San Antonio Pediatric Surgery Associates

Pediatric Surgery Study Guide and Learning Objectives

General Pediatric Surgical Care

1. Describe the cardiac and pulmonary changes of postnatal transitional physiology.
2. Calculate the appropriate fluid and electrolyte requirements for:
   a. term newborn infant with esophageal atresia and normal electrolytes (weight 3 kg)
   b. 4 week old infant with pyloric stenosis, 5% dehydration, and serum chloride of 85 meq/l (weight 4 kg).
   c. 7 year old febrile child with appendicitis of 3 days duration (weight 20 kg).
3. Calculate the appropriate nutritional requirements for:
   a. term newborn infant who is status post primary repair of a gastroschisis defect.
   b. 6-year-old child with severe closed head injury and intact intestinal tract.
   c. 14 year old child with Crohn’s disease and intestinal obstruction.
4. Describe the appropriate ventilator settings for:
   a. newborn term infant status post repair of duodenal atresia
   b. newborn infant with congenital diaphragmatic hernia.
   c. 4 year old child with pulmonary contusions and closed head injury after motor vehicle accident.
5. What are the important perioperative management concerns in a child who undergoes surgery who also has:
   a. Type I diabetes mellitus
   b. Asthma or recent upper respiratory illness
   c. Sickle cell anemia
   d. History of prematurity
   e. History of chemotherapy
6. What are the various options for central venous access in the pediatric patient?
7. Describe the role of prenatal diagnosis of common congenital surgical disorders.
8. Describe the role of fetal surgery in the treatment of prenatally diagnosed:
   a. cystic lung lesions
   b. massive cervical lymphangioma
   c. congenital diaphragmatic hernia
   d. renal obstructive disorders
9. Describe the embryological development and selected maldevelopment of the following organ systems:
   a. tracheopulmonary
   b. cardiac and great vessels
   c. diaphragm
   d. foregut
   e. midgut
   f. hindgut
   g. anorectum
   h. abdominal wall
   i. genitourinary

Head/Neck

1. Describe the embryology, presentation, and treatment of the common branchial cleft anomalies; which is the most commonly seen in clinical practice?
2. What is the appropriate diagnostic and therapeutic management of the child with cervical adenitis? When is surgical drainage appropriate?
3. Describe the embryology, presentation, and diagnosis of thyroglossal duct cysts. Contrast the surgical management of an infected vs. non-infected cyst.
4. Describe the evaluation and management of a 10-year-old child with a progressively enlarging painless cervical mass.
Chest
1. Describe the embryology, presentation, diagnosis, and preoperative management of an infant with esophageal atresia.
2. What is the classification system for esophageal atresia? What is meant by "long gap" atresia, and how does its management differ from non-long gap atresia?
3. Describe the pathophysiology of patent ductus arteriosus, persistent fetal circulation, Tetralogy of Fallot.
4. Differentiate the common congenital anomalies of the lung (congenital lobar emphysema, cystic adenomatoid malformation, and pulmonary sequestration).
5. Describe the embryology, presentation, diagnosis, and management of congenital diaphragmatic hernia. Know the indications and contraindications for extracorporeal membrane oxygenation support (ECMO) in these patients.
6. A 4-year-old girl is brought to the ER 1 hour after a suspected ingestion of lye cleaning solution. She has punctate superficial burns around her mouth and oropharynx. Describe your management plan. What are the long-term consequences of esophageal lye burns?
7. Describe the presentation and diagnosis of pectus excavatum and pectus carinatum. When should these be repaired? Describe the conditions seen in Poland’s syndrome.

Gastric
1. What is the appropriate evaluation and differential diagnosis of a 1-month-old child with progressive non-bilious emesis?
2. Describe the evaluation and management of a 6-month-old child with failure to thrive and suspected gastroesophageal reflux. What are the technical components of the various fundoplication procedures?
3. What is the appropriate evaluation, preoperative, and operative management of pyloric stenosis?

Hepatobiliary/pancreas/spleen
1. What is the appropriate evaluation for the infant with direct hyperbilirubinemia? What are the major disorders in the differential diagnosis?
2. Describe the pathology of biliary atresia. What are the important technical points of a Kasai portoenterostomy? What are the outcomes?
3. Describe the pathology and classification of choledochal cysts. How does the presentation differ between infants and older children/adults? What are the surgical options for this disorder?
4. What is nesidioblastosis? Describe the medical and surgical options for this disorder.
5. Describe the pathophysiology of idiopathic thrombocytopenic purpura. When is surgery recommended in the child? What immunizations are necessary?

Small Intestine
1. What is intestinal atresia? Contrast the embryology, presentation, diagnosis, and management of duodenal atresia vs. jejuno-ileal atresia. What are the important associated anomalies seen with the different types of atresias?
2. What is the appropriate evaluation for an infant with bilious emesis? Describe the embryological basis for malrotation. What is a Ladd’s procedure?
3. What is meconium ileus? Describe the diagnosis and management of an infant with uncomplicated meconium ileus vs. an infant with complicated meconium ileus. What is Distal Intestinal Obstructive Syndrome (DIOS) (formerly known as meconium ileus equivalent)?
4. Where does idiopathic intussusception occur? Describe the current diagnosis and nonsurgical management of this disorder. When is surgery recommended? How does its evaluation differ among age groups?
5. Describe the embryology, anatomy, and complications of a Meckel’s diverticulum. What are the various forms of vitelline duct anomalies?
6. What is necrotizing enterocolitis? Describe its pathophysiology, presentation, and diagnosis. What are the classic radiological findings? Describe the common indications for surgical treatment.
7. How does Crohn’s disease differ in children compared to adults? What are the important growth considerations in a child with inflammatory bowel disease, and how does this alter your surgical recommendations?

**Large Intestine/Anus**
1. Describe the embryology, pathology, pathophysiology, and presentation of Hirschsprung’s disease. How is it diagnosed? Contrast the differences in treatment in an otherwise healthy infant vs. the infant who presents with severe enterocolitis. What are the current surgical options for this disorder?
2. What are small left colon syndrome and meconium plug syndrome? How are they treated?
3. What is the embryology of anorectal anomalies (imperforate anus)? Describe the common forms of imperforate anus, and know the major differences between males and females with this disorder.
4. Contrast the major differences in the treatment of infants with a low imperforate anus vs. a high imperforate anus. What is the general prognosis of these infants?
5. What are the components of the VACTERL association?
6. Describe the evaluation and management of a 1-year-old child with recurrent rectal prolapse.
7. Describe your approach to the evaluation of the child with acute abdominal pain. What are the common differential diagnoses, and how do they differ among age groups? What are the important diagnostic tests available, their efficacy, and their pitfalls?
8. Describe the differences between complicated and uncomplicated appendicitis. How are they treated differently, and what are the potential complications?
9. What do you do when you are faced with a negative appendectomy?

**Abdominal Wall**
1. Contrast the embryological development of omphalocele vs. gastroschisis. What are the important associated anomalies seen with each disorder?
2. How would you manage a newborn infant with a gastroschisis defect? How would you manage a newborn with an omphalocele?
3. Describe the diagnosis and management of a child with an umbilical hernia. When should surgical repair be considered?
4. What is Eagle-Barrett syndrome? What are the important associated anomalies?

**Genitourinary**
1. Describe the evaluation and management of a young male with an acute, painful scrotum. What are the surgical considerations in the treatment of testicular torsion?
2. Describe the evaluation and management of a young male with a non-painful scrotal mass.
3. What are the surgical causes of primary amenorrhea?
4. Contrast the difference between a direct inguinal hernia and an indirect inguinal hernia. What is seen most commonly in children?
5. What are the technical considerations in the repair of childhood inguinal hernias? What are the complications of unrepaired hernias?
6. Describe the embryology, epidemiology, and diagnosis of cryptorchidism. When should this be corrected? How do you evaluate and manage the child with a non-palpable testicle?
7. What is hypospadias? What is epispadias? What is bladder exstrophy?
8. What are the pros and cons of infant circumcision? Describe two techniques.

**Oncology**
1. Describe the differential diagnosis and evaluation of a (1) newborn and (2) a two-year-old child with an abdominal mass.
2. Know the important surgical/oncological concepts for neuroblastoma, Wilm’s tumor, hepatoblastoma, and rhabdomyosarcoma, including:
   a. epidemiology
   b. pathology
   c. basic molecular characteristics (tumor markers, chromosomal anomalies, etc.)
   d. staging
e. diagnostics  
f. surgical principles  
g. outcomes  
3. What are the important surgical/anesthetic considerations for a child with a large anterior mediastinal mass?  
4. A child presents to you for biopsy of a suspicious neck mass. What are the important diagnostic studies that you should discuss with the pathologist?  
5. What are the common abdominal complications seen in the neutropenic patient?  
6. What is the most common pediatric thyroid malignancy? Describe the evaluation of a thyroid mass in the pediatric patient.  
7. Describe the treatment of central line sepsis in the immunocompromised child. Describe the management of a "clotted" or broken Broviac catheter.  

Trauma  
1. What is the epidemiology of childhood trauma in North America?  
2. Describe the major airway, morphological, and cardiopulmonary differences between the pediatric and adult trauma victim.  
3. Describe the evaluation of abdominal injury in the stable vs. unstable pediatric trauma victim. What are the advantages and disadvantages of the various diagnostic modalities?  
4. What are the major thoracic injuries seen in children?  
5. Describe the management of splenic and hepatic injuries in children (operative, salvage, and nonoperative). What are the criteria for successful nonoperative treatment?  
6. What are the components of the lapbelt complex of injuries? Describe the evaluation of the pediatric patient with a seatbelt mark.  
7. What is the appropriate treatment of a child with a renal contusion? Renal fracture?  
8. A 5-year-old girl is run over by a car. She presents with an unstable pelvic fracture and blood oozing from the vagina. Describe your evaluation and management.  
9. What is the appropriate evaluation and treatment for a 10-year-old who presents with a fractured humerus and no radial pulse?  
10. What is the Salter-Harris classification of fractures in children?  
11. Contrast the difference in the determination of body surface area in the pediatric vs. adult burn victim. What is the appropriate resuscitation formula for a 2-year-old child with 2nd and 3rd degree scald burns over 60% of his body? What are the important considerations for ventilation and extremity perfusion? What is the appropriate timing for skin grafting?  
12. What are the legal requirements for health professionals in the state of Texas when dealing with a suspected child abuse victim?