SURGICAL IMMUNOLOGY AND ORGAN TRANSPLANTATION

PART A: SURGICAL IMMUNOLOGY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Section One: General Immunologic Principles

1. Describe the basic concepts of the human immune system, including:
    a. Cells involved in host defense
    b. Central roles of lymphocytes and macrophages
    c. Their derivation from pluripotent stem cells
2. Summarize the major activities of the macrophage, its products of secretion, and its role as the antigen-presenting cell (APC).
3. Describe the ontogeny, function, and role in cellular immunity and graft rejection of the T-lymphocyte; demonstrate understanding of the T-cell receptor and its interaction with the human leukocyte antigen (HLA) complex.
4. Summarize the events in T-cell activation, including the roles of CD4+ and CD8+ cells and the release of involved interleukins.
5. Explain the development, differentiation, and function of B-lymphocytes in the formation of antibodies; outline and describe the functional anatomy of an immunoglobulin molecule.
6. Describe the immune functions of the spleen, liver, thymus, and bone marrow; summarize the impact of their manipulation on the immune system.
7. Describe immunological changes which occur in the elderly patient compared to a younger patient.

Section Two: Defenses against Infection

1. Describe the resident flora, mechanical barriers, local hormones, and chemicals of the epithelium in the following tracts involved in the body's defenses against infection:

    a. Gastrointestinal

    b. Respiratory

    c. Genitourinary

2. Describe the body's response to infection when:

    a. There has been no prior antigenic contact

    b. There has been prior contact

        (1) Passive and active immunization

        (2) T-cell memory activation

3. Explain the therapeutic and prophylactic roles of intravenous immunoglobulin and viral vaccines.

4. Distinguish between several known congenital and acquired immunodeficiency states, including sepsis and severe burns.

5. Describe tests of cellular immune integrity, including skin and laboratory tests of lymphocyte function.

Section Three: Clinical Immunology

1. Describe the mechanism of action and potential side effects of current immunosuppressive agents; state the rationale for their use and timing in transplantation and in other medical applications:

    a. Prednisone

    b. Cyclosporine

    c. Azathioprine

    d. Tacrolimus (FK5O6)

    e. Mycophenolatemofetil (RS6144)

f. Monoclonal antibody (Moab) use for induction

2. Differentiate between agents used to treat acute transplant rejection:

   a. Steroids

   b. Radiation therapy

   c. Poly- and mono- clonal antibodies

3. Summarize the role and preparation of monoclonal antibodies in the treatment of neoplastic lesions. Describe their application to clinical pathology and diagnostic and therapeutic oncology. Describe side effects and their treatment.

4. Explain the preparation, quality control, and application of polyclonal antibodies. Describe side effects and their treatment.

5. Outline an approach to the management of infection in immunocompromised patients resulting from:

   a. Iatrogenic immunosuppression secondary to drugs

   b. Natural immune deficiency states

   c. Impaired immunity secondary to cancer

6. Formulate a plan for management of immunosuppression in patients with severe surgical morbidity or complications.

Section Four: Trends in Immunology and Molecular Biology

1. Recognize new and investigational immunosuppressive drugs used for nontransplant medical conditions.

2. Summarize the current rationale and clinical status of novel oncologic treatments using biologic modifiers and immunomodulation; analyze their potential limitations and side effects.

3. Explain the manipulation of gene transplantation and describe several clinical applications currently being investigated.

4. Discuss the growing importance of molecular biology and the basic techniques of recombinant DNA technology to investigate problems in immunology, oncology, and pathology.

5. Explain the significance of transgenic animals, their creation, and potential application to experimental and clinical transplantation.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Participate in the perioperative management of immunosuppressive agents in chronically-medicated patients undergoing general surgery.

2. Plan and perform elective surgery in immunosuppressed patients with attention to minimizing infectious risks; perform emergent surgical intervention (treatment of perforated viscous) in similar high-risk patients.

3. Optimize patients' immune state secondary to systemic compromise following major surgery, burns, trauma, and malnutrition.

4. Recognize and treat wound infections and other complex disorders in chronically immunosuppressed patients undergoing elective and emergent surgery.

5. Monitor drug levels and side effects in immunosuppressants.

6. Participate in the care of patients receiving immunostimulatory medications (e.g., IV immunoglobulin [IVIG], granulocyte stimulating factor).

7. Describe differences in survival rate which occur in elderly patients compared to younger patients. Consider the following factors:

    a. Differences in work-ups that occur in elderly patients.

    b. Complications in elderly versus younger patients

PART B: ORGAN TRANSPLANTATION

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Section One: Background/Preparation

1. Demonstrate a working knowledge of the history and evolution of clinical transplantation, including:

a. Early vascular surgery

b. Concept of tolerance

c. First successful organ transplants

d. Introduction of immunosuppressive agents

2. Describe the anatomic and biologic terms associated with organ transplantation, donor and recipient relationships, and grafting between species.

3. Explain the human leukocyte antigen (HLA) complex, including its genetic location and composition, pattern of inheritance, and the difference between Class I and II antigens of the major histocompatability complex (MHC). Consider these aspects:

   a. Serological determination HLA

   b. Molecular methods of HLA

   c. Crossmatching

4. Discuss the role of tissue typing in the identification and preparation of patients for organ transplantation to include:

   a. Natural, pre-formed antibodies

   b. Acquired antibodies

   c. The role of panel reactive antibody (PRA)(sensitization)

   d. The effect of tissue typing compatibility on graft survival

5. Discuss advanced age as a positive consideration in solid organ transplantation by considering the importance of:

   a. Physiologic status vs. absolute age in years

   b. Rates of organ rejection and its severity among the elderly

   c. Elderly compliance with medical regimens

   d. Extended life expectancy

6. Compare the 5-year survival for patients aged 60 and older receiving a renal transplant with those undergoing dialysis.

7. Define the criteria for organ and tissue donation; apply these criteria to critically ill patients.

8. Explain the clinical definition of brain death, including a discussion of the available laboratory and radiologic studies to support the clinical criteria.

9. Analyze and formulate a plan for management of the organ donor.

10. Outline the development of organ preserving solutions and techniques, and describe the currently practiced methods for handling and storing vascularized organs.

Section Two: Clinical Transplantation

1. Discuss the current method for the allocation of organs for transplantation, including consideration of the need, availability, and philosophical biases surrounding organ donation. (Be prepared to utilize the algorithm for assigning organs based on the results of HLA typing, PRA, blood type, age, and time-waiting.)

2. Explain the united organ sharing (UNOS) method for assigning organs to potential recipients. Discuss how local procurement agencies function to optimize the donor organ pool and facilitate coordination of organ harvesting and their subsequent distribution.

3. Analyze and outline the indications for kidney, pancreas, heart, and lung transplant; relate the relative frequency of these operations as well as rates of patient and graft survival.

4. Specify the various drug schemes for induction, maintenance, and rejection therapy, including new "rescue" therapies.

5. Describe the mechanism of action, dosing schedule, and side effects of the following immunosuppressive drugs:

    a. Azathioprine

    b. Prednisone

    c. Anti-lymphocyte globulin

    d. Cyclosporine

    e. Anti-T3 monoclonal antibody

    f. Tacrolimus (FK506)

g. Anti IL-2R Moab

h. Mycophenolate mofetil

i. Rapamycin

6. Analyze the short- and long- term risks of chronic immunosuppression:

   a. Opportunistic infections
   b. Cardiovascular problems
   c. Autoimmune diseases
   d. Lymphoproliferative disease
   e. Rejection

7. Evaluate the diagnostic maneuvers to detect hyperacute, acute, and chronic organ rejection.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Evaluate potential candidates for living-related and cadaveric vascularized organ transplantation, including:

   a. Clinical suitability

   b. Strength of social support

   c. Expected graft and patient survival

2. Participate in the pre- and post- operative surgical management of patients after vascularized organ transplant.

3. Assist/perform kidney, pancreas, and heart transplantation.

4. Participate in the perioperative management of immunosuppressive drug therapy, including monitoring drug levels and treating potential toxicities.

5. Participate in the evaluation of patients suspected of organ rejection to include:

   a. Laboratory and radiologic testing

   b. Administration of immunosuppressive (IS) agents

   c. Following patients for potential acute and chronic side effects

6. Participate in the preparation and handling of multiple organ harvest in the brain dead patient.

7. Define suitability characteristics of organs for transplantation.

8. Formulate a response to these ethical questions:

   a. Should an individual with renal disease, who is 70-75 years old, have access to the scarce resource of cadaver kidneys?

   b. Should the surgeon reasonably consider renal transplantation in older recipients when the nephrologist contends that dialysis is the preferred method of treatment?

9. Manage postoperative surgical complications, including wound infection, anastomotic stenoses and leaks, and lymphocele formation.

SURGICAL ONCOLOGY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Discuss frequency/death rates of the top five benign and malignant neoplasms in men, women, and children in the United States .

2. Describe trends of increasing, decreasing, and high incidence for certain solid neoplasms.

3. Explain the implications of the heterogeneous cellular makeup of most solid neoplasms with reference to clinical behavior and response to adjuvant treatment.

4. Discuss the mechanisms of cellular apoptosis and the potential feasibility for therapeutic applications.

5. Identify genetic factors associated with neoplastic disease in regard to known proto-oncogenes.

6. Define current theories of carcinogenesis.

7. Summarize the tenets of tumor biology, including the biochemical events of invasion and metastasis; describe the natural history of these lesions.

8. Identify and differentiate between the diagnostic features of benign versus malignant neoplasms (gross and microscopic).

9. Predict patterns of presentation of malignant neoplasms.

10. Describe the characteristics of the various staging systems and explain their use in evaluating malignant neoplasms.

11. Outline the appropriate usage of tumor markers, tumor excretory metabolites, and diagnostic cytologic techniques.

12. Describe the principles of surgical technique for operative procedures designed for cure of malignant diseases and their application to endoscopic operative techniques.

13. Summarize the nutritional requirements for cancer patients, and describe how they differ from those recommended for a healthy patient.

14. Describe indications for curative versus palliative treatment, and formulate therapeutic plans for each approach.

15. Outline the status of the current predominant investigative work in cancer immunotherapy.

16. Explain the rationale for the use of heat shock proteins in conjunction with immunology.

17. Summarize current techniques of genetic screening for cancer.

18. Describe the biologic rationale, mechanisms, and current status of gene therapy for malignancy.

19. Describe the enzymatic determinants of prognosis for epithelial derived cancers and their biologic sources.

20. Discuss the economic and psychosocial issues associated with malignant disease, and analyze how they affect the management of patients with cancer, including:

    a. Ethics of cancer management

    b. Rehabilitation

    c. Home care resources

    d. Patient support groups

    e. Family support groups

f. Enterostomal therapy

g. Cost containment

h. Pre-admission procedures and authorization

i. Conservation of in-patient resources

j. Special problems of the elderly

k. Tumor registry data

21. Identify available social service and community agency resources to address the issues listed in #20 above.

Senior Level: PGY-III, PGY-IV, PGY-V

1. Apply clinical screening for common malignancies. Recognize typical presentations and clinical manifestations for different types of neoplasms.

2. Describe the stimuli for and the biologic events in angiogenesis and the potential therapeutic implications thereof.

3. Discuss the known facts relative to tumor suppressive genes and the implications of mutations.

4. Stage specific neoplasms both clinically and pathologically, including the tumor, nodes, and metastasis system (TNM).

5. Relate tumor staging to prognosis.

6. Describe differences in presentation, treatment, and outcomes for malignancy in older patients.

7. Compare each applicable treatment modality to the prognosis for tumors within the scope of general surgery.

8. Apply post-treatment screening/surveillance for common malignancies.

9. Discuss the known facts relative to tumor recurrence after local resection of a primary lesion of the breast and with regard to survival.

10. Identify margins of resection and how this relates to local recurrence.

11. Describe the indications for and actions of pharmacologic support in the postoperative state.

12. Describe the indications and means for implementing nutritional support in the pre- and post- operative cancer patient.

13. Explain the fundamental principles of radiation oncology and detail its application as a primary therapy for the treatment of selected benign and malignant lesions.

14. Summarize the indications and appropriate modalities for adjuvant therapy within the scope of general surgery, including chemotherapy, radiation therapy, immunotherapy, and gene therapy.

15. Describe radioimmunoguided surgery (RIGS) and its clinical applications.

16. Explain the rationale and methodology employed in lymphatic mapping and sentinel node biopsies along with the expected level of positive findings.

17. Understand the surgical options for venous access and oncologic care, and their risks/complications.

18. Describe the criteria and necessary procedures for intraoperative monitoring of cardiovascular and pulmonary functions of the cancer patient.

19. Analyze and explain an holistic approach to the treatment of patients with cancer.

20. Analyze the medical preparation of patients for cancer surgery to include the correction of metabolic and nutritional deficits.

21. Indicate the potential alterations in pulmonary function in the elderly patient which may affect preoperative preparation and postoperative management.

22. Identify the indications of anticipated need in elderly patients for:

    a. Postoperative urinary tract decompression

    b. Nutritional support

    c. Thromboembolism prophylaxis

23. Define and apply the criteria for palliative versus curative treatment plans.

24. Analyze and explain the rationale for combined adjuvant modalities in the prevention and treatment of cancer recurrence.

25. Apply proper clinical and demographic data to the tumor registry.

26. Outline the indications for and initiate requests for appropriate consultation.

27. Demonstrate a working knowledge of prior research milestones, current research efforts, and cancer research methodology.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Perform a complete history and physical examination on patients with cancer.

2. Formulate an appropriate differential cancer diagnosis, and record an independent, written diagnosis for each cancer patient assigned.

3. Excise benign lesions of skin, dermal appendages, and breast. Demonstrate proper wound care and follow-up management.

4. Excise skin cancers, demonstrating proper wound margins and appropriate wound closure and follow-up management.

5. Close wounds following major resections.

6. Manage colostomies and ileostomies.

7. Design an appropriate nutritional support program for a cancer patient both pre- and post- operatively.

8. First assist on colostomies, ileostomies, and wedge resections of lung and liver.

9. Perform lymph node biopsies, breast biopsies, and procedures of similar magnitude.

10. Cut en bloc gross surgical specimens.

11. Interpret frozen section slides with supervision.

12. Perform nutritional assessments and plan nutritional support programs.

13. Perform feeding gastrostomies and tube jejunostomies.

14. Record clinical and pathological correlations by presenting the clinical picture and operative findings on each assigned cancer patient.

15. Perform all varieties of endoscopy (upper and lower gastrointestinal) and bronchoscopy.

Senior Level: PGY-III, PGY-IV, PGY-V

1. Demonstrate the capability for independent function in all aspects of cancer patient management, including palliative care planning.

2. Prepare and defend the preoperative assessment plan for the elderly patient in preparation for:

    a. Gastric resection

    b. Colon resection

    c. Pancreatic resection (Whipple Procedure)

    d. Mastectomy

3. Stage specific neoplasms clinically and pathologically using the TNM system.

4. Prepare patients medically for cancer surgery, including correction of nutritional and metabolic deficits.

5. Specify and prepare management plans for nutritional support in the elderly patient. Indicate differences to be expected in requirements compared to patients less than 50 years of age.

6. Assess the need and institute appropriate monitoring both pre- and post- operatively.

7. Use appropriate support from pharmacologic agents.

8. Prepare an operative plan for treatment of malignant disease.

9. Perform colostomies, colostomy closures, and bowel anastomoses of all types.

10. Demonstrate proficiency in the use and interpretation of operative and endoscopic ultrasonography.

11. Demonstrate proficiency in fine-needle and core biopsies of the breast.

12. Demonstrate proficiency in endoscopic ultrasonography for detection of hepatic metastases and depth of invasion of colorectal lesions.

13. Demonstrate proficiency in gamma probe-directed or dye-directed sentinel lymph node biopsy for breast cancer and melanoma.

14. Assume responsibility for managing the psychosocial aspects of neoplastic disease.

15. Perform, with appropriate supervision, major resections in neck, chest, abdomen, breast, and extremity, including complex operative procedures (e.g., Whipple procedures, construction of ileal loop bladder, major neck dissections, segmental and lobar hepatic resections).

16. Utilize appropriate social agencies and support groups in cancer patient management.

17. Assume teaching responsibilities for junior residents as assigned.

18. Use laser therapy, photodynamic therapy, and cryotherapy when indicated, observing proper precautions.

19. Participate in a multidisciplinary tumor board.

BREAST SURGERY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Describe the anatomy of the breast.

2. Explain the hormonal regulation of the breast.

3. Summarize the incidence, epidemiology, and risk factors associated with breast cancer.

4. Distinguish between these common entities in the differential diagnosis of breast masses:

    a. Fibroadenomas
    b. Cysts
    c. Abscesses
    d. Fibrocystic disease
    e. Fat necrosis
    f. Cancer

5. Explain the general indications, uses, and limitations of mammography. Define the importance and impact of screening mammography.

6. Discuss the principles and historic context of the basic options available for the treatment of breast cancer such as:

    a. Radical mastectomy

    b. Modified mastectomy

    c. Lumpectomy and axillary dissection

7. Outline the genetic and environmental factors associated with carcinoma of the breast.

8. Describe the following pathological types of breast cancer, including the biology, natural history, and prognosis of each:

    a. Infiltrating ductal carcinoma

    b. Ductal carcinoma in situ (DCIS)

    c. Infiltrating lobular carcinoma

    d. Lobular carcinoma in situ

9. Describe the presentation, natural history, pathology, and treatment of the following benign breast diseases:

    a. Lactational breast abscess

    b. Chronic recurring subareolar abscess

    c. Intraductal papilloma

    d. Atypical epithelial hyperplasia

    e. Fibroadenoma

10. Explain the steps in the clinical decision tree that are involved in the work-up of a breast mass.

11. Discuss the role of mammography, needle aspiration, fine-needle biopsy, open biopsy, and mammographic needle localization and biopsy.

12. Explain the mechanics and potential value of the stereotactic needle biopsy.

13. Outline the diagnostic work-up and the differential diagnosis of various forms of nipple discharge.

14. Explain the use of tumor, nodes, and metastases (TNM) staging in the treatment of breast cancer.

15. Summarize the rationale for using a team approach to facilitate the complex discussions and explanation of options for the newly diagnosed breast cancer patient prior to definitive treatment (e.g., team of oncologist, surgeon, plastic surgeon, and radiation therapist).

16. Explain the role of reduction and augmentation mammoplasty.

17. Discuss several causes of gynecomastia and outline an appropriate work-up.

Senior Level: PGY-III, PGY-IV, PGY-V

1. Describe the characteristics, diagnosis, and therapy of less common lesions of the breast such as:

    a. Inflammatory carcinoma
    b. Paget's Disease
    c. Lactiferous duct fistula
    d. Mondor's Disease
    e. Cystosarcoma phylloides
    f. Bilateral breast carcinoma
    g. Male breast carcinoma

2. Understand the methodologies and results of landmark breast cancer trials: B-04, B-06, B-17, B-24 (NSABP)

3. Define appropriate breast conservation therapies, their benefits, and comparative outcomes, and compare them with modified radical mastectomy.

4. Summarize the role of adjuvant chemotherapy and radiation therapy for the treatment of primary breast carcinoma.

5. Outline the importance of estrogen and progesterone receptors in the prognosis and treatment of breast cancer.

6. Describe the basic issues in the staging and treatment of metastatic breast cancer, including the role of:

    a. Chemotherapy

b. Radiation therapy

c. Hormonal therapy

7. Summarize the physiologic changes associated with pregnancy, including breast problems peculiar to pregnancy. Theorize appropriate management of breast cancer diagnosed during pregnancy.

8. Formulate plans for basic patient care, including pre-, intra-, and post- operative care.

9. Summarize the major considerations for post-mastectomy breast reconstruction.

10. Identify and analyze the data addressing controversial areas of breast disease, such as:

    a. Current concepts in the management of cancer

    b. Cancer prevention techniques, such as tamoxifen and raloxifene

    c. Role of various adjuvant therapy programs.

    d. Biological behavior of lesions such as lobular carcinoma in situ

    e. Benefit and frequency of screening mammograms

    f. Relationship of mammographic parenchymal patterns to the risk of subsequent malignancy

11. Review and evaluate the following areas of research in breast disease:

    a. Role of breast cancer susceptibility genes

    b. Monoclonal antibodies

    c. Other breast markers, including Her-2/neu, cathepsin D, and flow cytometry with chromosomal analysis

12. Explain the role of sentinel lymph node biopsy for breast cancer

    a. Sensitivity and specificity

    b. Indication and contraindications

    c. Technique

    d. Treatment plan based on findings

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Take an appropriate history to evaluate breast patients to include:
    a. Pertinent risk factors
    b. Previous history of breast problems
    c. Current breast symptoms
2. Demonstrate an increasing level of skill in the physical examination of the breast, including recognition of the range of variation in the normal breast.
3. Perform simple procedures such as:
    a. Diagnostic fine-needle aspiration of cysts
    b. Drainage of simple breast abscesses
    c. Core needle biopsy of breast masses
    d. Open biopsy of superficial masses
4. Identify common lesions such as fibroadenomas, cysts, mastitis, and cancer.
5. Interpret signs suspicious for malignancy on mammogram such as stellate masses or suspicious microcalcifications.
6. Perform open breast biopsies and other operative procedures such as simple mastectomy and excision of intraductal papillomas, under direct supervision.
7. Demonstrate the ability to satisfactorily orient the surgical specimen for pathologic examination.
8. Determine the indications and special requirements for tissue processing for estrogen and progesterone receptors.
9. Educate patients to perform breast self-examination.
10. Demonstrate familiarity with male breast problems, including gynecomastia and male breast cancer.
    a. Discuss risk factors

b. Outline appropriate work-up and management

Senior Level: PGY-III, PGY-IV, PGY-V

1. Independently evaluate a new breast patient through history and physical examination, ordering appropriate and cost-effective tests such as mammogram, ultrasound, or fine-needle aspiration (FNA).

2. Formulate a diagnostic work-up and treatment plan for most common breast problems, including the common types of breast carcinomas.

3. Consult and interact with other members of the professional cancer team in explaining options to the newly diagnosed breast cancer patient.

4. Perform, under direct supervision, more advanced procedures on the breast such as:

   a. Radical mastectomy

   b. Modified mastectomy

   c. Lumpectomy and axillary dissection

   d. Sentinel lymph node biopsy

   e. Excision of lactiferous duct fistula

   f. Needle-localized breast biopsy

   g. Simple mastectomy for gynecomastia

5. Acquire basic experience with breast reconstruction and cosmetic surgical techniques.

6. Evaluate the physical status of patients who report for evaluation of augmentation and reduction mammoplasties.

7. Prescribe various types of adjuvant therapy such as:

   a. Chemotherapy
   b. Hormonal therapy
   c. Radiation therapy
   d. Biologic response modifiers

8. Manage unusual breast diseases such as:

   a. Inflammatory carcinoma
   e. Bilateral breast cancer

b. Paget's Disease

c. Lactiferous duct fistula

d. Mondor's Disease

f. Male breast cancer

g. Cystosarcoma phylloides

9. Describe the evolving role of bone marrow transplantation in the management of selected breast cancer patients.

10. Outline an appropriate follow-up schedule for patients who have undergone:

    a. Treatment of breast cancer with curative intent

    b. Treatment of DCIS

    c. Biopsy which revealed fribroadenoma, benign epithelial hyperplasia, or fibrocystic disease with atypia

BREAST DISEASE IN THE ELDERLY PATIENT

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

The resident should be able to:

1. Articulate currently accepted guidelines for breast cancer screening in the elderly patient.

2. Describe the demographics of breast cancer in the elderly

3. Describe currently accepted surgical treatment.

4. Discuss the use of adjuvant chemotherapy.

5. Describe the barriers that prevent adequate treatment in some elderly women.

6. Discuss appropriate modification of cancer therapy in the frail elderly woman.

7. Discuss the diagnostic evaluation of an elderly male with a breast lump.

8. Discuss the treatment of male breast cancer.

9. Discuss the role of hormonal therapy in older patients.

ENDOCRINE SURGERY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Describe the normal anatomy, histology, physiology, and pertinent biochemistry of the following organs:
    a. Thyroid gland
    b. Parathyroid gland
    c. Hypothalamus
    d. Pituitary gland
    e. Endocrine pancreas
    f. Adrenal glands
    g. Gastrointestinal tract as an endocrine organ
    h. Gonads as endocrine organs
2. Discuss fully the secretion and the control thereof of the following:
    a. Thyroxine and thyroid stimulating hormone
    b. Parathyroid hormone
    c. Adrenocorticotropic hormone (ACTH)/cortisol
    d. Insulin/glucagon
    e. Catecholamines (epinephrine, norepinephrine, dopamine)
    f. Gastrin/secretin/cholecystokinin
    g. Serotonin/histamine
    h. Estrogen/progesterone/testosterone (and their releasing factors)

i. Oxytocin/vasopressin

j. Growth hormone

k. Melanocyte stimulating hormone

l. Prolactin

m. Motilin/gastric inhibitory peptide/enteroglucagon/vasoactive intestinal peptide

n. Somatostatin

3. Summarize the following aspects of endocrine pathology:

   a. The criteria for the diagnosis of malignancy

   b. Chromosomal abnormalities as a screening/diagnostic tool

   c. The unique characteristics about the clinical epidemiology of patients with sporadic versus familial disease

   d. Define and differentiate multiple endocrine neoplasia (MEN) type I, MEN II, and familial non-MEN syndromes

   e. Fine-needle aspiration biopsy

   f. DNA ploidy

4. Explain the integrated concept of clinical neuroendocrinology, the cells and organs of the amine precursor uptake decarboxylase (APUD) system, and the known clinical endocrine syndromes.

5. Outline the approach to the surgical management of diseases of the endocrine systems:

   a. Is the treatment of each disease primarily surgical or medical?

   b. Is surgical treatment different for benign versus malignant disease?

   c. Is surgical treatment curative or palliative?

   d. Is surgical treatment directed at the target organ or primary organ?

   e. What role does lesion localization play in endocrine disorders?

6. Discuss the pathophysiology, clinical presentation, work-up, and treatment of the following diseases:

    a. A solitary thyroid nodule

    b. A multinodular thyroid gland

    c. Thyrotoxicosis

    d. Primary, secondary, and tertiary hyperparathyroidism

    e. Insulinoma/glucagonoma/vipoma

    f. Zollinger-Ellison syndrome

    g. Gastrointestinal carcinoid tumors

    h. Endogenous hypercortisolism (Cushing's syndrome vs. Cushing's disease; secondary to pituitary, adrenal, and ectopic causes)

    i. Pheochromocytoma

    j. Primary hyperaldosteronism

    l. The incidentally discovered adrenal mass

    m. Galactorrhea

    n. Gigantism/dwarfism

7. Discuss the preoperative preparation/management of the following:

    a. Hypercalcemic crisis

    b. Thyroid "storm"

    c. Grave's disease/Hashimoto's disease

    d. Pheochromocytoma

    e. Hyperaldosteronism

    f. Endogenous hypercortisolism

    g. Insulinoma/gastrinoma

h. Carcinoid syndrome

i. Adrenal insufficiency crisis

8. Outline the differential diagnosis of:

   a. Hypercalcemia

   b. Hypoglycemia

   c. Hypergastrinemia

   d. Elevated serum thyroxine level

   e. A decreased sensitive thyroid stimulating hormone (TSH) level

   f. Elevated ACTH levels

9. Discuss corticosteroid administration for elderly patients for diseases more common in that population. Explain the following disease entities as they relate to problems in the elderly patient:

   a. Cushing's syndrome

   b. Exogenous hypercortisolism

   c. Chronic alcohol abuse

   d. Chronic intake of self-administered "arthritis pills"

10. Discuss the surgical approaches to:

   a. The left adrenal gland

   b. The right adrenal gland

   c. The anterior pituitary gland

   d. The head of the pancreas

   e. The body/tail of the pancreas

   f. The inferior parathyroid glands

   g. The superior parathyroid glands

h. A retrosternal goiter

11. Identify and discuss areas of endocrine surgery in which patient management is controversial and areas in which change is taking place, including:

    a. Zollinger-Ellison syndrome

    b. Thyrotoxicosis

    c. Genetic screening for neuroendocrine syndromes

    d. Minimally invasive parathyroidectomy

12. Summarize key physiologic alterations of the neuroendocrine system that occur with normal aging. Include explanation of these alterations that can occur with advancing age:

    a. Plasma noradrenaline concentrations increase

    b. Steady decrease in aldosterone secretion

    c. Plasma renin activity declines

    d. Plasma cortisol levels significantly increase

13. Summarize significant issues in the management of anesthesia in endocrine surgery, including:

    a. Airway management during neck surgery

    b. Cardiovascular manipulation during thyroid and pheochromocytoma operations

    c. Special attention to electrolyte management

14. Critique the role of the following developments in the surgical management of endocrine problems:

    a. Localizing modalities (e.g., metaiodobenzylguanine [MIBG], sestamibi, selective venous sampling, intraoperative tumor localization, rapid parathyroid hormone [PTH] assays)

    b. Diagnostic assays (e.g., sensitive TSH, C-peptide, fine needle aspiration)

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Complete a preliminary evaluation of patients suspected of having endocrine disease to include:

    a. Focused history

    b. Family history

    c. Physical examination

    d. Appropriate relevant diagnostic studies

2. Participate in the pre- and post- operative care of patients undergoing endocrine surgery.

3. Observe endocrine surgery cases.

4. Perform a detailed evaluation of patients with suspected endocrine disease.

5. Manage the pre- and post- operative care of patients with endocrine disease, under supervision.

6. Observe and assist in surgery of the thyroid, parathyroid and adrenal glands, as well as those of the pancreas.

7. Spend quality time working under the direct supervision of a cytopathologist in the surgical pathology laboratory.

Senior Level: PGY-III, PGY-IV, PGY-V

1. Develop a comprehensive plan for the surgical management of endocrine disease.

2. Perform or assist in the performance of adrenal, pancreas, thyroid, and parathyroid surgery.

3. Evaluate patients with complex endocrine disease and present a differential diagnosis.

4. Perform surgery on the adrenals, pancreas, thyroid, and parathyroids.

5. Independently manage the diagnosis, pre- and post- operative care, and surgery for a variety of endocrine surgery cases.

6. Understand the indications for minimally invasive parathyroidectomy.

ABDOMINAL SURGERY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Describe the embryological development of the peritoneal cavity and the positioning of the abdominal viscera.

2. Diagram the anatomy of the abdomen including its viscera and anatomic spaces:

    a. Musculoskeletal envelope

    b. Lesser sac

    c. Subphrenic spaces

    d. Morrison's pouch

    e. Foramen of Winslow

    f. Pouch of Douglas

    g. True pelvis

    h. Lateral gutters

    i. Contents of the retroperitoneum

    j. Major lymph node groups and their drainage

3. Surgical outcome is dependent on coexistent disease. Describe changes in the following organ systems that result from the aging process:

    a. Heart

    b. Lung

    c. Kidney

    d. Brain

    e. Hematopoietic system

    f. Gastrointestinal tract

4. Explain absorption and secretory functions of the peritoneal surfaces and the diaphragm.

5. Describe the anatomy of the omentum and its role in responding to inflammatory processes.

6. Assess the following signs associated with the acute abdomen and describe their pathophysiology:

    a. Referred pain
    b. Rebound tenderness
    c. Guarding
    d. Rigidity

7. Specify characteristics of the history, physical examination findings, and mechanism of visceral and somatic pain for the following processes:

    a. Acute appendicitis
    b. Bowel obstruction
    c. Perforated ulcer
    d. Ureteral colic
    e. Diffuse peritonitis
    f. Biliary colic

8. List possible distinctions in the presentation and examination of the elderly patient with the following causes of acute abdomen:

    a. Perforated viscus
    b. Cholecystitis

9. Discuss the differences in the physiologic response to stress in the geriatric patient.

10. Explain the mechanism of referred pain in:

    a. Ruptured spleen
    b. Biliary colic
    c. Basilar pneumonia
    d. Renal colic
    e. Pancreatitis
    f. Inguinal hernia

11. Discuss the following causes of paralytic ileus:

    a. Postoperative electrolyte imbalance
    b. Retroperitoneal pathology
    c. Trauma
    d. Extraperitoneal disease (central nervous system, lung)

12. Illustrate use of the following diagnostic studies in the work-up of each process in #7 and #10 above:

    a. Laboratory evaluation

    b. Urinalysis

    c. Plain x-rays

    d. Contrast gastrointestinal (GI) studies

    e. Ultrasound

    f. Computed axial tomography (CAT)

    g. Biliary studies

    h. Renal studies

13. When considering the possibility of wound complications:

    a. What are the risk factors for abdominal wound infection?

    b. What are the contributing factors for abdominal wound dehiscence and evisceration?

    c. What are the usual clinical presentations and timing?

    d. What is the incidence of wound infection in surgeries involving the biliary tree, upper GI tract, and colon?

    e. List wound complications that are more problematic in the elderly patient.

14. Identify the anatomic locations for the following intra-abdominal abscesses; name disease process(es) associated with each:

    a. Left subphrenic space

    b. Right subphrenic space

    c. Subhepatic space

    d. Lesser sac

    e. Interloop

    f. Pelvis

    g. Left paracolic gutter

    h. Right paracolic gutter

    i. Psoas muscle

15. Differentiate between the conditions favoring percutaneous drainage versus operative drainage for each of the abscesses in #14. Describe the safest and most effective approach using each technique.

16. Differentiate between the following intestinal fistulas and the organs to which they most often communicate:

    a. Esophageal
    b. Gastric
    c. Enteric (including duodenal)
    d. Colonic

17. Explain the formation of fistulas in each of the following disease processes or factors:

    a. Operative complications (bowel injury with abscess formation)
    b. Inflammatory bowel disease
    c. Acute pancreatitis
    d. Foreign body or prosthetic material
    e. Malignancy

18. Explain the role of a fistulogram in the diagnosis of intra-abdominal fistulas and abscesses.

19. List the factors that prevent healing of a fistula.

20. Summarize the conditions favoring operative versus non-operative treatment for fistulas listed in #16.

21. Describe the anatomy, clinical presentation, and complications of non-operative management for these hernias:

    a. Direct and indirect inguinal, femoral, and obturator
    b. Sliding hiatal
    c. Paraesophageal
    d. Ventral
    e. Umbilical
    f. Spigelian

g. Paraduodenal

h. Richter's

i. Lumbar and Petit

j. Parastomal

k. Diaphragmatic

(1) Posterolateral (Bochdalek)

(2) Anterior (Morgagni)

(3) Traumatic

l. Internal

22. Name the hernia types that are most common in elderly patients, and explain how they may become problematic.

23. Define a Richter's hernia and describe its clinical presentation.

24. Define a sliding hernia and describe its repair.

25. Differentiate between incarceration and strangulation.

Senior Level: PGY-III, PGY-IV, PGY-V

1. Summarize the surgical procedures available for repair of the hernias listed in #21 above.

2. Outline the uses of prosthetic material and management of infection for incisional or recurrent hernias involving prosthetic material.

3. Construct a plan for the diagnosis and potential for surgical repair of the following congenital abdominal wall defects:

a. Gastroschisis

b. Omphalocele

c. Diastasis Recti

4. Discuss the management of umbilical hernia in infants.

5. Describe the indications for contralateral exploration in the repair of an inguinal hernia in an infant.

6. Explain the operative approaches for each of the following, including laparoscopic:

    a. Abdominal cavity: liver/biliary tract, spleen, small bowel, large bowel, and pelvis

    b. Retroperitoneal organs: kidneys, pancreas, adrenal glands, abdominal aorta

    c. Thoracoabdominal aorta

    d. Pericardial sac

7. Outline the techniques for wound closure (including type of suture material) for each of the incisions named in #6 immediately above.

8. Describe the use and method of placement of retention sutures.

9. Explain the rationale for and mechanics of techniques of peritoneal dialysis in:

    a. Renal failure

    b. Management of peritoneal infections or pancreatitis

10. Assess the treatment of secondary peritoneal infections due to peritoneal dialysis catheters.

11. Describe the pathophysiology and treatment of ascites in:

    a. Malignancy

    b. Hepatic disease: cirrhosis, Budd Chiari Syndrome

    c. Chylous leak

    d. Pancreatic leak

    e. Cardiac disease

    f. Renal disease

    g. Bile leak

12. Explain the indications for use and complications of peritoneo-venous shunts.

13. Describe the etiology, manifestations, and treatment of:

a. Desmoid tumors

b. Rectus sheath hematoma

c. Retroperitoneal fibrosis

14. Describe the more common retroperitoneal tumors, sarcomas, and liposarcomas. (What are their clinical presentations, treatments, and prognoses?)

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Perform, record, and report complete patient evaluation and assessment.

2. Evaluate and diagnose the acute abdomen.

3. Assist with hernia repairs in the groin or umbilicus, demonstrating a basic understanding of the anatomy and surgical repair.

4. Interpret the following in coordination with attending radiologists and staff:

   a. Acute abdominal series (identify free air, small bowel obstruction, ileus, colonic pseudo-obstruction, volvulus; the presence of ascites, atelectasis vs. pneumonia)

   b. Upper GI series

   c. Barium enema (identify neoplasms, signs of ischemia)

   d. Abdominal ultrasound and CT scans

5. Evaluate and institute management of abdominal wound problems, including:

   a. Infection

   b. Evisceration

   c. Fasciitis

   d. Dehiscence

6. Coordinate pre- and post- operative care for the patient with the acute abdomen.

7. Institute drainage for abdominal wall fistula and protection of surrounding structures, especially skin.

8. Assist in closure of abdominal incisions; exhibit competency in suture technique.

Senior Level: PGY-III, PGY-IV, PGY-V

1. Open and close abdominal incisions of all varieties.

2. Treat wound complications such as infections and evisceration. Use retention sutures appropriately.

3. Assist with thoracoabdominal and retroperitoneal exposures for access to kidneys, pancreas, aorta, iliac arteries.

4. Perform laparotomy for acute abdomen, demonstrating a systematic approach for determination of the etiology of the process via a systematic abdominal exploration and appropriate measures for its management (e.g., acute appendicitis, small bowel obstruction, perforated peptic ulcer [the 5th year resident should be able to guide the more junior resident through the case]).

5. Perform more complex laparotomies involving diffuse peritonitis in the septic patient (e.g., a gangrenous or severely inflamed gallbladder or perforated diverticulitis requiring resection).

6. Coach a junior resident through the repair of simple hernia (indirect inguinal or umbilical). (The chief resident should be able to perform repair of any of the hernias mentioned earlier in the text.)

7. Provide appropriate surgical drainage for any intra-abdominal abscess.

8. Serve as an effective surgical team leader.

ALIMENTARY TRACT AND DIGESTIVE SYSTEM

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Define the basic scientific principles of the alimentary tract and digestive system diseases to include:
    a. Anatomy, embryology, and biochemistry of the gastrointestinal (GI) tract

        (1) Embryologic development of primitive foregut and hindgut and its appendages, including normal rotation and fixation

        (2) Histology of alimentary tract, including differentiation of cell types

        (3) Anatomy of alimentary tract from esophagus to anus with emphasis on systemic blood supply, portal venous drainage, neural-endocrine axis, and lymphatic drainage

        (4) Abdominal anatomy, explaining its relationship to lower thorax, retroperitoneum, and pelvic floor

        (5) Mucosal transport, including mechanism of absorption of nutrients and water

        (6) Sites of electrolyte and acid-base regulation

    b. GI physiology

        (1) Physiology of deglutition and phases of digestion

        (2) Neuroendocrine control of GI secretion and motility

        (3) Regional controls of mucosal secretion and absorption (neural and hormonal)

        (4) Enterohepatic circulation

        (5) Neuromuscular control of defecation

        (6) Digestion of sugars, fats, proteins, vitamins, and cofactors

        (7) Rates of mucosal turnover

        (8) Nutritional needs of surgical patients

        (9) Normal secretory rates for the stomach, small bowel, biliary tree, and pancreas

    c. Normal bacterial flora and their concentrations in the upper and lower GI tract

d. Immunologic properties of the GI tract and how this barrier is affected by: trauma, sepsis, burns, malnutrition, and chronic disease

e. Principles of intestinal healing

(1) Normal GI tissue integrity and strength and how this relates to healing of anastomoses

(2) Effects of suturing and stapling techniques of the gut

2. Explain and give examples for the following aspects of gastrointestinal diseases:

a. Infections inside and outside the GI tract from esophagus to anus, including the peritoneum

b. Embryologic abnormalities of the GI tract, including:

(1) Strictures
(2) Stenoses
(3) Webs
(4) Atresias
(5) Duplications
(6) Malrotations

c. Congenital and acquired abnormalities of gut motility

d. Neoplasia of the GI tract

e. Ulceration of the proximal and distal GI tract

f. Causes of GI obstruction

g. Causes of paralytic ileus

h. Causes of GI hemorrhage

i. Causes of GI perforation

j. Causes of abdominal abscess formation or secondary peritonitis

k. Short gut and malabsorptive conditions

l. Acute and chronic mesenteric ischemia

m. Portal hypertension and venous thrombosis

n. Inflammatory bowel diseases

o. Causes of an acute abdomen

p. Management of intestinal ostomies

q. Traumatic injury to abdominal viscera

r. Ischemic bowel

3. Discuss some of the more common diseases of the esophagus in elderly patients, to include:

a. Motility disorders
b. Esophageal injuries
c. Diverticular disease
d. Inflammatory disease
e. Gastroesophageal reflux
f. Tumors (benign and malignant)

4. Outline the essential characteristics of routine and highly specialized diagnostic evaluation of the alimentary tract, including:

a. History

(1) Pain
(2) Nausea/emesis
(3) Bowel function
(4) Prior episodes
(5) Past surgical history

b. Physical examination:

(1) Inspection
(2) Auscultation
(3) Percussion
(4) Palpation

c. Radiologic examinations, including:

(1) Barium swallow

(2) Upper GI Series with small bowel follow-through

(3) Enteroclysis

(4) Ultrasound

(5) Transesophageal echo

(6) Computerized Tomography

(7) Magnetic Resonance Imaging

(8) Barium enema

(9) Angiograms

(10) Nuclear scans for bleeding or to evaluate for Meckle's diverticulum

d. Fiberoptic endoscopy

e. Rigid anoscopy and sigmoidoscopy

f. Tests of GI function including:

(1) Manometry

(2) pH measurement

(3) Gastric analysis (basal and stimulated)

(4) Radioisotope clearance studies

(a) Technetium 99m

(b) Technetium HIDA (hepatic 2,6-dimethyliminodiacetic acid) dynamic biliary imaging

(5) Gastric emptying studies

(6) Transit times

(7) Hormonal determinations

(8) Absorption

5. Summarize current medical management and its potential limitations; explain the role of surgical intervention when management fails in the following:

a. Peptic ulcer disease

b. Esophageal varices

c. Upper and lower GI bleeding

d. Gastroparesis

e. Inflammatory bowel disease

f. Diverticulitis

Senior Level: PGY-III, PGY-IV, PGY-V

1. Specify the pathophysiology of multisystem problems of the alimentary tract and digestive system, including neurohumoral and hormonal interactions.

2. Explain the physiologic rationale for the following gastrointestinal operations:

    a. Vagotomy

    b. Pyloroplasty

    c. Gastric resection for ulcer disease and reconstructive techniques

    d. Small bowel resection with anastomosis

    e. Ostomy formation

    f. Resection of GI tract segments with nodes for tumors

    g. Bypass of GI tract segments for resectable tumors

    h. Drainage of pancreatic cysts (internal vs. external)

    i. Drainage of abdominal and retroperitoneal abscesses (percutaneous vs. operative)

3. Detail the standard intraoperative techniques and alternatives associated with each of the above operations.

4. Explain the indications and contraindications for diagnostic and therapeutic endoscopy of the alimentary tract.

5. Assess alternatives to surgical intervention in the management of complex diseases of the alimentary tract and digestive system such as:

    a. Short gut syndrome

    b. Achalasia

    c. Barrett's esophagus

    d. Intestinal polyposis

    e. Inflammatory bowel disease

    f. Seropositive status for H. pylori

g. Multifocal atrophic gastritis in the elderly

6. Discuss the surgical ramifications of the following statement: "The expectation of more frequent vague gastrointestinal complaints by the elderly patient may delay presentation with significant illness and diagnosis."

7. Summarize the preoperative, intraoperative, and postoperative management of complex diseases of the alimentary tract and digestive system, including:

   a. Re-operative abdomen

   b. Failed peptic ulcer and reflux operation

   c. Management of post-gastrectomy syndromes

   d. High output GI fistulas

   e. Inflammatory bowel disease with strictures, pouches, ostomies, and perineal fistulas

   f. Recurrent colon malignancy

   g. Carcinomatosis

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Evaluate emergency department or clinic patients who present with problems referable to the GI tract.

2. Serve as assistant to the primary surgeon during operations of the esophagus, stomach, small intestine, colon, and anorectum.

3. Perform less complicated surgical procedures such as:

   a. Gastrostomy

   b. Meckel's diverticulectomy

   c. Appendectomy

d. Hemorrhoidectomy

e. Anal fissurectomy and fistulectomy

f. Incision and drainage of perirectal abscesses

4. Accept responsibility for (under the guidance of the chief resident and attending surgeon) the postoperative management of:

   a. Nasogastric tubes

   b. Intestinal tubes

   c. Intra-abdominal drains

   d. Intestinal fistulas

   e. Abdominal incisions (simple and complicated)

5. Evaluate and manage nutritional needs (enteral and parenteral) of surgical patients until normal GI function returns.

6. Provide follow-up care to the surgical patient in the outpatient clinic or surgical office.

Senior Level: PGY-III, PGY-IV, PGY-V

1. Perform initial consultation for inpatients with problems of the GI tract; develop differential diagnosis and initiate treatment plan.

2. Assist the chief resident and attending staff with complex digestive system cases.

3. Perform, under appropriate supervision, GI operations, including:

   a. Vagotomy

   b. Pyloroplasty

   c. Gastric resection and reconstructive techniques

   d. Small bowel resection with anastomosis

   e. Drainage of pancreatic cysts

f. Drainage of abdominal and retroperitoneal abscesses

g. Lysis of adhesions

h. Repair of enterotomies

i. Colon resection

j. Creation of ostomies

4. Develop diagnostic and therapeutic endoscopy skills such as:

   a. Diagnostic esophagogastroduodenoscopy

   b. Endoscopic control of GI bleeding

   c. Percutaneous endoscopic gastroscopy

   d. Dilation of intestinal strictures

   e. Assist with endoscopic retrograde cholangiopancreatography (ERCP)

   f. Diagnostic colonoscopy

   g. Polypectomy

5. Select and interpret appropriate pre- and post- operative diagnostic studies.

6. Assist junior residents in the diagnosis, surgical management, and follow-up care of patients with diseases of the alimentary tract and digestive system.

7. Coordinate intervention of multiple specialties that may be involved in management of complex GI problems such as:

   a. Variceal hemorrhage

   b. Biliary obstruction

   c. Chronic varices

   d. Inflammatory bowel disease

   e. Chronic abdominal pain

   f. Chronic constipation

g. Localized and advanced malignancies

8. Perform appropriate reoperative laparotomy for a variety of gastrointestinal problems.

9. Supervise postoperative care of GI and digestive tract surgical patients.

LIVER, BILIARY TRACT AND PANCREAS

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level: PGY-I, PGY-II

Liver and Biliary Tract

1. Describe the anatomy of the liver and biliary system, including commonly found variations.

2. Describe the physiology and function of liver and biliary system to include:

   a. Glucose metabolism
   b. Protein synthesis
   c. Coagulation
   d. Drug metabolism
   e. Reticuloendothelial system
   f. Function of bile in fat metabolism

3. Explain the formation of bile, its composition, and its function in digestion. Describe the pathophysiology of gallstone formation.

4. Correlate bile formation and composition with disease states affecting the biliary system such as gallstone formation and biliary obstruction.

5. Discuss the enterohepatic circulation of bile.

6. Outline the work-up and differential diagnosis of the jaundiced patient.

7. Identify the most significant determinants of mortality in elderly patients following cholecystectomy.

8. Discuss various types of liver cysts (echinococcal or hydatid, nonparasitic) and the appropriate management of each.

9. Discuss the principal characteristics of and the treatment for the following:
    a. Metastatic lesions to the liver
    b. Primary malignancies of liver and biliary tree
    c. Benign tumors of the liver
10. Summarize the etiologies and management of pyogenic and amebic hepatic abscesses.
11. Explain types of infectious hepatitis (A, B, C) with:
    a. Modes of transmission
    b. Diagnosis
    c. Time course for serologic conversion
    d. Natural course
12. Outline the pathophysiology, evaluation, and management of the following:
    a. Choledochal cysts
    b. Caroli's disease
    c. Sclerosing cholangitis
    d. Primary biliary cirrhosis
    e. Secondary biliary cirrhosis
    f. Cholangitis
    g. Gallstone ileus
    h. Gallstone pancreatitis
    i. Benign biliary strictures
    j. Acute cholecystitis
    k. Symptomatic gallstones
    l. Acalculous cholecystitis
    m. Biliary dyskinesia
    n. Congenital biliary atresia

Pancreas

1. Describe the anatomy of the pancreas, including regional vascular anatomy.
2. Summarize changes that occur in the anatomy of the pancreas with aging by considering:
    a. Duodenal C loop
    c. Atrophy of pancreas

b. Head of the pancreas d. Pancreatic ductal anatomy

3. Discuss the physiology of the pancreas, including endocrine and exocrine function and hormonal regulation.

   a. Endocrine--islet cells

      (1) Alpha (Glucagon)

      (2) Beta (Insulin)

      (3) Delta (Somatostatin)

      (4) Non-Beta (pancreatic polypeptide)

   b. Exocrine--acinar cells

      (1) Lipase

      (2) Amylase

   c. Hormonal regulation

      (1) Secretin--bicarbonate secretion

      (2) Cholecystokinin--enzyme secretion

4. Explain the pathophysiology of pancreatitis to include:

   a. Common etiologies such as:

      (1) Gallstones

      (2) Alcohol related

      (3) Trauma

      (4) Medications

      (5) Postoperative

      (6) Post endoscopic retrograde cholangiopancreatography (ERCP)

      (7) Idiopathic

   b. Diagnosis, evaluation, and medical management

c. Role of peritoneal lavage

d. Complications of pancreatitis, such as:

(1) Adult respiratory distress syndrome (ARDS; Acute lung injury-ALI also used)

(2) Hypovolemia

(3) Pseudocyst

(4) Abscess

(5) Sterile pancreatic necrosis

(6) Infected pancreatic necrosis

e. Indications for operative management of pancreatitis

f. Management of gallstone pancreatitis with timing of surgery

g. Methods of prognostic assessment

5. Describe the incidence of these diseases in the elderly patient:

a. Cholelithiasis

b. Acute gallstone pancreatitis

c. Pancreatic carcinoma

6. Explain the pathophysiology of carcinoma of the pancreas to include:

a. Typical history and presentation

b. Diagnostic evaluation using:

(1) Computed axial tomography

(2) Ultrasound

(3) ERCP

(4) Percutaneous transhepatic cholangiography (PTC)

(5) Arteriography

(6) Laparoscopy/laparotomy

c. Indications for:

(1) Operative versus nonoperative biliary drainage

(2) Percutaneous versus endoscopic stenting

(3) Resection

(4) Concomitant gastrojejunostomy with operative biliary bypass

7. Discuss presentation, evaluation, and management of pancreatic pseudocysts with attention to:

a. Complications of pseudocysts (hemorrhage, infection, rupture)

b. Timing of drainage

c. Percutaneous versus surgical drainage

d. Indications for external versus internal drainage

e. Choice of internal drainage procedure

8. Explain the diagnosis and management of pancreatic ascites.

Senior Level: PGY-III, PGY-IV, PGY-V

Liver and Biliary Tract

1. Analyze alternatives to surgery in the management of gallstones, such as:

a. Oral dissolution with ursodeoxycholic acid

b. Extracorporeal shock wave lithotripsy

c. Endoscopic sphincterotomy

2. Compare laparoscopic versus open cholecystectomy.

3. Analyze the potential significance of finding a filling defect on ultrasonography or liver scan in an elderly patient. Discuss:

    a. Frequency of metastatic cancer vs. primary tumors in liver

    b. Correlation between incidence of gastrointestinal malignancy and increasing age

4. Assess management alternatives for common bile duct stones:

    a. Open versus laparoscopic common bile duct exploration

    b. ERCP

5. Since acute cholecystitis is becoming one of the more common indications for emergency admissions of elderly patients to a surgical service, specify factors contributing to its being a more complex disease in elderly vs. young patients by considering:

    a. Incidence of comorbid disease such as diabetes

    b. Atypical clinical presentation (right upper quadrant pain, fever, leukocytosis)

    c. Signs of sepsis or septic shock

    d. Jaundice

    e. Altered mental status

6. Discuss the pathophysiology of hepatic cirrhosis and portal hypertension to include:

    a. Various etiologies of cirrhosis (alcohol and hepatitis)

    b. Differential diagnosis of portal hypertension (prehepatic, hepatic, posthepatic)

    c. Medical management of ascites, encephalopathy, and other complications of cirrhosis

    d. Child's classification of cirrhosis and its relationship to prognosis and surgical mortality

    e. Perioperative management of the cirrhotic patient

    f. Medical management of bleeding esophageal varices using Vasopressin, Sengstaken-Blakemore tube, sclerotherapy, and transjugular intrahepatic portosystemic shunts (TIPS)

g. Surgical management of bleeding esophageal varices to include:

(1) Selection of operative candidates

(2) Appropriate selection of procedures such as:

(a) Selective and nonselective shunts

(b) Devascularization procedures

(c) Esophageal transection

h. Surgical management of ascites with peritoneovenous shunts to include patient selection and complications

7. Discuss Budd-Chiari Syndrome (pathophysiology and management).

8. Outline indications and contraindications for liver transplantation in adults and children.

9. Explain factors important to the choice of treatment options for the elderly patient with hepatobiliary disease, including:

a. Cardiovascular disease
b. Cerebrovascular disease
c. Renal insufficiency
d. Systemic hypoperfusion
e. Curative/palliative procedure
f. Quality of life issues

Pancreas

1. Describe the etiology, pathophysiology, and management of chronic pancreatitis to include:

a. Indications for operative management

b. Selection of appropriate operative procedure such as:

(1) Longitudinal pancreaticojejunostomy (Puestow-Gillesby Procedure)

(2) Caudal pancreaticojejunostomy (Duval Procedure)

(3) Subtotal pancreatectomy

(4) Pancreatoduodenectomy

c. Role of celiac ganglion ablation (chemical splanchnicectomy) in pain control

2. Summarize the common sequelae of chronic pancreatitis to include pain, fat malabsorption, and diabetes.

3. Discuss diagnosis, evaluation, and surgical management of cystic neoplasms of the pancreas (mucinous and serous cystadenomas; cystadenocarcinoma).

4. Compare the probabilities of coexisting intra-abdominal pathology in elderly vs. younger patients. Consider:

a. Acute pancreatitis
b. Mesenteric ischemia
c. Gangrenous cholecystitis
d. Perforated viscus

5. Describe the diagnosis, evaluation, and surgical management of the following islet cell tumors of the pancreas:

a. Gastrinoma (Zollinger-Ellison Syndrome)

b. Glucagonoma

c. Somatostatinoma

d. Insulinoma

e. VIPoma (Verner-Morrison Syndrome, WDHA Syndrome)

6. Describe the diagnosis and management of pancreas divisum.

Chief Level: PGY-V

Liver and Biliary Tract

1. Detail the appropriate surgical management of any selected disorder of the liver or biliary tract.

2. Analyze the technical details of each surgical procedure and options that may be available with pros and cons of each.

3. Summarize the common complications associated with surgical management of liver and biliary tract disease.

4. Summarize the principles of perioperative management of liver and biliary tract disease.

Pancreas

1. Outline the appropriate surgical management of disorders of the pancreas to include:

    a. Pancreatoduodenectomy (Whipple Procedure)

    b. Distal pancreatectomy

    c. Total pancreatectomy

    d. Subtotal (distal 95%) pancreatectomy

    e. Longitudinal pancreaticojejunostomy (Puestow Procedure)

    f. Internal drainage of pseudocysts (cystogastrostomy, cystoduodenostomy, Roux-en-Y cystojejunostomy)

2. Explain the technical details of the above procedures, including the options available and the pros and cons of each.

3. Describe the common complications associated with surgical management of diseases of the pancreas.

4. Summarize the principles of perioperative management of diseases of the pancreas.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-I, PGY-II

Liver and Biliary Tract

1. Perform history and physical examination specifically focused on liver and biliary system.

2. Select and interpret appropriate laboratory and radiologic evaluations in the work-up of the jaundiced patient to include:

    a. Alkaline phosphatase, serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT), direct and indirect bilirubin, prothrombin time (PT) and partial thromboplastin time (PTT)

    b. Endoscopic retrograde cholangiopancreatography (ERCP)

    c. Percutaneous transhepatic cholangiography (PTC)

    d. Liver-spleen scan

    e. Hepatobiliary nuclear scan (HIDA)

    f. Oral cholecystogram (OCG)

    g. Ultrasound

    h. Computed axial tomography

    i. Arteriography

3. Assist in the perioperative management of patients undergoing hepatobiliary surgery.

4. Assist in management of patients with bleeding esophageal varices including the use of:

    a. Vasopressin

    b. Sengstaken-Blakemore tube

    c. Sclerotherapy

5. Perform uncomplicated hepatobiliary surgery under supervision, such as cholecystectomy, both laparoscopic and open, with operative cholangiography.

6. Assist in more advanced hepatobiliary operations.

Pancreas

1. Perform history and physical examination focused on the pancreas.

2. Select and interpret appropriate laboratory and radiologic examinations in evaluation of pancreatic disease, including:

    a. Serum amylase and lipase

    b. Urinary amylase

    c. Computed axial tomography

    d. Ultrasound

    e. Endoscopic retrograde cholangiopancreatography (ERCP)

    f. Arteriography

3. Assist in management of patient with acute pancreatitis.

4. Assist in perioperative management of patients undergoing pancreatic surgery.

5. Perform minor pancreatic procedures under supervision such as external drainage of pseudocyst or internal drainage via cystgastrostomy.

Senior Level: PGY-III, PGY-IV, PGY-V

Liver and Biliary Tract

1. Perform detailed evaluation of patients with liver and biliary disease and plan appropriate management and operative approach.

2. Perform, under supervision, increasingly complex hepatobiliary surgery:

    a. Laparoscopic cholecystectomy with cholangiography

    b. Common bile duct exploration with choledochoscopy

    c. Biliary drainage procedures, such as:

        (1) Choledochoduodenostomy

        (2) Roux-en-Y and loop choledochojejunostomy

        (3) Cholecystojejunostomy

        (4) Sphincteroplasty

d. Drainage of liver abscess

e. Peritoneovenous shunts

f. Complicated cholecystectomy--acute, gangrenous

g. Simple liver resection

Pancreas

1. Perform detailed evaluation of patients with pancreatic disease and plan appropriate medical or surgical management.

2. Perform increasingly complex pancreatic surgery such as:

   a. Internal drainage of pseudocysts with Roux-en-Y cystojejunostomy

   b. Longitudinal pancreaticojejunostomy (Puestow Procedure)

   c. Distal pancreatectomy

   d. Biliary bypass for carcinoma

Chief Level: PGY-V

Liver and Biliary Tract

1. Coordinate overall care of patients with hepatobiliary disease including:

   a. Initial evaluation

   b. Appropriate diagnostic studies

   c. Indicated consultations

   d. Operative management

2. Perform complex hepatic and biliary surgery:

   a. Anatomic liver resection

   b. Portosystemic shunts:

(1) Portocaval, end-to-side and side-to-side

(2) Mesocaval

(3) Distal splenorenal (Warren)

(4) Central splenorenal

c. Complicated procedures on extrahepatic bile ducts for:

(1) Cholangiocarcinoma

(2) Choledochal cyst

(3) Benign biliary stricture

d. Liver transplant

e. Kasai procedure (hepatoportoenterostomy)

3. Supervise and instruct junior house staff in minor hepatobiliary procedures.

Pancreas

1. Coordinate overall care of patients with complex pancreatic disease, including initial evaluation, appropriate diagnostic studies, and operative management of:

a. Pancreatic abscess and infected pancreatic necrosis

b. Cystadenomas

c. Periampullary carcinoma

d. Endocrine tumors of the pancreas

2. Perform complex pancreatic procedures such as:

a. Whipple resection

b. Total or subtotal pancreatectomy

c. Operative debridement and drainage of pancreatic abscess or infected necrosis

d. Surgical exploration for islet cell tumors of the pancreas

e. Local resection for ampullary tumors

3. Supervise and instruct junior house staff in minor pancreatic procedures.

VASCULAR SURGERY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Describe human arterial and venous anatomy.
2. Describe basic arterial and venous hemodynamics.
3. Discuss the anatomy, pathology, and pathophysiology of the arterial wall.
4. Review and describe the basic clinical manifestations of the following vascular disorders:
   a. Obstructive arterial disease
   b. Aneurysmal arterial disease
   c. Thromboembolic disease--arterial and venous
   d. Chronic venous insufficiency and lymphatic obstruction
   e. Portal hypertension
   f. Congenital vascular disease
5. Assess patients' vascular systems using appropriate skills in history-taking and clinical examination.
6. Describe the relationship of the following disorders/practices to atherosclerotic vascular disease:
   a. Diabetes mellitus
   b. Hypertension
   d. Congestive heart failure
   e. Hyperlipidemia

c. Renal failure
f. Smoking

7. Describe life-threatening signs of vascular disease and indicate when immediate intervention is required.

8. Differentiate between the following diagnostic tools available for assessing vascular disease and explain the relative contribution of each:

   a. Angiography

   b. Computed axial tomographic (CAT) scanning

   c. Magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA)

   d. Duplex scanning (ultrasonography)

9. Analyze and be prepared to explain the following concept: vascular disease, and specifically arterial disease may be diffuse and clinically silent, but it still represents a major threat to the patient.

10. Summarize the etiology and therapeutic options of specific categories of vascular disease:

    a. Venous disease

       (1) Varicose vein disease
       (2) Post-phlebitic syndrome
       (3) Thromboembolic disease
       (4) Pulmonary embolism
       (5) Portal hypertension

    b. Lymphatic disease

       (1) Anatomy of lymphatic system and lymphatic return

       (2) Congenital lymphatic anomalies

       (3) Acquired lymphatic disease

       (4) Operative procedures for correction of lymphatic disease

    c. Arterial disease

       (1) Atherosclerosis and its related disorders

       (2) Aortic and other vascular aneurysms

(3) Inflammatory vascular disease

(4) Atherosclerotic vascular disease

(5) Arterial embolic disease

(6) Arteriovenous fistulas or malformations

(7) Extracranial cerebrovascular disease

(8) Neurovascular compression syndromes (thoracic outlet syndrome)

(9) Visceral ischemic syndromes

(10) Renovascular hypertension

(11) Degenerative arterial disease

(12) Trauma

(13) Interactions of cardiovascular and pulmonary systems

d. Pathophysiology of peripheral vascular disease

(1) Arterial stenosis

(2) Aneurysmal disease

(3) Arteriovenous fistulas (local and cardiac hemodynamic effects)

(4) Venous thrombosis

e. Interaction of cardiovascular and pulmonary systems

f. Miscellaneous

(1) Tumors

(2) Sympathetic nervous system

(3) Congenital vascular syndromes

11. Outline the principles of non-invasive laboratory diagnosis; include a description of the role and limitations of the vascular laboratory.

12. Discuss basic principles of Doppler ultrasound in preparation for performing bedside arterial and venous Doppler testing.

13. Outline the principles of care for ischemic limbs.

14. Describe the natural history of medically treated vascular disease in the following categories:

    a. Carotid arterial stenosis

    b. Abdominal aortic aneurysm

    c. Chronic femoral artery occlusion

15. Summarize principles for the preoperative assessment and postoperative care of patients undergoing major vascular surgical procedures.

16. Outline the fundamental elements of nonoperative care of the vascular patient, including the role of risk assessment and preventive measures.

17. Indicate the role of anticoagulant agents, including antiplatelet agents, in the management of patients with vascular disease.

18. Analyze the role of the endothelium in atherosclerosis, thrombosis, and thrombolysis.

19. Describe the hemodynamics and pathophysiology of:

    a. Claudication

    b. Transient ischemic attack (TIA)

    c. Stroke

    d. Mesenteric angina

    e. Angina pectoris

    f. Renovascular hypertension

    g. Arteriovenous (AV) fistula

20. Explain the concept of critical arterial stenosis.

21. Differentiate between acute arterial and acute deep venous occlusion.

22. Discuss the principles of angiography to include the following considerations:

a. Indications and complications (including contrast-induced renal failure)

b. Principles and techniques of intraoperative angiography

c. Principles and techniques of emergency room angiography

23. Discuss the principles of and contraindications for anticoagulation and thrombolytic therapy.

24. Describe the surgically correctable causes of hypertension and their diagnostic modalities.

25. Explain the risk:reward ratios of surgical care for patients with vascular disease.

26. Discuss the mechanics of action and the therapeutic role of the following pharmacologic types of agents:

    a. Vasopressors

    b. Vasodilators

    c. Adrenergic blocking agents

    d. Anticoagulants

    e. Antiplatelet agents

    f. Thrombolytics

27. Illustrate the general principles of vascular surgical technique including:

    a. Vascular control and suturing

    b. Endarterectomy

    c. Angioplasty

    d. Bypass grafting

28. Determine a plan for assessment of operative risk in these categories:

    a. Cardiac

    b. Pulmonary

    c. Renal

    d. Metabolic

    e. Levels of anesthetic risk

29. Discuss clotting factors and how they interact (coagulation cascade).

30. Discuss the role of the following factors in maintaining homeostasis in the coagulation pathways:

    a. Protein S
    b. Protein C
    c. Platelets
    d. Platelet granules
    e. Endothelial cell
    f. Antithrombin III

31. Describe the use of adjunctive measures in the management of patients with vascular disease such as:

    a. Antibiotics
    b. Anticoagulants
    c. Thrombolytic agents
    d. Antiplatelet agents

32. Review the costs associated with providing surgical care to patients with vascular disorders.

Senior Level: PGY-III, PGY-IV, PGY-V

1. Identify and describe vascular anatomy and regional anatomy related to vascular disease.

2. Discuss the broad range of vascular illnesses, including congenital vascular disease and diseases of the venous and lymphatic systems.

3. Explain the physiologic and organic manifestations of vascular disease, such as renovascular hypertension, portal hypertension, and renal failure.

4. Differentiate between the different operative approaches to the vascular system to include:

    a. Incisions and exposure
    b. Handling of vascular tissues
    c. Principles of vascular bypass grafting
    d. Emergency vascular surgery
    e. Reoperative vascular surgery

f. Principles of endarterectomy

g. Endovascular techniques

5. Illustrate the operative exposure of the major vessels, including:

   a. Aortic arch
   b. Proximal subclavian
   c. Carotid artery
   d. Descending thoracic aorta
   e. Suprarenal aorta
   f. Infrarenal aorta
   g. Femoral artery
   h. Popliteal artery

6. Outline the indications for operations for claudication, abdominal aortic aneurysm, carotid stenosis, and amputation.

7. Describe the indications for balloon angioplasty and vascular stent placement with its risks and complications.

8. Describe the pathogenesis and complications of aneurysmal disease.

9. Summarize the etiology, microbiology, and treatment of diabetic foot infection.

10. Categorize the prevention and management of operative and postoperative complications, including graft infections, ischemic bowel, graft thrombosis, and extremity ischemia.

11. Outline the manifestation of failing peripheral vascular grafts, contrasting angioplasty with reconstruction and amputation.

12. Discuss the principles of reoperative vascular surgery.

13. Outline procedures for managing vascular surgical emergencies such as acute tissue ischemia or major hemorrhage (traumatic or ruptured aneurysm).

14. Summarize the characteristics of congenital arterial, venous, and lymphatic diseases.

15. Analyze the options for treatment of patients with chronic venous insufficiency and venous ulceration.

16. Demonstrate a basic knowledge of the various types of graft and suture material available.

17. Analyze alternative measures for the diagnosis and management of renovascular hypertension.

18. Discuss alternative operative procedures for the management of portal hypertension.

19. Summarize the surgical techniques available for managing the following vascular disorders:

    a. Abdominal aortic bypass or aneurysmectomy

    b. Carotid stenosis

    c. Femoral-popliteal occlusion

    d. Tibial artery occlusion

20. Analyze the management of complex vascular problems considering the following factors:

    a. Morbidity and mortality

    b. Advanced surgical techniques

        (1) Endoscopy

        (2) Microvascular techniques

21. Review critical factors for decision making in vascular surgery:

    a. Risk:reward ratio

    b. Morbidity and mortality probability

    c. Preoperative and postoperative assessment

    d. Non-invasive laboratories, duplex scanning

    e. Role of advanced radiologic techniques: Angioplasty, CT scanning, MRI/MRA imaging

22. Apply the decision making process in analyzing complex vascular diseases, including the following:

    a. Cerebrovascular problems

    b. Mesenteric vascular disease

    c. Renovascular disease

d. Aneurysmal disease

e. Lower extremity arterial occlusion

f. Venous disease

23. Outline the management of prosthetic graft infections, including:

a. Diagnosis

b. Use of alternate routes for revascularization

c. Use of alternative graft materials

24. Summarize complications of common major vascular procedures such as:

a. Carotid endarterectomy

b. Aortic reconstruction

c. Lower extremity vascular reconstruction

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Evaluate patients for vascular disease.
2. Demonstrate skill in basic surgical techniques, including:

a. Knot tying

b. Exposure and retraction

c. Knowledge of instrumentation

d. Incisions

e. Closure of incisions

f. Handling of graft material

3. Participate in surgery for varicose vein disease, including:
    a. Ligation and stripping
    b. Management of venous stasis ulcers
    c. Management of venous thrombosis
4. Participate in amputations with specific attention to:
    a. Demarcation levels
    b. Control of toxicity
5. Demonstrate proficiency in venous access procedures.
6. Demonstrate the ability to perform arterial access or arterio-venous access, including:
    a. Incisions
    b. Closure of incision
7. Obtain vascular control of diseased or traumatically occluded blood vessels using:
    a. Vascular clamp
    b. Vessel loop
    c. Balloon occlusion
8. Participate in thromboendarterectomy and thrombectomy.
9. Demonstrate appropriate vascular suture techniques.
10. Evaluate and manage sympathectomy procedures.
11. Perform the preoperative assessment and postoperative care of patients undergoing major vascular surgical procedures.

Senior Level: PGY-III, PGY-IV, PGY-V

1. Demonstrate the appropriate incisions and exposure of:

a. Abdominal aorta and its major branches

b. Portal venous system

c. Peripheral arterial system

d. Carotid arterial system

e. Arteriovenous fistula

2. Obtain vascular control of major vessels

   a. Aorta b. Vena cava

3. Participate in endarterectomy and bypass grafting.

4. Demonstrate ability to manage graft and suture materials.

5. Perform selected operative procedures or selected parts of the following operative procedures under supervision:

   a. Aortic aneurysm repair

   b. Carotid endarterectomy

   c. Aorto-iliac occlusive disease

   d. Femoral popliteal occlusive disease

   e. Correction of portal hypertension

   f. Peripheral vascular trauma

6. Discuss and demonstrate the role of adjunctive measures in operative procedures including angioscopy, and thrombolytic therapy.

7. Select and use proper advanced techniques in managing patients with a variety of vascular disorders such as:

   a. Ruptured aortic aneurysm

   b. Central vascular trauma

   c. Supra-renal aortic aneurysm

   d. Renovascular hypertension

e. Femoral tibial bypasses

8. Perform alternative methods of bypass grafting such as:

   a. Extra-anatomic bypass, principles and techniques

   b. Indirect revascularization

   c. In situ techniques

   d. Sequential and composite techniques

9. Manage prosthetic graft infections to include:

   a. Diagnosis

   b. Selection of alternate routes for revascularization

   c. Selection of appropriate graft materials

   d. Timing

10. Manage complications of common major vascular procedures such as:

    a. Carotid endarterectomy

    b. Aortic reconstruction

    c. Lower extremity vascular reconstruction

VASCULAR DISEASE IN THE ELDERLY PATIENT

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level: PGY-I, PGY-II

A. Demonstrate knowledge of the pathophysiology of abdominal aortic aneurysm (AAA) in the elderly patient with respect to:

1. Incidence in patients 65-85 years old

2. Annual growth rate and natural history of untreated AAA

3. Incidence of rupture and risk factors associated with increased incidence of rupture

4. Mortality rate of elective AAA replacement in selected elderly patients in comparison with the younger population

5. Mortality rate of emergent AAA replacement in elderly patients in comparison with the younger population

6. Concept of chronological age vs. physiological age and the medical risk factors that increase the risk of AAA replacement such as cardiac disease, pulmonary insufficiency and chronic renal failure

7. Perioperative cardiac screening and optimization of medical condition

8. Preservation of the quality of life following AAA replacement in elderly patients

9. Screening and diagnostic tests for AAA and the association between AAA and iliac, popliteal, and femoral aneurysms

10. Approaches to AAA replacement

11. Concept of endovascular aortic aneurysm replacement and its investigational status

B. Knowledge of the manifestation and management of lower extremity occlusive disease in the elderly patient with respect to:

1. Ability to differentiate the symptoms of arterial claudication from neurogenic or venous claudication

2. Natural history of intermittent claudication; the effects of smoking, diabetes, hypertension, and degree of ischemia upon presentation on the future risk of amputation

3. Role of exercise, risk factor modification, and drug therapy in the management of claudication; their mechanism of action and their limitations

4. Definition of rest pain and the risk of amputation if untreated

5. Different presentation of the elderly patient with single and multilevel arterial disease

6. Interpretation of noninvasive tests used for evaluating lower extremity ischemia:

a. Arm brachial index (ABI)

b. Segmental pressures

c. Toe pressures

d. Transcutaneous oxygen tension.

7. ABI changes in patients with claudication, rest pain, tissue loss

8. Limitations of the ABI in diabetic patients and the value of toe pressure measurements

9. Predicting healing of an amputation based on noninvasive testing

10. Morbidity, mortality, and ambulation rates after a major amputation in elderly patients

11. Accepted indications for primary amputation in elderly patients

12. Morbidity, mortality and patency rates of the revascularization options for aortoiliac occlusive disease:

    a. Aorto bifemoral bypass
    b. Axillo femoral bypass
    c. Femoro femoral bypass
    d. Balloon angioplasty
    e. Primary stenting

13. The patency rate and limb salvage rate following infrainguinal revascularization using autogenous veins and prosthetic conduits for:

    a. Femoro-above knee popliteal bypass

    b. Femoro-below knee popliteal bypass

    c. Femoro-tibial bypass

14. Limitations and patency rates of balloon angioplasty in infrainguinal occlusive disease

15. Mortality and morbidity of distal revascularization in octogenarians

C. Demonstrate knowledge of the manifestation and management of carotid disease in the elderly patient with respect to:

1. Significance of stroke as cause of mortality and disability in elderly patients
2. Risk factors for stroke development
3. Changes in stroke incidence with every decade of life
4. Contribution of carotid disease to the incidence of stroke
5. Significance of carotid bruit in elderly patients
6. Proven measures for stroke prevention
7. Advantages and disadvantages of diagnostic methods (duplex ultrasonography, angiography, MRA, intracranial doppler and CT scan)
8. Role of duplex ultrasonography in assessing the degree of carotid disease
9. Measurements of the degree of carotid stenosis based on angiography
10. Natural history of asymptomatic vs. symptomatic carotid disease
11. Benefits of Carotid endarterectomy in symptomatic patients
12. Benefits of Carotid endarterectomy in asymptomatic patients.
13. Risk of stroke or death following CEA in asymptomatic patients, patients with TIA, and patients with prior stroke
14. Mortality and morbidity of CEA in octogenarians
15. Limitations of the prospective randomized CEA trials with respect to the octogenarians

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Senior Level: PGY-III, PGY-IV, PGY-V

A. Demonstrate the ability to provide competent care to elderly patients with AAA with respect to:

1. Management of concomitant intra-abdominal pathology such as cholelithiasis, colonic cancer, renal tumors, and prostatic disease

2. Ability to recognize and treat possible postoperative complications, such as myocardial infarction, distal embolization, and ischemic colitis

3. Importance of preserving pelvic circulation through reperfusion of at least one hypogastric artery, the significance of previous colectomy, and the indications for reimplantation of the inferior mesenteric artery

4. Management of concomitant renovascular occlusive disease, mesenteric occlusive disease, or suprarenal extension of the aneurysmal pathology

B. Demonstrate knowledge of the management of carotid disease in elderly patients with respect to:

1. Effect of ulceration, degree of stenosis, and presenting symptoms on the risk of stroke in patients with symptomatic carotid disease managed medically without CEA

2. Effect of life expectancy and female gender on the benefits of CEA in asymptomatic patients

3. Causes of stroke during CEA

4. Understanding the etiology of recurrent carotid disease and the indications for intervention

5. Causes and management of stroke during and after CEA

6. Investigational role of carotid angioplasty and stenting in the management of carotid disease

SURGICAL ENDOSCOPY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Review normal anatomy and physiology of the gastrointestinal tract, airway, mediastinum, and thorax.

2. Demonstrate a working knowledge of the anatomical landmarks in the following organs. Describe and contrast the normal and pathological appearance of the:

   a. Esophagus
   b. Stomach
   c. Duodenum
   d. Small bowel
   e. Colon
   f. Airways
   g. Mediastinum
   h. Thorax

3. Identify the indications for endoscopy and common pathological conditions outlined below:

   a. Esophagus

      (1) Classes of esophagitis
      (2) Esophageal varices
      (3) Barrett's Esophagus
      (4) Neoplasms (benign/malignant)
      (5) Ulcers
      (6) Strictures
      (7) Infections

   b. Stomach

      (1) Ulcers: benign/malignant
      (2) Gastric varices
      (3) Gastric polyps: benign/malignant
      (4) Erosive gastritis
      (5) Gastric outlet obstruction
      (6) Gastric Bezoar
      (7) Marginal ulcer
      (8) The postoperative stomach

   c. Duodenum

(1) Ulcers

(2) Polyps: benign/malignant

(3) Inflammatory conditions (Duodenal Crohns)

(4) Tumors of the duodenum and ampulla of Vater

d. Small bowel

(1) Indications for enteroclysis

(2) Ileal Crohns

(3) Angiodysplasia

(4) Leiomyoma

e. Large bowel

(1) Polyps: benign and malignant; sessile and polypoid

(2) Diverticulosis/Diverticulitis

(3) Inflammatory conditions

(a) Ulcerative colitis

(b) Crohns Colitis

(c) Pseudomembranous colitis

(4) Intestinal ischemia

(5) Tumors: benign and malignant

(6) Melanosis Coli

4. Identify the various anatomical landmarks during endoscopy:

a. Esophagus

GE jnc/Z-line

b. Stomach

(1) Cardia
(2) Fundus
(3) Body
(4) Incisura angularis
(5) Antrum
(6) Pylorus

c. Duodenum

(1) Duodenal bulb
(2) Duodenal mucosa
(3) Papilla of Vater

d. Colon

(1) Rectum
(2) Sigmoid
(3) Descending
(4) Splenic flexure
(5) Transverse
(6) Hepatic flexure
(7) Ascending colon
(8) Ileocecal valve
(9) Cecum, confluence of tinea coli, and appendiceal orifice

5. Describe the fundamental mechanics and physics of endoscopic equipment and accessories (e.g., rigid and flexible scopes, multichannel scopes, types of snares, and biopsy forceps).

6. Be familiar with the routine operation of endoscopes and their support systems, including:

a. Ability to troubleshoot minor malfunctions

b. Knowledge of established procedures for cleaning, sterilization, and routine handling

7. Summarize methodological issues in endoscopy to include:

    a. Patient preparation
    b. Intubation
    c. Biopsy techniques
    d. Cytology techniques
    e. Specimen handling
    f. Polypectomies

8. Review surgical journals (e.g., SAGES publications) and other medical and surgical sources of information regarding screening, diagnostic, and therapeutic uses of various endoscopic procedures.

9. Understand the various access techniques for laparoscopic surgery, including:

    a. Veress needle
        b. Closed
        c. Open
    d. Optical trocars
    e. Combination techniques

10. Describe factors that account for the principal physiologic effects and benefits of laparoscopy, including:

    a. Reduced tissue trauma
    b. Carbon dioxide pneumoperitoneum
    c. Use of Helium, Argon, or Nitrous oxide
    d. Gasless laparoscopy

11. Outline the indications for performing diagnostic and therapeutic:

    a. Laryngoscopy
    b. Bronchoscopy
    c. Colonoscopy
    d. Laparoscopy
    e. Choledochoscopy
    f. Esophagogastroduodenoscopy (EGD)
    g. Proctosigmoidoscopy
    h. Thoracoscopy
    i. Mediastinoscopy

12. Summarize the use of sedatives (conscious sedation) and analgesics during endoscopic procedures, including:

    a. Mode of onset
    b. Principles of monitoring
    c. Side effects
    d. Reversing agents
    e. Monetary considerations

13. Describe potential advantages of thoracoscopy over an open procedure, discussing:

    a. Pain
    b. Length of hospital stay
    c. Tissue trauma
    d. Costs (hospital, disability, additional procedures)
    e. Cosmesis

14. Analyze the purpose of established guidelines for the management of various gastrointestinal disease states as developed by:

    a. Society for Surgery of the Alimentary Tract (SSAT)
    b. Society of American Gastrointestinal Endoscopic Surgeons (SAGES)
    c. American Society for Gastrointestinal Endoscopy (ASGE)

Senior Level: PGY-III, PGY-IV, PGY-V

1. Explain the pathophysiology of disease entities in which proctosigmoidoscopy, rigid or flexible, is indicated, including:

    a. Ulcerative colitis
    b. Crohns Disease
    c. Rectal polyps and tumors
    d. Pseudomembranous colitis
    e. Ischemic colitis
    f. Rectal ulcers
    g. Anorectal tumors
    h. Sigmoid volvulus

2. Differentiate between the following therapeutic maneuvers utilizing the endoscope:

    a. Dilatation

    b. Laser ablation

    c. Endomucosal resection

    d. Sclerotherapy

    e. Electrocautery (bipolar, monopolar, heater probe)

    f. Polyp excision

3. Analyze the use of endoscopes in the diagnosis and treatment of upper and lower gastrointestinal hemorrhage.

4. Assess the complications that may result from flexible endoscopic procedures, including:

    a. Hemorrhage

    b. Perforation and the various causes

5. Determine and categorize the essential features of a wide variety of diseases as seen through the endoscopes listed in #8 above.

6. Evaluate the uses of laparoscopy in surgical procedures to include:

    a. Indications and contraindications

    b. Technical and procedural considerations.

    c. Post-procedure care

    d. Comparison of open and laparoscopic procedures in regards to morbidity and mortality

    e. Complications

7. Understand the significance of laparoscopy and endoscopy in elderly patients:

    a. Elective, corrective action

    b. Sedation

c. Continuous monitoring

d. CO_2 effects

e. Length of stay

8. Assess the significance of physiologic effects of Carbon dioxide pneumoperitoneum, including:

a. Heart rate
b. Mean arterial blood pressure
c. Systemic vascular resistance
d. Central venous pressure
e. Decrease in venous return
f. Cardiac output
g. Cardiac index

9. Identify potential complications of thoracoscopic pulmonary resection, describing the significance of:

a. Pneumothorax
b. Air leak
c. Air embolism
d. Lung injury
e. Infection
f. Equipment malfunction

10. Summarize the legal and ethical issues associated with the use of endoscopic procedures.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-II

1. Observe flexible and rigid endoscopic procedures.
2. Under supervision, manipulate the endoscope for routine endoscopic procedures.
3. Discuss pathological findings and their significance as they relate to the patient's clinical history or condition.
4. Observe and monitor appropriate anesthetic techniques used to sedate the patient.
5. Prepare patients for various routine and elective endoscopic procedures.

6. Under supervision, demonstrate proper cleansing and sterilization of endoscopic instruments.

7. Participate in hands-on experience in rigid sigmoidoscopy in the operating room and in the endoscopic suite or clinic.

8. Distinguish between the indications for use and the preparation methods of the following:

    a. Biopsy
    b. Smears (cytologic)
    c. Culture
    d. Cytology

9. Use the flexible sigmoidoscope under direct supervision, beginning with elective cases.

10. Use models to improve eye-hand coordination and experience with endoscopic instruments, including:

    a. Computer simulators

    b. Trainer boxes

    c. Inanimate models

    d. Animal models

11. Assist in the performance of diagnostic and therapeutic:

    a. Esophagoscopy (rigid and flexible):

    b. Esophagogastroduodenoscopy (EGD)

    c. Colonoscopy

    d. Laparoscopy

    e. Bronchoscopy

    f. Thoracoscopy

    g. Mediastinoscopy

    h. Endoscopic retrograde cholangiopancreatography

i. Operative choledochoscopy

Senior Level: PGY-II, PGY-III, PGY-IV, PGY-V

1. Demonstrate, under proper senior supervision, the performance of a rigid proctosigmoidoscopy.

2. Observe, recognize, and interpret normal and abnormal findings by the use of the endoscopic procedures listed in #11 immediately above.

3. Perform flexible sigmoidoscopy under supervision.

4. Perform uncomplicated therapeutic endoscopic maneuvers under direct supervision such as:

    a. Excision of pedunculated colonic polyps

    b. Performance of percutaneous endoscopic gastrostomy (PEG)

5. Perform all portions of esophagoscopy, esophagogastro-duodenoscopy, and colonoscopy under supervision.

6. Perform the following uncomplicated endoscopic procedures independently with supervision available if needed:

    a. Rigid and flexible sigmoidoscopy

    b. Anoproctoscopy

7. Initiate and correlate the management of surgical patients who require various endoscopic procedures.

8. Demonstrate knowledge of the indications and contraindications for various medications used at your institution in the preparation and performance of endoscopic procedures.

9. Describe and demonstrate knowledge of the anatomy of the biliary tree as it relates to the use and limitations of the choledochoscope.

10. Assist in therapeutic endoscopic procedures such as:

    a. Sclerotherapy of esophageal varices

b. Electrocoagulation of upper and lower bleeding lesions

c. Removal of foreign bodies

d. Endoscopic polypectomy

e. Percutaneous gastrostomy

11. Observe and assist in more complicated therapeutic procedures such as:

a. Coagulation of mucosal ulcers

b. Palliative treatment of intestinal malignancies

c. Palliative stent placement

12. Describe the indications for and employ the best use of rigid and flexible bronchoscopy in patients, including:

a. Evacuation of mucous plugs

b. Brush biopsy techniques

c. Collection of bronchoscopic washings for culture and cytology

d. Removal of foreign bodies from the respiratory tract

e. Biopsy of endobronchial masses

MINIMAL ACCESS SURGERY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Section One: Overview

1. Differentiate between conventional open and scope-assisted surgery, including:

a. Anesthetic considerations

b. Effects of pneumoperitoneum

c. Cardiovascular stability

d. Need for team participation

e. Differences in patient outcome

2. Discuss the physical limitations imposed on the user participating in minimal access surgery, including:

   a. Surgeon fatigue and diminished proficiency over time

   b. Two-dimensional perspective

   c. Visual limitations of scope and monitoring equipment

   d. Crucial importance of patient position and cannula position for optimum exposure

3. Understand strategies to offset the difficulties suggested in #2 above, including:

   a. Proper alignment of eye-camera-instrument axes

   b. Efficient biomechanics

   c. Effective use of assistants

   d. Appropriate use of other advanced technologies such as endoscopic ultrasound

5. Analyze the factors affecting the decision to select a minimal access approach (as opposed to an open surgical approach) for a particular clinical problem.

6. Explain the concept of the learning curve, and discuss the need for quality control in the education and evaluation of surgical housestaff in developing proficiency in minimal access surgery.

7. Explain the mechanics and principles for safe and effective use of the following equipment/procedures:

   a. Cautery (monopolar and bipolar)

   b. Ultrasonic shears

   c. Laser

   d. Telescopic direction (straight and angled laparoscope)

   e. Insulation technique and hazards

f. Maintaining visualization of operative field

g. Dissecting and knot tying

8. Discuss appropriate anesthetic management for minimal access (MA) techniques for surgery involving the abdomen, thorax, and joints and soft tissue spaces.

9. Summarize areas of current investigation in MAS, including:

   a. Virtual reality

   b. Use of robots/robotics

   c. Three-dimensional imaging systems

   d. Dissection techniques for soft tissues

10. Summarize protocols for appropriate cleaning, sterilization, maintenance, and handling of MA equipment.

11. Discuss the potential economic impact of increased utilization of operating room time, advanced equipment, and disposable instruments on health care costs.

Section Two: Basic Laparoscopic Skills

1. Discuss techniques for gaining access to the abdomen, including:

   a. Veress needle

   b. Open (Hassan cannula)

   c. Direct visualization trocars

2. Describe the sequence of steps involved in establishing a pneumoperitoneum, including:

   a. Selection of first puncture site

   b. Initial entry via Veress needle or Hassan cannula

   c. Tests to confirm entry into peritoneum

d. Initial insufflation

e. Initial exploration of abdomen

f. Placement of additional trocars

3. Discuss indications for and limitations of diagnostic laparoscopy, as well as pros and cons of this diagnostic technique compared with other diagnostic modalities such as CT scan or ultrasound.

4. Discuss recognition and management of complications, including major vascular injury, massive Carbon dioxide embolus, or visceral injury.

5. List contraindications for laparoscopic surgery, and be able to explain why these conditions are considered relative or absolute contraindications.

Section Three: Laparoscopic Cholecystectomy (LC)

1. Discuss the indications and contraindications for laparoscopic cholecystectomy.

2. Describe the technical aspects of preparing for and operating on a patient undergoing LC.

3. Identify major considerations for the decisions involved in converting from laparoscopic to open cholecystectomy, including:

   a. Difficulty identifying anatomy (i.e., common duct)

   b. Poor visibility

   c. Hemorrhage control

4. Select management options for handling bile duct injuries, including immediate and delayed diagnosis and treatment.

5. Specify the indications and technique for percutaneous cholangiography, endoscopic ultrasound, and common bile duct exploration (CBDE), including use of choledochoscopy.

6. Discuss management of the patient with common duct stones, including:

   a. Choice of approach (open common duct exploration, versus laparoscopic CBDE, versus LC followed by/preceded by endoscopic stone extraction)

b. Timing of surgery

c. Safety and cost-effectiveness of each approach

Section Four: Additional Laparoscopic Procedures

1. Describe current theories, including advantages and disadvantages, regarding the use of laparoscopic anti-reflux procedures and myotomies.

   a. Discuss advantages and limitations of thoracoscopic versus laparoscopic approach for esophagomyotomy.

   b. Discuss indications and contraindications for addition of partial fundoplication to esophagomyotomy.

   c. Describe management of paraesophageal hernia.

2. Outline the potential benefits and limitations to:

   a. Laparoscopy-assisted colectomy

   b. Pre- and trans- peritoneal groin hernia repairs

   c. Laparoscopic ventral hernia repair

   d. Appendectomy

3. Summarize other intra-abdominal laparoscopic procedures currently being performed, including:

   a. Adrenalectomy

   b. Gastrectomy

   c. Splenectomy

   d. Donor nephrectomy

Section Five: Thoracoscopic Procedures

1. Identify the potential applications of thoracoscopic surgery, including:

a. Pulmonary resection

b. Lung biopsy

c. Pleurectomy/decortication

d. Esophageal surgery

e. Sympathectomy

2. Discuss anesthetic management of a patient undergoing thoracoscopy.

3. Discuss pros and cons of thoracoscopic versus open surgery for pulmonary disease.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Provide assistance in laparoscopic surgery (e.g., manage camera, first assist).

2. Demonstrate familiarity with laparoscopic equipment, including setup and trouble-shooting:

   a. Insufflator

   b. Camera

   c. Video equipment

3. Demonstrate understanding of basic principles of patient positioning and room setup for diagnostic laparoscopy and LC.

4. Perform entry of body cavities using open (Hassan cannula) and closed (Veress needle) access techniques.

5. Recognize when satisfactory pneumoperitoneum has been achieved. Demonstrate familiarity with danger signs (e.g., hypotension, hypercarbia) and appropriate action when patient does not tolerate pneumoperitoneum.

6. Perform MAS procedures of increasing complexity under supervision, including:

   a. Diagnostic laparoscop

b. LC

c. Laparoscopic appendectomy

d. Other procedures not requiring suturing or other advanced techniques

7. Demonstrate facility with laparoscopic suturing and knot-tying using a box trainer or other simulator.

8. Demonstrate the ability to convert from an MA to an open approach in a variety of surgical settings.

9. Perform appropriate preoperative work-up, and supervise postoperative care of patients undergoing laparoscopic procedures.

Senior Level: PGY-III, PGY-IV, PGY-V

1. List equipment needed for complex procedures, select instruments needed, set up room (including patient position) and equipment, troubleshoot equipment when malfunction occurs.

2. Demonstrate facility in endoscopic knot-tying, stapling, and suturing, either in a box-trainer, an animal model, or the operating room.

3. Participate in increasingly complex procedures under supervision, such as:

   a. Laparoscopic hiatal hernia repair

   b. Laparoscopic surgery for achalasia

   c. Laparoscopic splenectomy

   d. Laparoscopic inguinal hernia repair

4. Demonstrate understanding of uses of endoscopic ultrasound and other intraoperative adjuncts.

5. Complete additional MAS training as necessary through specialized courses at the home or outside institution to certify one's proficiency in performing currently practiced and widely accepted procedures.