NEONATAL SURGERY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level: PGY-I, PGY-II

Learn the embryology, anatomy and physiology of common neonatal surgical diseases:

1. Describe the cardiac, pulmonary, blood volume, and gastrointestinal changes of post-partum transitional physiology.

2. Describe relevant mechanisms (conductive, convective, evaporative, and radiant) of neonatal thermoregulation.

3. Describe how neonatal renal function (decreased concentrating ability) affects the pharmacokinetics of commonly used drugs and antibiotics.

4. Describe factors influencing neonatal immunologic immaturity and how this increases susceptibility to common neonatal pathogens.

5. Describe appropriate fluid and electrolyte management of the full-term neonate.

6. Describe the nutritional requirements of the full-term neonate, and calculate appropriate enteral and parenteral nutritional support.

7. Describe the embryology of neonatal organ systems and their common congenital anomalies, including:

    a. Craniocervical: dermoid cysts, branchial cleft cysts, and fistulas

    b. Foregut: esophageal atresia/tracheoesophageal fistula, duodenal atresia

    c. Respiratory: cystic adenomatoid malformation, congenital diaphragmatic hernia

    d. Cardiac: common cyanotic and acyanotic cardiac malformations

    e. Midgut: intestinal atresia, malrotation, meconium ileus

    f. Hindgut: Hirschsprung's disease, imperforate anus, meconium plug syndrome, small left colon syndrome

    g. Body wall defects: gastroschisis, omphalocele, umbilical and inguinal hernias

    h. Renal: ureteral obstruction, vesicoureteral reflux

i. Lower GU tract: urethral valves, hypospadias

8. Explain the pathophysiology of necrotizing enterocolitis.

9. Describe the arterial and venous anatomy of the neonate.

Diagnose common neonatal problems and describe surgical procedures for their correction:

1. Describe the diagnosis, preoperative evaluation, and management of the common congenital anomalies listed above.

2. Outline the technical principles involved in the following procedures:

   a. Gastrostomy

   b. Colostomy

   c. Inguinal and umbilical herniorrhaphy

   d. Circumcision

   e. Central venous access

3. Explain the perioperative care of neonates, including:

   a. Basic ventilator management

   b. Fluid, electrolyte, and nutritional management

   c. Correction of coagulopathies

   d. Indications for transfusion

   e. Diagnosis of sepsis and antibiotic use

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Perform a comprehensive evaluation of a neonate with suspected surgically correctable conditions.

2. Establish percutaneous venous and arterial access in neonates over 2 kg.

3. Assist or perform under supervision:

    a. Peripheral venous and arterial cutdown access

    b. Placement of umbilical catheters

    c. Placement of central venous access

    d. Tube thoracostomy

    e. Incision and drainage of cysts and abscesses

    f. Hernia reduction

4. Participate in the perioperative care of the neonate by recording appropriate assessments and treatment plans in daily progress notes, including:

    a. Ventilator management

    b. Fluid, electrolyte, and nutritional management

    c. Antibiotic use

5. Complete oral or written examination of topics listed in junior level knowledge objectives.

6. Assist or perform surgical repairs of congenital diseases listed in junior-level knowledge objectives.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

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

Learn the embryology, anatomy, and physiology of basic and advanced neonatal surgical diseases. The resident is responsible for all conditions listed above in junior-level objectives, plus:

1. Describe the pathophysiology and evaluation of:

    a. Respiratory distress

    b. Cyanosis

    e. Bilious emesis

    f. Abdominal distention

c. Gastroesophageal reflux

d. Jaundice

g. Bloody diarrhea

h. Body wall defects

2. Describe the complications and appropriate treatment of necrotizing enterocolitis.

3. Describe appropriate fluid and electrolyte management of the premature neonate.

4. Describe the nutritional requirements of premature neonates, and calculate appropriate enteral and parenteral nutritional support.

5. Describe the embryology of basic anomalies (listed above) and more complex congenital anomalies, including:

a. Craniocervical: choanal atresia, cleft lip and palate

b. Foregut: laryngotracheal cleft, duodenal web and duplication, annular pancreas, preduodenal portal vein, biliary atresia

c. Respiratory: congenital lobar emphysema and sequestrations

d. Cardiac: complex cyanotic and acyanotic cardiac malformations

e. Midgut: intestinal duplication, volvulus, meconium peritonitis

f. Hindgut: neuronal intestinal dysplasia, total colonic and ultrashort Hirschsprung's disease, cloacal exstrophy

g. Body wall defects: pentalogy of Cantrell, Jeune's thoracic dystrophy

h. Renal: renal agenesis, fusion and ectopia; bladder exstrophy, prune-belly syndrome

i. Lower GU tract: ambiguous genitalia, urogenital sinus abnormalities

Diagnose common neonatal problems and describe surgical procedures for their correction:

1. Describe the diagnosis, preoperative evaluation, operative management, and postoperative care of the congenital anomalies listed above.

2. Describe the immediate care, operative correction, and postoperative management of life-threatening anomalies:

a. Congenital diaphragmatic hernia

b. Midgut volvulus

c. Necrotizing enterocolitis

d. Gastroschisis

e. Prune-belly syndrome

3. Describe respiratory support of the neonate, including high frequency ventilation and extracorporeal membrane oxygenation.

4. Describe neonatal nutritional assessment and supervision of long-term nutritional support for neonates with short-gut syndrome.

5. Describe indications for and technical aspects of endoscopic evaluation of the neonate.

6. Describe indications for and technical aspects of intubation, tube thoracostomy, and percutaneous central venous access in the neonate.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

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

1. Describe the capabilities and limitations of various diagnostic modalities used in neonatal care.

2. Formulate a care plan for neonates with problems such as:

a. Respiratory distress

b. Cyanosis

c. Gastroesophageal reflux

d. Jaundice

e. Bilious emesis

f. Abdominal distention

g. Bloody diarrhea

h. Body wall defects

3. Perform or assist in all major surgical procedures performed on the pediatric surgical service.

4. Personally conduct comprehensive preoperative evaluation and postoperative management for all critically ill neonates, and direct junior residents in the management of routine surgical problems.

5. Complete oral or written examination of topics listed in senior-level knowledge objectives.

PEDIATRIC SURGERY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Describe the development of children in terms of the following criteria:

    a. Weight, length, and head size

    b. Nutritional requirements

    c. Renal function

    d. Hormonal influences on development

    e. Response to stress and infection

2. Classify congenital malformations of the newborn by type, origin, and the need for surgical intervention:

    a. Head and neck: thyroglossal duct cyst, lymphadenopathy, cystic hygroma

    b. Gastrointestinal: pyloric stenosis, appendicitis

    c. Respiratory: tracheal lesions

    d. Abdominal wall defects: omphalomesenteric and urachal malformations

    e. Genitourinary: polycystic kidneys, undescended testis, torsion of the testis

    f. Inborn and genetic errors: trisomy 13, trisomy 18, Down's syndrome

    g. Orthopedic anomalies which commonly occur with other malformations

4. Summarize the basic approach to the diagnosis and management of more common surgical problems of infancy and childhood, such as:

    a. Pyloric stenosis

b. Perforated appendicitis

c. Intussusception

5. Identify the technical aspects of the following procedures:

a. Excision of skin and subcutaneous lesions

b. Incision and drainage of abscesses

c. Lymph node biopsy

d. Chest tube placement

e. Oral intubation

f. Herniorrhaphy in older children

6. Describe the fundamental considerations in the pre- and post- operative care of infants and children in the cases listed above.

7. Explain the principles of diagnosis and treatment for common causes of gastrointestinal hemorrhage in the neonate, infant, child, and adolescent.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Evaluate surgical conditions in the pediatric population through a comprehensive history, physical examination, and appropriate diagnostic studies.

2. Participate in the management of simple surgical problems in the pediatric population, including:

a. Integument

(1) Excision of skin and subcutaneous lesions

(2) Incision and drainage of abscesses

b. Head and Neck

(1) Excision of dermoid cysts and small skin lesions

(2) Lymph node biopsy

c. Thoracic

(1) Chest tube placement

d. Cardiovascular

(1) Central venous catheter placement

(2) Venous cutdown

(3) Arterial line placement

e. Gastrointestinal

(1) Pyloromyotomy

(2) Appendectomy

(3) Herniorrhaphy (umbilical; inguinal in patients 2 years and up)

f. Genitourinary

(1) Circumcision

(2) Orchiopexy

g. Gynecology

(1) Oophorectomy, simple

(2) Vaginoscopy for foreign body or biopsy

h. Musculoskeletal

(1) Ganglion cyst excision

(2) Excision of supernumerary digit

(3) Muscle biopsy

3. Develop a working relationship with members of the pediatric intensive care unit in managing postoperative pediatric patients.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

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

Learn the embryology, anatomy, and physiology of basic and advanced neonatal surgical diseases. The resident is responsible for all conditions listed above in junior-level objectives, plus:

1. Explain the approach to surgical management, (i.e., diagnosis, perioperative care, surgical therapy, and postoperative follow-up) of more complex surgical procedures for infants and children such as:

    a. Large skin grafts and musculocutaneous flaps

    b. Thoracotomy for pulmonary resection and vascular cardiac repair

    c. Flexible endoscopy

    d. Antireflux procedure

    e. Bowel resection

    f. Repair of hepatic, biliary, and pancreatic injury

    g. Splenectomy and splenorrhaphy

    h. Management of the seriously injured patient

2. Analyze the pathophysiology, diagnosis, and management options in the treatment of short-gut syndrome.

3. Demonstrate an understanding of the special psychological, social, and education issues confronting selected pediatric trauma/ postoperative patients.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

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

1. Evaluate pediatric patients for problems requiring more complex surgical intervention.

2. Participate in preoperative, operative, and postoperative care of more complex problems in pediatric surgery such as:

a. Integument

(1) Pedicle graft

(2) Large skin grafts for burns

(3) Subcutaneous mastectomy

b. Craniocervical

(1) Branchial cleft and thyroglossal duct cysts

(2) Cystic hygroma

c. Thoracic

(1) Laryngoscopy, bronchoscopy, esophagoscopy

(2) Tracheostomy

(3) Thoracotomy for biopsy, lung resection

(4) Diaphragm repair

d. Cardiovascular

(1) Resection of small vascular cutaneous lesions such as (A-V) malformation, hemangioma, or lymphangioma

(2) Repair of patent ductus arteriosus

(3) Repair of aortic anomaly/injury

(4) Support of a child with extracorporeal membrane oxygenation (ECMO)

e. Gastrointestinal

(1) Flexible endoscopy

(2) Antireflux procedure

(3) Bowel resection for inflammatory bowel disease, intussusception, intestinal duplications

(4) Hodgkin's staging

(5) Biopsy of tumor (open, laparoscopic or endoscopic)

(6) Laparotomy for trauma

(7) Splenectomy (laparoscopic or open), splenorrhaphy

(8) Repair of hepatic injury, renal and/or bladder injury

(9) Cholecystectomy (open or laparoscopic)

(10) Omphalomesenteric duct and urachal anomalies

f. Oncologic

(1) Neuroblastoma

(2) Wilms' tumor

(3) Rhabdomyosarcoma

(4) Teratomas

(5) Germ cell tumors

(6) Hepatoblastoma

(7) Sarcomas

(8) Hodgkin's and non-Hodgkin's lymphomas

(9) ALL

g. Genitourinary

(1) Polycystic kidney

(2) Ambiguous genitalia

h. Musculoskeletal

(1) Torticollis

OTOLARYNGOLOGY AND HEAD AND NECK SURGERY

PART A: OTOLARYNGOLOGY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

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

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

3. Discuss the significance of the cornerstones of the physical examination, including:

a. Visual inspection
c. Palpation

b. Auscultation
d. Percussion

4. Analyze the clinical management of ear, nose, and throat (ENT) patients in the intensive care unit (ICU), including:

a. Respiratory infection management

b. Airway management

c. Wound care

5. Describe and compare the pathophysiology of the following common ENT diseases:

a. Sinusitis
c. Neck abscess

b. Sialadenitis
d. Epiglottitis

6. Describe and explain the pathophysiology of presbycusis as it can be:

a. Conductive

b. Metabolic and toxic

c. Neural

d. Cochlear

e. Tumor-related

f. Age-dependent

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

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

9. Evaluate patients with facial trauma and develop a treatment plan for the management of:

a. Fractures
b. Lacerations
c. Hemotympanum
d. Epistaxis

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

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

12. Compare the use of the following procedures in evaluating ENT problems:

a. Radiography
b. Contrast studies
c. Ultrasound

13. Describe the indications for simple endoscopy and its diagnostic contributions such as:

a. Nasopharyngoscopy
b. Direct laryngoscopy
c. Esophagoscopy

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

15. Outline the diagnostic approaches to otolaryngologic neoplasia, including:

a. Direct visualization
b. Indirect visualization
c. Use of radiography
d. Fine-needle biopsy

16. Describe diagnostic and therapeutic procedures utilized in treating the following:

a. Abscess
b. Neck mass
c. Oral ulcer
d. Salivary gland mass

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

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

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

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

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

22. Describe the signs and symptoms and discuss the health care significance to elderly patients from the pathophysiology of:

a. Tinnitus
b. Vertigo
c. Cerumen impaction
d. Basilar artery stenosis

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

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

2. Manage the emergent/elective airway; using visual inspection, radiographic evaluation, indirect invasive and non-invasive visualization techniques (direct speculum and indirect mirror evaluations, direct fiberoptic and rigid evaluations); with consideration for:

a. Nose, nasal passages
b. Nasopharynx
c. Oropharynx
d. Larynx
e. Trachea

3. Be prepared to manage airway obstruction as the result of:

a. Edema
b. Secretion
d. Anaphylaxis
e. Foreign body

c. Benign and malignant tumors (including, vascular malformations and infectious processes)

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

5. Perform tracheostomy on adults under direct supervision.

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

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

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

9. Interpret radiologic examinations of sinuses.

10. Perform simple endoscopy including:

a. Nasopharyngoscopy

b. Direct laryngoscopy

c. Esophagoscopy

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

12. Perform tracheostomy on children with supervision.

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

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

15. Remove esophageal foreign bodies endoscopically.

16. Perform diagnostic bronchoscopy.

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

18. Manage facial fractures with appropriate consultation.

19. Evaluate and treat caustic injury.

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

PART B: HEAD AND NECK SURGERY
COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Define and discuss the three-dimensional anatomy of the head and neck region with regard to:

    a. Interrelationships of anatomy

    b. Fascial planes

    c. Path and course of cranial nerves

    d. Major arterioles and venous structures

    e. Musculature of face and neck

    f. Anatomy of larynx and cervical trachea

    g. Location of cricothyroid membrane

    h. Cervical anatomy of nasopharynx, pharynx, esophagus (special emphasis on sinuses, eustachian tubes, middle and external ear structures)

2. Describe laryngeal function as it relates to voice production.

3. Describe the interrelationship of pharyngeal and laryngeal function.

4. Identify the bones of the skull, face, and cervical spine. Explain their relationship to major neurologic and neurovascular structures of the head and neck.

5. Analyze predisposing factors for head and neck cancer.

6. Differentiate between neoplastic and non-neoplastic neck masses.

7. Explain the tumor, nodes, and metastases (TNM) classification system for tumors of the head and neck.

8. Prepare a protocol for evaluating intraoral cancer.

9. Outline the principles associated with the repair of avulsion of ear and nose.

10. Indicate how to examine a patient with severe facial laceration to rule out damage to the following:

    a. Lacrimal drainage systems

b. Parotid gland and duct

c. Facial nerve

11. Identify and delineate

a. Pathophysiology of cranial nerve dysfunctions and injuries

b. Brachial plexus injuries

c. Anatomy/location of parotid and submandibular ductal drainage systems

12. Define and describe the Le Fort maxillary fracture classification system.

13. Define and demonstrate knowledge of Angle's classification of dental occlusion.

14. Identify and delineate Zones I, II, and III of penetrating injuries to the neck and their associated management.

15. Describe the roles of the following diagnostic modalities in the evaluation of head and neck lesions and facial fracture:

a. Plain x-rays

b. CT scanning

c. Sialography

d. Magnetic resonance imaging (MRI)

e. Isotope scans

f. Ultrasound

16. Describe the anatomy of the fascial spaces of the neck and their importance in neck abscesses and infections.

17. Discuss indications for radical and modified radical neck dissection.

18. Distinguish between the following kinds of grafts in the management of head and neck problems:

a. Split-thickness grafts

b. Full-thickness skin grafts

c. Rotational flaps

d. Free flaps

19. Describe the anatomy and the advantages and disadvantages of regional flaps available for head and neck reconstruction.

20. Compare and contrast the use of the following local flaps:

a. Advancement
b. Rotational
c. Pedicle
d. Rhomboid (Limberg)
e. Z-plasty
f. W-plasty
g. V-Y advancement

21. Outline the advantages and disadvantages of irradiation, chemotherapy, and resection of neoplastic lesions of the:

a. Tongue
b. Floor of mouth
c. Buccal mucosa
d. Retromolar trigone
e. Alveolar ridge
f. Palate

22. Discuss the frequency of benign and malignant head and neck tumors in the pediatric population.

23. Outline the microbiology and treatment of deep neck abscesses.

24. Explain the techniques of scar revision, including:

a. Primary excision
b. Z-plasty
c. Serial excision
d. Geometric broken line closure
e. Use of cosmetics

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Perform head and neck examinations, including nasopharyngoscopy and fiberoptic direct laryngoscopy.

2. Administer postoperative care (ICU, wards, discharge planning, follow-up appointments, patient/family counseling, home health care) for head and neck patients.

3. Provide emergency airway management, including performance of:

a. Intubation

b. Emergency cricothyrotomy

c. Emergency tracheostomy

4. Administer treatment for sialadenitis.

5. Diagnose and evaluate infectious illness (viral, bacterial, fungal), acute and chronic, affecting:

a. CNS
b. Sinuses
c. Bones
d. Soft tissues of face

6. Demonstrate a clear understanding of the pathophysiology of:

a. Ludwig's angina

b. Necrotizing fasciitis of the neck

c. Mucormycosis of sinus

d. Epiglottitis

e. Gustatory sweating (Frye's syndrome)

7. Perform biopsy of all intraoral lesions.

8. Care for contaminated wounds, including animal bites of face and neck.

9. Assist with incisions for head and neck surgery, including:

a. Radical neck dissection

b. Salivary gland surgery

c. Tracheostomy

d. Laryngeal/tracheal trauma

e. Considerations for incisions of previously irradiated tissues

10. Formulate a plan for the management of an unknown primary tumor of the head and neck.

11. Perform fine-needle biopsies.

12. Perform simple operative incisions with supervision (tracheostomy, intubation, simple lesions of head and neck).

13. Assist with repair of avulsion of ear and nose.

14. Perform simple operative incisions without direct supervision.

15. Perform radical neck dissection under direct supervision.

16. Manage postoperative complications, including nerve paralysis and cutaneous fistulas from the aerodigestive tract.

17. Manage trauma to the upper airway.

NEUROSURGERY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Demonstrate knowledge of and skills in neurological examination of patients with neurological or neurosurgical disease or injury so that:

    a. An accurate history can be taken

    b. A sufficient physical examination can be performed

    c. Logical conclusions can be drawn regarding location and nature of neuropathology

2. Apply basic knowledge of the following neuroradiological methods in terms of deciding, after conducting the neurological history and examination, which diagnostic tests or interventions would provide the least risk and most useful information for subsequent interpretation:

    a. Plain skull and spine radiographs

    b. Computed axial tomography of the head and spine

    c. Magnetic resonance imaging (MRI)

3. Demonstrate an understanding of the management of head injuries to include:

a. Selection, prioritizing, and performance of resuscitation efforts

b. Analyzing components and results of baseline neurological examination to determine and evaluate changes in patient neurological status

c. Treatment of a scalp wound

d. Initial treatment of compound depressed skull fractures

e. Management of increased intracranial pressure

f. Recognition of cerebral herniation syndromes

g. Initiation, management, and interpretation of intracranial pressure monitoring

h. Recognition and initial management of post-traumatic intracranial hemorrhage

4. Apply knowledge of cervical and thoracolumbar spine injuries, including:

a. Means of stabilization of spine (sandbags, tongs, halo)

b. Recognition of level of injury by neurological deficit found on physical examination

c. Pathophysiological responses in quadriplegic or paraplegic patient

5. Demonstrate the ability to assess and manage diseases of the cervical and lumbar discs according to:

a. Anatomical structures involved: disc (cartilage), annulus (ligament), joint capsule, pedicle, nerve root, foramen

b. Conservative management: traction, rest, physical therapy, and analgesic medications

c. Selection and usefulness of radiological modalities: plain spine films, CT, MRI, myelography

d. Indications for surgical management: intractable radicular pain, neurological deficit

6. Demonstrate the ability to describe and diagnose intracranial and intraspinal mass lesions (neoplasm, abscess, hematoma) utilizing:

a. Signs and symptoms of intracranial and intraspinal mass lesions

b. Classification of intracranial and intraspinal tumors

c. Pathophysiology of intracranial and intraspinal abscess

d. Pathophysiology of cerebral aneurysms and vascular lesions

e. Pathophysiology of spontaneous intracranial and intraspinal hemorrhage

f. Pathophysiology of hydrocephalus

7. Summarize several factors to consider when making critical decisions about treatment options for the elderly neurosurgical patient, to include:

a. Patient views

b. Quality of life issues

c. Acceptable risks

8. Demonstrate an understanding of important non-surgical problems and postoperative complications relating to neurosurgery, including:

a. Closed head injury: problems related to coma, brain swelling, increased intracranial pressure (ICP), ICP monitoring

b. Spinal cord injury: problems related to paralysis, sensory deficit, roto bed, tongs, halo

c. Airway and respiratory problems secondary to coma or high cord injury: arterial blood gases, respirator, endotracheal tube, tracheostomy

d. Vascular problems: hypo- and hyper- tension, cerebral circulation, cerebral ischemia

e. Bladder problems: secondary to brain, cord, or cauda pathology

f. Metabolic problems: hypopituitary, hypoadrenal, hyponatremia, water intoxication

9. Clarify and explain the challenge of making an accurate diagnosis for the elderly patient who exhibits signs of the following disorders. Suggest diagnostic tools for making a differential diagnosis.

a. Alterations of consciousness

b. Personality changes

c. Focal neurologic deficits to cerebrovascular disease

d. Senile dementia

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

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

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

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

2. Assist during neurosurgical procedures, gaining exposure to and hands-on experience with:

a. Craniotomy, laminectomy

b. Hemostasis

c. Protection of neural tissues

d. Removal of specific lesions: tumor, abscess, hematoma, disc

e. Vascular repair: carotid endarterectomy, clipping of aneurysm

f. Problems related to cerebrospinal fluid circulation: hydrocephalus

g. Repair/replacement of dura and bone

3. Perform limited neurosurgical procedures under direction such as:

a. Diagnostic lumbar puncture

b. Insertion of ICP monitor

c. Repair of scalp lacerations

d. Burr hole for sub-dural hematoma

e. Elevation of simple depressed skull fracture

f. Application and management of skeletal traction by tongs or halo

4. Manage patients with closed head injuries.

5. Formulate appropriate postoperative care, including:

a. Address potential complications

b. Provide information/instructions to patient and family

c. Prepare a discharge plan

d. Plan adequate post hospital care

ORTHOPEDIC SURGERY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

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

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

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

4. Analyze the orthopedic role in evaluation of the following:

a. Musculoskeletal trauma

b. Inflammatory, infectious, and metabolic disorders (rheumatoid arthritis, systemic lupus erythematosus, pyogenic arthritis, osteomyelitis, osteomalacia, hypothyroidism)

c. Musculoskeletal tumors

d. Degenerative conditions (osteoarthritis, traumatic arthritis, osteoporosis)

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

6. Discuss the use of radiographic imaging such as magnetic resonance imaging (MRI), computed axial tomography (CAT) scan, radionucleotide, arteriography, and plain films in the evaluation and management of the following orthopedic pathology:

a. Musculoskeletal tumors
b. Isolated extremity injury
c. Spinal injury or fracture
d. Pelvic trauma
e. Vascular injury
f. Urologic injury

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

8. Discuss specific areas of concern when considering total hip replacement for the elderly patient, including:

a. Comorbid conditions
b. Thromboembolic disease
c. Urinary retention
d. Bleeding dyscrasias
e. Occult infections

9. Explain the fundamental principles of management of orthopedic trauma, including:

a. Compartment pressure problems and use of fasciotomy
b. Indications and limitations of closed reduction and casting
c. Indications for open reduction and internal fixation of fractures
d. Indications and methods for application of skeletal traction
e. Principles of early mobilization and rehabilitation
f. Diagnosis and management of fat embolism

10. Explain the management of open fractures, including:

a. Timing
b. Stabilization priorities
c. Irrigation and debridement
d. Early fixation
e. Mobilization

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

12. Determine the management of selected congenital and developmental musculoskeletal defects and fractures in children to include:

a. Epiphyseal fractures: Salter-Harris Classification

b. Supracondylar elbow fractures in children

(1) Risk of Volkmann's ischemic contracture

(2) Role of the vascular surgeon in evaluation and treatment

c. Supracondylar femur fracture (adjacent role of the vascular surgeon)

d. Cervical spine congenital deformity versus pseudosubluxation in a young child

e. Developmental hip dislocation

f. Talipes equinovarus (club foot)

13. Discuss common causes of deterioration in elderly patients that most frequently lead to the need for total knee replacement. Include: (1)frequency of occurrence, (2)associated medications, (3)pain and degeneration, and (4)quality of life decisions for:

a. Osteoarthritis

b. Rheumatoid arthritis

c. Post-traumatic arthritis

d. Osteonecrosis of femoral condyles

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

15. Explain the management of the following kinds of diseases affecting the musculoskeletal system:

a. Inflammatory diseases (rheumatoid arthritis, systemic lupus erythematosus [SLE], psoriatic arthritis, Reiter's syndrome)

b. Infectious diseases (septic arthritis, osteomyelitis)

c. Metabolic diseases (osteomalacia, hyperparathyroidism, hyperthyroidism)

16. Describe the following fracture classifications:

a. Malgaigne

b. Complex extremity and soft tissue

c. Pelvic

17. Diagram gross and roentgenographic characteristics of histological and pathological conditions of the musculoskeletal system, including:

a. Osteoporosis
c. Primary tumors
b. Metastatic disease of the skeleton
d. Trauma

18. Outline the management of musculoskeletal tumors, including:

a. Evaluation and staging: Enneking Classification

b. Selection and performance of appropriate biopsy such as:

(1) Open- versus fine- needle aspiration

(2) Frozen section versus permanent section

c. Adjuvant therapy options

(1) Chemotherapy
(2) Radiation

19. Explain the management of nerve injury associated with musculoskeletal trauma and other pathology, including:

a. Response of nervous tissue to injury

b. Evaluation of nerve injury

c. Transmission of impulses at various points in the peripheral nervous system

d. Operative repair options

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

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

22. Fractures in the elderly population typically occur as the result of low-energy impacts. Discuss the significance of frequency and outcome of the following disease entities/abnormalities:

a. Osteoporosis (include gender)

b. Paget's disease

c. Infection

d. Malignancy

e. Marrow dysplasias

f. Osteomalacia

g. Metabolic derangements (hyperthyroidism, hyperparathyroidism)

h. Elder abuse and neglect

23. Compare the indications and contraindications for joint aspiration.

24. Analyze the indications for and surgical approaches to amputation in the following situations:

a. Trauma

b. Ischemia

c. Infection

d. Tumors

e. Prostheses

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

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

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

28. Describe the surgical technique utilizing a "clean air" environment, covering these broad aspects of control:

a. Needs assessment regarding procedure

b. Consideration of laminar flow systems

c. Use of ultraviolet light

d. Operating room traffic

e. Soft tissue handling

f. Use of prophylactic antibiotics

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Perform and record a focused history and physical examination of orthopedic disorders, including:

a. Trauma

b. Congenital malformations

c. Degenerative diseases

d. Inflammatory processes

e. Neoplasia

2. Request and interpret appropriate diagnostic imaging and laboratory studies of orthopedic pathology:

a. Preoperative laboratory evaluation as needed for safe surgical intervention

b. Plain film analysis (specifically cervical spine and major skeleton films)

c. CT scan for spinal fracture, pelvis, and extremity injury

d. MRI spine and knee

3. Perform immobilization of cervical spine.

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

5. Participate in the management of orthopedic trauma to extremities, including such procedures as:

a. Splinting closed fractures

b. Closed reduction of fractures

c. Reducing dislocations

d. Applying traction

e. Applying casts

f. Débriding and irrigating open extremity fractures

g. Open reduction and internal fixation of extremity fractures

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

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

8. Perform joint aspirations in appropriate situations.

9. Participate in diagnostic and therapeutic arthroscopy procedures such as:

a. Partial meniscectomy (knee)

b. Arthroscopy of shoulder (diagnostic)

10. Participate in the management of amputations:

a. Determine amputation level

b. Perform lower extremity amputation in appropriate cases

c. Direct rehabilitation of an amputee in appropriate cases

11. Participate in the management of musculoskeletal tumors, including:

a. Planning and performing an incisional biopsy of a soft tissue tumor

b. Performing preoperative evaluation and staging of soft tissue tumors

c. Assisting in the planning and resection of soft tissue tumors and considerations for limb salvage

12. Assist in prosthetic joint replacement.

13. Participate in the management of congenital, developmental, and other musculoskeletal deficiencies in children such as:

a. Cerebral palsy

b. Myelomeningocele

c. Muscular dystrophy

d. Developmental hip/dislocation

e. Talipes equinovarus

OPHTHALMOLOGY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Describe the anatomy of the eye and its surrounding structures, including:
    a. Adnexa (lids, tarsal plates, gray line, levator muscles, orbital septum, innervation, vascular supply, nasolacrimal system, orbital bones, lacrimal gland)
    b. Extraocular muscles and innervation
    c. Anterior Segment (conjunctiva, cornea, anterior chamber, iris, lens)
    d. Posterior Segment (ciliary body, vitreous, optic nerve, retina, macula, fovea, choroid)
    e. Retrobulbar Structures (optic nerve, optic canal, chiasm, sella turcica)
2. Diagram and summarize the principles of vision, including:
    a. Refraction caused by lenses (tear film, cornea, lens, vitreous)
    b. Encoding of image (retina, including fovea and macula)
    c. Transmission of image (nerve fiber layer, optic disc, optic nerve, chiasm, optic radiations, occipital lobe)
    d. Muscle control centers (cranial nerves III, IV, VI)
    e. Pupillary control (cranial nerve III and parasympathetic nerves)
3. Explain fundamental ocular physiology by considering the following questions:
    a. How do the adnexal structures ensure that the eye is lubricated and shielded from trauma?
    b. What would a paresis of any of the innervating cranial nerves do to the movement of the eye?

c. When the cornea is damaged, what effect is there upon comfort or vision? Knowing the innervation of the iris, what information might an anisocoria indicate? What is a Marcus Gunn, afferent pupillary defect, or a Horner's pupil?

d. What purpose do the ciliary body and the vitreous serve? What do the macula, the fovea, and the optic nerve do?

e. What difference would it make in the examination of the eye (vision, visual field, and appearance of the nerve) if damage occurred at the site of the optic nerve, optic canal, optic chiasm, or in a retrochiasmal location?

4. Outline common eye pathology, including:

a. Trauma to eye, orbit, and supporting structure

(1) Diagnosing a perforated globe

(2) Indications for referral and repair of a blow out fracture

(3) Diagnosing a corneal epithelial defect

(4) Identifying a hyphema

(5) Treatments for severe loss of vision with optic nerve trauma

b. Infections of the eye (blepharitis, hordeola, chalazia, corneal ulcers, endophthalmitis, conjunctivitis, keratoconjunctivitis, iritis, uveitis)

c. Burns of the eye (different effects of a thermal, alkali, or acid burn of the cornea)

d. Anisocoria (Horner's syndrome, iatrogenic, belladonna induced, diabetic, third cranial nerve, Marcus Gunn, afferent pupillary defect)

e. Sudden loss of vision (from migraine, traumatic neuropathy, ischemic optic neuropathy, temporal arteritis, optic neuritis, central retinal vein or artery occlusion)

f. Eye pain (different descriptions of pain from iritis vs. corneal abrasion vs. herpes simplex keratitis)

g. Eye donation (methods of tissue removal: whole eye and anterior segment)

5. Discuss the following important microbiologic considerations of the eye and its surrounding structures:

a. Indications for cultures:

(1) Hyperpurulent or unresponsive conjunctivitis

(2) Neonatal conjunctivitis

(3) Corneal ulcers

(4) Localized lid infections

(5) Suspected orbital cellulitis

(6) Penetrating trauma

b. Sampling technique

(1) Swab and transport media (acceptable for mild infections)

(2) Direct culture on agar plates (for more serious disease)

(3) Spatula scraping and direct agar plating (for corneal ulcers by ophthalmologist)

(4) Blood cultures for orbital cellulitis

c. Risks for patients who cannot blink fully (as in eyes drying in intensive care unit)

(1) Predisposes to severe infection

(2) Possible globe perforation by Pseudomonas or N. gonorrhea

6. Outline the essential elements of a focused eye examination for each of the problems in #5 above to include significant aspects of the following:

a. History

b. Visual acuity and confrontational visual fields

c. External exam (appearance of adnexa)

d. Anterior segment (cornea, iris, anterior chamber)

e. Pupillary exam (direct, consensual, indirect, afferent)

f. Extraocular muscles (ductions, vergences, exotropia, esotropia, convergence)

g. Posterior segment (including red reflex, direct ophthalmoscopy)

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

8. What is the level of importance of these elderly patient situations to the outcome of eye surgery?

a. Renal transplant recipient

b. Bone marrow transplant recipient

c. End-stage renal patient

d. Insulin-dependent diabetes mellitus patient

9. Summarize the criteria for appropriate referral and follow□up for the management of common eye problems to include the following questions:

a. Is there information that will help me assess the systemic condition of the patient? (vascular and neurologic information especially important)

b. Is there a vision-threatening problem? (consultation with ophthalmologist is essential if patient is obtunded, does not blink, and there is a developing corneal ulcer)

c. What is the source of the patient's ocular complaint or condition? Is it acute (inpatient consult) or chronic (outpatient consult)?

10. Explain the principles of management for common eye problems to include the following:

a. Exposure keratopathy

b. Conjunctivitis

c. Herpes simplex keratitis

d. Iritis

e. Blow out fracture

f. Corneal abrasion

11. Describe the etiology (include appropriate racial differences), signs and symptoms of, and primary treatment or rehabilitative strategy for the following disorders as they affect the vision of the elderly population:

a. Presbyopia

b. Essential blepharospasm

g. Retinal detachment

h. Macular degeneration

c. Ptosis

d. Glaucoma

e. Cataracts

f. Noncicatricial ectropion; entropion

i. Diabetic retinopathy

j. Herpes zoster

k. Pterygium

12. Determine appropriate surgical management of common eye problems utilizing precepts such as the following:

a. Indications for repair of blow out fracture

(1) Persistent findings after approximately seven days of symptomatic diplopia, or symptomatic enophthalmos; positive forced traction test

(2) Possible hypesthesia

(3) Presence of a fracture by itself is not necessarily an indication

b. Current controversy and possible therapy for sudden, profound vision loss associated with traumatic optic neuropathy

13. Describe the pathophysiology of uncommon eye problems associated with surgical practice, including:

a. Tumors of the eye

(1) Retinoblastoma (2) Melanoma (3) Metastatic

b. Congenital abnormalities of the eye

(1) Glaucoma (2) Cataract (3) Exotropia/esotropia

14. Determine the emergency surgical management of eye and orbital injuries, including:

a. Blow out fracture

b. Rupture of the globe

c. Corneal laceration

d. Corneal foreign bodies

e. Hyphema

f. Vitreous hemorrhage

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Complete a basic history and eye examination.

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

3. Apply local anesthetic, repair simple eyelid lacerations, and remove foreign bodies.

   a. Diagnose injuries

   b. Review special techniques for repair

   c. Call the ophthalmologist if the following situation(s) exists: laceration involving: margin of lid, levator muscle, canaliculus, or nasolacrimal system

4. Interpret imaging studies in the evaluation of common eye problems such as:

   a. Ocular prosthesis

   b. Ocular foreign body

   c. Blow out fracture

   d. Zygomatic fracture

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

6. Identify appropriate candidates and arrange for eye donation:

   Review criteria of the Eye Bank Association of America for donors

   (1) Essentially no age limits on donation

   (2) Tissue that is "too old" or "too young" for routine transplant may still be useful for emergency repairs or for research

   (3) Contagious diseases are contraindications (syphilis, AIDS, Creutzfeldt-Jacob, rabies, death from unknown causes)

7. Participate in enucleation for corneal harvesting under supervision.

8. Participate in management of orbital injuries.

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

PLASTIC AND RECONSTRUCTIVE SURGERY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Outline the components of a comprehensive focused history and physical examination pertinent to the evaluation and correction of congenital or acquired defects under the realm of plastic and reconstructive surgery.

2. Discuss and compare skin and connective tissue according to:

    a. Anatomy

    b. Normal physiology and biochemistry

    c. Pathophysiology of benign and malignant skin disorders

    d. Unique pathophysiology of connective tissue disorders

3. Explain the basic techniques for surgical repair of superficial incisions and lacerations of the head, neck, trunk, and extremities to include the following considerations:

    a. Skin

    b. Subcutaneous tissue

    c. Superficial muscle and fascia

    d. Dressings

    e. Splints

    f. Suturing and knot tying

4. Describe the physiology of various techniques of skin and composite tissue transplantation with particular regard to component tissue circulation:

    a. Skin grafts (split- vs. full- thickness)

    b. Bone (cartilage grafts)

    c. Composite grafts

    d. Skin flaps

    e. Muscle flaps

    f. Myocutaneous flaps

g. Bone flaps

h. Osteocutaneous flaps

i. Myo-osseous flaps

j. Vascularized versus nonvascularized flaps

k. Neurocutaneous flaps

5. Categorize the pathophysiology of thermal, chemical, and electrical burns, including consideration of:

a. Systemic pathophysiology

b. Local pathophysiology

c. Cardiac depression

d. Pulmonary compromise

6. Describe the "classical" chemical agents causing burns; list their antidotes.

7. Outline the components of a comprehensive examination of the naso-, oro-, and hyo-pharynx to include:

a. Normal anatomy

b. Common congenital anomalies

c. Evolution of neoplastic disease

8. Explain the assessment of facial skeletal trauma according to the following systems:

a. LeFort I, II, and III classification of maxillary fractures

b. Nasoethmoidal disruption classification

c. Zygomatic, orbit, and mandibular fractures

d. Disruption classification

9. Define the tumor, node, and metastases (TNM) classification system as used for neoplasms of skin, soft tissue, and head and neck.

10. Discuss epidemiology, risk factors, treatment, and prevention of cutaneous malignancies in the geriatric patient, including:

a. Skin cancer rates (basal cell carcinoma [BCC], squamous cell carcinoma [SCC])

b. Average age of onset for BCC/SCC

c. Etiology of BCC/SCC

d. Usual modes of treatment for BCC/SCC (Mohs Technique, radiation, chemotherapy)

e. Prevention using medications (isotretinoin, beta-carotene)

11. Explain the methods for performing incisional and excisional biopsies of skin and oral cavity.

12. Demonstrate the systematic examination of the hand to assess motor and sensory function, including:

a. Intrinsic tendon and muscle function

b. Extensive tendon and muscle function

c. Median nerve

d. Ulnar nerve

e. Radial nerve

f. Circulation

g. Bones

13. Describe the physiology of local and general anesthetics in these categories:

a. Narcotics

b. Sedatives

c. Analgesics

(1) Local anesthesia

(2) General anesthetics

14. Outline appropriate diagnostic studies needed to supplement the physical examination when developing a treatment plan for:

a. Surgery of the hand

b. Facial fractures

c. Congenital structural anomalies of the head/neck and hand/trunk.

15. Summarize the evaluation of patients with head and neck cancer, and develop a treatment plan according to the following criteria:

a. Location of lesion

b. Size of primary lesion

c. Presence of metastatic disease

16. Demonstrate a working knowledge of the safe use of nasopharyngoscopy, laryngoscopy, esophagoscopy, and other endoscopic procedures utilized in the evaluation of patients with head and neck cancer.

17. Discuss the use of the reconstructive ladder (including skin grafts, local flaps, and regional and free microvascular flaps) in the definitive management of traumatic or excised wounds.

18. Explain considerations in a geriatric patient undergoing major reconstructive operation, to include the implications of:

a. Decreased functional physiologic reserve

b. Multiple medical problems

c. Slower wound healing (consider significance of: age, concomitant illnesses, medications)

d. Preoperative evaluation procedures

e. Invasive operative monitoring

f. Intensive postoperative monitoring

19. Discuss the surgical treatment of:

a. Common hand injuries and tumors

b. Surgical repair of facial trauma, soft tissue, and bony defects

c. Resection and reconstruction of the simple, soft tissue defects following resection of neoplasms of the head and neck

d. Resection of skin and soft tissue neoplasms requiring complex reconstruction

e. Reconstruction of the breast for congenital and acquired defects

f. Management of the burned hand and face

g. Reconstruction of congenital craniofacial defects

20. Analyze treatment options for the comprehensive care of the burn patient, including:

a. Excision of burn

b. Homografting

c. Xenografting

d. Autografting

e. Tissue engineering and prefabrication

21. Assess basic lines of research in plastic and reconstructive surgery to include:

a. Current hypotheses dealing with:

(1) Craniofacial growth and development

(2) Perfusion of the skin and muscle

(3) Wound healing

(4) Skin, bone, and cartilage grafts

(5) Tumor biology

(6) Reconstructive hand surgery

(7) Bone reconstruction

(8) Bone distraction

(9) Tissue transplantatio

b. Avenues for new investigation

22. Summarize currently accepted surgical techniques for treating the following:

a. Correction of congenital lesions of the head/neck and hand/trunk

b. Craniofacial anomalies, including cleft lip and palate

c. Breast reconstruction after mastectomy

d. Reconstruction and ablative head and neck surgery

e. Aesthetic rejuvenation of the face and body

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Complete a comprehensive physical examination and clinical data history, including pertinent diagnostic laboratory and radiographic findings.

2. Evaluate and treat simple and intermediate abrasions and burns of the face, trunk, and extremities.

3. Perform simple incisional biopsies and excise small lesions on the skin and subcutaneous tissue of the trunk or extremities.

4. Provide definitive treatment plans for superficial incised and lacerated wounds of the neck, trunk, and extremities.

5. Participate in the perioperative evaluation and management of congenital or acquired defects (traumatic and surgical).

6. Apply and remove dressings of the head, neck, hand, trunk, and extremities, including:

a. Occlusive

b. Non-occlusive

c. Wet to dry

d. Casts

e. Alginate

f. Colloidal

7. Debride and suture major non-facial wounds and burns.

8. Participate in the acute resuscitation, evaluation, and initial treatment of a burned patient.

9. Harvest and apply split-thickness skin grafts.

10. Perform simple, localized skin flaps for wound coverage.

11. Participate in the evaluation and formulation of treatment plans for:

    a. Hand injuries
    b. Facial fractures
    c. Head and neck cancer
    d. Congenital anomalies
    e. Breast deformities
    f. Burn patients

12. Under the direction of a plastic surgeon, assist in the planning and performance of complex reconstructive operations.

13. Harvest and apply full-thickness skin grafts and local flaps.

14. Reconstruct defects with random flaps, composite flaps, and grafts.

15. Act as first assistant and attending-supervised surgeon for major resectional and reconstructive surgery of the head, neck, breast, trunk and extremities.

16. Raise muscle and skin-muscle flaps under direct supervision.

17. Perform major excision of burns, escharotomy, and skin grafting.

18. Assess and act as first assistant and attending-supervised surgeon for the following:

    a. Complex soft tissue injury
    b. Fractures requiring operative and non-operative reduction
    c. Nerve, tendon, and bone surgery of the hand
    d. Vascular injuries

19. Act as first assistant or attending supervised surgeon for:

    a. Reconstruction and reparative surgery of the hand
    b. Surgical repair of facial trauma
    c. Resection of neoplasms of the head and neck
    d. Resection of major skin and soft tissue neoplasms requiring complex reconstruction
    e. Surgical repair of craniomaxillofacial congenital defects
    f. Reconstruction of the breast

g. Complex wound reconstruction using flap both local, regional, and free microvascular

UROLOGY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Describe the normal anatomy and physiology of the genitourinary system to include the following structures:

   a. Kidneys

   b. Ureters

   c. Bladder

   d. Prostate seminal vesicles and vas deferens

   e. Urethra (male and female)

2. Summarize the basic science of genitourinary disease to include the following:

   a. Anatomy, physiology, biology, biochemistry, microbiology, immunology, and embryology of the genitourinary system

   b. Pathophysiology of urinary tract disease

   c. Endocrine function of kidney

3. Discuss the components of a focused genitourinary history and physical examination to include:

   a. History

      (1) Pain (location)

      (2) Hematuria

         (a) Painful, painless

         (b) Initial, terminal, total

(c) Presence of clots

(3) Lower urinary

(a) Irritative

(b) Obstructive

(4) Incontinence (stress, urge)

(5) Sexual dysfunction

b. Physical Examination

(1) Kidneys

(a) Flank masses

(b) Peritoneal signs

(c) Signs of nerve root irritability

(2) Bladder

(3) Penis

(4) Scrotum and contents

(5) Rectal examination (to include prostate)

(6) Pelvic examination in female

4. Explain the following clinical science study factors/variables as they relate to genitourinary disease:

a. Anatomy

b. Embryology of genitourinary tract

c. Renal physiology

d. Bacteriology and antibiotic management

e. Renal calculus disease

f. Urologic oncology

g. Female urology

h. Urologic trauma

5. Describe the pathologic anatomy and pathophysiology of non-complex genitourinary diseases such as:

a. Tumors (renal, ureteral, bladder, testicular, prostate)

b. Calculi (renal, ureteral, bladder)

c. Trauma (testis, upper and lower urinary tract)

d. Renal infections

e. Benign prostatic hyperplasia and bladder outlet obstruction

f. Vesicoureteral reflux and pyelonephritis

g. Varicocele

h. Incontinence (stress, overflow, neurogenic, urgency)

i. Impotence and Peyronie's disease

j. Urethral stricture disease

k. Priapism

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

7. Summarize the indications for routine diagnostic procedures in urology such as:

a. Cystoscopy (ureteral catheterization)

b. Bladder catheterization

c. Intravenous pyelogram

d. Cystogram (retrograde ureteropyelogram)

e. Computed tomography and ultrasound of the GU tract

f. Urography in trauma

g. Indications for using MRI

h. Retrograde urethrogram

i. Transrectal ultrasound

j. Renal arteriography

k. Renography and renal perfusion scanning (I 131)

l. Urinalysis, biochemical and radioimmunoassay

8. Discuss the nature and indication for routine therapeutic procedures in genitourinary disease such as:

a. Bladder catheterization

b. Passage of Coudé tips and filiform catheters

c. Meatotomy if necessary for catheterization

d. Suprapubic punch cystostomy

e. Dorsal slit for phimosis

9. Analyze the etiology of urinary incontinence in elderly patients. Consider the following:

a. Factors that may be associated with aging

(1) Bladder capacity

(2) Amount of residual urine

(3) Frequency of involuntary bladder contractions

(4) Incidence of impaired mobility

(5) CNS disorder

(6) Congestive heart failure

(7) Medications

b. Female elderly patients

(1) Decline in bladder outlet
(2) Decline in urethral resistance pressure

(a) Influence of estrogen

(b) Pelvic structures associated with childbirth

(c) Surgeries

c. Male elderly patients

Prostatic enlargement

(a) Obstructed urethra (overflow incontinence)

(b) Detrusor motor instability (urge incontinence)

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

11. Describe cancer of the prostate, citing disease rates that make it the:

a. Most commonly diagnosed malignancy in men

b. Second leading cause of cancer death in men

12. Describe the embryology of the GU tract to include a discussion of the following:

Congenital abnormalities

(a) Ureteropelvic junction (UPJ) with hydronephrosis

(b) Reflux

(c) Polycystic kidney

(d) Urethral valves with hydronephrosis

13. Describe the types of incisions and exposure required for genitourinary surgery, including those for:

a. Nephrectomy

b. Radical nephrectomy

c. Ureterolithotomy

d. Radical cystectomy

e. Radical retropubic prostatectomy

f. Perineal prostatectomy

g. Orchiectomy

h. Radical orchiectomy

i. Laparoscopic urologic surgery (nephrectomy, partial nephrectomy, prostatectomy)

14. Discuss treatment options in the management of ureteral injuries to include:

a. Primary repair

b. Ureteroureterostomy

c. Neoureterocystostomy

d. Psoas hitch

e. Percutaneous drainage

f. Emergent nephrectomy

g. Ureteral stenting

15. Outline recommended screening guidelines for prostate cancer.

16. Summarize considerations for appropriate treatment of incidentally detected carcinoma of the prostate, found on simple prostatectomy, when these conditions exist:

a. Low-grade lesion with combined Gleason score <5

b. Transurethral resection (TUR) shows lesion occupies 5% or less of tissue resected

c. Lesion is considered clinical stage A-1

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

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

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

3. Plan and initiate appropriate therapy for urological disorders such as:

a. Hematuria work up

b. Obstructive uropathy work-up

c. Simple infections

d. Resistant infections

e. Initiate therapy for: calculus disease, renal neoplasm, transitional cell neoplasm

f. Maintain a working knowledge of carcinoma of the prostate

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

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

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

7. Perform cystoscopy and urethral catheterization.

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

9. Perform nephrectomies for disease.

10. Perform suprapubic prostatectomy.

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

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

GYNECOLOGY AND OBSTETRICS

PART A: GYNECOLOGY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

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

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

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

4. Discuss the physiology and pathophysiology of gynecologic conditions and disease, including:

   a. Intrauterine pregnancy

   b. Benign diseases of the ovaries (e.g., cysts and the risks of torsion, hemorrhagic corpus luteum)

   c. Ectopic pregnancy

   d. Carcinoma of the ovary, uterus, cervix uteri, vagina, and vulva

   e. Advanced uterine prolapse in a postmenopausal woman

   f. Uterine leiomyoma in a postmenopausal woman

   g. Urinary and rectal incontinence

5. Outline the differential diagnoses for pelvic pathology such as:

   a. Salpingitis versus appendicitis

   b. Mittelschmerz versus bleeding ovarian cyst

   c. Fibroid uterus versus other intra-abdominal masses

6. Discuss the differential diagnosis of a pelvic mass to include considering:

   a. Cysts

      (1) Benign ovarian cysts (functional, neoplastic)

      (2) Malignant ovarian cysts

   b. Tumors

(1) Benign solid tumors (uterus, tubes, ovaries)

(2) Malignant solid tumors (primary or metastatic)

c. Infectious processes (tubo-ovarian abscess)

d. Gastrointestinal processes (diverticular disease)

7. Summarize the categories of information provided by the following types of studies:

   a. Imaging (ultrasound—including Doppler flow, computed axial tomography, magnetic resonance imaging)

   b. Cytology of ascitic fluid

   c. Intravenous pyelography and cystoscopy

   d. Gastrointestinal contrast studies and sigmoidoscopy

8. Explain the basis of preferred treatment for the following conditions:

   a. Uterine bleeding

   b. Ectopic pregnancy (ruptured versus unruptured)

   c. Ovarian cysts with bleeding, enlargement

   d. Adnexal torsion (role of detorsion, color flow Doppler)

   e. Endometriosis

   f. Carcinoma of the ovary, uterus, vagina, and vulva

   g. Fibroids; fibroids in a 70-year-old woman

   h. Normal pregnancy and its complications requiring Caesarean section

9. Discuss the significance of postmenopausal vaginal bleeding, including:

   a. Etiology

   b. Evaluation

   c. Diagnostic studies (including endometrial stripe assessment, saline-infusion sonohysterography)

   d. Alleviation of symptoms

   e. Treatment alternatives

10. Identify and discuss pelvic support defects in the elderly woman, including:

    a. Restoration of normal genital tract anatomy

        (1) Bladder neck
        (2) Anterior vaginal wall
        (3) Apex of vagina
        (4) Vaginal length
        (5) Posterior vaginal wall
        (6) Perineal body

    b. Options to surgery

    c. Associated risks and benefits

        (1) Quality of life decisions

        (2) Healthy life-style

11. Describe the indications for hysterectomy.

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

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

14. Summarize the principles of the following surgical procedures:

    a. Hysterectomy
    b. Salpingectomy
    c. Oophorectomy
    d. Laparoscopy
    e. Vulvectomy
    f. Radical groin dissection

15. Explain the principle of uterine artery embolization procedures.

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

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

18. Discuss the management of an ovarian mass unsuspected at laparotomy by considering:

    a. Biopsy versus oophorectomy

b. Surgical staging (peritoneal washings, contralateral ovarian biopsy, omentectomy)

c. Consultation (family, gynecologist)

d. Morphology (size, septations, surface texture)

19. Adenocarcinoma of the endometrium is the most common invasive gynecologic malignancy in the U.S. Describe:

a. Mean age at diagnosis

b. Most common presenting complaint (90% of cases)

c. High-risk factors (including Tamoxifen use and familial predisposition)

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Perform pelvic examinations, only initially under direct supervision:

a. Part of every woman's general physical examination (including rectovaginal exam)

b. Significant for patient to be evaluated for abdominal or pelvic symptoms

c. Critical for patients who must undergo abdominal or pelvic surgery

d. Evaluation of traumatically injured female

2. Participate as part of the surgical team in performing multiple gynecological surgery procedures:

a. Perform as surgical assistant during earliest training stages

b. Perform surgical procedures when experienced and under supervision:

(1) Pelvic laparoscopy

(2) Oophorectomy

(3) Salpingectomy

(4) Hysterectomy

3. Formulate differential diagnoses of pelvic infection and masses to consider:

a. Common infections (endometritis, salpingitis, tubo-ovarian abscess, bacterial vaginosis)

b. Common organisms (gonococcus, chlamydia, anaerobic bacteria)

c. Differentiating findings on pelvic and abdominal examination (mass, tenderness, signs of peritoneal irritation, ultrasound imaging, fever, leucocytosis)

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

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

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

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

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

9. Perform a radical groin dissection and assist in the performance of related gynecological surgery for carcinoma such as:

a. Pelvic and inguinal lymph node dissection

b. Bowel resection

c. Cystectomy

d. Pelvic exenteration with urinary and/or bowel diversion

PART B: OBSTETRICS

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Describe the physiologic changes in pregnancy, including:

a. Cardiovascular

b. Respiratory

d. Genital

e. Breasts

c. Gastrointestinal

2. Describe normal intrauterine growth and development with consideration for the following:

a. Basic science principles of placental and fetal development

b. Fetal developmental physiology

3. Explain the stages of fetal development, including

a. Characteristics of each trimester of pregnancy

b. Assessment of the fetus

c. Risk of surgery in each trimester.

4. Outline major issues involved in managing surgical conditions in the pregnant patient, including:

a. Appendicitis (difficult to diagnose; necessity for different surgical approach)

b. Cholecystitis (medical management before resorting to surgery)

c. Intestinal obstruction (confusing symptoms; operative approach; postoperative nutritional support)

d. Breast mass (confusion with physiologic changes in breast; special considerations at surgery; postoperative complications with lactation)

e. Trauma (management of mother and fetus; special diagnostic measures)

f. Ovarian torsion (diagnosis and treatment options, risk of oophorectomy in the first trimester)

5. Specify possible physiologic effects to the pregnant woman and/or the developing child exposed to the following agents:

a. Anesthesia

(1) Effects of common anesthetic agents, inhalation, and conduction

(2) Catastrophic events: failed endotracheal intubation, pulmonary aspiration, total spinal block

(3) Anesthetic management in obstetric complications: amniotic fluid embolism, hemorrhage, hypertension

(4) Position on operating room table and relevance to hemodynamics

b. Medication

(1) Understanding risk factors and categories assigned to all drugs

(2) Fetal effects of drugs which cross the placenta

c. Radiation

(1) Effect on fertility

(2) Effect on fetus (trimester specific, Rad/Gray levels considered safe)

6. Discuss the differential diagnosis of ectopic pregnancy, including:

a. Signs and symptoms

b. Qualitative human chorionic gonadotrophin (hCG)

c. Quantitative hCG

d. Abdominal and vaginal ultrasonography: correlation with hCG for presence of intrauterine fetal sac or adnexal mass (discriminatory zone)

7. Outline the indications and contraindications for laparoscopy in the pregnant patient, discussing:

a. Diagnosis and treatment of ectopic pregnancy

b. Contraindications: including multiple previous laparotomies, Class IV cardiac disease, peritonitis or obstruction with bowel distension

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Diagnose pregnancy, utilizing:

a. History: include menstrual history and symptoms of early pregnancy

b. Physical examination: expected changes in the uterine cervix and corpus

c. Laboratory tests for pregnancy

2. Diagnose common gynecological problems that affect pregnant women, including:

a. Sexually transmitted diseases

b. Acquired Immunodeficiency Syndrome

c. Human papillomavirus infections (especially condylomata)

d. Leiomyomata uteri

3. Deliver a baby during an uncomplicated delivery.

4. Perform a Cesarian section in an emergency situation.

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

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

THORACIC SURGERY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Describe thoracic anatomy and physiology, including anatomic and functional relationships:

a. Chest wall (including spine)

b. Accessory muscles of respiration

c. Diaphragm (including subjacent abdominal organs)

d. Mediastinum

e. Trachea, segmental and subsegmental bronchi

f. Lungs

g. Esophagus

h. Heart and pericardium

i. Great vessels and their immediate branches

j. Peripheral nerves (vagus, sympathetics, intercostals, phrenic, recurrent laryngeal)

k. Thoracic duct

l. Azygous and Hemiazygous veins

2. Summarize and discuss the embryological development of:

a. Upper airway

b. Lower airway

c. Lungs

d. Esophagus

e. Heart and great vessels

f. Mediastinal contents

g. Lymphatic drainage of esophagus and lungs

3. Review and analyze the basic principles and critical factors involved in:

a. Ventilation

b. Perfusion

c. Control of respiration

d. Lung function tests

e. Respiratory failure

f. Oxygen therapy

g. Function of the diseased lung (obstructive, restrictive, and vascular)

4. Summarize the modalities listed below, stating their indications and limitations in thoracic surgical procedures:

a. Endoscopy/thoracoscopy

b. Standard and positional roentgenograms

c. Arteriography

d. Ultrasonography

e. Computed axial tomography (CAT), magnetic resonance imaging (MRI), and positron emission tomograph (PET)

f. Nuclear medicine

g. Ventilatory methods

h. Tracheostomy

i. Intubation and vent support

j. Central venous catheters

k. Pacemakers/defibrillators

l. Thoracostomy tubes

m. Stents (coronary, esophageal, tracheal, and bronchial)

5. Discuss the following conditions, then choose and justify the appropriate diagnostic and therapeutic modalities:

a. Pneumothorax

b. Hydrothorax and hemothorax

c. Combinations of a and b

a. Chylothorax

e. Pulmonary infiltrates or masses

f. Abnormal cardiac silhouettes

g. Congenital anomalies

h. Pleural effusions

i. Fractures (clavicles, sternum, ribs, scapulae, and spine)

j. Mediastinal masses

k. Infectious processes (parenchymal and pleural)

l. Neoplastic processes (esophageal, pulmonary, extrapulmonary)

m. Reactive processes (esophageal)

6. Explain the various types of anesthetic agents and equipment used in thoracic surgery.

7. Discuss and justify the indications for the following procedures:

a. Needle aspiration

b. Chest tube placement

c. Mediastinoscopy

d. Thoracoscopy

e. Median sternotomy

f. Mediastinotomy

g. Thoracotomy

h. Bilateral thoracotomy

i. Heller myotomy

j. Thal patch

k. Stent use

l. Bronchoscopy

8. Evaluate a patient as a candidate for thoracic surgery and discuss:

a. Operative risks

b. Diagnostic tests important in assessing probable outcome

c. Potential complications

d. Operation choices

e. Informed consent

f. Advanced directives

g. Living wills

h. Power of attorney

9. Explain the mechanics and applications of pulmonary function studies in evaluating patients for thoracic surgery.

10. Recommend when to use such diagnostic and therapeutic procedures as:

a. Bronchoscopy and esophagoscopy (flexible and rigid)

b. Thoracoscopy/Video Assisted Thoracoscopic Surgery (VATS)

c. Emergency room thoracotomy

d. Aortic cross clamping

e. Standard thoracotomy and median sternotomy (Chamberlain and book procedures)

f. Pericardial window/pericardiocentesis

g. Lung biopsy/fine-needle aspiration (FNA)

h. Pulmonary resection

i. Lung volume reduction operations

j. Mediastinoscopy

k. Dilatation

l. Manometry (esophageal)

m. 24-hour pH monitoring

11. Demonstrate an understanding of the mechanics of ventilatory support and the clinical application of mechanical ventilation by completing the following activities:

a. Contrast types of ventilators

b. Specify indications for ventilators

c. Demonstrate management of ventilators

d. Differentiate modes of ventilation

e. Explain weaning

f. Evaluate weaning parameters

g. Analyze complex ventilation problems

h. Discuss indications for tracheostomy

12. Identify indications for the following therapeutic modalities; and then justify/critique their use:

a. Extra corporeal membrane oxygenation

b. Ventricular assist devices (LVAD, RVAD, BVAD)

c. Intra-aortic balloon pump (IABP)

d. High frequency jet ventilation

e. Laser (used endoscopically)

f. Endoscopic thoracic procedures

g. Alveolar (pulmonary) lavage

h. Autotransfusion

i. Cell saver

j. Pulmonary artery catheterization

13. Analyze changes in thoracic anatomy and physiology resulting from the following:

a. Abdominal operations

b. Mediastinoscopy

c. Thoracotomies

d. Sternotomies

e. Thoracoscopy

f. Thoracoplasties

g. Spine operations

h. Neck operations

i. General anesthesia

j. Epidural anesthesia

14. Illustrate the various types of incisions used in thoracic surgery for:

a. Apical resections

b. Pneumonectomy

c. Esophagectomy

d. Mediastinal procedures

e. Tracheal/bronchial procedures

f. Esophageal stenosis and diverticula

g. Thoracoplasty

h. Diaphragmatic operations

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

1. Discuss the general diagnostic and operative approaches to treating blunt and penetrating trauma to the thorax and its contents.

2. Describe specific surgical management of trauma to the thorax and its contents:

   a. Neck

   b. Esophagus

   c. Nerves

   d. Mediastinum

   e. Bony thorax

   f. Diaphragm

   g. Vessels

   h. Trachea/lungs

   i. Heart

3. Integrate the pathophysiology and surgical management of the following:

   a. Aortic aneurysms

   b. Aortic dissections

c. Trauma to heart and great vessels

d. Occlusive disease

4. Evaluate infiltrates, infectious processes, and neoplastic processes in the thorax, and recommend appropriate management.

5. Discuss and list thoracic tumor types, staging for each, including descriptions of nodal drainage sites and levels.

6. Summarize the causes and appropriate management of cardiac arrhythmias, including:

a. Pharmacotherapeutics

b. Cardioversion

c. Pacemakers

d. Defibrillators

7. Describe the diagnosis and discuss therapy of such surgical complications as:

a. Fistulas: bronchopleural, pleurocutaneous, tracheoesophageal (TE), arteriovenous (AV) and thoracic duct

b. Esophageal leak/stenosis/obstruction

c. Loculated hemothorax

d. Postoperative bleeding

e. Empyema

f. Air leaks

g. Bronchial obstructions

h. Endstage COPD/pulmonary fibrosis

8. Identify indications for and be prepared to interpret results of the following diagnostic modalities:

a. Plain and positional chest x-rays

b. Gastrointestinal contrast studies

c. CAT, MRI, and PET scans

d. Bronchograms

e. Pulmonary function studies

f. Ventilation-perfusion studies

g. Nuclear medicine studies

h. Ultrasound

i. Split pulmonary functions

9. Specify and justify the diagnostic or therapeutic indications for the use of the following modalities:

a. Rigid and flexible bronchoscopy

b. Esophagoscopy (rigid and flexible)

c. Mediastinoscopy (cervical and parasternal)

d. Thoracoscopy/VATS

e. Laser

f. Stents

g. Lung transplant

10. Assess and recommend the surgical procedures involved in:

a. Tracheal, bronchial, and esophageal obstructing lesions

b. Thoracoplasty

c. Esophageal resection/reconstruction

d. Anti-reflux procedures

e. Sleeve resection of the trachea/bronchus for tumor

f. Chest wall reconstruction using myocutaneous flaps and/or synthetic materials

11. Select and specify diagnostic and therapeutic maneuvers to manage problem areas following thoracic surgery:

a. Cardiovascular and pulmonary medical complications

b. Renal failure

c. Liver failure

d. Diabetes mellitus

e. Malnutrition

f. Metabolic dysfunction

g. Immune system suppression

12. Discuss quality assurance, cost-cutting measures, and patient-care pathways as they relate to thoracic surgery.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Evaluate thoracic pathophysiology; order and interpret appropriate tests.

2. Diagnose and provide initial management of fractures of ribs, clavicle, sternum, scapulae, and spine.

3. Evaluate patients for thoracic surgery with regard to risk factors, candidacy for surgical resection, pulmonary function studies, and possible postoperative disability.

4. Manage general thoracic perioperative procedures.

5. Use, set, and regulate mechanical ventilators.

6. Observe and then:

a. Insert chest tubes

b. Perform thoracentesis

c. Insert central venous access lines

d. Execute simple endoscopic procedures

e. Perform tracheostomies

f. Institute naso-oropharyngeal/tracheal anesthesia for endoscopic procedures

7. Use data obtained from diagnostic and therapeutic procedures to assess and plan treatment for thoracic pathology.

8. Perform bronchoscopy, esophagoscopy, nasotracheal, and orotracheal intubation, including double lumen tubes.

9. Manage empyemas surgically.

10. Insert Swan-Ganz catheter and perform cardiovascular monitoring calculations for:

    a. Pressures

    b. Cardiac output

    c. Systemic vascular resistance

11. Supervise ventilator regulation.

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

1. Perform and/or supervise all thoracic diagnostic and therapeutic endoscopic procedures.

2. Resect ribs, treat empyema cavities, perform pleural and lung biopsies.

3. Manage thoracic trauma.

4. Manage thoracic aortic aneurysms and dissections.

5. Direct complex ventilator-dependent patient management.

6. Perform lung resections, rib resections, mediastinoscopies, and mediastinotomies.

7. Provide surgical management of neoplasms of the thorax and its contents.

8. Provide medical and surgical management of infectious processes in the thorax.

9. Manage cardiac arrhythmias.

10. Perform and/or supervise pacemaker/defibrillator selection and placement.

11. Manage all pharmacotherapeutics associated with thoracic surgery.

12. Treat medical conditions associated with thoracic surgical procedures.

13. Place esophageal and bronchial stents.

CARDIAC AND GREAT VESSELS SURGERY

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Describe and demonstrate a working knowledge of the heart and great vessels, including:

    a. Cardiac chambers (atria and ventricles)

    b. Cardiac valves (mitral, aortic, tricuspid, pulmonic)

    c. Coronary arteries

    d. Intrinsic neural conduction system

    e. Extrinsic neural innervation (sympathetic and parasympathetic)

    f. Great vessels (cavae, aorta, innominate artery, carotid arteries, and subclavian arteries)

2. Describe and demonstrate working knowledge of cardiac physiology, including:

    a. Electrophysiology (action potential, depolarization, repolarization, mechanisms of rhythm control)

    b. Determinants of cardiac output (heart rate and stroke volume)

    c. Interactions and control mechanisms (preload, afterload, contractility, Frank-Starling Law, peripheral resistance)

    d. Determinants of myocardial oxygen consumption

    e. Normal pressures, waveforms, and oxygen saturation in cardiac chambers

3. Identify the control mechanisms and normal physiology of peripheral vessels. Relate each of these to a clinical example:

    a. Arterial autoregulation

b. Venous flow regulation

c. Interrelationship of cardiac output, peripheral blood flow, and autoregulation

4. Discuss the information obtained from the history and physical examination pertinent to cardiac and peripheral vascular pathophysiology. Determine the interactions of those details and their implications on planned surgical procedures and outcomes. Consider the following for risk assessment and perioperative management:

a. Patient age

b. Risk factors for cardiovascular disease (family history, smoking, hypertension, diabetes mellitus, hyperlipidemia, and obesity)

c. Symptoms/signs associated with coronary artery disease, ventricular dysfunction, and valvular dysfunction

d. Pulmonary dysfunction (pulmonary hypertension, chronic obstructive pulmonary disease [COPD], previous pulmonary resection)

e. Neurologic abnormalities

f. Renal dysfunction

g. Hematologic abnormalities

h. Hepatic dysfunction

i. Cerebrovascular, peripheral vascular, or aneurysmal disease

j. Gastrointestinal considerations

k. Metabolic, nutritional, genetic, immune, and oncologic abnormalities

l. Psychiatric conditions, psychological and social interactions

m. Re-operative chest surgery

n. Miscellaneous considerations (prior operations including vascular or valvular prostheses, substance abuse, dental status, interactions of medications)

5. Discuss the use and interpretation of cardiovascular diagnostic tests in identification of cardiovascular pathology, including:

a. Electrocardiography

b. Echocardiography (transthoracic and transesophageal)

c. Traditional roentgenography

d. Cardiac catheterization and arteriography

e. Peripheral vascular arteriography

f. Vascular ultrasonography

g. Computer and magnetic resonance imaging

h. Radionuclide scintigraphy (multi-gated aquisition [MUGA], stress, and Persantine thallium)

6. Demonstrate the use and principles associated with various cardiac monitoring methods, including:

a. Intra-arterial and central venous pressure transducers

b. Pulmonary artery catheters

c. Left atrial catheters

d. Temporary percutaneous and intracardiac pacing wires

7. Discuss techniques, mechanisms of action, and potential complications for mechanical and pharmacologic support of the circulation, including:

a. Inotropic agents (dopamine, dobutamine, epinephrine, norepinephrine, amrinone, isoproterenol)

b. Pre- /after- load agents (Nipride, nitroglycerine, Neo-synephrine)

c. Intra-aortic balloon pump

d. Ventricular assist devices

e. Cardiac pacing

8. Describe and assess the operative indications, risk, and expected outcomes associated with several cardiac surgical procedures, including:

a. Coronary artery bypass and minimally invasive direct coronary artery bypass surgery

b. Valvular replacement/repair (aortic, mitral, tricuspid)

c. Operations of the ascending aorta, aortic arch and descending thoracic aorta

d. Permanent pacemaker/automatic defibrillator insertion

e. Pericardial drainage procedure

9. Discuss the complications of cardiac surgery and methods used to reduce their incidence. Complications: death, myocardial infarction, stroke, bleeding, arrhythmias, low cardiac output syndrome, cardiac tamponade, pneumothorax, sternal and extremity wound infections, respiratory and renal failure

10. Review the management of postoperative cardiac surgery patients in the intensive care unit.

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

1. Discuss the pathophysiology of congenital cardiac disease, including:

   a. Coarctation of the aorta

   b. Patent ductus arteriosus

   c. Atrial septal defects

   d. Ventricular septal defects

   e. Complex cyanotic cardiac disease

      (1) Transportation of great vessels

      (2) Tetralogy of Fallot

      (3) Pulmonary atresia

      (4) Total anomalous venous return

2. Discuss the pathophysiology of acquired cardiac disease including:

   a. Myocardial ischemia

   b. Valvular heart disease (stenotic and regurgitant)

   c. Endocarditis

d. Ventricular aneurysms

e. Thoracic aneurysms

f. Trauma to the heart and great vessels

3. Summarize the management of the following post-cardiac surgery variances, including the monitoring, prevention, and the therapeutic intervention of:

a. Arrhythmias (ventricular and atrial)

b. Bleeding (correction of coagulopathy, indications for re-exploration)

c. Infection (methods of prophylaxis, empiric and culture-specific therapy)

d. Low cardiac output and hypotension

e. Postoperative hypertension

4. Demonstrate working knowledge and use of the following postoperative support systems:

a. Cardiac drugs (inotropic, chronotropic, afterload-reducing, anti-platelet, beta-blockade, ACE inhibition, diuretics)

b. Mediastinal and pleural drainage

c. Mechanical ventilation, airway management systems

d. Temporary and permanent pacemakers

e. Intra-aortic balloon pumps and other ventricular assist devices

f. Dialysis and ultrafiltration

g. Cardiopulmonary bypass and extracorporeal membrane oxygenation

5. Summarize the diagnostic evaluation and indications for each of the following surgical procedures:

a. Coronary artery bypass grafting

b. Adult valvular repair and replacement procedures (mechanical vs. bioprosthetic)

c. Resection of ventricular aneurysms

d. Resection and grafting of thoracic aneurysms

e. Combination operations of valve replacement and coronary artery bypass grafting

f. Surgical treatment of idiopathic hypertrophic subaortic stenosis

6. Discuss the evaluation and therapeutic options available for surgical management of cardiac trauma such as:

a. Traumatic transection of the aorta and other great vessels

b. Blunt and penetrating cardiac and great vessel injury

7. Outline the post-hospitalization follow-up and management of cardiac surgery patients to include:

a. Instructions to the patient

b. Follow-up clinic visit (including physical examination, electrocardiogram [ECG], Chest x-ray)

c. Long-term follow-up for coronary and valve patients (including anticoagulation adjustment where indicated)

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

Junior Level: PGY-I, PGY-II

1. Perform preoperative evaluation, history, and physical examination of cardiac surgery patients.

2. Obtain and interpret indicated diagnostic studies.

3. Discuss diagnostic and therapeutic approaches to specific acquired and congenital cardiac diseases with the attending physicians.

4. Assist with selected cardiac and general surgery cases, such as:

a. Pacemaker and defibrillator insertions

b. Saphenous vein harvest and wound closure for coronary bypass operations

c. Valve and coronary operations

d. Pericardial drainage operations

e. Tracheostomy

f. Minor vascular repairs

5. Provide postoperative cardiac surgery follow-up care for the following cases:

a. Coronary surgery

b. Valve surgery

c. Thoracic aortic surgery

d. Pacemaker and defibrillator placement

6. Perform percutaneous insertion of chest tubes and intravenous, intra-arterial, and pulmonary artery catheters with supervision.

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

1. Serve as first assistant on selected major cardiothoracic cases, including:

a. Coronary artery bypass surgery, minimally invasive direct coronary artery bypass

b. Valvular replacements and repairs, including minimally invasive procedures

c. Thoracic aortic surgery

d. Congenital cardiac surgery

e. Complex defibrillators

f. Emergency thoracotomies

2. Perform cardiac procedures, under supervision, including the following:

a. Insert intra-aortic balloon pump

b. Pacemaker implantation

c. Median sternotomy incision

d. Aortic cannulation for cardiopulmonary bypass

e. Saphenous vein and internal thoracic artery harvest

f. Perform proximal coronary anastomoses

g. Repair of vascular trauma

h. Graft replacement of aorta in selected cases

3. Coordinate the work-up of emergency cardiac surgery cases with:

a. Emergency room or trauma team

b. Cardiac catheterization laboratory

c. Diagnostic imaging services

d. Laboratory (including blood bank)

e. Anesthesia

f. Operating room

g. Perfusion services

4. Assist with emergency cardiac surgery, including trauma cases.

5. Recognize and prescribe treatment for complications of cardiac surgery such as:

a. Gastrointestinal bleeding

b. Cerebrovascular accident

c. Endocrine abnormalities

d. Pulmonary complications

e. Renal dysfunction

f. Coagulopathy

g. Dysrhythmias

h. Low cardiac output status

CARDIOTHORACIC SURGERY IN ELDERLY PATIENTS

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Discuss the epidemiological impact of cardiovascular disease in the elderly.

2. Identify the cardiovascular risk factors associated with surgical morbidity and mortality.

3. Discuss the cardiac surgical procedures performed most often in the elderly.

4. Discuss the indications for valvular heart surgery in the elderly.

5. Discuss the pathophysiologic changes in the cardiovascular system that accompany aging.

6. Discuss the case management of elderly patients with coronary artery disease with respect to surgical risk.