) Kidneys
            (a) Flank masses
            (b) Peritoneal signs
            (c) Signs of nerve root irritability
        (2) Bladder
        (3) Penis
        (4) Scrotum and contents
        (5) Rectal examination (to include prostate)
        (6) Pelvic examination in female

4. Explain the following clinical science study factors/variables as they relate to genitourinary disease:
    a. Anatomy
    b. Embryology of genitourinary tract
    c. Renal physiology
    d. Bacteriology and antibiotic management
    e. Renal calculus disease
    f. Urologic oncology
    g. Female urology
    h. Urologic trauma

5. Describe the pathologic anatomy and pathophysiology of non-complex genitourinary diseases such as:
    a. Tumors (renal, ureteral, bladder, testicular, prostate)
    b. Calculi (renal, ureteral, bladder)
    c. Trauma (testis, upper and lower urinary tract)
    d. Renal infections
    e. Benign prostatic hyperplasia and bladder outlet obstruction
    f. Vesicoureteral reflux and pyelonephritis
    g. Varicocele
    h. Incontinence (stress, overflow, neurogenic, urgency)
    i. Impotence and Peyronie's disease
    j. Urethral stricture disease
    k. Priapism

6. Explain the tumor, nodes, and metastases (TNM) classification of tumors of the kidney, bladder, prostate, and testis.

7. Summarize the indications for routine diagnostic procedures in urology such as:
    a. Cystoscopy (ureteral catheterization)
    b. Bladder catheterization
    c. Intravenous pyelogram
    d. Cystogram (retrograde ureteropyelogram)
    e. Computed tomography and ultrasound of the GU tract
    f. Urography in trauma
    g. Indications for using MRI
    h. Retrograde urethrogram
    i. Transrectal ultrasound
    j. Renal arteriography
    k. Renography and renal perfusion scanning (I 131)
    l. Urinalysis, biochemical and radioimmunoassay

8. Discuss the nature and indication for routine therapeutic procedures in genitourinary disease such as:
    a. Bladder catheterization
    b. Passage of Coudé tips and filiform catheters
    c. Meatotomy if necessary for catheterization
    d. Suprapubic punch cystostomy
    e. Dorsal slit for phimosis

9. Analyze the etiology of urinary incontinence in elderly patients. Consider the following:
    a. Factors that may be associated with aging
        (1) Bladder capacity
        (2) Amount of residual urine
        (3) Frequency of involuntary bladder contractions
        (4) Incidence of impaired mobility
        (5) CNS disorder
        (6) Congestive heart failure
        (7) Medications
    b. Female elderly patients
        (1) Decline in bladder outlet
        (2) Decline in urethral resistance pressure
            (a) Influence of estrogen
            (b) Pelvic structures associated with childbirth
            (c) Surgeries
    c. Male elderly patients – prostatic enlargement
        (1) Obstructed urethra (overflow incontinence)
        (2) Detrusor motor instability (urge incontinence)

10. Describe the rationale for transurethral prostate resection and other endoscopic urologic procedures.

11. Describe cancer of the prostate, citing disease rates that make it the:
    a. Most commonly diagnosed malignancy in men
    b. Second leading cause of cancer death in men

12. Describe the embryology of the GU tract to include a discussion of the following:
    a. Congenital abnormalities
        (1) Ureteropelvic junction (UPJ) with hydronephrosis
        (2) Reflux
        (3) Polycystic kidney
        (4) Urethral valves with hydronephrosis

13. Describe the types of incisions and exposure required for genitourinary surgery, including those for:
    a. Nephrectomy
    b. Radical nephrectomy
    c. Ureterolithotomy
    d. Radical cystectomy
    e. Radical retropubic prostatectomy
    f. Perineal prostatectomy
    g. Orchiectomy
    h. Radical orchiectomy
    i. Laparoscopic urologic surgery (nephrectomy, partial nephrectomy, prostatectomy)

14. Discuss treatment options in the management of ureteral injuries to include:
    a. Primary repair
    b. Ureteroureterostomy
    c. Neoureterocystostomy
    d. Psoas hitch
    e. Percutaneous drainage
    f. Emergent nephrectomy
    g. Ureteral stenting

15. Outline recommended screening guidelines for prostate cancer.

16. Summarize considerations for appropriate treatment of incidentally detected carcinoma of the prostate, found on simple prostatectomy, when these conditions exist:
    a. Low-grade lesion with combined Gleason score <5
    b. Transurethral resection (TUR) shows lesion occupies 5% or less of tissue resected
    c. Lesion is considered clinical stage A-1

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Complete and record a focused urological history and physical examination.

2. Work up a prostatic mass on a routine rectal examination, including processing necessary radiologic and laboratory studies.

3. Plan and initiate appropriate therapy for urological disorders such as:
    a. Hematuria work-up
    b. Obstructive uropathy work-up
    c. Simple infections
    d. Resistant infections
    e. Initiate therapy for: calculus disease, renal neoplasm, transitional cell neoplasm
    f. Maintain a working knowledge of carcinoma of the prostate

4. Perform a bladder catheterization (including passage of Coudé tips).

5. Perform a urologic evaluation (history and physical exam), diagnostic studies (retrograde urethrogram, cystogram, CT, angiography), and treatment (cystostomy, cystorrhaphy, ureteral repair, ureteral reconstruction, renal artery and vein repair, nephrectomy) in a trauma setting.

6. Interpret Computed Tomography scans and ultrasound results in genitourinary diseases.

7. Perform cystoscopy and urethral catheterization.

8. Request intravenous pyelography (IVP), CT, and ultrasound genitourinary procedures in appropriate cases.

9. Perform nephrectomies for disease.

10. Perform suprapubic prostatectomy.

11. Manage urologic emergencies such as torsion of testicle, scrotal masses, and urinary retention.

12. Manage complex intra-abdominal and pelvic general surgery that involves the genitourinary system.

The Urology unit was revised by J. Scott Roth, MD, from the Curriculum, third edition.

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UNIT 5.9/5.9G
GYNECOLOGY AND OBSTETRICS

PART A: GYNECOLOGY

UNIT OBJECTIVES:

Demonstrate the ability to identify basic gynecologic pathologic conditions, and differentiate between gynecological and abdominal pathology requiring surgical intervention.

Demonstrate the ability to manage gynecologic problems, including emergency procedures and pathology/trauma involving pelvic and abdominal organs.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Describe the components of a complete gynecological assessment, including an accurate history and physical examination. Note how the examination and findings would likely differ for a postmenopausal woman without estrogen replacement therapy.

2. Outline the anatomical relationships of the pelvic organs and the lower intra-abdominal organs.

3. Explain the physiology and endocrinology relating to endometrial function (e.g., hypothalamic pituitary ovarian axis and menstrual function).

4. Discuss the physiology and pathophysiology of gynecologic conditions and disease, including:
   a. Intrauterine pregnancy
   b. Benign diseases of the ovaries (e.g., cysts and the risks of torsion, hemorrhagic corpus luteum)
   c. Ectopic pregnancy
   d. Carcinoma of the ovary, uterus, cervix uteri, vagina, and vulva
   e. Advanced uterine prolapse in a postmenopausal woman
   f. Uterine leiomyoma in a postmenopausal woman
   g. Urinary and rectal incontinence

5. Outline the differential diagnoses for pelvic pathology such as:
   a. Salpingitis versus appendicitis
   b. Mittelschmerz versus bleeding ovarian cyst
   c. Fibroid uterus versus other intra-abdominal masses

6. Discuss the differential diagnosis of a pelvic mass to include considering:
   a. Cysts
      (1) Benign ovarian cysts (functional, neoplastic)
      (2) Malignant ovarian cysts
   b. Tumors
      (1) Benign solid tumors (uterus, tubes, ovaries)
      (2) Malignant solid tumors (primary or metastatic)
   c. Infectious processes (tubo-ovarian abscess)
   d. Gastrointestinal processes (diverticular disease)

7. Summarize the categories of information provided by the following types of studies:
   a. Imaging (ultrasound—including Doppler flow, computed axial tomography, magnetic resonance imaging)
   b. Cytology of ascitic fluid
   c. Intravenous pyelography and cystoscopy
   d. Gastrointestinal contrast studies and sigmoidoscopy

8. Explain the basis of preferred treatment for the following conditions:
   a. Uterine bleeding
   b. Ectopic pregnancy (ruptured versus unruptured)
   c. Ovarian cysts with bleeding, enlargement
   d. Adnexal torsion (role of detorsion, color flow Doppler)
   e. Endometriosis
   f. Carcinoma of the ovary, uterus, vagina, and vulva
   g. Fibroids; fibroids in a 70-year-old woman
   h. Normal pregnancy and its complications requiring Caesarean section

9. Discuss the significance of postmenopausal vaginal bleeding, including:
   a. Etiology
   b. Evaluation
   c. Diagnostic studies (including endometrial stripe assessment, saline-infusion sonohysterography)
   d. Alleviation of symptoms
   e. Treatment of alternatives

10. Identify and discuss pelvic support defects in the elderly woman, including:
   a. Restoration of normal genital tract anatomy
      (1) Bladder neck
      (2) Anterior vaginal wall
      (3) Apex of vagina
      (4) Vaginal length
      (5) Posterior vaginal wall
      (6) Perineal body
   b. Options to surgery
   c. Associated risks and benefits
      (1) Quality of life decisions
      (2) Healthy life-style

11. Describe the indications for hysterectomy.

12. Explain the appropriate surgical approach to radical groin dissection and vulvectomy for carcinoma.

13. Describe the surgical and pathological staging of ovarian and uterine neoplasia.

14. Summarize the principles of the following surgical procedures:
   a. Hysterectomy
   b. Salpingectomy
   c. Oophorectomy
   d. Laparoscopy
   e. Vulvectomy
   f. Radical groin dissection

15. Explain the principle of uterine artery embolization procedures.

16. Describe the relation of the ureters to the pelvic anatomy and the most common locations for ureteral compromise.

17. Explain the principles of chemotherapy and radiotherapy in the management of gynecologic malignancies.

18. Discuss the management of an ovarian mass unsuspected at laparotomy by considering:
    a. Biopsy versus oophorectomy
    b. Surgical staging (peritoneal washings, contralateral ovarian biopsy, omentectomy)
    c. Consultation (family, gynecologist)
    d. Morphology (size, septations, surface texture)

19. Adenocarcinoma of the endometrium is the most common invasive gynecologic malignancy in the U.S. Describe:
    a. Mean age at diagnosis
    b. Most common presenting complaint (90% of cases)
    c. High-risk factors (including Tamoxifen use and familial predisposition)

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Perform pelvic examinations, only initially under direct supervision:
    a. Part of every woman's general physical examination (including rectovaginal exam)
    b. Significant for patient to be evaluated for abdominal or pelvic symptoms
    c. Critical for patients who must undergo abdominal or pelvic surgery
    d. Evaluation of traumatically injured female

2. Participate as part of the surgical team in performing multiple gynecological surgery procedures:
    a. Perform as surgical assistant during earliest training stages
    b. Perform surgical procedures when experienced and under supervision:
        (1) Pelvic laparoscopy
        (2) Oophorectomy
        (3) Salpingectomy
        (4) Hysterectomy

3. Formulate differential diagnoses of pelvic infection and masses to consider:
    a. Common infections (endometritis, salpingitis, tubo-ovarian abscess, bacterial vaginosis)
    b. Common organisms (gonococcus, chlamydia, anaerobic bacteria)
    c. Differentiating findings on pelvic and abdominal examination (mass, tenderness, signs of peritoneal irritation, ultrasound imaging, fever, leucocytosis)

4. Identify all normal pelvic structures visually and through palpation during laparotomy.

5. Manage general surgical problems of the pregnant patient (appendicitis, cholecystitis, breast mass, intestinal obstruction, ovarian torsion).

6. Diagnose ectopic pregnancy (role of quantitative B-HCG and transvaginal ultrasound, discriminatory zone)

7. Perform a salpingostomy under direct supervision. (evaluate contralateral Fallopian tube and consider salpingectomy)

8. Perform an emergency hysterectomy (beware the ureters).

9. Perform a radical groin dissection and assist in the performance of related gynecological surgery for carcinoma such as:
    a. Pelvic and inguinal lymph node dissection
    b. Bowel resection
    c. Cystectomy
    d. Pelvic exenteration with urinary and/or bowel diversion

PART B: OBSTETRICS

UNIT OBJECTIVES:
Demonstrate an understanding of the process of pregnancy.

Demonstrate the ability to manage common surgical problems that occur during pregnancy.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:
1. Describe the physiologic changes in pregnancy, including:
    a. Cardiovascular
    b. Respiratory
    c. Gastrointestinal
    d. Genital
    e. Breasts

2. Describe normal intrauterine growth and development with consideration for the following:
    a. Basic science principles of placental and fetal development
    b. Fetal developmental physiology

3. Explain the stages of fetal development, including
    a. Characteristics of each trimester of pregnancy
    b. Assessment of the fetus
    c. Risk of surgery in each trimester.

4. Outline major issues involved in managing surgical conditions in the pregnant patient, including:
    a. Appendicitis (difficult to diagnose; necessity for different surgical approach)
    b. Cholecystitis (medical management before resorting to surgery)
    c. Intestinal obstruction (confusing symptoms; operative approach; postoperative nutritional support)
    d. Breast mass (confusion with physiologic changes in breast; special considerations at surgery; postoperative complications with lactation)
    e. Trauma (management of mother and fetus; special diagnostic measures)
    f. Ovarian torsion (diagnosis and treatment options, risk of oophorectomy in the first trimester)

5. Specify possible physiologic effects to the pregnant woman and/or the developing child exposed to the following agents:
    a. Anesthesia
        (1) Effects of common anesthetic agents, inhalation, and conduction
        (2) Catastrophic events: failed endotracheal intubation, pulmonary aspiration, total spinal block
        (3) Anesthetic management in obstetric complications: amniotic fluid embolism, hemorrhage, hypertension
        (4) Position on operating room table and relevance to hemodynamics

b. Medication
   (1) Understanding risk factors and categories assigned to all drugs
   (2) Fetal effects of drugs which cross the placenta
c. Radiation
   (1) Effect on fertility
   (2) Effect on fetus (trimester specific, Rad/Gray levels considered safe)

6. Discuss the differential diagnosis of ectopic pregnancy, including:
   a. Signs and symptoms
   b. Qualitative human chorionic gonadotrophin (hCG)
   c. Quantitative hCG
   d. Abdominal and vaginal ultrasonography: correlation with hCG for presence of intrauterine fetal sac or adnexal mass (discriminatory zone)

7. Outline the indications and contraindications for laparoscopy in the pregnant patient, discussing:
   a. Diagnosis and treatment of ectopic pregnancy
   b. Contraindications: including multiple previous laparotomies, Class IV cardiac disease, peritonitis or obstruction with bowel distension

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Diagnose pregnancy, utilizing:
   a. History: include menstrual history and symptoms of early pregnancy
   b. Physical examination: expected changes in the uterine cervix and corpus
   c. Laboratory tests for pregnancy

2. Diagnose common gynecological problems that affect pregnant women, including:
   a. Sexually transmitted diseases
   b. Acquired Immunodeficiency Syndrome
   c. Human papillomavirus infections (especially condylomata)
   d. Leiomyomata uteri

3. Deliver a baby during an uncomplicated delivery.

4. Perform a Cesarian section in an emergency situation.

5. Manage a pregnant surgical patient during acute trauma (mother comes first!).

6. Perform laparoscopy under direct supervision for a pregnant patient (usually ectopic pregnancy).

The Gynecology and Obstetrics unit was revised by J. Scott Roth, MD, and Gordon B. Sherard, III, MD, from the Curriculum, third edition, by Paul R.G. Cunningham, M.D.

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UNIT 6.3
ANESTHESIA

UNIT OBJECTIVES:
Demonstrate an understanding of the pathophysiology of pain and its management.

Demonstrate an understanding of the pharmacology and principles of regional and general anesthesia in analgesia.

Demonstrate the ability to use these principles in the management of surgical patients.

Recognize the condition of malignant hyperthermia and its treatment.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Discuss the rationale governing the use of local, regional, and general anesthesia, including the following concepts:
    a. Careful cardiovascular, respiratory, and neurologic monitoring is the mainstay of safe anesthesia
    b. No specific anesthetic is inherently safer than any other; and as such, risk assessment must be considered in each case
    c. Regional anesthesia may provide some advantages, including:
        (1) Decreased blood loss
        (2) Improved perioperative graft patency in vascular reconstruction
        (3) Reduced incidence of venous thrombosis
    d. Combined regional and general techniques may improve outcomes in selected patient populations:
        (1) Significant cardiovascular disease and major abdominal or thoracic surgery
        (2) Severe pulmonary disease and major abdominal or thoracic surgery
    e. Preemptive analgesia, such as the use of epidural anesthesia, enhances perioperative comfort

2. Summarize the essential elements of the pre-anesthesia assessment, including:
    a. Targeted history and physical examination (review of systems, emphasizing cardiovascular and pulmonary disease)
        (1) Effects of chronic medications (anticoagulants, insulin, and antiarrhythmics)
        (2) Effects of preoperative medications (narcotics, anxiolytics, and atropine)
        (3) Effects of postoperative medications (including antihypertensives and antiemetics)
    b. Anatomic and physiologic variables germane to anesthetic success:
        (1) Airway anatomy, including the Mallampati classification.
            (a) Class 1: Visualization of all oro- and hypo- pharyngeal structures
            (b) Class 2: Anterior and posterior tonsillar pillars are obscured by tongue
            (c) Class 3: Soft palate and base of uvula are visible
            (d) Class 4: Only the soft palate is visualized
            (e) Increasing Mallampati score is associated with the reduced likelihood of successful direct laryngoscopic intubation.
        (2) Skeletal deformities
        (3) Neuromuscular diseases
        (4) Aspiration risk (pregnancy, scleroderma, hiatal hernia)

c. Assigned Anesthesia Society of America class and physical status:
   (1) Class 1: No organic disease
   (2) Class 2: Mild to moderate systemic disease
   (3) Class 3: Severe systemic disorders
   (4) Class 4: Severe systemic disturbance; life threatening
   (5) Class 5: Patient is moribund with little chance of survival
   (6) Class E: Patient requires an emergency procedure

3. Outline the major characteristics of the pharmacokinetics and pharmacodynamics of anesthetic agents (local, volatile, opioid), considering:
   a. Lipid solubility
   b. Protein binding
   c. Partition coefficients

4. Summarize the use and monitoring of drugs for sedation and analgesia to include:
   a. Minimum anesthetic monitoring (pulse oximetry, electrocardiogram, blood pressure)
   b. Advantages of scheduled postoperative analgesia versus intermittent dosing
   c. Indications for patient-controlled anesthesia (PCA)
   d. Importance of periodic assessment to determine:
      (1) Level of consciousness
      (2) Pulmonary status in sedated patients

5. Summarize the principles of administration for and compare the effectiveness of the following methods of anesthesia:
   a. General
   b. Spinal
   c. Regional
   d. Local

6. Describe the potential benefits of regional and local anesthesia, including:
   a. Decreased respiratory depression
   b. Diminished systemic effects (liver and renal toxicity)
   c. Decreased direct cardiac depression

7. Outline the potential complications associated with the use of regional anesthesia, including:
   a. Spinal anesthetics (headache, cerebrospinal fluid leak, meningitis)
   b. Regional nerve blocks (perineural hematomas)

8. Discuss the indications for the use of muscle relaxants.

9. Analyze anesthetic monitoring techniques, to include:
   a. Swan-Ganz catheters
   b. Arterial lines
   c. Transvenous pacemakers
   d. End-tidal carbon dioxide monitoring
   e. Temperature monitoring
   f. Transesophageal echocardiography

10. Describe the techniques and potential complications of managing an airway, including endotracheal and nasotracheal intubation.

11. Describe and explain the most common immediate postoperative anesthetic issues:
    a. Airway stability
    b. Ventilation and oxygenation
    c. Pain control
    d. Nausea and vomiting
    e. Temperature regulation
    f. Hemodynamic stability

12. Analyze therapeutic options for patients with chronic pain.

13. Recognize the condition of malignant hypothermia and its management:
    a. Incidence in general population (1:10,000)
    b. Autosomal inheritance with variable penetrance
    c. Pathophysiology of defective sarcoplasmic reticulum and secondary diminished reuptake of myoplasmic calcium leading to increased aerobic metabolism of skeletal muscle
    d. Inducing medications, including inhaled anesthetics and succinylcholine
    e. Hallmarks of hypermetabolism, skeletal muscle rigidity, and increased temperature
    f. Therapy includes the discontinuance of anesthetic agents, dantrolene administration, and fluid resuscitation with proper physiologic monitoring.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level

1. Manage the airway in adults and children, employing appropriate:
    a. Physical maneuvers
    b. Oral/nasal support devices
    c. Suctioning techniques to maintain clear airway

2. Perform nasal and oral intubation.

3. Recognize the stages of general anesthesia and their implications, particularly in regard to airway management.

4. Recognize and treat the signs and symptoms of complications due to anesthetic agents such as:
    a. Cardiovascular collapse
    b. Acute metabolic disturbances
    c. Malignant hyperthermia

5. Perform preoperative assessment of patients.

6. Recognize risks and possible side effects of drugs used for pain control.

The Anesthesiology unit was revised by Joshua Schwartz, MD, and Jeffrey C. Pence, MD, from the Curriculum, third edition.

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UNIT 6.3G
ANESTHESIA FOR THE ELDERLY PATIENT

UNIT OBJECTIVES:
Demonstrate an understanding of the physiological alterations of the aging process and the potential impact on anesthetic administration.

Recognize and manage postoperative altered mental status in the elderly.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Summarize how the physiology of aging interacts with the effects of anesthesia, with particular attention to:
   a. How high sympathetic tone, loss of beta-receptor responsiveness, and volume sensitivity to both hypovolemia and hypervolemia make blood pressure inherently unstable.
   b. How increased chest wall stiffness, increased lung compliance, and increased brain sensitivity to sedative/ analgesics increase the likelihood of hypoxia, atelectasis, and pneumonia.

2. Summarize the pharmacokinetic and pharmacodynamic principles underlying the effective use of anesthetic agents, particularly how aging often leads to increased sensitivity and prolonged duration of drug effects.

3. Understand how the anesthesiologist approaches patient evaluation and the optimization of patient condition in preparation for surgery.

4. Recognize those issues important to an elderly patient when faced with the decision to have surgery, and be able to determine when mental impairment does or does not preclude the patient from providing informed consent.

5. Understand how the elderly patients are predisposed to hypothermia and how hypothermia adversely affects the risk of infection and cardiac morbidity.

6. Be familiar with the causes, diagnosis, and management of postoperative delirium.

7. Explain the principles and techniques of preemptive analgesia, including non-steroidal analgesics and peripheral nerve and field blocks.

8. Analyze and compare the hemodynamic effects, benefits, risks, and contraindications for the following advanced techniques of postoperative pain control:
   a. Epidural infusions of local anesthetics and/or opioids.
   b. Continuous nerve blocks
   c. Intrapleural and extrapleural catheters

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior and Senior Levels

1. Assess the risk surrounding the stress of the proposed surgery relative to the benefit of the surgery, with the perspective of the physiological reserve of the patient, and be able to adjust the scope of the proposed surgery accordingly.

2. Appropriately select medications and adjust dosages for the elderly patient.

3. Recognize postoperative delirium and be able to diagnose and treat reversible causes.

4. Perform common field and nerve blocks for postoperative analgesia.

5. Establish effective dialogue with anesthesia and internal medicine colleagues for the comprehensive care of complicated patients.

The Anesthesia for the Elderly Patient unit was revised by G. Alec Rooke, MD, PhD, from the Curriculum, third edition, by G. Alec Rooke, MD, PhD.

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Unit 7.4/7.4G
ETHICAL AND LEGAL ISSUES IN SURGICAL PRACTICE

UNIT OBJECTIVES:
Demonstrate knowledge of basic ethical and legal principles applicable to the practice of medicine.

Demonstrate the ability to recognize ethical and legal issues that arise in the practice of surgery.

Demonstrate the ability to employ strategies for effectively managing ethical and legal issues associated with the practice of surgery.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Section One: Ethical, and legal issues associated with the practice of medicine

1. Define the following terms, and analyze their application to the practice of surgery:
   - Abortion
   - Advance Directives
     - Patient Self-Determination Act
     - Living Will (your state requirements)
     - Durable Power of Attorney for Healthcare
     - Right to Die concept
   - Authoritarianism (importance of patient choices)
   - Autonomy
     - As 'capacity for self-determination'
     - As 'right to self-determination'
   - Beneficence
   - Bioethics
   - Casuistry (based on the study of case histories)
   - Causation
   - Civil law
   - Codes of ethics
   - Competence
   - Confidentiality
   - Continuity of care
   - Cost of care –
     - Cost-benefit analysis
     - Cost-containment, including use of clinical pathways
     - Access to healthcare
     - Rights to healthcare
   - Covenant
   - Criminal law
   - Death (including various legal definitions)
   - Deontological ethics
   - DNR (Do Not Resuscitate) decisions
   - Duty
   - Ethics
     - As the analysis of human behavior according to given principles, values, virtues, and/or according to specific methods of reasoning
     - As the rules or patterns of behavior expected within certain groups (e.g., professions, religious communities) or by virtue of holding a specific role

- Eugenics
- Euthanasia
- "Futile" treatment
- Hospital Ethics Committee
- Impaired physician
- Informed consent
- Institutional Review Board
- Justice
  - As 'distributive'
  - As 'retributive'
  - As 'commutative' (justice in transactions)
- Liability (including forms and limits of coverage)
- Malpractice
- Managed care
- Medical ethics
- Morality
- Natural law
- Natural rights
- Negligence
- Omission (morally not performing an act or not performing a moral act)
- Palliative care
- Paternalism (relation with patients)
- Peer review
- Physician-assisted suicide
- Pragmatism
- *Prima facie* duty
- Principles
- Privacy
- Quality assurance (and associated concepts such as Continuous Quality Improvement)
- Quality of life
- Research on human and animal subjects
- Right
  - As a 'negative right'
  - As a 'positive right'
- Rule
- Situation ethics
- Social contract
- Standard of care
- Surrogate decision-maker (proxy)
- Teleological ethics
- Tort
- Truthfulness
- Utilitarianism
- Utilization review (and related concepts)
- Values (patient defines benefit and quality)
- Virtue ethics
- Withdrawal or withholding treatment

2. Identify and evaluate similarities and differences between the ethical and the technical aspects of clinical decision making.

3. Specify the ethical and legal values and principles associated with the profession of surgery and clinical surgical decision-making.

4. Discuss ethical and legal considerations for the development and use of new technologies in human subjects, including stem cell research, cloning, and gene therapy.

5. Assess the professional and institutional resources and methods for managing ethical and legal issues including the management of conflict.

Section Two: The physician-patient relationship

1. Analyze and explain the ethical and legal characteristics of the physician-patient relationship, including:
   a. Establishing the relationship
   b. Maintaining the relationship, including continuity of care
   c. Observing a patient's right to privacy and the confidentiality of clinical information
   d. Severing the relationship; patient abandonment

2. Predict possible implications of 'managed care' on the traditional physician-patient relationship.

Section Three: The medical record

1. Analyze the ethical and legal considerations of the medical record by performing these tasks:
   a. Describe the essential components of a medical record that meet both clinical and legal requirements.
   b. Describe the role of the inpatient/outpatient medical record and its use as:
      (1) An accurate and complete account of the surgical management of a patient
      (2) A legal document
   c. Specify the legal implications of altering or destroying medical records.
   d. Identify the proper method of making corrections or additions to the medical record.

Section Four: Informed consent

1. Analyze the concept of informed consent by performing these tasks:
   a. Define competence, and discuss its application in obtaining informed consent.
   b. Determine how to ensure that patient consent to treatment is given voluntarily.
   c. Describe your institutional requirements for informed consent.
   d. Review the concept that physicians disclose all risks that would be considered material to the competent person (*Canterbury v. Spence*).
   e. Discuss the role of second opinion in surgical decision-making.
   f. Recommend a response to patient's refusal of recommended treatment.
   g. Discuss the ethical and legal issues associated with the performance of prophylactic surgery.
   h. Define the physician's responsibilities in the performance of experimental procedures.
   i. Define the ethical and legal obligations to inform patients of a physician's HIV status.

2. Analyze patient advance directives, including:
   a. Identify federal, state, institutional, and individual responsibilities under the Patient Self-Determination Act.
   b. Review statutory requirements for legally valid advance directives.
   c. Compare and contrast living wills versus durable powers of attorney

3. Summarize ethical and legal issues associated with death and dying, considering:
   a. "Do Not Resuscitate" orders
   b. Discontinuing or foregoing treatment
   c. Withholding or withdrawing life-prolonging medical treatment
   d. Nutrition and hydration
   e. Euthanasia
   f. Physician-assisted suicide
   g. Determination of death

Section Five: Professional responsibility

1. Formulate an appropriate approach to the management of:
   a. The impaired physician
   b. Physician error
      (1) Own error
      (2) Another's error

2. Explain the ethical and legal implications of refusing requested medical treatment under the following circumstances:
   a. Where treatment would be futile
   b. Where medical treatment poses risks to the physicians or others
   c. Where the physician opposes the treatment for moral reasons
   d. Where the physician opposes treatment for economic reasons

3. Identify the physician's ethical obligation to participate in:
   a. Medical review of individual physician/surgeon activities
   b. General evaluation of surgical therapies

4. Discuss the following aspects of medical staff appointment and disciplinary decisions:
   a. Role of economic credentialing
   b. Utilization review
   c. Implications of the American's with Disabilities Act

5. Review the confidentiality of medical peer review records and proceedings.

6. Discuss the responsibilities of the profession to provide access to healthcare.

7. Discuss political and social activism in the profession regarding:
   a. Membership and participation in professional associations
   b. Communication with legislators
   c. Community activism and education
   d. Participation in physician “union” activities

Section Six: Professional licensure and certification

1. Describe the processes and identify the agencies associated with:
   a. Residency program accreditation
   b. Physician/surgeon certification
   c. Licensure
   d. Credentialing

2. Assess the value of recertification.

Section Seven: Professional liability

1. Analyze the characteristics and issues involved in the current malpractice climate by performing the following tasks:
   a. Characterize the relationships between the legal and medical professions and the insurance industry in resolution of malpractice claims.
   b. Discuss the function and process of litigation in resolving malpractice claims.
   c. Summarize the issues and goals involved in legislative reform of the civil justice system in the area of professional liability.

2. Compare various types of professional liability insurance with regard to forms of coverage, limits of coverage, availability, and cost.

3. Outline the process of a medical liability action and the role of each of the following in the process:
   a. Subpoena
   b. Discovery
   c. Deposition
   d. Settlement
   e. Directed verdict
   f. Appeal

4. Outline the process of a medical malpractice trial.

5. Describe criteria for the entry of legal actions into the National Practitioner Data Bank.

6. Estimate the significance of the following variables:
   a. Potential litigious situations
   b. Malpractice avoidance/practice management techniques
   c. Corporate negligence or negligent credentialing
   d. Spoliation of evidence

7. Review the general rules for:
   a. Professional liability insurance carrier involvement
   b. Attorney selection
   c. Preparation of defense
   d. Role and selection of expert witnesses

8. Discuss the role, practices, and procedures of the following in reducing professional liability:
   a. Risk management
   b. Quality assurance

9. Review the legal aspects of *ex parte* contacts with attorneys representing physicians in malpractice actions.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Illustrate various moral concepts using examples from healthcare, especially those cases that have set a legal precedent or significantly influenced medical ethics (e.g., *Roe v. Wade*, Quinlan, Bouvia, Cruzan, Sakiewicz, Tuskegee Syphilis Study).

2. Describe the pluralistic nature of the United States and the role of healthcare as a 'public arena.

3. Determine the course of action to be followed in the event of a malpractice claim, including interaction with plaintiffs, lawyers, and insurance companies.

4. Outline the appropriate steps to take when one suspects that a colleague is impaired.

5. Identify the professional liability concerns of other members of the healthcare team, including nurses, pharmacists, dieticians, and other medical specialists.

6. Obtain proxy consent in appropriate cases, including those involving minors.

7. Demonstrate proper methods of correcting medical records.

8. Participate in discussions and decisions regarding the discontinuation or foregoing of treatment.

9. Ascertain patient and family wishes regarding discontinuation or foregoing treatment.

10. Write orders for treatment limitation in appropriate cases.

11. Participate in the identification and resolution of cases involving surgical error.

12. Determine the degree of personal involvement in professional liability issues.

13. Formulate a plan for involvement in the political and legislative arenas regarding civil justice reform of professional liability litigation.

14. Determine a personal plan for achieving recognition and certification in surgery or its subspecialties.

15. Participate in surgical case review activities.

16. Participate in utilization review activities.

17. Review options for reform of the U.S. healthcare system, and identify possible consequences of reform proposals for surgical practice, patient access to care, and the cost of healthcare.

The Ethical and Legal Issues in Surgical Practice unit was revised by Walter E. Pofahl, II, MD, from the Curriculum, third edition.

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