
# PEDIATRIC SURGERY

# ENTRUSTABLE PROFESSIONAL ACTIVITES

# (PS EPAs)

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EVALUATION AND MANAGEMENT OF A PATIENT WITH AN ABDOMINAL WALL DEFECT

EVALUATION AND MANAGEMENT OF A PATIENT WITH AN ANORECTAL MALFORMATION

EVALUATION AND MANAGEMENT OF A PATIENT WITH A COMMON GASTROINTESTINAL CONDITION

EVALUATION AND MANAGEMENT OF A PATIENT WITH A CONGENITAL DIAPHRAGMATIC HERNIA

EVALUATION AND MANAGEMENT OF A PATIENT WITH A CONGENITAL LUNG LESION

EVALUATION AND MANAGEMENT OF A PATIENT WITH ESOPHAGEAL ATRESIA AND TRACHEOESOPHAGEAL FISTULA

EVALUATION AND MANAGEMENT OF A PATIENT WITH A GENITOURINARY CONDITION

EVALUATION AND MANAGEMENT OF A PATIENT WITH A HEPATOBILIARY DISORDER

EVALUATION AND MANAGEMENT OF A PATIENT WITH HIRSCHSPRUNG DISEASE

EVALUATION AND MANAGEMENT OF A PATIENT WITH AN INGUINAL HERNIA

EVALUATION AND MANAGEMENT OF A PATIENT WITH A NEONATAL INTESTINAL CONDITION (ATRESIA, MECONIUM ILEUS)

EVALUATION AND MANAGEMENT OF A PATIENT WITH OTHER ONCOLOGICAL CONDITIONS

EVALUATION AND MANAGEMENT OF A PATIENT WITH NEUROBLASTOMA OR WILMS TUMOR

EVALUATION AND MANAGEMENT OF A PATIENT WITH A ROTATIONAL ANOMALY

EVALUATION AND MANAGEMENT OF A PATIENT REQUIRING VASCULAR ACCESS

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EVALUATION AND MANAGEMENT OF A PATIENT REQUIRING EXTRACORPOREAL LIFE SUPPORT

EVALUATION AND MANAGEMENT OF A PATIENT WITH SIP/NEC

EVALUATION AND MANAGEMENT OF A PEDIATRIC PATIENT WITH OBESITY

EVALUATION AND MANAGEMENT OF THE TRAUMA PATIENT

ASSESSMENT AND RESUSCITATION OF AN UNSTABLE PATIENT

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# Evaluation and Management of a Patient with an Abdominal Wall Defect

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| **Description of the Activity** | Abdominal wall defects are a common congenital anomaly treated by pediatric surgeons that almost always require surgical repair either in the urgent setting immediately after birth or in a delayed fashion. The essential function of this activity is the definitive diagnosis, workup, and treatment of the spectrum of abdominal wall defects from the prenatal phase of care to long-term follow-up. |
| **Functions** | ❖ Nonoperative/Preoperative<br><br>• Gastroschisis (GS)<br>○ Counsel a family on pre- and postnatal strategies to optimize the outcome for the fetus, including the risk of intrauterine fetal demise.<br>○ Discuss options for surgical repair after birth and the long-term outcomes and risks of GS with the family.<br>○ Identify risk factors for a fetus with GS, including gastrointestinal dilation, worsening biophysical profile, and intrauterine growth restriction.<br>○ Identify the risks and benefits of both early and near-term delivery in a fetus with GS.<br>○ Perform an initial evaluation of the bowel to determine the urgency and type of surgical repair, including the identification of strategies to improve perfusion to the bowel if needed.<br>○ Discuss the different strategies for GS repair, including the associated risks, benefits, and outcomes of each strategy.<br>○ Recognize the different types of silos, including prefabricated and surgeon-constructed versions.<br>○ Identify the need for early gastric decompression, intravenous access, and fluid resuscitation.<br>○ Recognize the importance of bowel coverage, temperature regulation, patient position, and frequent reassessment of bowel viability.<br>○ Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.<br>○ Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.<br><br>• Omphalocele<br>○ Counsel the family on the long-term outcomes and risks associated with omphalocele.<br>○ Identify a safe delivery strategy in a fetus with a giant omphalocele.<br>○ Perform additional studies to diagnose associated anatomic and genetic anomalies in a fetus with omphalocele.<br>○ Discuss the spectrum of associated anatomic abnormalities and prenatal diagnostic studies.<br>○ Perform an initial evaluation of the abdominal wall defect, and identify the difference between an omphalocele and a giant omphalocele based on physical examination.<br>○ Order testing to allow for safe upfront surgical repair (eg, echocardiogram, postnatal glucose monitoring).<br>○ Discuss options for a safe surgical plan based on examination of the omphalocele, including the indications for primary omphalocele repair and delayed repair.<br>○ Formulate an operative plan based on the size of the omphalocele, the severity of comorbid conditions, and the epithelialization of the sac. |

# Evaluation and Management of a Patient with an Abdominal Wall Defect

- Determine the timing of a delayed ventral hernia repair when using the "paint and wait" strategy for a giant omphalocele.
- Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.
- Devise an operative plan, and communicate it to members of the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.

- Cloacal exstrophy
  - Perform a focused initial physical examination to identify anatomic variations in the size of the omphalocele and bladder plates.
  - Ensure adequate protective covering of the omphalocele and mucosal surfaces.
  - Order preoperative diagnostic studies and tests (including karyotype) to evaluate for associated abnormalities, including spinal dysraphism (omphalocele, exstrophy of the cloaca, imperforate anus, and spinal defects [OEIS]).
  - Discuss different strategies for operative staging to address the abdominal wall closure based on the size of the omphalocele, patient stability, and the presence of comorbid conditions or associated anomalies.
  - Recognize the need for a multidisciplinary team with experience in the repair of cloacal exstrophy and the need to transfer to a tertiary care center.
  - Counsel the family on the diagnosis of cloacal exstrophy, and discuss anatomic variations, long-term outcomes, and quality of life

❖ Intraoperative
- GS
  - Identify the safest location for the procedure (bedside vs operating room) at your institution.
  - Place a spring-loaded silo in a newborn with GS at the bedside using a silo of appropriate size.
  - Perform a sutureless umbilical closure at the bedside after identifying the instruments and supplies needed for the procedure.
  - Manage the silo using daily reduction techniques, and determine the timing for GS closure in a baby with a silo in place.
  - Safely perform a delayed GS repair using the fascial closure or sutureless umbilical closure techniques.
  - Recognize how abdominal pressure can be monitored during and after GS closure.
  - Identify the need to open the fascia more widely in certain settings.
  - Perform an assessment and initial safe management of a suspected intestinal atresia.
- Omphalocele
  - In a baby with a giant omphalocele, initiate a "paint and wait" strategy for epithelialization of the omphalocele sac and delayed ventral hernia repair.
  - In a baby with a small or medium omphalocele, safely perform a primary omphalocele repair.
  - Demonstrate a technique to perform an umbilicoplasty in an infant undergoing primary omphalocele repair.
  - In the setting of a ruptured omphalocele sac, understand the different options available for repair, including primary fascial repair, sac repair, and silo placement.
  - Demonstrate the techniques required for a complex omphalocele repair (eg, component separation).

- Cloacal exstrophy
  - Describe the goals of complete surgical repair, whether staged or primary, including securing the abdominal wall, separating the hindgut from the bladder, maintaining bowel length, and ultimately closing the bladder.

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# Evaluation and Management of a Patient with an Abdominal Wall Defect

- Recognize when the omphalocele cannot be closed primarily, and describe management options to include epithelialization or silo placement.
- Understand the steps for the creation of a functional hindgut ostomy, including protection of the blood supply, preservation of the hindgut, and tubularization of the cecal plate.
- Demonstrate a basic understanding of management strategies regarding conversion of the cloacal exstrophy to a classic bladder exstrophy with delayed bladder closure and osteotomies for closure of the pelvis.

❖ Postoperative

- GS
  - Formulate a nutritional plan for a baby with GS awaiting return of bowel function, including parenteral nutrition and the gradual advance of enteral nutrition.
  - In the early postoperative setting, recognize the signs of abdominal compartment syndrome, and formulate a surgical plan to reopen the abdomen.
  - Identify the natural history of umbilical hernia in a baby with GS who undergoes the sutureless umbilical closure technique, including the indications for and timing of surgical repair.
  - Identify the importance of long-term follow-up to evaluate growth, abdominal wall hernia development, and nutritional status.

- Omphalocele
  - In the early postoperative setting, recognize the signs of abdominal compartment syndrome, and formulate a surgical plan to reopen the abdomen.
  - Formulate a plan for additional staged procedures and ways to increase abdominal domain.
  - Identify the importance of long-term follow-up to evaluate growth and abdominal wall hernia development.

- Cloacal exstrophy
  - Formulate a postoperative plan to monitor fluids and electrolytes and initiate enteral feedings.
  - Recognize electrolyte imbalances that may result from a proximal colostomy (compared with a hindgut ostomy).
  - Identify the different aspects of complex wound care of a remaining omphalocele and the bladder plates if a staged approach was used.
  - Recognize and manage surgical complications from breakdown of repair of the cecal plate, omphalocele, and bladder.
  - Demonstrate understanding of long-term complications involving urinary and fecal incontinence, bowel dysmotility, permanent ostomy, and infertility.

## Scope

❖ In scope

❖ Diagnoses
- Cloacal exstrophy
- GS
- Omphalocele

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# Evaluation and Management of a Patient with an Abdominal Wall Defect

❖ Procedures
- GS – silo followed by repair
- Omphalocele – epithelization of the sac with delayed repair
- Initial operative management of cloacal exstrophy
- Primary suture closure
- Sutureless closure
- Staged repair

❖ Special populations
- OEIS complex
- Pentalogy of Cantrell

❖ Out of scope

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# Evaluation & Management of a Patient with an Abdominal Wall Defect

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| 1<br><br>**Framework:**<br><br>The attending will show and tell or the learner acts as first assistant.<br><br>**Entrustment:**<br><br>The learner demonstrates understanding of information and has basic skills.<br><br>What a new pediatric surgery fellow should know. | • With active assistance, performs a basic H&P and identifies the preop studies required to safely proceed with an operation in an uncomplicated patient with an abdominal wall defect.<br><br>• With active assistance, formulates an initial surgical plan for an uncomplicated patient, including bedside vs. OR repair and primary vs staged/delayed repair<br><br>• With active guidance, identifies and directs management for a patient who requires emergent intervention due to complicated gastroschisis, bowel ischemia, or ruptured omphalocele<br><br>• Demonstrates basic knowledge of fluid losses in term neonates with abdominal wall defects<br><br>• With active assistance, directs preop fluid resuscitation, temperature management, gastric decompression, patient positioning, and ventilatory strategies in an uncomplicated patient<br><br>• Establishes a professional rapport with a patient and their family and communicates the basic risks and benefits of a planned procedure without diagnosis-specific details<br><br>• Reviews prenatal diagnostic information without interpretation or formulation of a | • With active assistance, performs primary repair of a neonate with an uncomplicated or small abdominal wall defect<br><br>• In an uncomplicated patient, requires active assistance with intraop decision-making and moving through the steps of an operation regarding the need for silo placement or widening the abdominal wall defect (GS) or delayed or staged repair, incision type, and need for patch (OM)<br><br>• With active assistance, handles tissues gently and identifies normal anatomic structures, delicate/thin membranes, or tissue planes | • With active assistance, identifies the need for postop enteral or parenteral nutrition and formulates a plan<br><br>• With active assistance, recognizes postop abdominal compartment syndrome and formulates a plan for management in an uncomplicated neonate<br><br>• With active assistance, formulates and communicates with care teams/family on a basic plan for suspected intestinal atresia associated with gastroschisis or staged abdominal wall closure of a giant omphalocele<br><br>• With active assistance in an uncomplicated neonate, recognizes postop complications (eg, wound infection, dehiscence, leak, perforation, electrolyte abnormalities, ileus, obstruction, intestinal ischemia)<br><br>• With active assistance, formulates a long-term follow-up plan for evaluation of residual or recurrent hernia defects in an uncomplicated patient. |

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# Evaluation & Management of a Patient with an Abdominal Wall Defect

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | postnatal plan and has limited participation in prenatal consultation | | |
| **2**<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case.<br><br>**Entrustment:**<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point. | • With passive assistance, performs a basic H&P and identifies the preop studies required to safely proceed with an operation in an uncomplicated patient with an abdominal wall defect.<br><br>• With passive assistance, formulates an initial surgical plan for an uncomplicated patient, including bedside vs. OR repair and primary vs. staged/delayed repair.<br><br>• With direct supervision, identifies and directs management for a patient who requires emergent intervention due to complicated gastroschisis, bowel ischemia, or ruptured omphalocele.<br><br>• Demonstrates understanding of and describes basic aspects of fluid losses in term neonates with abdominal wall defects.<br><br>• With passive assistance, directs preop fluid resuscitation, temperature management, gastric decompression, patient positioning, and ventilatory strategies in an uncomplicated patient.<br><br>• Establishes a therapeutic relationship with a patient and their family and compassionately communicates the disease-specific risks and benefits of a planned procedure. | • With direct supervision, performs primary repair of a neonate with an uncomplicated or small abdominal wall defect.<br><br>• In an uncomplicated patient, requires passive assistance with intraop decision-making and moving through the steps of an operation regarding the need for silo placement or widening the abdominal wall defect (GS) or delayed or staged repair, incision type, and need for patch (OM).<br><br>• With passive assistance, handles tissues gently and identifies normal anatomic structures, delicate/thin membranes, or tissue planes, | • With passive assistance anticipates, formulates, and coordinates a plan for postop enteral or parenteral nutrition<br><br>• With passive assistance, recognizes postop abdominal compartment syndrome and formulates a plan for management in an uncomplicated neonate<br><br>• With passive assistance, formulates and communicates with care teams/family a basic plan for suspected intestinal atresia associated with gastroschisis or staged abdominal wall closure of a giant omphalocele.<br><br>• With passive assistance in an uncomplicated neonate, recognizes postop complications (eg, wound infection, dehiscence, leak, perforation, electrolyte abnormalities, ileus, obstruction, intestinal ischemia).<br><br>• With passive assistance, formulates a long-term follow-up plan for evaluation of residual or recurrent hernia defects in an uncomplicated patient. |

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# Evaluation & Management of a Patient with an Abdominal Wall Defect

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | • With passive assistance, interprets prenatal diagnostic information and formulates an appropriate delivery and postnatal surgical plan with minimal participation in prenatal consultation. | | |
| **3**<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case.<br><br>**Entrustment:**<br><br>The learner can perform the operation/task independently in the uncomplicated patient.<br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves. | • With passive assistance, performs a detailed H&P and orders the preop studies required to safely proceed with an operation for a complex/preterm neonate with an abdominal wall defect<br><br>• With passive assistance, formulates a comprehensive surgical plan for a medically complex/preterm neonate, including intraop management strategies, bedside vs OR repair, and primary vs. staged/delayed repair<br><br>• With indirect supervision, identifies and directs management for a patient who requires emergent intervention due to complicated gastroschisis, bowel ischemia, or ruptured omphalocele<br><br>• Demonstrates understanding of and describes comprehensive aspects of fluid losses in straight forward neonates with abdominal wall defects<br><br>• With passive assistance, directs preop fluid resuscitation, temperature management, gastric decompression, patient positioning, and ventilatory strategies in a complicated patient (eg, bowel ischemia, ruptured omphalocele) | • With passive assistance, performs repair of a small abdominal wall defect in a patient presenting with gastroschisis and intestinal ischemia (eg, closing gastroschisis), small omphalocele and syndromic features, or significant comorbid conditions (complex congenital cardiac disease, pulmonary HTN, Beckwith-Wiedemann syndrome)<br><br>• In a complex patient, requires passive assistance with intraoperative decision-making and moving through the steps of an operation regarding the need for silo placement, widening of the abdominal wall defect, and ostomy formation (GS) or a partial/staged omphalocele repair with attention to tissue tension, intra-abdominal pressure, and anatomic constraints (OM)<br><br>• With passive assistance, handles tissues gently and identifies variations in anatomy, delicate/thin membranes, or abnormal tissue planes | • With passive assistance, anticipates, formulates, and coordinates a plan for postop enteral or parenteral nutrition in a medically or surgically complex neonate<br><br>• With passive assistance, recognizes postoperative abdominal compartment syndrome and formulates a plan for management in a complex neonate<br><br>• With passive assistance in a medically complex neonate, formulates a timely and comprehensive long-term surgical plan and participates in a multidisciplinary discussion with care teams/family for suspected intestinal atresia associated with gastroschisis or complex staged abdominal wall closure of a giant omphalocele<br><br>• With passive assistance in a complex neonate, identifies and manages postop complications (eg, wound infection, dehiscence, leak, perforation, electrolyte abnormalities, ileus, obstruction, intestinal ischemia)<br><br>• With passive assistance, formulates a long-term follow-up plan and diagnoses |

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# Evaluation & Management of a Patient with an Abdominal Wall Defect

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | • Establishes a culturally sensitive therapeutic relationship with a socially complex family or the family of a medically complex neonate and compassionately communicates the disease-specific risks and benefits of a planned procedure and the prognosis<br>• Independently interprets prenatal diagnostic information and formulates an appropriate delivery and postnatal surgical plan with passive participation in prenatal consultation | | and manages residual or recurrent hernia defects in a complex patient |
| 4<br>**Framework**<br>The learner has a strong and indepth understanding of surgical options and techniques.<br>**Entrustment:**<br>Can perform the operation/task independently in complicated cases<br>or<br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases. | • Independently performs a detailed H&P and orders the preop studies required to safely proceed with an operation any patient with an abdominal wall defect<br>• Independently leads the formulation of a surgical plan, including intraop management strategies, bedside vs OR repair, or primary vs. staged/delayed repair in any patient with an abdominal wall defect<br>• Independently identifies and directs management for a patient who requires emergent intervention due to complicated gastroschisis, bowel ischemia, or ruptured omphalocele<br>• Demonstrates understanding of and describes comprehensive aspects of fluid losses in complex/preterm neonates with abdominal wall defects | • Independently performs repair of a small abdominal wall defect in a patient presenting with gastroschisis and intestinal ischemia (eg, closing gastroschisis), small omphalocele and syndromic features, or significant comorbid conditions (complex congenital cardiac disease, pulmonary HTN, Beckwith-Wiedemann syndrome)<br>• In a complex patient, independently makes decisions intraoperatively and moves through the steps of an operation regarding silo placement, widening of the abdominal wall defect, and ostomy formation (GS) or a partial/staged giant omphalocele repair with attention to tissue tension, intra-abdominal pressure, and anatomic constraints (OM)<br>• Adapts tissue handling to tissue type and independently identifies variations in | • Independently anticipates, formulates, and coordinates a plan for postop enteral or parenteral nutrition in a medically or surgically complex neonate<br>• Immediately recognizes postoperative abdominal compartment syndrome and independently formulates a management plan in a complex neonate<br>• In a medically complex neonate, independently formulates a comprehensive evidence-based and long-term surgical plan and actively participates in a multidisciplinary discussion with care teams/family for suspected intestinal atresia associated with gastroschisis or complex staged abdominal wall closure of a giant omphalocele<br>• In a complex neonate, independently identifies and manages postop |

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# Evaluation & Management of a Patient with an Abdominal Wall Defect

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | • Independently leads preop fluid resuscitation, temperature management, gastric decompression, and ventilatory strategies in medically complex/premature patient with an abdominal wall defect<br><br>• Establishes a culturally sensitive therapeutic relationship with a socially complex family or the family of a medically complex neonate and uses shared decision-making to align patient and family values, goals, and preferences with treatment options to make a personalized care plan<br><br>• Independently interprets prenatal diagnostic information and formulates an appropriate delivery and postnatal surgical plan with active participation in prenatal consultation | anatomy, delicate/thin membranes, or abnormal tissue planes | complications (eg, wound infection, dehiscence, leak, perforation, electrolyte abnormalities, ileus, obstruction, intestinal ischemia)<br><br>• Independently formulates a long-term follow-up plan and diagnoses and manages residual or recurrent hernia defects in a complex patient |

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# Evaluation and Management of a Patient with an Anorectal Malformation

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| **Description of the Activity** | Pediatric surgeons must be able to evaluate and manage pediatric patients with an anorectal malformation (ARM), from prenatal counseling to reconstructive procedures, to adolescence, in a variety of practice settings. The key features of ARM include:<br>• A spectrum of anomalies with multiple subtypes ranging from mild to severe, depending on the specific nature of the malformation<br>  ○ Some cases may involve only minor abnormalities that can be corrected with relatively simple surgical procedures, while others may require more complex surgical interventions.<br>• Abnormalities in the genitourinary tract, such as the urinary and reproductive organs<br>• Associated conditions, such as VACTERL (vertebral defects, anal atresia, cardiac defects, tracheoesophageal fistula, renal anomalies, and limb abnormalities<br>The prognosis and long-term outcomes for pediatric patients with ARM depend on the severity of the malformation, the success of surgical interventions, and the presence of any associated conditions. Early detection and intervention are crucial for optimizing outcomes and improving the quality of life for affected individuals. |
| **Functions** | ❖ Nonoperative/Preoperative<br>• Identify common findings on prenatal ultrasound in a patient with cloaca, including abdominal/pelvic cystic masses, hydronephrosis, hydroureteronephrosis, oligohydramnios, ascites, and distended or obstructed bowel.<br>  ○ These findings should prompt additional evaluation with the maternal-fetal medicine team and may prompt magnetic resonance imaging (MRI).<br>  ○ If MRI findings suggest cloaca or ARM, refer the patient to a center for counseling, and consider delivery at an appropriate facility.<br>• Counsel parents and families on delivery expectations and the anticipated postnatal course.<br>• Obtain a thorough history and physical exam, identifying prenatal risk factors. Differentiate between common and uncommon ARM variants on exam.<br>• Communicate the clinical workup, evaluation, and expectations to the parents and other health care providers.<br>• Perform a VACTERL workup, and identify important comorbid conditions.<br>• Identify a unique ARM problem (eg, hydrocolpos in the setting of cloaca and potential complications).<br>• Recognize factors that portend outcome, such as tethered cord, high versus low defect, and sacral ratio.<br>• Perform initial nonoperative and operative management<br>• Identify the role of early versus delayed repair in patients with perineal and vestibular fistulas.<br>• Identify the indications and outline the technical aspects for a diverting colostomy in the neonatal period.<br>• Evaluate a patient with cloaca, and identify initial operative management strategies.<br>• Evaluate and manage a patient with hydrocolpos.<br>• Perform panendoscopy and a three-dimensional cloacagram.<br>• Perform and interpret a distal high-pressure colostogram, recognizing its impact on surgical management.<br>• Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record. |

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# Evaluation and Management of a Patient with an Anorectal Malformation

- Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.

❖ Intraoperative
- Describe the necessary steps for operative repair.
- Ensure the patient is positioned correctly and the operating room contains the necessary equipment and materials (eg, Foley catheter, antibiotics).
- Identify the sphincter complex with electrostimulation.
- Describe the key steps of a posterior sagittal anorectoplasty (PSARP) in male and female patients.
- Manage any urethral anomalies (e.g. rectourethral fistula).
- Identify the key steps of and indications for laparoscopic repair of ARM.
- For a patient with cloaca:
  - Identify the initial need for colostomy, and describe its technical aspects.
  - Describe the operative management for likely scenarios.
  - For a patient with type 1 cloaca:
    - Common channel < 1 cm: urethra is left untouched, introitoplasty, and PSARP
    - Common channel < 3 cm and urethra > 1.5 cm: total urogenital mobilization (TUM) and PSARP
    - Common channel > 3 cm or urethra < 1.5 cm: urogenital (UG) separation with the common channel as the urethra and PSARP
- Recognize the risk to the ureter during dissection.
- Identify options for vaginal replacement.

❖ Postoperative
- Recognize the rationale for the debate regarding time to postoperative feeds in a nondiverted patient and the need for postoperative anal dilations.
- Perform postoperative management for a patient with a Foley catheter who has undergone ARM repair.
- Manage postoperative complications (eg, surgical site infection [SSI] in a nondiverted PSARP).
- Identify indications for urologic and gynecologic follow-up and evaluation.
- Identify possible long-term outcomes.
- Evaluate a patient who is “not doing well.”
- Discuss problems with the prior diagnosis, decision-making, studies, or operative issues.
- Recognize and address common post-operative problems:
  - Constipation
  - Fecal incontinence
  - Fistulae
  - Mislocated anus
  - Obstructed menstruation
  - Persistent UG sinus

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# Evaluation and Management of a Patient with an Anorectal Malformation

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| | ▪ Retained remnant of original fistula<br>▪ Rectal prolapse<br>▪ Stricture of the rectum/neoanus<br>▪ Urethra atresia/stricture/injury<br>▪ Urinary tract infection<br>▪ Vaginal atresia<br>• Determine the role of bowel management. |
| **Scope** | ❖ In scope<br><br>• Diagnoses<br>○ Male and female:<br>▪ Low and high ARMs<br>○ Gender nonspecific:<br>▪ Rectoperineal<br>▪ Without fistula<br>○ Male:<br>▪ Bladder neck<br>▪ Rectourethral (bulbar/prostatic)<br>○ Female:<br>▪ Cloaca (short/long)<br>▪ Cloacal exstrophy<br>▪ Rectovestibular<br><br>• Procedures<br>○ Anoplasty<br>○ Antegrade continence enema<br>○ Cloacal repair<br>○ Diverting colostomy<br>○ Laparoscopic-assisted anorectal pull-through<br>○ PSARP/anterior sagittal anorectoplasty<br><br>• Special populations<br>○ Currarino syndrome<br>○ VACTERL (complex decision-making) |

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# Evaluation and Management of a Patient with an Anorectal Malformation

❖ Out of scope

- Diagnoses/procedures
  - Bladder exstrophy
  - Disorder of sexual development
  - Fissures
    Fistula-in-ano
  - Hemorrhoids
  - Pilonidal disease
  - Rectal prolapse

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# Evaluation & Management of a Patient with an Anorectal Malformation

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| 1<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br><br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br><br>The attending will show and tell or the learner acts as first assistant. | • With active assistance, elicits a focused H&P that includes a prenatal history and correct identification of the anatomy<br><br>• With active assistance, initiates an appropriate workup/evaluation, including VACTERL anomalies, and discusses the role of diversion or dilations<br><br>• With active guidance, identifies the appropriate surgical options for a common ARM variant (eg, PSARP, laparoscopy, primary PSARP vs delayed PSARP)<br><br>• Respectfully communicates basic facts about the condition to the family and interprofessional team | • With active guidance, assists in the management of the periop environment, including room setup, equipment check, time-out, patient positioning, and debrief<br><br>• With active guidance, progresses through the creation of a stoma, requiring assistance on technical nuances (eg, location, distal decompression)<br><br>• With active guidance, progresses through major steps of a straightforward PSARP for a perineal or vestibular fistula and critical aspects of the operation, including use of a stimulator to identify the sphincter complex; requires active assistance to stay in the appropriate plane and recognize major structures at risk (male urethra, posterior vagina, fistula if present)<br><br>• With active assistance, manages, anticipates, and prevents intraop complications for a common procedure (eg, enterotomy, bleeding) | • Recognizes and manages a general postop problem (eg, SSI, skin dehiscence) but displays limited understanding of an ARM-specific complication (eg, anal stenosis, mucosal prolapse)<br><br>• Displays limited knowledge of long-term treatment/outcomes (eg, bowel management)<br><br>• With active assistance, manages a patient's postop course following a PSARP for a perineal fistula<br><br>• Communicates basic aspects of the operative procedure and ongoing management plan to the family and interprofessional team |
| 2<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not | • With direct supervision, elicits a focused and complete H&P with identification of a common anatomic variant and articulates a management strategy<br><br>• With indirect supervision, integrates information with patient-specific factors to design a succinct diagnostic workup | • With direct supervision, assists in the management of the periop environment, including room setup, equipment check, time-out, patient positioning, and debrief<br><br>• With passive guidance, progresses through the creation of a stoma | • Recognizes an ARM-specific complication (eg, anal stenosis, mucosal prolapse) but requires direct supervision to institute a treatment plan<br><br>• Demonstrates understanding of long-term outcomes and the role of bowel |

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# Evaluation & Management of a Patient with an Anorectal Malformation

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| know the nuances of a basic case<br><br>Entrustment:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br><br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | and management plan for a medically uncomplicated surgical patient<br><br>• With direct supervision, identifies the appropriate surgical options for a common ARM variant (eg, PSARP, laparoscopy, primary PSARP vs delayed PSARP)<br><br>• Establishes a therapeutic relationship with the family of a uncomplicated patient and communicates information clearly to the care team | • With direct supervision, progresses through major steps of a straightforward PSARP for a perineal or vestibular fistula and critical aspects of the operation, including use of a stimulator to identify the sphincter complex; requires passive assistance to maintain dissection in the optimal tissue plane and may inconsistently demonstrate careful handling of tissue<br><br>• With passive assistance, manages, anticipates, and prevents intraop complications for a common procedure (eg, enterotomy, bleeding) | management but needs direct supervision in implementing long-term therapy and follow-up<br><br>• With indirect supervision, manages the postop course of a patient with a common ARM but requires direct supervision for a complex or uncommon ARM<br><br>• Communicates a cohesive postop plan to the family and interprofessional team for a common ARM variant |
| **3**<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>Entrustment:<br><br>The learner can perform the operation/task | • With indirect supervision, elicits a focused and complete H&P with identification of an uncommon anatomic variant and articulates a management strategy<br><br>• With indirect supervision, initiates an appropriate workup/evaluation for a medically complicated patient (eg, congenital heart disease, multiple anomalies)<br><br>• With indirect supervision, identifies the appropriate surgical options for an uncommon ARM variant, including management of a clinically important comorbid condition (eg, hydrocolpos) | • With indirect supervision, manages the periop environment, including room setup, equipment check, time-out, patient positioning, and debrief<br><br>• With indirect supervision, progresses through the creation of a stoma<br><br>• With indirect supervision, progresses through major steps of PSARP, including an advanced case such as a rectourinary fistula in males, possibly including open or laparoscopic approaches; requires direct supervision to maintain dissection in the optimal tissue plane; visualizes tissue planes and identifies and dissects relevant normal anatomy and consistently demonstrates careful handling of tissues | • With indirect supervision, recognizes, but does not anticipate, an ARM-specific complication (eg, anal stenosis, mucosal prolapse) and institutes a proper treatment plan<br><br>• Articulates the need for long-term follow-up and with assistance implements a bowel management program with indirect supervision<br><br>• With indirect supervision, manages the postop course of a complicated neonatal or pediatric surgical patient |

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# Evaluation & Management of a Patient with an Anorectal Malformation

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| independently in the uncomplicated patient<br><br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | • Establishes a therapeutic relationship with the family of a complicated patient and uses active listening skills to adapt to care team needs | • With indirect supervision, recognizes and manages findings such as an unexpected fistula or iatrogenic injury to the vagina or urethra and implements modifications to the operative plan in real time | • Communicates a cohesive postop plan to the family and interprofessional team for an uncommon ARM variant |
| **4**<br><br>**Framework:**<br><br>The learner has a strong and indepth understanding of surgical options and techniques<br><br>Entrustment:<br><br>Can perform the operation/task independently in complicated cases<br><br>**or**<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently assesses and performs a focused and complete H&P, interprets diagnostic images (e.g. colostogram), reviews reports, and initiates an individualized management plan across the spectrum of ARMs, addressing clinically important comorbid conditions (eg, hydrocolpos)<br><br>• Independently recognizes limitations (if applicable) and engages additional resources required for the care of a complex patient (eg, additional consultants, engagement with a colorectal center)<br><br>• Independently identifies the appropriate surgical options for an uncommon ARM variant, including management of a clinically important comorbid condition (eg, hydrocolpos)<br><br>• Independently conducts a family/care team meeting to define the goals of care | • Independently manages the periop environment, including room setup, equipment check, time-out, patient positioning, and debrief<br><br>• Independently performs and properly locates a diverting ostomy<br><br>• Independently progresses through major steps of PSARP, including an advanced case such as a rectourinary fistula in males and short common channel cloaca in females, possibly including open or laparoscopic approaches; visualizes tissue planes and identifies and dissects relevant abnormal anatomy<br><br>• Independently recognizes and manages findings such as an unexpected fistula or iatrogenic injury to the vagina or urethra and implements modifications to the operative plan in real time | • Independently anticipates and implements a strategy for management of a postop complication, such as dehiscence of perineal body, mislocated anus, fistulae, ROOF, rectal prolapse, or urethral injury or stricture<br><br>• Independently initiates a postop plan that may include a bowel management program or multidisciplinary involvement to assist with comorbid conditions<br><br>• Independently manages the postop course of a complicated neonatal or pediatric surgical patient<br><br>• Independently customizes emotionally difficult news such as changes to the operative plan, adverse outcomes, expectations, or additional procedures to the family in a culturally caring manner |

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# Evaluation & Management of a Patient with an Anorectal Malformation

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | for a complicated pediatric surgical patient, including informed consent | | |

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# Evaluation and Management of a Patient with a Common Gastrointestinal Condition

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| **Description of the Activity** | Pediatric surgeons must be able to evaluate and manage common gastrointestinal conditions in children, including pyloric stenosis, intussusception, and gastroesophageal reflux disease (GERD) as a complication of enteral access, regardless of the clinic or resource setting. |
| **Functions** | ❖ Nonoperative/Preoperative<br><br>• General<br>○ Synthesize essential demographic information from the patient's medical record, history, and physical examination (e.g. age, comorbidities) to develop a differential diagnosis.<br>○ Triage the patient for resuscitation, evaluation, and management based on acuity.<br>○ Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.<br>○ Devise an operative plan, and communicate it to members of the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.<br>• For a patient with pyloric stenosis:<br>○ Order and interpret diagnostic imaging to establish the diagnosis of pyloric stenosis (ultrasound, upper GI series).<br>○ Evaluate and initiate resuscitative measures to correct physiological derangements.<br>○ Determine when the patient is sufficiently resuscitated to safely undergo surgical pyloromyotomy.<br>• For a patient with enteral access:<br>○ Establish the need for enteral access by obtaining a feeding and growth history to evaluate the patient for dysphagia, failure to thrive, or other congenital abnormalities, such as esophageal atresia.<br>○ Evaluate the patient for presence and severity of GERD based on the patient's clinical history and physical examination, and determine the need for additional diagnostic testing (upper GI series, endoscopy).<br>○ Discuss the risks and benefits of surgical and nonsurgical options for prepyloric and postpyloric enteral feeding access.<br><br>• Intussusception<br>○ Order and interpret diagnostic imaging to establish the diagnosis of intussusception (abdominal x-ray, ultrasound).<br>○ Evaluate and initiate resuscitative measures to correct physiological derangements.<br>○ Customize treatment options of observation, air enema reduction, or surgical reduction based on presentation, including:<br>▪ Age<br>▪ Diagnostic uncertainty<br>▪ Duration of symptoms<br>▪ Hemodynamic instability<br>▪ Location of intussusception<br>▪ Peritonitis |

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# Evaluation and Management of a Patient with a Common Gastrointestinal Condition

❖ Intraoperative

- Manage the perioperative environment, including room setup, preprocedural time-out, specimen processing, instrument counts, wound classification, and debriefing.
- For a patient with pyloric stenosis:
  - Perform an open or laparoscopic pyloromyotomy.
  - Ensure the patient is positioned correctly and relevant equipment is available.
  - Ask for the correct instruments and sutures.
  - Identify the borders of the pylorus and the appropriate depth for the myotomy.
  - Perform the relevant steps of the procedure efficiently.
- Manage operative complications or unexpected intraoperative findings, including:
  - Normal pylorus
  - Pyloric perforation
- Manage a patient with GERD who requires enteral access:
  - Perform an open or laparoscopic gastrostomy.
  - Position the patient, and ensure the presence of relevant equipment and sutures.
  - Identify the correct gastrostomy tube sizes.
  - Perform the relevant operative steps efficiently, remaining cognizant of abnormal anatomy.

- Perform an open or laparoscopic Nissen fundoplication.
  - Position the patient, and ensure the presence of relevant equipment and sutures (esophageal dilators/bougies).
  - Perform the relevant operative steps efficiently with particular attention to esophageal and hiatal dissection and tension of fundoplication.
- Manage operative complications or unexpected intraoperative findings, including:
  - Esophageal perforation
  - Hiatal hernia
  - Malrotation
  - Microgastria
- For a patient with intussusception:
  - Perform an open or laparoscopic intussusception reduction.
  - Position the patient, and ensure the presence of relevant equipment/sutures.
  - Perform the relevant operative steps efficiently with particular attention to tissue handling.
  - Manage operative complications or unexpected intraoperative findings, including:
    - Intestinal ischemia or necrosis
    - Lead point
    - Lymphadenopathy
    - Meckel diverticulum
- Communicate patient-specific needs to the health care team.

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# Evaluation and Management of a Patient with a Common Gastrointestinal Condition

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| | ❖ Postoperative<br>• Provide routine postoperative care, including follow-up.<br>• Recognize and manage complications after pyloromyotomy, including:<br>○ Feeding intolerance<br>○ Incomplete myotomy<br>○ Leak<br>○ Poor weight gain<br>• Recognize and manage complications after gastrostomy or fundoplication, including:<br>○ Gastrostomy dislodgement/replacement (early vs late)<br>○ Persistent GERD or pseudoachalasia<br>• Recognize and manage complications after an air enema or surgical intussusception reduction, including recurrent intussusception.<br>• Communicate patient-specific needs to the health care team. |
| **Scope** | ❖ In scope<br><br>❖ Diagnoses<br>○ Congenital neurologic/neuromuscular<br>○ Discussion for nasojejunal tube<br>○ Dysphagia<br>○ Failure to thrive<br>○ Hypertrophic pyloric stenosis<br>○ Ileocolic intussusception<br>○ Indications for gastrostomy in a neonate<br>○ Intussusception<br>○ Pathologic lead point versus viral lymphadenopathy<br>○ Severe reflux/GERD (including discussion for Nissen fundoplication or another surgical choice)<br>○ Small bowel intussusception<br>○ Younger child (< 3 years) versus older child<br><br>❖ Procedures<br>○ Antireflux surgery<br>○ Gastrostomy: laparoscopic, open (tube vs button), laparoscopic-assisted percutaneous endoscopic gastrostomy<br>○ Intussusception: radiologic reduction, laparoscopic versus open, reduction versus resection<br>○ Pyloromyotomy: laparoscopic or open |

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# Evaluation and Management of a Patient with a Common Gastrointestinal Condition

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| | ❖ Special populations<br>○ GERD/severe reflux<br>○ Long-gap esophageal atresia<br>○ Pathologic lead point: Meckel diverticulum, polyps, Henoch-Schonlein purpura, tumor<br>○ Patients younger than 5 years<br><br>❖ Out of scope<br>• Diagnoses/procedures<br>▪ Need for enteral access in a patient older than 1 year<br>▪ Rotational anomalies (see EPA: E&M of a Patient with a Rotational Anomaly) |

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# Evaluation and Management of a Patient with a Common Gastrointestinal Condition

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| **1**<br><br>**Framework:**<br><br>**The learner demonstrates understanding of information and has basic skills**<br><br>**What a new pediatric surgery fellow should know**<br><br>**Entrustment:**<br><br>**The attending will show and tell or the learner acts as first assistant.** | • With active guidance, performs a focused H&P, reviews diagnostic reports, and formulates a differential that includes both medical and surgical problems<br><br>• With active guidance, evaluates and initiates resuscitative measures to correct physiological or nutritional derangements<br><br>• With active guidance conducts some elements of informed consent | • With active guidance, recognizes the instruments and setup required for diagnostic endoscopy based on patient age and indications for the procedure<br><br>• With active assistance, performs key steps of an open or laparoscopic pyloromyotomy and demonstrates understanding of the appropriate depth for a myotomy<br><br>• With active assistance, performs key steps of a laparoscopic or open enteral access/fundoplication and demonstrates understanding of tissue planes and relevant hiatal anatomy<br><br>• With active assistance, performs key steps of a laparoscopic or open intussusception reduction | • With active assistance, defines the different nutritional and metabolic requirements of children at different ages<br><br>• With active assistance, communicates the basic steps of the postop plan to the family and other healthcare team members, including immediate postop needs and the need for short-term follow-up |
| **2**<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case | • With direct supervision, performs a focused H&P, reviews diagnostic reports, and formulates a differential that includes both medical and surgical problems<br><br>• With direct supervision, evaluates and initiates resuscitative measures to correct physiological or nutritional derangements<br><br>• In an uncomplicated patient, conducts all the elements of an informed consent process and documents the discussion | • With direct supervision, consistently recognizes the instrument components to perform a diagnostic endoscopy<br><br>• With direct supervision, performs key steps of an open or laparoscopic pyloromyotomy and demonstrates understanding of the appropriate depth for a myotomy<br><br>• With direct supervision, performs key steps of laparoscopic or open enteral | • With direct supervision, coordinates the development of a multidisciplinary postop nutritional plan and communicates the plan to families and primary care<br><br>• With direct supervision, communicates the postop plan to the family and other health care team members, including immediate postop needs and the need for short-term follow-up |

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# Evaluation and Management of a Patient with a Common Gastrointestinal Condition

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| Entrustment:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br><br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | | access/fundoplication and demonstrates understanding of tissue planes and relevant hiatal anatomy<br><br>• With direct supervision, performs key steps of a laparoscopic or open intussusception reduction | |
| **3**<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>Entrustment:<br><br>The learner can perform the operation/task independently in the uncomplicated patient | • With indirect supervision, integrates information with patient-specific factors to design a succinct diagnostic workup and management plan for a medically complicated neonatal or pediatric surgical patient<br><br>• With indirect supervision, evaluates and initiates resuscitative measures to correct physiological or nutritional derangements<br><br>• In an uncomplicated patient, conducts all the elements of an informed consent process with cultural humility, individualizing the risks and benefits for the patient and documenting the discussion | • With indirect supervision, performs a diagnostic endoscopy and an endoscopic intervention (esophageal dilation)<br>• With indirect supervision, performs key steps of an open or laparoscopic pyloromyotomy and identifies an intraop complication or unexpected finding (eg, pyloric/gastric perforation)<br><br>• With indirect supervision, performs key steps of alaparoscopic or open enteral access/fundoplication and identifies intraop complications or unexpected findings (eg, microgastria, hiatal hernia, malrotation, esophageal/gastric perforation)<br><br>• With indirect supervision, performs key steps of a laparoscopic or open | • With indirect supervision, coordinates the development of a multidisciplinary postop nutritional plan and communicates the plan to families and primary care<br><br>• With indirect supervision, communicates a comprehensive postop plan to the family and other health care team members, including short- and long-term complications/goals of care for a complex patient |

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# Evaluation and Management of a Patient with a Common Gastrointestinal Condition

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | | intussusception reduction and identifies intraop complications or unexpected findings (eg, intestinal ischemia/necrosis, Meckel diverticulum, other pathologic lead point) | |
| 4<br><br>**Framework:**<br><br>The learner has a strong and indepth understanding of surgical options and techniques<br><br>Entrustment:<br><br>Can perform the operation/task independently in complicated cases<br><br>or<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently integrates information with patient-specific factors to design a succinct diagnostic workup and management plan for a medically complicated neonatal or pediatric surgical patient<br><br>• Independently initiates resuscitative measures to correct physiological or nutritional derangements<br><br>• In a complicated patient, conducts all the elements of an informed consent process, with cultural humility, individualizing the risks and benefits for the patient and documenting the discussion | • Independently performs a diagnostic endoscopy and an endoscopic intervention (esophageal dilation)<br><br>• Independently performs key steps of an open or laparoscopic pyloromyotomy and identifies an intraop complication or unexpected finding (eg, pyloric/gastric perforation)<br><br>• Independently performs key steps of laparoscopic or open enteral access/fundoplication and identifies intraop complications or unexpected findings (eg, microgastria, hiatal hernia, malrotation, esophageal/gastric perforation)<br><br>• Independently performs key steps of a laparoscopic or open intussusception reduction and identifies intraop complications or unexpected findings (eg, intestinal ischemia/necrosis, Meckel diverticulum, other pathologic lead point) | • Independently coordinates the development of a multidisciplinary postop nutritional plan and communicates the plan to families and primary care<br><br>• Independently communicates a comprehensive postop plan to the family and other health care team members, including short- and long-term complications/goals of care for a complex patient |

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# Evaluation and Management of a Patient with a Congenital Diaphragmatic Hernia

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| **Description of the Activity** | Congenital diaphragmatic hernia (CDH) is a cornerstone diagnosis in pediatric surgery. Although rare, it is associated with significant individual and societal costs. The care of a patient with CDH may start with the prenatal diagnosis and continue through adolescence. The essential functions of this activity include prenatal counseling, complex critical care including extracorporeal life support (ECLS), definitive repair, and surveillance. The spectrum of disease includes Morgagni and Bochdalek hernias as well as diaphragmatic eventration. |
| **Functions** | ❖ Nonoperative/Preoperative<br><br>• Perform a prenatal workup and provide counseling accordingly.<br>• Recognize when transfer is indicated.<br>• Provide preoperative critical care, including ventilator management and ECLS.<br>• Determine the timing of repair.<br>• Recognize potential complications related to treatment.<br>• Differentiate CDH from diaphragmatic eventration, and manage diaphragmatic eventration.<br>• Recognize the signs and symptoms of delayed presentation.<br>• Recognize CDH on prenatal ultrasound.<br>• Perform risk stratification using prenatal ultrasound and magnetic resonance imaging to describe the defect side, lung/head ratio, observed-to-expected lung/head ratio, liver and stomach position, fetal lung volume, and cardiac assessment, and use this information to place the patient into high-, moderate-, or low-risk categories.<br>• Perform prenatal counseling, taking into account concomitant anomalies, such as the likelihood of survival, likelihood/candidacy of extracorporeal membrane oxygenation (ECMO), expected hospital course, long-term outcomes, and the delivery plan.<br>• Recognize when a patient is a candidate for fetoscopic endotracheal occlusion (FETO).<br>• Recognize the need for a multidisciplinary team to ensure proper prenatal care, surveillance, and counseling as well as coordination of delivery location.<br>• Identify ventilator strategies with permissive hypercapnia, recognizing the importance of targeted strategies in early management.<br>• Identify the need for adjunct studies upon diagnosis.<br>• Recognize the need for ECLS and contraindications to ECLS.<br>• Consider concomitant anomaly management.<br>• Communicate the diagnosis and treatment options to the family and consultants.<br>• Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.<br>• Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient positioning, anesthesia needs, special instrumentation, and postoperative planning.<br>• Recognize the implications of repair while the patient is on ECLS, including timing (early vs late) and location (neonatal intensive care unit, operating room) and their associated advantages/disadvantages.<br>• Determine the need for surgical repair of eventration. |

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# Evaluation and Management of a Patient with a Congenital Diaphragmatic Hernia

❖ Intraoperative
- Perform procedures as indicated:
  - Open, thoracoscopic, or laparoscopic repair
  - Primary, muscle flap, or mesh repair
  - Repair on ECLS
- Systematically examine the defect.
- Identify the sac if present.
- Repair the defect.
- Pay specific attention to the posterolateral portion, and use rib sutures if necessary.
- Determine if an open abdominal incision can be closed primarily, and perform alternative closures if necessary.
- Recognize the treatment plan when a sequestration is identified intraoperatively.
- Perform plication in a patient with eventration.

❖ Postoperative
- Communicate the postoperative plan of care to the family and other involved health care team members.
- Perform critical care of the patient, including weaning to extubation, weaning from the ECLS circuit if used, starting feeds, monitoring for compartment syndrome, managing an open abdomen if present, and managing other complications such as hemorrhage and chylothorax.
- Monitor the patient for early recurrence.
- Perform outpatient surveillance for delayed recurrence.
- Identify long-term morbidity (chronic lung disease, gastroesophageal reflux, failure to thrive, neurocognitive dysfunction).
- Recognize the importance of a multidisciplinary approach to long-term follow-up.
- Identify the implications of anatomic variance in intestinal rotation.
- Provide postoperative critical care.
- Provide postoperative surveillance after discharge.

## Scope

❖ In scope

- Diagnoses
  - Congenital diaphragmatic hernia:
    - Bochdalek
    - Morgagni
- Diaphragmatic eventration

- Procedures
  - Laparoscopic repair

# Evaluation and Management of a Patient with a Congenital Diaphragmatic Hernia

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| | ○ Muscle flap<br>○ Open CDH repair +/– mesh<br>○ Thoracoscopic CDH repair +/– mesh<br><br>• Special populations<br>○ Prenatal consultation<br>○ Patients needing repair on ECLS<br><br>❖ Out of scope<br><br>• Diagnoses/procedures<br>○ Hiatal hernia<br>○ Traumatic diaphragmatic hernia |

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# Evaluation & Management of a Patient with a Congenital Diaphragmatic Hernia

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| 1<br><br>**Framework:**<br><br>The attending will show and tell, or the learner acts as first assistant.<br><br>**Entrustment:**<br><br>The learner demonstrates understanding of information and has basic skills.<br><br>What a new pediatric surgery fellow should know. | • With active assistance, participates in prenatal consultation, including review of abnormal prenatal radiographic findings and risk stratification<br><br>• With active guidance, articulates the importance of optimal ventilatory strategies<br><br>• With active guidance, explains a diagnosis to the multidisciplinary team and family and obtains informed consent<br><br>• With active guidance, participates in conversations about surgical options, timing of repair, and ECLS strategies<br><br>• With active guidance, demonstrates understanding of the implications of comorbidities such as congenital heart disease in a low-risk patient<br><br>• With active guidance, diagnoses and manages diaphragmatic eventration and Morgagni hernia<br><br>• Demonstrates how to access and use available evidence for preop management and incorporates the patient's and family's preferences and values into care<br><br>• With active guidance, explains the diagnosis to the multidisciplinary team and family | • Requires active assistance in surgical positioning and prep<br><br>• With active guidance, demonstrates basic understanding of key steps of the operation, including examining the defect, identifying the sac if present, and repairing the defect, needing substantial guidance when choosing the type of procedure (open vs thoracoscopic vs lap) and repair (primary vs muscle flap vs mesh, rib sutures)<br><br>• Requires active guidance to manage concurrent sequestration<br><br>• Requires active guidance to perform diaphragm plication for eventration<br><br>• With active guidance, can repair a diaphragmatic hernia recurrence<br><br>• Requires active guidance to determine if the abdomen should be closed | • With active guidance, diagnoses postop complications such as compartment syndrome, hemorrhage, and chylothorax, requiring active assistance to manage them<br><br>• With active guidance, identifies long-term morbidity, including chronic lung disease, reflux, failure to thrive, and neurocognitive dysfunction, recognizing the importance of surveillance for delayed recurrence through a multidisciplinary approach<br><br>• With active guidance, communicates the basic steps of the operative procedure and the postop plan/expected course with the multidisciplinary team and family, including ventilation management, pulmonary HTN, and nutrition<br><br>• With active guidance, participates with the ICU team in ventilation and ECLS weaning as necessary<br><br>• Demonstrates how to access and use available evidence for postop care, integrating it with the patient's and family's preferences and values |

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# Evaluation & Management of a Patient with a Congenital Diaphragmatic Hernia

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | • Requires active guidance to diagnose a diaphragmatic hernia recurrence | | |
| **2**<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case.<br><br>**Entrustment:**<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point. | • Requires direct supervision during prenatal consultation to review abnormal prenatal radiographic findings and describe risk stratification<br><br>• With direct supervision, optimizes ventilatory strategies<br><br>• With direct supervision, explains a diagnosis to the multidisciplinary team and family and obtains informed consent<br><br>• With direct supervision, provides preoperative planning regarding surgical options, timing of repair, and ECLS strategies<br><br>• With passive assistance, demonstrates a good understanding of the implications of comorbidities such as congenital heart disease and adjusts treatment accordingly in a low-risk patient<br><br>• With direct supervision, diagnoses and manages diaphragmatic eventration and Morgagni hernia<br><br>• Articulates clinical questions about preop management and elicits the patient's and family's preferences and values to guide evidence-based care | • Requires direct supervision for surgical positioning and prep<br><br>• With direct supervision, performs key steps of the operation, including examining the defect, identifying the sac if present, and repairing the defect; for straightforward cases, chooses the type of procedure (open vs thoracoscopic vs lap) and repair (primary vs muscle flap vs mesh, rib sutures)<br><br>• Requires direct supervision to identify and manage concurrent sequestration<br><br>• Requires direct supervision to perform diaphragm plication for eventration<br><br>• With direct supervision, can repair a diaphragmatic hernia recurrence<br><br>• Requires passive guidance to determine if the abdomen should be closed | • Diagnoses postop complications such as compartment syndrome, hemorrhage, and chylothorax, requiring direct supervision to manage them<br><br>• With direct supervision, identifies long-term morbidity, including chronic lung disease, reflux, failure to thrive, neurocognitive dysfunction, and surveillance for delayed recurrence, recognizing the importance of a multidisciplinary approach<br><br>• With indirect supervision, communicates most aspects of the operative procedure and postop plan/expected course with the multidisciplinary team and family, including ventilation management, pulmonary HTN, and nutrition<br><br>• With passive guidance, works with the ICU team in ventilation and ECLS weaning as necessary<br><br>• Articulates clinical questions about postop care and elicits the patient's and family's preferences and values to guide evidence-based care |

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# Evaluation & Management of a Patient with a Congenital Diaphragmatic Hernia

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | • With direct supervision, explains the diagnosis to the multidisciplinary team and family<br>• With direct supervision, diagnoses a diaphragmatic hernia recurrence | | |
| **3**<br>**Framework:**<br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case.<br>**Entrustment:**<br>The learner can perform the operation/task independently in the uncomplicated patient.<br>or<br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves. | • Requires indirect supervision during prenatal consultation to review abnormal prenatal radiographic findings and describe risk stratification<br>• With indirect supervision, optimizes ventilatory strategies<br>• With indirect supervision, explains a diagnosis to the multidisciplinary team and family and obtains informed consent<br>• With indirect supervision, develops a plan regarding surgical options, timing of repair, and ECLS strategies<br>• With passive assistance, demonstrates understanding of the implications of comorbidities such as congenital heart disease and adjusts treatment accordingly in a high-risk patient<br>• With indirect supervision, diagnoses and manages diaphragmatic eventration and Morgagni hernia<br>• Applies the best available evidence to preop management and integrates it with the patient's and family's preferences to guide care | • Requires indirect supervision for surgical positioning and prep<br>• Independently performs key steps of the operation for less severe types of diaphragmatic hernias (A and B); with indirect supervision, performs key steps of the operation for more severe types (C and D), including examining the defect, identifying the sac if present, and repairing the defect; for complex cases, chooses the type of procedure (open vs thoracoscopic vs lap) and repair (primary vs muscle flap vs mesh, rib sutures)<br>• Requires indirect supervision to identify and manage concurrent sequestration<br>• Requires indirect supervision to perform diaphragm plication for eventration<br>• With indirect supervision, can repair a diaphragmatic hernia recurrence<br>• Requires passive guidance to determine when the abdomen needs to be left open, manages the open abdomen, and determines when closure is appropriate | • With indirect supervision, anticipates and implements strategies to manage postop complications such as compartment syndrome, hemorrhage, and chylothorax<br>• With indirect supervision, identifies, counsels, and manage long-term morbidity, including chronic lung disease, reflux, failure to thrive, neurocognitive dysfunction, and surveillance for delayed recurrence, recognizing the importance of a multidisciplinary approach<br>• With indirect supervision, communicates all aspects of the operative procedure and the comprehensive postop plan/expected course with the multidisciplinary team and family, including ventilation management, pulmonary HTN, and nutrition<br>• With indirect supervision, works with the ICU team to individualize ventilation and ECLS management as necessary<br>• Locates and applies the best available evidence for postop care, integrated |

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# Evaluation & Management of a Patient with a Congenital Diaphragmatic Hernia

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | • With indirect supervision, explains the diagnosis to the multidisciplinary team and family and obtains informed consent<br>• With indirect supervision, diagnoses a diaphragmatic hernia recurrence | | with the patient's and family's preferences |
| 4<br>**Framework**<br>The learner has a strong and indepth understanding of surgical options and techniques.<br>**Entrustment:**<br>Can perform the operation/task independently in complicated cases.<br>or<br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases. | • Independently performs a prenatal consult, including imaging interpretation, risk stratification, and counseling<br>• Independently uses common ventilator strategies with permissive hypercapnia to optimize oxygenation/ventilation and determines the need for ECMO<br>• Independently holds a multidisciplinary team/family meeting and obtains informed consent<br>• Independently develops an operative plan regarding surgical options, timing of repair, and ECLS strategies<br>• Independently recognizes relevant comorbidities (congenital heart disease, sequestration) and incorporates these into operative planning in a high-risk patient<br>• Independently diagnoses and manages diaphragmatic eventration and Morgagni hernia | • Independently performs surgical positioning and prep<br>• Independently chooses the best procedure to perform diaphragmatic repair in complex patients (including repair on ECMO and C and D defects) by examining the defect, identifying the sac if present, and repairing the defect<br>• Independently recognizes and manages concurrent sequestration<br>• Independently performs diaphragm plication for eventration<br>• Can independently repair a diaphragmatic hernia recurrence<br>• Independently recognizes when the abdomen needs to be left open, manages the open abdomen, and determines when closure is appropriate | • Independently anticipates and implements strategies to manage postop complications such as compartment syndrome, hemorrhage, and chylothorax<br>• Independently identifies, counsels and manages long-term morbidity, including chronic lung disease, reflux, failure to thrive, neurocognitive dysfunction, and surveillance for delayed recurrence, recognizing the importance of a multidisciplinary approach<br>• Independently communicates all aspects of the operative procedure and the comprehensive postop plan/expected course with the multidisciplinary team and family, including ventilation management, pulmonary HTN, nutrition and customizes emotionally difficult news (eg. changes to the operative plan, adverse outcomes, expectations, additional procedures) to the parent(s)family in a culturally caring manner |

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# Evaluation & Management of a Patient with a Congenital Diaphragmatic Hernia

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | • Critically appraises and applies evidence for preop management, even in the face of uncertain or conflicting evidence, to guide care, tailoring it to the patient and family<br><br>• Independently explains the diagnosis to the multidisciplinary team and family and obtains informed consent<br><br>• Independently diagnoses a diaphragmatic hernia recurrence | | • Actively and independently works with the ICU team to individualize ventilation and ECLS management as necessary<br><br>• Critically appraises and applies evidence to guide postop care, even in the face of uncertain or conflicting evidence, tailoring it to the patient and family |

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# Evaluation and Management of a Patient with a Congenital Lung Lesion

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| **Description of the Activity** | Infants with congenital lung lesions are frequently referred to pediatric general surgeons in the inpatient and outpatient settings. These surgeons should be able to perform and counsel families on fetal risk stratification; diagnose and treat patients with congenital lung lesions; and select the optimal operative treatment, approach, and timing. Patient/family-centered, evidenced-based, and shared decision-making is necessary to ensure optimal outcomes. |
| **Functions** | ❖ Nonoperative/Preoperative<br>○ During the prenatal consultation:<br>○ Obtain maternal history and fetal imaging.<br>○ Perform fetal risk stratification.<br>○ Use current scoring systems to assess severity of disease such as the congenital pulmonary airway malformation (CPAM) volume ratio (CVR).<br>○ Outline a prenatal surveillance strategy (eg, evaluate second-trimester growth, CVR) and delivery plan.<br>○ Discuss indications for fetal intervention based on the CVR (steroids, surgery).<br>○ Communicate predicted postnatal risk outcomes to the family and members of the multidisciplinary care team.<br>○ Assist in determining when referral to a specialized center is indicated.<br>○ Obtain and synthesize essential information from the patient's pre- and postnatal records, history, physical examination, and initial diagnostic evaluations to develop a differential diagnosis. Correlate this information with any known prenatal imaging.<br>○ Complete a cost-effective, evidence-based diagnostic evaluation.<br>○ Obtain appropriate imaging directed at operative planning.<br>○ Identify the appropriate operative timing, approach, and technique based on patient diagnosis and clinical stability.<br>○ Determine which patients require intervention in the neonatal period versus those who are stable enough to undergo elective operative intervention.<br>○ Determine when a patient would benefit from a minimally invasive versus an open approach.<br>○ Communicate the diagnosis and treatment options to the family and consultants.<br>○ Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.<br>○ Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.<br><br>❖ Intraoperative<br>○ Manage the perioperative environment, including room setup, equipment check, preprocedural time-out, specimen processing, counts, wound classification, updating the family, and debriefing.<br>○ Adequately and safely position the patient to expose the operative field, taking precautionary measures to avoid iatrogenic injury and allow the anesthesia team access to the patient.<br>○ Confirm the availability of necessary equipment (staplers, energy devices, clip appliers, ties, extra equipment for conversion to open approach). |

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# Evaluation and Management of a Patient with a Congenital Lung Lesion

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| | ○ Collaborate with other health care professionals to create and maintain an intraoperative environment that promotes safe patient care.<br>○ Collaborate with the anesthesia team about patient positioning, the need for lung isolation, lines, and pain control.<br>○ Safely perform the procedures required to manage congenital lung disease through minimally invasive and open approaches:<br>  ○ Cyst excision (bronchogenic cyst)<br>  ○ Lobectomy<br>  ○ Nonanatomic resection<br>• Recognize and confirm all relevant anatomy.<br>• Recognize and develop a management plan for unexpected intraoperative findings:<br>  ○ Aberrant anatomy<br>  ○ Bleeding from pulmonary arteries/veins<br>  ○ Bronchial leak<br>○ Recognize indications to convert from a minimally invasive to an open approach.<br><br>❖ Postoperative<br>• Provide postoperative management for a patient with a congenital lung lesion.<br>• Communicate with the family and the health care team to ensure instructions are understood.<br>• Establish goals for chest tube and drain removal if used.<br>• Recognize early and late complications:<br>  ○ Air leak<br>  ○ Bleeding<br>  ○ Chest tube issues<br>  ○ Respiratory failure<br>• Establish a short- and long-term follow-up plan that includes pathology review and further imaging as needed. |
| **Scope** | ❖ In scope<br><br>• Diagnoses<br>  ○ Bronchogenic cyst<br>  ○ Bronchopulmonary sequestration<br>  ○ Congenital lobar emphysema<br>  ○ Congenital lung lesion<br>  ○ CPAM<br><br>• Procedures<br>  ○ Open pulmonary lobectomy<br>  ○ Thoracoscopic nonanatomic resection |

# Evaluation and Management of a Patient with a Congenital Lung Lesion

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| | ○ Thoracoscopic pulmonary lobectomy<br><br>• Special populations<br>○ Patients with an intra-abdominal pulmonary sequestration<br>○ Neonates<br>○ Fetus<br><br>❖ Out of scope<br><br>• Diagnoses/procedures<br>○ Congenital diaphragmatic hernia (see specific EPA)<br>○ Extracorporeal membrane oxygenation (see specific EPA) |

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# Evaluation & Management of a Patient with a Congenital Lung Lesion

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| **1**<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br>What a new pediatric surgery fellow should know.<br><br>**Entrustment:**<br><br>The attending will show and tell or the learner acts as first assistant. | • Reviews prenatal diagnostic information without interpretation or formulation of a postnatal plan and has limited participation in prenatal consultation<br><br>• With active assistance, integrates evidenced-based information with patient-specific factors (H&P) to design a succinct diagnostic workup (appropriate CT imaging with contrast) and operative vs. nonoperative management plan for an uncomplicated patient<br><br>• With active guidance, demonstrates a basic understanding of how to avoid potential life-threatening preop complications, including avoidance of positive pressure ventilation and the need for emergent thoracotomy (e.g., CLE)<br><br>• With active guidance, describes the indications and contraindications for MIS<br><br>• Demonstrates basic knowledge of relevant thoracic or respiratory anatomy, physiology, and development<br><br>• Establishes a professional rapport with a patient and their family and with active guidance communicates in a clear and understandable manner, identifying common barriers to effective communication (e.g., language, disability)<br><br>• With active guidance, coordinates recommendations and leads discussions | • With active guidance, ensures adequate intraop preparation, patient positioning, and airway management strategies with the anesthesia team<br><br>• With active guidance, identifies trocar placement and appropriate instrumentation for MIS<br><br>• Requires active guidance for noncritical portions of the procedure (e.g., opening and closing of chest incisions, division of inferior pulmonary ligament, retraction of lung tissues)<br><br>• With active guidance, recognizes and manages a common intraop complications | • With direct supervision, manages routine chest tube care and infant-specific analgesia<br><br>• Communicates a routine postop plan and the expected course to other members of the health care team<br><br>• Identifies the rationale for long-term management, with specific diagnoses managed nonoperatively (e.g., CLE, certain CPAMs) |

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# Evaluation & Management of a Patient with a Congenital Lung Lesion

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | with different members of the healthcare team to optimize patient care and maintain effective communication in crisis situations. Communicates feedback and constructive criticism to superiors. | | |
| **2**<br><br>**Framework**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case.<br><br>**Entrustment:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case. | • Reviews prenatal diagnostic information with some interpretation or formulation of a postnatal plan and has a basic participation in prenatal consultation<br><br>• With direct supervision, integrates evidenced-based information with patient-specific factors to design a succinct diagnostic workup and operative vs nonoperative management plan for an uncomplicated patient<br><br>• With direct supervision, demonstrates a comprehensive understanding of how to avoid potential life-threatening preop complications, including avoidance of positive pressure ventilation and the need for emergent thoracotomy (e.g., CLE)<br><br>• With direct supervision, recognizes if a patient is an appropriate candidate for MIS<br><br>• Demonstrates comprehensive knowledge of relevant thoracic or respiratory anatomy, physiology and development, and relevant clinical implications<br><br>• Establishes a therapeutic relationship with a straightforward patient and their family and with passive guidance compassionately | • With direct supervision, ensures adequate intraop preparation, patient positioning, and airway management strategies with the anesthesia team<br><br>• With direct supervision, identifies trocar placement and appropriate instrumentation for MIS<br><br>• With direct supervision manages noncritical portions of the procedure (e.g., opening and closing of chest incisions, division of inferior pulmonary ligament, retraction of lung tissues)<br><br>• With direct supervision, recognizes and manages common intraop complications | • With indirect supervision, manages routine chest tube care and infant-specific analgesia<br><br>• Communicates routine and complex postop plans and the expected course(s) to other members of the health care team, soliciting feedback on performance as a member of the health care team<br><br>• Describes a general long-term management plan with specific diagnoses managed nonoperatively (CLE, certain CPAMs) |

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# Evaluation & Management of a Patient with a Congenital Lung Lesion

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | delivers medical information, identifying complex barriers to effective communication (e.g., health literacy, cultural differences)<br><br>• With direct supervision, coordinates recommendations and leads discussions with different members of the healthcare team to optimize patient care and maintain effective communication in crisis situations. Communicates feedback and constructive criticism to superiors. | | |
| 3<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>**Entrustment:**<br><br>The learner can perform the operation/task independently in the uncomplicated patient<br>or<br><br>The attending provides passive/indirect supervision/suggestions in | • With indirect supervision, interprets prenatal diagnostic information and formulates an appropriate delivery and postnatal surgical plan with active participation in prenatal consultation<br><br>• With indirect supervision, integrates evidenced-based information with patient-specific factors to design a succinct diagnostic workup and operative vs nonoperative management plan for a complicated patient<br><br>• With indirect supervision, manages potential life-threatening preop complications, recognizing the need to avoid positive pressure ventilation and when to perform emergent thoracotomy (e.g., CLE)<br><br>• With indirect supervision, recognizes if a patient is an appropriate candidate for MIS | • With indirect supervision, assists in ensuring adequate intraop preparation, patient positioning, and airway management strategies with the anesthesia team<br><br>• With indirect supervision, manages trocar placement and appropriate instrumentation for MIS<br><br>• With indirect supervision, manages critical portions of the procedure (e.g., division of incomplete fissure, ligation of key vascular structures, closure of bronchus)<br><br>• With indirect supervision, recognizes and manages a common intraoperative complication | • With indirect supervision, manages a chest tube with and without air leak and infant-specific analgesia<br><br>• Communicates routine and complex postop plans and the expected course(s, to other members of the health care team, using active listening to adapt communication style to fit team needs; communicates concerns and provides feedback to peers and learners<br><br>• Integrates patient- and family-specific factors in the construction of an evidence-based long-term management plan with specific diagnoses managed nonoperatively; requires indirect supervision in complex patients (CLE, certain CPAMs) |

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# Evaluation & Management of a Patient with a Congenital Lung Lesion

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| the complicated patient but still allows the learner to perform the operation/task themselves | • Applies knowledge of relevant thoracic or respiratory anatomy, physiology and development to medical decision-making<br>• Establishes a therapeutic relationship with a challenging patient and their family and acknowledges uncertainty in alignment of goals; when prompted, reflects on personal biases while attempting to minimize communication barriers<br>• With indirect supervision, coordinates recommendations and leads discussions with different members of the healthcare team to optimize patient care and maintain effective communication in crisis situations. Communicates feedback and constructive criticism to superiors. | | |
| 4<br>**Framework:**<br>The learner has a strong and indepth understanding of surgical options and techniques<br>**Entrustment:**<br>Can perform the operation/task independently in complicated cases<br>or | • Independently interprets prenatal diagnostic information and formulates an appropriate delivery and postnatal surgical plan with active participation in prenatal consultation<br>• Independently integrates evidenced-based information with patient-specific factors to design a succinct diagnostic workup and operative vs nonoperative management plan for a complicated patient<br>• Independently manages potential life-threatening preop complications, recognizing the need to avoid positive pressure ventilation and when to perform emergent thoracotomy (e.g., CLE) | • Independently assists in ensuring adequate intraop preparation, patient positioning, and airway management strategies with the anesthesia team<br>• Independently manages trocar placement and appropriate instrumentation for MIS<br>• Independently manages critical portions of the procedure (e.g., division of incomplete fissure, ligation of key vascular structures, closure of bronchus)<br>• Independently recognizes and manages common intraop complications | • Independently manages a chest tube with and without air leak and infant-specific analgesia<br>• Independently communicates and coordinates routine and complex postop plans and the expected course(s) to other members of the health care team to optimize patient care and maintain effective communication in a crisis situation; communicates feedback and constructive criticism to superiors<br>• Independently integrates patient- and family-specific factors in the construction of an evidence-based long- |

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# Evaluation & Management of a Patient with a Congenital Lung Lesion

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently recognizes if a patient is an appropriate candidate for MIS<br>• Independently incorporates knowledge of relevant thoracic or respiratory anatomy, physiology and development to medical decision-making<br>• Independently establishes a therapeutic relationship with a challenging patient and their family and acknowledges uncertainty in alignment of goals; reflects on personal biases while attempting to minimize communication barriers<br>• Independently coordinates recommendations and leads discussions with different members of the health care team to optimize patient care and maintain effective communication in a crisis situation; communicates feedback and constructive criticism to superiors | | term management plan, even with complex patients |

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# Evaluation & Management of a Patient with Esophageal Atresia and Tracheoesophageal Fistula

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| **Description of the Activity** | Esophageal atresia is encountered relatively infrequently by pediatric surgeons, and its management requires meticulous clinical decision-making and operative technique. The essential functions of this activity are the establishment of effective swallowing and oral nutrition, minimization of respiratory compromise, and identification of associated congenital conditions. |
| **Functions** | ❖ Nonoperative/Preoperative<br>➢ Perform a thorough prenatal consultation.<br>➢ Obtain maternal history and fetal imaging.<br>➢ Provide fetal risk stratification based on associated anomalies (eg, VACTERL [vertebrae, anus, cardiac anomalies, trachea, esophagus, renal anomalies, limb differences).<br>➢ Outline a prenatal surveillance strategy and delivery plan.<br>➢ Discuss the impact of polyhydramnios on the delivery plan and the potential need for intervention (eg, amnioreduction).<br>➢ Communicate predicted postnatal risk outcomes to the family and the multidisciplinary care team.<br>➢ Assist in determining when referral to a specialized center is indicated.<br>➢ Establish the diagnosis, and delineate the tracheoesophageal anatomy.<br>➢ Perform necessary preoperative investigations to inform operative timing and management options.<br>➢ Identify associated congenital conditions, and adapt management accordingly (eg, VACTERL).<br>➢ Communicate the diagnosis and treatment options to the family and other members of the health care team.<br>➢ Outline the timing of definitive repair (eg, delayed approach in long-gap esophageal atresia).<br>➢ Identify the risks and benefits of management strategies.<br>➢ Recognize high-risk situations (eg, very low birth weight, premature infant, complex congenital heart disease).<br>➢ Identify the need for and timing of additional procedures during esophageal atresia and tracheoesophageal fistula (EA/TEF) repair (eg, colostomy for anorectal malformations [ARM], duodenal atresia repair, gastrostomy).<br>➢ Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.<br>➢ Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.<br><br>❖ Intraoperative<br><br>➢ Perform the procedures required to manage esophageal atresia through minimally invasive and open approaches.<br>➢ Confirm correct patient positioning, and ensure that the necessary equipment and materials are available<br>➢ Perform bronchoscopy as indicated<br>➢ Recognize the need for primary versus staged repair. |

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# Evaluation & Management of a Patient with Esophageal Atresia and Tracheoesophageal Fistula

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| | ➢ Perform additional procedures when necessary (eg, colostomy for ARM, gastrostomy).<br>➢ Recognize and confirm all relevant anatomy.<br>➢ Establish clear intraoperative communication with the operating room team (anesthesia, nursing).<br>➢ Recognize and develop a management plan for unexpected intraoperative findings.<br>➢ Identify aberrant anatomy.<br>➢ Recognizes excessive gap or tension and institutes appropriate management to complete immediate repair vs delayed repair (eg, lengthening procedures)<br>➢ Recognize indications to convert from a minimally invasive to an open approach.<br><br>❖ Postoperative<br><br>➢ Communicate the postoperative plan of care to the family and other involved health care team members.<br>➢ Manage postoperative ventilation, timing of enteral feeds (and investigations leading to this decision), and other early complications such as hemorrhage, chylothorax, and esophageal leak.<br>➢ Manage postoperative esophageal strictures, including congenital esophageal stenosis.<br>➢ Identify long-term morbidity (chronic lung disease, gastroesophageal reflux, failure to thrive, associated congenital anomalies).<br>➢ Recognize the importance of a multidisciplinary approach to long-term follow-up. |
| **Scope** | ❖ In scope<br><br>• Diagnoses<br>○ Esophageal atresia<br>○ Tracheoesophageal fistula<br><br>• Procedures<br>○ Bronchoscopy<br>○ Esophageal atresia repair<br>○ Esophagoscopy with or without dilation<br>○ TEF ligation/division<br>○ Thoracoscopic esophageal atresia repair<br><br>• Special populations<br>○ Long gap, H-type<br>○ Recurrent TEF |

# Evaluation & Management of a Patient with Esophageal Atresia and Tracheoesophageal Fistula

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| | ○ Unstable patient (eg, severe respiratory distress)<br>○ VACTERL<br><br>❖ Out of scope<br><br>• Diagnoses/procedures<br>○ Esophageal stricture<br>○ Iatrogenic tracheoesophageal fistula |

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# Evaluation & Management of a Patient with Esophageal Atresia and Tracheoesophageal Fistula

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| **Level 1**<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br><br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br><br>The attending will show and tell or the learner acts as first assistant. | • With active guidance, integrates prenatal and neonatal physiology and imaging studies to develop a management plan for a near/full-term infant with esophageal atresia without a major congenital condition or cardiorespiratory compromise<br><br>• With active guidance recognizes the need for potential emergent evaluation of infant with esophageal atresia who has respiratory distress<br><br>• With active guidance, uses language that values the neonatology and anesthesiology teams in communications regarding issues with airway and ventilatory support specific to tracheoesophageal fistula<br><br>• Demonstrates knowledge of normal tracheoesophageal anatomy and development | • With direct supervision, chooses and assembles bronchoscopy equipment<br><br>• Performs rigid bronchoscopy with active guidance<br><br>• Serves effectively as first assistant for closure of the tracheoesophageal fistula, handling of the distal esophagus, and performance of the esophago-esophagostomy<br><br>• With active guidance and normal anatomy, identifies the appropriate tissue planes during muscle-sparing thoracotomy, retropleural exposure of the tracheoesophageal fistula, dissection of the tracheoesophageal fistula, and identification of the tracheoesophageal groove<br><br>• Functions as first assistant in the management of an inadvertent tracheal injury during dissection | • With active guidance, manages the postop course of a medically and surgically uncomplicated patient with esophageal atresia<br><br>• With active guidance, identifies the rationale for long-term management of a patient with esophageal atresia (eg, association with gastroesophageal reflux, stricture, esophageal dysplasia) |
| **2**<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not | • Under direct supervision, integrates prenatal and neonatal physiology and imaging studies to develop a management plan for a near/full-term infant with esophageal atresia without a major congenital condition or cardiorespiratory compromise<br><br>• Under direct supervision, recognizes the need for potential emergent evaluation of | • With indirect supervision, chooses and assembles bronchoscopy equipment<br><br>• Performs rigid bronchoscopy with direct supervision, requiring assistance to identify the tracheoesophageal fistula<br><br>• With indirect supervision, performs closure of the tracheoesophageal fistula, careful handling of the distal esophagus, | • With direct supervision, manages the postop course of a medically and surgically uncomplicated patient with esophageal atresia<br><br>• With direct supervision, describes a general long-term management plan for a patient with esophageal atresia (eg, |

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# Evaluation & Management of a Patient with Esophageal Atresia and Tracheoesophageal Fistula

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| know the nuances of a basic case<br><br>Entrustment:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br><br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | infant with esophageal atresia who has respiratory distress, and initiates basic workup and resuscitation in a timely manner<br><br>• Under direct supervision, communicates with the neonatology and anesthesia teams regarding issues with airway and ventilatory support specific to tracheoesophageal fistula<br><br>• Demonstrates knowledge of abnormal tracheoesophageal anatomy and development | and esophago-esophagostomy in a stable patient<br><br>• With indirect supervision and normal anatomy, identifies the appropriate tissue planes during muscle-sparing thoracotomy, retropleural exposure of the tracheoesophageal fistula, dissection of the tracheoesophageal fistula, and identification of the tracheoesophageal groove<br><br>• With direct supervision manages an inadvertent tracheal injury during dissection | association with gastroesophageal reflux, stricture, esophageal dysplasia) |
| **3**<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>Entrustment:<br><br>The learner can perform the operation/task independently in the uncomplicated patient | • With indirect supervision, develops a plan for a patient with complicated esophageal atresia and concurrent duodenal atresia, anorectal malformation, or cardiorespiratory compromise<br><br>• With indirect supervision, develops a treatment plan for a complicated case of severe respiratory distress, such as a patient with gastric distention requiring decompression, tracheomalacia, or need for emergent GE junction occlusion<br><br>• With indirect supervision, communicates concerns and provides feedback to the neonatology team regarding issues with airway and ventilatory support specific to tracheoesophageal fistula | • Independently chooses and assembles bronchoscopy equipment<br><br>• Performs rigid bronchoscopy and identifies the tracheoesophageal fistula with indirect supervision<br><br>• With indirect supervision, performs closure of the tracheoesophageal fistula, careful handling of the distal esophagus, and esophago-esophagostomy in a complex patient (eg, cardiac anomalies, complicated anatomy) or a patient with cardiorespiratory compromise<br><br>• With indirect supervision and variant anatomy, identifies appropriate tissue planes during muscle-sparing thoracotomy, retropleural exposure of | • With indirect supervision, manages the postop course of a medically complicated esophageal patient with esophageal atresia patient (eg, prematurity, congenital heart disease, anastomotic leak, early anastomotic stricture)<br><br>• With indirect supervision, follows an evidence-based long-term management plan for a patient with esophageal atresia (eg, management of gastroesophageal reflux, prevention and management of stricture, screening for esophageal dysplasia) |

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# Evaluation & Management of a Patient with Esophageal Atresia and Tracheoesophageal Fistula

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | • With passive assistance, identifies surgically relevant variations in tracheoesophageal anatomy (eg, right-sided aortic arch, proximal tracheoesophageal fistula) and development and alters patient management accordingly | the tracheoesophageal fistula, dissection of the tracheoesophageal fistula, and identification of the tracheoesophageal groove<br><br>• With indirect supervision manages an inadvertent tracheal injury during dissection | |
| **4**<br><br>**Framework:**<br><br>The learner has a strong and indepth understanding of surgical options and techniques<br><br>Entrustment:<br><br>Can perform the operation/task independently in complicated cases<br><br>**or**<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently integrates prenatal and neonatal physiology and imaging studies to develop a management plan for a complicated infant with esophageal atresia (eg, prematurity or complex congenital heart disease)<br><br>• Independently, develops a treatment plan for a complicated case of severe respiratory distress, such as a patient with gastric distention requiring decompression, tracheomalacia, or need for emergent GE junction occlusion<br><br>• Independently coordinates recommendations from the neonatology or anesthesiology team regarding issues with airway and ventilatory support specific to tracheoesophageal fistula in a crisis situation<br><br>• Independently identifies surgically relevant variations in tracheoesophageal anatomy and development (eg, right-sided aortic arch, proximal tracheoesophageal fistula) and alters patient management accordingly | • Independently chooses and assembles bronchoscopy equipment, including additional equipment needed for a complicated case (eg, Fogarty, concomitant esophagoscopy)<br><br>• Independently moves forward with rigid bronchoscopy and with passive supervision refines the approach in a complicated situation (eg, hypoxemia, excessive secretions) and identifies abnormal anatomy (eg, congenital subglottic stenosis, laryngotracheoesophageal cleft)<br><br>• Independently performs closure of the tracheoesophageal fistula, handling of the distal esophagus, and esophago-esophagostomy in a complex patient<br><br>• Independently visualizes tissue planes and performs muscle-sparing thoracotomy, retropleural exposure of the tracheoesophageal fistula, dissection of the tracheoesophageal fistula, and identification of the tracheoesophageal groove | • Independently manages the postop course of a medically complicated esophageal atresia patient (eg, prematurity, congenital heart disease, anastomotic leak, early anastomotic stricture)<br><br>• Integrates patient- and family-specific factors into an evidence-based long-term management plan for a patient with esophageal atresia (eg, management of gastroesophageal reflux, prevention and management of stricture, screening for esophageal dysplasia) |

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# Evaluation & Management of a Patient with Esophageal Atresia and Tracheoesophageal Fistula

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | | • With independently manages an inadvertent tracheal injury during dissection | |

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# Evaluation and Management of a Patient with a Genitourinary Condition

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| **Description of the Activity** | Pediatric surgeons commonly encounter patients with genitourinary conditions in both the elective (phimosis, cryptorchidism) and emergent (testicular or ovarian torsion) settings. In these instances, the pediatric surgeon must be able to evaluate the broad spectrum of presentations for these conditions as well as initiate timely investigation and surgical intervention. |
| **Functions** | ❖ Nonoperative/Preoperative<br>➢ Synthesize essential information from the patient's clinical history, physical examination, and pertinent records to develop a differential diagnosis.<br>➢ Identify the location of the testicle on exam, differentiating between a retractile testicle and an undescended testicle.<br>➢ Recognize findings consistent with testicular torsion.<br>➢ In the setting of an ovarian or paratubal cyst, determine if the patient has torsion.<br>➢ Complete a timely, cost-effective, and evidence-based diagnostic evaluation.<br>➢ Communicate the diagnosis and potential treatment options to the patient/family and the primary health care provider/consultants.<br>➢ Obtain informed consent, ensuring patient and family understanding of the indications, risks, benefits, alternatives, optimal operative timing, and potential short- and long-term complications as well as the typical convalescence of the planned operative procedure. Include nuances relevant to the patient's individual condition (eg, ovarian preservation), comorbidities, and family/caregiver situation (eg, social determinants of health).<br>➢ Perform preoperative optimization of the patient, including obtaining additional consultation as needed (eg, patient with complex comorbidities or a recent upper respiratory tract infection).<br>➢ Identify a patient who requires emergent intervention.<br>➢ Identify testicular or ovarian torsion<br>➢ Identify acute urinary retention from severe phimosis<br>➢ Identify paraphimosis<br>➢ Identify a patient in whom operative intervention may be delayed or not required.<br>➢ Identify retractile testicles<br>➢ Identify a patient in whom further investigation is required.<br>➢ Bilateral undescended testicles or suspected DSD (more investigation)<br>➢ Identify special patient populations associated with cryptorchid testicles and the potential challenges associated with management.<br>➢ gastroschisis, omphalocele, congenital diaphragmatic hernia, prune belly, Kleinfelter syndrome, trisomy 21, cerebral palsy<br>➢ Identify a patient who requires orchiectomy rather than orchidopexy based on age, malignant potential, location, perinatal torsion<br><br>❖ Intraoperative<br><br>➢ Perform the procedures required to manage cryptorchidism.<br>➢ Perform open or laparoscopic orchidopexy in a patient with palpable testes. |

# Evaluation and Management of a Patient with a Genitourinary Condition

- Identify and mobilize the testicle.
- Perform lengthening procedures (retroperitoneal dissection, medialization).
- Demonstrate awareness of a long looping vas.
- Create a dartos pouch and secure the testicle.
- Recreate an external ring.
- Perform final orientation of cord structures.
- Perform laparoscopy in a patient with nonpalpable testes.
- Determine the location of the testicle to plan a 1-stage or 2-stage procedure.
- Perform a 2-stage Fowler-Stephens orchidopexy.
- Ligate the testicular vessels to promote secondary vascularization of the testicle (stage 1).
- Mobilize the peritoneum containing secondary vasculature, preserving the peritoneum between testicular vessels and the vas deferens.
- Perform scrotal orchidopexy (acute torsion).
- Expose the testicle, initiate rewarming and assess for viability.
- Perform contralateral orchidopexy with or without ipsilateral orchidopexy/orchiectomy.
- Manage ovarian torsion with laparoscopic or open repair.
- Perform simple detorsion with or without potential resection of any associated mass or cyst.
- Differentiate between ovarian and paratubal cysts, ensuring fallopian tube preservation in the latter.
- Assess ovary and fallopian tube viability (may require salpingo- or salpingo-oophorectomy).
- Demonstrate understanding of ovarian preservation as a key principle.
- Perform circumcision using a bell clamp, Gomco clamp, Plastibell, or open procedure.
- Manage bleeding complications.
- Manage common intraoperative complications such as bleeding, vas injury, and testicular ischemia during exploration for testicular torsion or orchidopexy.
- Identify alternative techniques to get adequate length (retroperitoneal mobilization, Prentiss maneuver, orchidopexy).

❖ Postoperative

- Perform routine postoperative, immediate, and follow-up care.
- Order follow-up imaging to inform a future procedure (resection of mass) for a patient with ovarian torsion.
- Assess for meatal stenosis and review pathology for balanitis xerotica obliterans (BXO) for a patient who has undergone circumcision.
- Communicate with the patient/family to ensure that instructions are understood.
- Recognize early and late complications related to genitourinary tract procedures.
- Perform follow-up for testicular position and atrophy assessment in a patient who has undergone orchidopexy.

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# Evaluation and Management of a Patient with a Genitourinary Condition

## Scope

- In scope
  - Diagnoses
    - Cryptorchidism
      - Inguinal testes
      - Intra-abdominal testes
    - Ovarian torsion
      - Ovarian cyst
        - Hemorrhagic
        - Ruptured versus intraovarian
    - Paraphimosis
    - Paratubular cyst
  - Procedures
    - Circumcision
    - Circumcision revision
    - Orchidopexy (including laparoscopic-assisted, Fowler-Stephens stage 1 and 2)
    - Ovary-preserving cystectomy
    - Reduction paraphimosis
  - Special populations
    - Older children with missed cryptorchidism
    - Intersex
- Out of scope
  - Diagnoses/procedures
    - Acquired postinguinal hernia
    - Bilateral undescended testes
    - Congenital hydrocele
    - Gastroschisis, prune belly
    - Ischemic gonads
    - Retractile testes

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# Evaluation & Management of a Patient with a Genitourinary Condition

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| 1<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br><br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br><br>The attending will show and tell or the learner acts as first assistant. | • With active assistance, uses a patient's H&P and pertinent records to develop a differential for an uncomplicated patient<br><br>• With active assistance, diagnoses an undescended testicle; demonstrates limited ability to identify the location of the testicle on exam<br><br>• With active guidance, identifies a patient requiring emergent intervention (e.g., testicular or ovarian torsion, acute urinary retention from severe phimosis or paraphimosis)<br><br>• With active assistance and using evidence-based care, determines the need for orchiectomy vs orchidopexy with consideration for age, malignant potential, location, and history of perinatal torsion<br><br>• With active assistance, determines anatomic contraindications to circumcision (eg, chordee, hypospadias, epispadias, concealed or buried penis, micropenis, webbed penis, ambiguous genitalia)<br><br>• Establishes professional rapport with a patient and their family and communicates basic facts about the condition but inconsistently uses applicable language services and audio/visual aids | • Requires direct supervision during routine inguinal or scrotal orchidopexy, laparoscopic Fowler-Stephens staged orchidopexy, testicular detorsion, and laparoscopic-assisted ovarian detorsion/cystectomy<br><br>• Performs a circumcision in the OR with active assistance<br><br>• Demonstrates understanding of the basic elements of testicular, ovarian, and penile anatomy | • With direct supervision, manages the postop course of a patient undergoing an uncomplicated genitourinary tract procedure<br><br>• With direct supervision, identifies post-circumcision complications in the ambulatory setting requiring operative intervention (e.g., bleeding)<br><br>• Establishes a professional rapport with a patient and their family and communicates postop instructions in a clear and understandable manner |

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# Evaluation & Management of a Patient with a Genitourinary Condition

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| **2**<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case<br><br>Entrustment:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br><br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | • With direct supervision, uses a patient's H&P and pertinent records to develop a comprehensive plan and differential for an uncomplicated patient<br><br>• With direct supervision, diagnoses an undescended testicle and identifies the location of the testicle on exam<br><br>• With direct supervision, identifies a patient requiring emergent intervention (eg, testicular or ovarian torsion, acute urinary retention from severe phimosis or paraphimosis)<br><br>• With indirect supervision and using evidence-based care, determines the need for orchiectomy vs orchidopexy with consideration for age, malignant potential, location, and history of perinatal torsion<br><br>• With passive assistance, determines anatomic contraindications to circumcision (eg, chordee, hypospadias, epispadias, concealed or buried penis, micropenis, webbed penis, ambiguous genitalia)<br><br>• Establishes a therapeutic relationship with a straightforward patient and their family and compassionately delivers medical information, using visual aids as necessary | • Requires indirect supervision during routine inguinal or scrotal orchidopexy, laparoscopic Fowler-Stephens staged orchidopexy, testicular detorsion, and laparoscopic-assisted ovarian detorsion/cystectomy<br><br>• Performs a circumcision in the OR with passive assistance<br><br>• Demonstrates understanding of the surgically relevant anatomic variations in testicular, ovarian, and penile anatomy | • With indirect supervision, manages the postop course of a patient undergoing an uncomplicated genitourinary tract procedure and describes a general long-term management plan<br><br>• With indirect supervision, identifies post-circumcision complications in the ambulatory setting requiring operative intervention (eg, bleeding)<br><br>• Establishes a therapeutic relationship with a straightforward patient and their family and compassionately delivers medical information, identifying complex barriers to effective communication |

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# Evaluation & Management of a Patient with a Genitourinary Condition

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| **3**<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>**Entrustment:**<br><br>The learner can perform the operation/task independently in the uncomplicated patient<br><br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | • Independently uses a patient's H&P and pertinent records to develop a comprehensive plan and differential for an uncomplicated patient<br><br>• With passive assistance, localizes an undescended testicle, distinguishes retractile testes, and recognizes testicular torsion<br><br>• With indirect supervision, identifies a patient requiring emergent intervention (eg, testicular or ovarian torsion, acute urinary retention from severe phimosis or paraphimosis)<br><br>• Independently determines the need for orchiectomy vs orchidopexy using evidence-based care, with consideration for age, malignant potential, location, and history of perinatal torsion<br><br>• Independently determines anatomic contraindications to circumcision (eg, chordee, concealed or buried penis, micropenis, webbed penis); requires passive assistance with a complex presentation (eg, hypospadias, epispadias, ambiguous genitalia)<br><br>• Establishes a therapeutic relationship with a challenging patient and their family and acknowledges uncertainty in alignment of goals | • Requires indirect supervision during complex inguinal or scrotal orchidopexy (includes retroperitoneal mobilization, Prentiss maneuver), laparoscopic Fowler-Stephens staged orchidopexy, testicular detorsion including assessment of viability and need for orchiectomy, and laparoscopic-assisted ovarian detorsion/cystectomy; differentiates between an ovarian and a paratubal cyst and safely preserves the fallopian tube<br><br>• With indirect supervision, performs a circumcision in the outpatient setting<br><br>• With indirect supervision, identifies surgically relevant anatomic variations and alters patient management accordingly | • With indirect supervision, manages the postop course of a patient undergoing a complicated genitourinary tract procedure and follows an evidence-based long-term management plan<br><br>• With indirect supervision, identifies post-circumcision complications in the ambulatory setting and initiates operative intervention<br><br>• Establishes a therapeutic relationship with a challenging patient and their family and clearly communicates the expected outcome, anticipated treatment course, and need for future imaging |

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# Evaluation & Management of a Patient with a Genitourinary Condition

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| 4<br><br>**Framework:**<br><br>The learner has a strong and indepth understanding of surgical options and techniques<br><br>Entrustment:<br><br>Can perform the operation/task independently in complicated cases<br><br>**or**<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently integrates information with patient-specific factors to design a succinct workup and diagnostic management plan for a complicated patient<br><br>• Independently localizes an undescended testicle, distinguishes retractile testes, and recognizes testicular torsion<br><br>• Independently and swiftly identifies a patient requiring emergent intervention (eg, testicular or ovarian torsion, acute urinary retention from severe phimosis or paraphimosis) and mobilizes the surgical team to expedite care<br><br>• Using evidence-based care, independently identifies special patient populations associated with cryptorchid testicles (eg, gastroschisis, omphalocele, CDH, prune belly syndrome, Klinefelter syndrome, trisomy 21, cerebral palsy), recognizing the potential challenges associated with management<br><br>• Independently identifies anatomic contraindications to circumcision, including a complex presentation<br><br>• Uses shared decision-making to align the values, goals, and preferences of a patient and their family with treatment options to make a personalized care plan; discusses the nuances relevant to the patient's condition (eg, ovarian preservation), | • Independently performs complex inguinal or scrotal orchidopexy (includes retroperitoneal mobilization, Prentiss maneuver), laparoscopic Fowler-Stephens staged orchidopexy, testicular detorsion including assessment of viability and need for orchiectomy, and laparoscopic-assisted ovarian detorsion/cystectomy; differentiates between an ovarian and a paratubal cyst and safely preserves the fallopian tube<br><br>• Independently performs a circumcision in the outpatient setting<br><br>• Independently describes and identifies the elements of testicular, ovarian, and penile anatomy, including anatomic variants, and alters patient management accordingly | • Independently manages the postop course of a patient undergoing a complicated genitourinary tract procedure and integrates patient- and family-specific factors into the construction of an evidence-based long-term management plan<br><br>• Independently identifies post-circumcision complications in the ambulatory setting and initiates operative intervention<br><br>• Aligns the values, goals, and preferences of the patient and their family with treatment options to make a personalized care plan using shared decision-making, recognizing when personal treatment preferences diverge from those of the patient or family |

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# Evaluation & Management of a Patient with a Genitourinary Condition

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | comorbidities, and caregiver situation (eg, social determinants of health | | |

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# Evaluation and Management of a Patient with a Hepatobiliary Disorder

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| **Description of the Activity** | Biliary atresia (BA) and choledochal cyst (CC) are congenital diseases that occur in infancy and early childhood. Infants with BA and CC are frequently referred to pediatric general surgeons in the inpatient and outpatient settings. The pediatric surgeon should be able to perform and counsel families on fetal risk stratification and diagnose and treat patients with these conditions, selecting the optimal operative treatment, approach, and timing. Patient- and family-centered, evidenced-based, and shared decision-making is necessary to ensure ideal outcomes. |
| **Functions** | ❖ Nonoperative/Preoperative<br><br>❖ BA<br>➢ Obtain and synthesize essential information from the patient's pre- and postnatal records, history, physical examination, and initial diagnostic evaluations to develop a differential diagnosis. Correlate this information with any known prenatal imaging.<br>➢ Evaluate a patient with neonatal jaundice, investigating for possible congenital, genetic, infectious, and metabolic causes.<br>➢ Obtain the information needed to diagnose BA, including laboratory (blood studies), radiologic (cholangiogram, hepatobiliary iminodiacetic acid scan, ultrasound), and surgical options (liver biopsy, cholangiogram).<br>➢ Demonstrate understanding of other conditions that can mimic BA, such as hepatitis, alpha-1 antitrypsin disorder, and Alagille syndrome, and diagnose these conditions.<br>➢ Complete a cost-effective, evidence-based diagnostic evaluation, obtaining appropriate imaging directed at operative planning.<br>➢ Identify the optimal timing, approach, and technique for repair based on the patient's diagnosis and clinical stability (timing of a portoenterostomy, need for preoperative antibiotics and vitamin K, need for cholangiogram and portoenterostomy).<br>➢ Recognize when a patient with delayed presentation or advanced cirrhosis should be referred to the transplant team.<br>➢ Communicate the diagnosis and treatment options to the family and consultants.<br>➢ Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.<br>➢ Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.<br>❖ CC<br>➢ Obtain and synthesize essential information from the patient's pre- and postnatal records, history, physical examination, and initial diagnostic evaluations to develop a differential diagnosis. Correlate this information with any known prenatal imaging.<br>➢ Evaluate a patient with neonatal jaundice, investigating for possible congenital, genetic, infectious, mechanical and metabolic causes.<br>➢ Demonstrate knowledge of the 5 types of CC.<br>➢ Complete a cost-effective, evidence-based diagnostic evaluation, obtaining imaging directed at operative planning (ultrasound, magnetic resonance cholangiopancreatography [MRCP], endoscopy) and assessing the need for preoperative antibiotics.<br>➢ Identify the optimal timing, approach, and technique for repair based on the patient's diagnosis and clinical stability. |

# Evaluation and Management of a Patient with a Hepatobiliary Disorder

- Determine which patients require intervention in the neonatal period and which are stable enough to undergo elective operative intervention.
- Determine when a patient would benefit from a minimally invasive versus an open approach.

➢ Identify the appropriate surgical procedure for each of the 5 types of CC, including hepaticoduodenostomy and hepaticojejunostomy, endoscopic treatment, and drain placement.

➢ Communicate the diagnosis and treatment options to the family and consultants.

➢ Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.

➢ Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.

❖ Intraoperative

❖ BA

➢ Manage the perioperative environment, including room setup, equipment check, preprocedural time-out, specimen processing, counts, wound classification, updating the family, and debriefing functions.

➢ Position the patient to expose the operative field, taking precautionary measures to avoid iatrogenic injury and allow the anesthesia team access to the patient.

➢ Confirm the availability of necessary equipment (staplers, energy devices, clip appliers, ties, extra equipment).

➢ Collaborate with other health care professionals to create and maintain an intraoperative environment that promotes safe patient care.

➢ Perform the procedures required to manage BA through an open approach, including portoenterostomy.

➢ Recognize and develop a management plan for unexpected intraoperative findings, such as aberrant anatomy, bleeding liver and hepatic vessels, and bile leak.

❖ CC

➢ Manage the perioperative environment, including room setup, equipment check, preprocedural time-out, specimen processing, counts, wound classification, updating the family, and debriefing functions.

➢ Position the patient to expose the operative field, taking precautionary measures to avoid iatrogenic injury and allow the anesthesia team access to the patient.

➢ Confirm the availability of necessary equipment (staplers, energy devices, clip appliers, ties, extra equipment).

➢ Collaborate with other health care professionals to create and maintain an intraoperative environment that promotes safe patient care.

➢ Perform the procedures required to manage CC through minimally invasive and open approaches, including hepaticoduodenostomy and hepaticojejunostomy.

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# Evaluation and Management of a Patient with a Hepatobiliary Disorder

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| | ➢ Recognize and develop a management plan for unexpected intraoperative findings, including aberrant anatomy; bleeding from hepatic arteries/veins, portal vein, and IVC; bile leak; and significant inflammation involving the CC and portal vein.<br>➢ Recognize indications to convert from a minimally invasive to an open approach<br>➢ Identify the indications for endoscopic retrograde cholangiopancreatography (ERCP).<br><br>❖ Postoperative<br>• BA<br>○ Provide postoperative management for a patient with BA.<br>○ Communicate with the family/caregiver(s) and the health care team to ensure instructions are understood.<br>○ Establish goals for drain removal if used.<br>○ Identify early (anastomotic leak, ileus, cholangitis) and late (liver failure requiring transplant, bowel obstruction) postoperative complications associated with a portoenterostomy procedure.<br>○ Recognize the long-term outcomes from portoenterostomy, such as possible cholangitis and the fact that 30% will avoid transplantation, 30% will have liver failure in the first year, and 30% will progress to liver failure later in childhood.<br>○ Recognize the need for a transplant referral after portoenterostomy in patients with early failed portoenterostomy, repeated cholangitis, and cirrhosis.<br>○ Demonstrate understanding of evidence-based best practices, including avoidance of the routine use of steroids pre- or postoperatively<br>○ Plan and establish a short- and long-term follow-up plan that includes pathology and imaging as needed.<br>• CC<br>○ Provide postoperative management for a patient with CC.<br>○ Communicate with the family/caregiver(s) and the health care team to ensure instructions are understood.<br>○ Establish goals for drain removal if used.<br>○ Identify early (anastomotic leak, ileus, bleeding) and late (bowel obstruction and stricture ) postoperative complications associated with a portoenterostomy procedure.<br>○ Plan and establish a short- and long-term follow-up plan that includes pathology and imaging as needed.<br>Perform postoperative care, including administration of antibiotics, and recognize the acute surgical complications that are associated with surgical treatment, such as ileus. |
| **Scope** | ❖ In scope<br><br>• Diagnoses<br>○ BA<br>○ CC<br>○ Workup for neonatal jaundice:<br>▪ Congenital<br>▪ Genetic<br>▪ Infectious |

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# Evaluation and Management of a Patient with a Hepatobiliary Disorder

- Mechanical
- Metabolic

- Procedures
  - Hepaticojejunostomy
  - Intraoperative cholangiography
  - Laparoscopic versus open choledochal cyst resection with hepaticoduodenostomy
  - Liver biopsy
  - Portoenterostomy
  -
- Special populations
  - Prenatally diagnosed cystic BA
  - Type 4 choledochal cysts
  - Inflamed choledochal cyst that cannot be separated

❖ Out of scope

- Diagnoses/procedures
  - Bile duct cancer
  - Gallbladder cancer
  - Hepatic angiosarcoma
  - Hepatoblastoma
  - Neonatal vascular malformation and vascular tumor

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# Evaluation & Management of a Patient with a Hepatobiliary Disorder

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| 1<br><br>**Framework:**<br><br>The attending will show and tell or the learner acts as first assistant.<br><br>**Entrustment:**<br><br>The learner demonstrates understanding of information and has basic skills.<br><br>What a new pediatric surgery fellow should know. | • With active guidance, obtains and synthesizes essential information from a patient's pre- and postnatal records, H&P, initial diagnostic evaluation, and prenatal imaging to develop a differential, including the type of biliary atresia/choledochal cyst<br><br>• With active guidance, defines the appropriate operative timing, approach, and technique based on patient diagnosis and communicates these to the patient and family<br><br>• With active guidance, identifies the different surgical procedures utilized in patients with biliary atresia/choledochal cyst (portoenterostomy, hepaticoduodenostomy, hepaticojejunostomy, endoscopic treatment, drain placement)<br><br>• During the initial evaluation, establishes professional rapport with family and consultants and respectfully relays the pertinent clinical findings in a clear and understandable manner<br><br>• Establishes a therapeutic relationship with a patient and family and has a basic understanding of how personal biases can lead to communication barriers | • Demonstrates basic knowledge of biliary atresia/choledochal cyst and anatomic variations<br><br>• Recognizes the specific functions of the periop environment, including room setup, equipment check, time-out, and debrief<br><br>• With active guidance, progresses through the initial portions of liver mobilization or cyst dissection, including basic interpretation of the cholangiogram<br><br>• Demonstrates basic understanding of intraop complications due to aberrant anatomy such as bleeding or bile leak | • With active guidance, implements a postop management plan for a patient with uncomplicated biliary atresia or choledochal cyst<br><br>• Demonstrates basic understanding of acute surgical complications associated with surgical treatment of biliary atresia or choledochal cyst (eg, anastomotic leak, ileus, bleeding, cholangitis, liver failure, bowel obstruction/stricture)<br><br>• With active guidance, follows an evidence-based long-term management plan for a patient with biliary atresia or choledochal cyst<br><br>• Engages family and care team in discussion of postoperative instructions and respectfully relays information on goals, and expectations to<br><br>• With active guidance, uses active listening to adapt communication style to fit family/guardians/care team needs; coordinates recommendations from different members of the health care team to optimize patient care; and maintains effective communication in a crisis situation<br><br>• Respectfully listens to concerns from members of care teams |

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# Evaluation & Management of a Patient with a Hepatobiliary Disorder

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| **2**<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case.<br><br>**Entrustment:**<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | • With direct supervision, obtains and synthesizes essential information from a patient's pre- and postnatal records, H&P, initial diagnostic evaluation and prenatal imaging to develop a differential, including the type of biliary atresia/choledochal cyst<br><br>• With direct supervision, defines the appropriate operative timing, approach, and technique based on patient diagnosis and communicates these to the patient and family<br><br>• With direct supervision, identifies the appropriate surgical procedure for each of the types of biliary atresia/choledochal cyst (portoenterostomy, hepaticoduodenostomy, hepaticojejunostomy, endoscopic treatment, drain placement)<br><br>• With direct supervision, communicates the diagnosis and treatment options to a family and consultants and obtains informed consent<br><br>• Establishes a therapeutic relationship with a patient and family and when prompted, reflects on personal biases while attempting to minimize communication barriers | • With direct supervision, identifies surgically relevant anatomic variations with an intraop cholangiogram, performs liver biopsy, and alters patient management appropriately<br><br>• With direct supervision, manages the periop environment, including room setup, equipment check, time-out, and debrief<br><br>• With direct supervision, progresses through the initial portions of liver mobilization, anterior cyst dissection for choledochal cyst, and hepaticoduodenostomy/ hepaticojejunostomy anastomosis; assists with portal plate dissection and portoenterostomy for biliary atresia<br><br>• With direct supervision, manages, anticipates, and prevents intraop complications for portoenterostomy, hepaticoduodenostomy, or hepaticojejunostomy anastomosis | • With direct supervision, manages the postop course of a patient with uncomplicated biliary atresia or choledochal cyst<br><br>• With direct supervision, identifies and manages surgical complications commonly associated with surgical treatment of biliary atresia or choledochal cyst (eg, anastomotic leak, ileus, bleeding, cholangitis, liver failure, bowel obstruction/stricture)<br><br>• With passive guidance, follows an evidence-based long-term management plan for a patient with biliary atresia or choledochal cyst<br><br>• With direct supervision, communicates postop instructions, goals, and expectations to family/guardians/care teams clearly and concisely in an organized and timely manner<br><br>• Under direct supervision, uses active listening to adapt communication style to fit family/guardians/care team needs; coordinates recommendations from different members of the health care team to optimize patient care; and maintains effective communication in a crisis situation<br><br>• Under direct supervision, communicates feedback to and |

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# Evaluation & Management of a Patient with a Hepatobiliary Disorder

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| | | | requests constructive criticism from superiors |
| 3<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case.<br><br>**Entrustment:**<br><br>The learner can perform the operation/task independently in the uncomplicated patient<br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves. | • With indirect supervision, integrates essential information from a patient's pre- and postnatal records, H&P, initial diagnostic evaluation and prenatal imaging to develop a treatment plan for patients with biliary atresia/choledochal cyst<br><br>• With indirect supervision, defines the appropriate operative timing, approach, and technique based on patient diagnosis and participates in shared decision-making to align the values, goals, and preferences of the patient and family with treatment options to make a personalized care plan<br><br>• With indirect supervision, identifies the appropriate surgical procedure for each of the types of biliary atresia/choledochal cyst (portoenterostomy, hepaticoduodenostomy, hepaticojejunostomy, endoscopic treatment, drain placement)<br><br>• With indirect supervision, communicates the diagnosis and treatment options to a family and consultants and obtains informed consent<br><br>• Establishes a therapeutic relationship with a patient and family and with minimal prompting critically reflects on personal biases while attempting to minimize communication barriers | • With indirect supervision, identifies surgically relevant anatomic variations with an intraop cholangiogram, performs liver biopsy, and alters patient management appropriately<br><br>• With indirect supervision, manages the periop environment, including room setup, equipment check, time-out, and debrief<br><br>• With indirect supervision, progresses through liver mobilization, circumferential cyst dissection for choledochal cyst, and hepaticoduodenostomy/ hepaticojejunostomy anastomosis; assists with portal plate dissection and portoenterostomy for biliary atresia<br><br>• With indirect supervision, manages, anticipates, and prevents intraop complications due to aberrant anatomy such as bleeding and bile leak | • With indirect supervision, implements a postop management plan for a patient with complicated biliary atresia or choledochal cyst<br><br>• With indirect supervision, recognizes and manages surgical complications commonly associated with surgical treatment of biliary atresia or choledochal cyst (eg, anastomotic leak, ileus, bleeding, cholangitis, liver failure, bowel obstruction/stricture)<br><br>• With indirect supervision, integrates patient- and family-specific factors into the construction of an evidence-based long-term management plan for a patient with biliary atresia or choledochal cyst, including the use of steroids in biliary atresia, and relays outcomes to the family<br><br>• With indirect supervision, ensures that postop instructions, goals, and expectations are understood by family/guardians/care teams<br><br>• Often uses active listening to adapt communication style to fit family/guardians/care team needs; coordinates recommendations from different members of the health care team to optimize patient care; and |

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# Evaluation & Management of a Patient with a Hepatobiliary Disorder

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | | | maintains effective communication in a crisis situation<br>• With indirect supervision, communicates feedback to and requests constructive criticism from superiors |
| 4<br><br>**Framework**<br><br>The learner has a strong and indepth understanding of surgical options and techniques.<br><br>**Entrustment:**<br><br>Can perform the operation/task independently in complicated cases<br><br>or<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently integrates and synthesizes essential information from a patient's pre- and postnatal records, H&P, initial diagnostic evaluation and prenatal imaging to develop a treatment plan for patients with biliary atresia/choledochal cyst<br>• Independently defines and implements the appropriate operative timing, approach, and technique based on patient diagnosis and participates in shared decision-making to align the values, goals, and preferences of the patient and family with treatment options to make a personalized care plan<br>• Independently identifies the appropriate surgical procedure for each of the types of biliary atresia/choledochal cyst (portoenterostomy, hepaticoduodenostomy, hepaticojejunostomy, endoscopic treatment, drain placement)<br>• Independently communicates the diagnosis and treatment options to a family and consultants and obtains informed consent<br>• Independently recognizes personal biases while attempting to proactively minimize | • Independently demonstrates comprehensive knowledge of biliary atresia/choledochal cyst and anatomic variations such as surgically correctable types of biliary atresia or aberrant hepatic arterial blood supply<br>• Independently manages the periop environment, including room setup, equipment check, time-out, and debrief<br>• Independently progresses fluidly through the entirety of portoenterostomy (including cholangiogram and liver biopsy) or circumferential cyst resection and hepaticoduodenostomy or hepaticojejunostomy anastomosis<br>• Independently manages, anticipates, and prevents intraop complications due to aberrant anatomy such as bleeding, bile leak, and adherent posterior wall | • Independently implements a postop management plan for a patient with biliary atresia or choledochal cyst<br>• Independently recognizes and manages surgical complications commonly associated with surgical treatment of biliary atresia or choledochal cyst (eg, anastomotic leak, ileus, bleeding, cholangitis, liver failure, bowel obstruction/stricture)<br>• Independently integrates patient- and family-specific factors into the construction of an evidence-based long-term management plan for a patient with biliary atresia or choledochal cyst, including the use of steroids in biliary atresia, and relays outcomes to the family<br>• Independently communicates with family/guardians/care teams to ensure postop instructions, goals, and expectations are understood<br>• Consistently uses active listening to adapt communication style to fit family/guardians/care team needs; |

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# Evaluation & Management of a Patient with a Hepatobiliary Disorder

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | communication barriers with family/caregivers/health care teams | | coordinates recommendations from different members of the health care team to optimize patient care; and maintains effective communication in a crisis situation<br><br>• Consistently and independently communicates feedback to and requests constructive criticism from superiors |

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# Evaluation and Management of a Patient with Hirschsprung Disease

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| **Description of the Activity** | Hirschsprung disease (HD) is a condition that every pediatric surgeon will encounter during their career. Pediatric surgeons may encounter these patients during the newborn period or later in life for those not diagnosed in early infancy. The surgeon must be able to diagnose and treat these patients in both the inpatient and outpatient settings and on an acute and elective basis. Given the lifelong implications of HD, the pediatric surgeon will ensure proper transition of care as the patient becomes an adult. |
| **Functions** | ❖ Nonoperative/Preoperative<br>➢ Perform a targeted history and physical, including an inquiry into the timing of the first passage of meconium.<br>➢ Recognize the signs and symptoms of Hirschsprung-associated enterocolitis (HAEC) and its management.<br>➢ Identify initial radiographic studies used to aid in the diagnosis, including interpretation and limitations of the studies.<br>➢ Determine whether urgent surgical intervention is warranted, including indications for stoma creation.<br>➢ Discuss the role of rectal biopsy in the diagnosis, including biopsy techniques and the advantages and disadvantages of each.<br>➢ Formulate an operative approach based on the patient's age, weight, and clinical presentation.<br>➢ Recognize when additional workup for comorbidities is needed (trisomy 21, congenital central hypoventilation syndrome, hereditary HD).<br>➢ Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.<br>➢ Recognize the signs, symptoms, and severity of HAEC.<br>➢ Demonstrate understanding of the differential diagnosis of neonatal distal bowel obstruction.<br>➢ Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.<br><br>❖ Intraoperative<br>➢ Manage the perioperative environment, including temperature regulation in the neonate and sites for peripheral intravenous lines, as well as room setup, equipment needed, procedural time-out, specimen processing (and communication with pathology), wound classification, and the importance of debriefing.<br>➢ Recognize the correct patient positioning based on the age of the patient and the surgical intervention being performed.<br>➢ Administer preoperative antibiotics.<br>➢ Collaborate with the perioperative health care team to ensure an environment that promotes the optimal care of the patient.<br>➢ Recognize the histologic findings of HD and additional stains used to improve diagnosis.<br>➢ Ensure a circular segment of the pull-through segment is reviewed by the pathologist intraoperatively to ensure circumferential ganglion cells.<br>➢ Pull-through:<br>▪ Recognize the common approaches to abdominal dissection based on the level of the transition zone (open, laparoscopic, transanal). |

# Evaluation and Management of a Patient with Hirschsprung Disease

- Identify the crucial steps of the operation: sequential biopsies to identify the transition zone, skeletonization of the aganglionic bowel, and mobilization of the proximal ganglionic bowel to allow a tension-free delivery to the anus.
- Recognize the recommended minimum distance from the biopsy site to the pull-through segment to avoid a transition zone pull-through.

➢ Laparoscopic Soave:
- Identify the common positioning of trocars.
- Recognize the need to mobilize the colon while preserving the marginal artery.
- Determine adequate length by grasping the bowel 10 to 20 cm proximal to the transition zone and directing it to the pelvis.
- Recognize the location of the mucosal incision in relation to the dentate line.
- Identify the plane between the submucosa and the muscularis, and recognize the need to continue in this plane until the intra-abdominal dissection is met.
- Recognize the need to divide the muscular wall, pull the colon through the muscular cuff, divide the cuff posteriorly, and divide the colon.
- Complete the anastomosis by placing traction sutures to ensure proper orientation, and then additional sutures to create a tight anastomosis.

➢ Swenson:
- Perform circumferential mobilization of the rectum to the pelvic floor or as low as can be safely performed.
- Recognize the need to stay close to the rectal wall, identify and avoid the ureters, and in boys, protect the vas deferens.
- Perform transanal dissection by incising full-thickness through the rectal wall circumferentially, 1 cm above the dentate line. Recognize the continued need to stay close to the rectal wall.
- Recognize complications associated with each operative technique (Swenson vs Soave vs Duhamel).

➢ Leveling ostomy:
- Access the abdominal cavity using a laparoscopic or open approach.
- Identify the target of the seromuscular biopsy.
- Determine the location of the ostomy based on the findings of the frozen section.
- Consider a 4-quadrant biopsy at the point chosen for the stoma to avoid a transition zone stoma.
- Recognize long-segment HD with serial biopsies and the need for proximal diversion.

❖ Postoperative
- ➢ Communicate the postoperative plan of care to the family and other involved health care team members.
- ➢ Verbalize the importance of avoiding instrumentation/manipulation of the rectum to minimize the risk of anastomotic disruption.
- ➢ Recognize the need for short-term follow-up after discharge (within 2-3 weeks) to determine the need for routine rectal dilations or continued rectal irrigations.
- ➢ Identify the signs, symptoms, and treatment of HAEC, and recognize its occurrence before or after definitive surgical intervention.
- ➢ Recognize special populations at increased risk for HAEC (patients with trisomy 21 and long-segment disease).
- ➢ Recognize the need for transfer to a higher-level facility for patients with long-segment HD.

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# Evaluation and Management of a Patient with Hirschsprung Disease

## Scope

- In scope

- Diagnoses
  - HAEC
  - Normal-segment HD

- Procedures
  - Botox injection
  - Laparoscopic-assisted /open pull-through
  - Leveling colostomy/ileostomy
  - Rectal biopsy (punch or open)
  - Rectal irrigation/decompression
  - Soave/Swenson with or without Duhamel

- Special populations:
  - Hereditary populations
  - Long-segment
  - Trisomy 21

- Out of scope

  - Diagnoses/procedures
    - Anorectal malformation (see specific EPA)
    - Idiopathic constipation

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# Evaluation & Management of a Patient with Hirschsprung Disease

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| 1<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br><br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br><br>The attending will show and tell or the learner acts as first assistant. | • With active guidance, performs a relevant H&P including inquiry of passage of first meconium or stooling history<br><br>• With active assistance, performs a suction rectal biopsy in a patient with suspected HD and interprets pathologic findings<br><br>• With active guidance, identifies a patient in need of rectal irrigations, including one presenting with HAEC, and provides general parental education on their performance<br><br>• With active guidance, interprets findings of initial studies such as a contrast enema to aid in the diagnosis of HD (e.g., abnormal rectosigmoid ratio)<br><br>• With active assistance, communicates the basic facts of HD to the family in a respectful and culturally sensitive manner | • With active guidance, participates in preparation and positioning of the patient and demonstrates understanding of variances depending on the HD surgical intervention to be performed<br><br>• With active assistance, performs leveling biopsies and serves as first assistant with the pull-through procedure (open or lap-assisted)<br><br>• With active assistance, recognizes HD transition zone pathophysiology and the implications of a transition zone pull-through<br><br>• With active assistance, articulates surgical options and general principles such as identification of the transition zone, preservation of the blood supply of the proximal intestine, and the importance of tension-free repair and avoiding injury to the dentate line<br><br>• With active assistance, performs an open rectal biopsy when a suction rectal biopsy is nondiagnostic or not possible and verbalizes complications of the procedure<br><br>• With active assistance, discusses intraop biopsy/specimen findings with the pathologist | • With active assistance, communicates the basic steps of the postop plan to the family and other health care team members, including immediate postop needs and the need for short-term follow-up<br><br>• With active assistance, recognizes the short- and long-term complications of a pull-through procedure such as HAEC, anastomotic stricture, cuff abscess, soiling/incontinence, and obstructive symptoms<br><br>• With active assistance, identifies the rationale for long-term multidisciplinary management |

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# Evaluation & Management of a Patient with Hirschsprung Disease

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | | • With active guidance, recognizes a patient with long- segment HD while performing a leveling biopsies, and identifies the need for proximal diversion.<br>• With active guidance, considers HD in a patient undergoing diversion after presenting with an acute abdomen (i.e., cecal or appendiceal perforation) and performs the appropriate workup (i.e., rectal biopsy). | |
| 2<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case<br><br>Entrustment:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br><br>The attending gives active help throughout the case to maintain forward progression or may need to | • With indirect supervision, performs a relevant H&P, including inquiry of passage of first meconium or stooling history in an uncomplicated patient with HD<br>• With direct supervision, performs a suction rectal biopsy in a patient with suspected HD and interprets pathologic findings<br>• With direct supervision, identifies a patient in need of rectal irrigations, including one presenting with HAEC, and provides parental education on their performance<br>• With indirect supervision, interprets findings of initial studies such as a contrast enema to aid in the diagnosis of HD (e.g., abnormal rectosigmoid ratio)<br>• With direct supervision, thoroughly explains the pathophysiology of HD to the | • With direct supervision, prepares and positions the patient depending on the HD surgical intervention to be performed<br>• With direct supervision, performs the pull-through procedure (open or lap-assisted)<br>• With direct supervision, recognizes HD transition zone pathophysiology and implications of a transition zone pull-through<br>• With direct supervision, articulates surgical options and general principles such as identification of the transition zone, preservation of the blood supply of the proximal intestine, and the importance of tension-free repair and avoiding injury to the dentate line | • With direct supervision, communicates the postop plan to the family and other health care team members, including immediate postop needs and the need for short-term follow-up<br>• With direct supervision, recognizes the short- and long-term complications of a pull-through procedure such as HAEC, anastomotic stricture, cuff abscess, soiling/incontinence, and obstructive symptoms and delineates a basic treatment plan for short-term complications<br>• With direct supervision, identifies the rationale for long-term multidisciplinary management |

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# Evaluation & Management of a Patient with Hirschsprung Disease

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| take over the case at a certain point | family in a respectful and culturally sensitive manner and obtains informed consent | • With direct supervision, performs an open rectal biopsy when a suction rectal biopsy is nondiagnostic or not possible and verbalizes complications of the procedure<br>• With direct supervision, discusses intraop biopsy/specimen findings with the pathologist<br>• With direct supervision, recognizes a patient with long-segment HD while performing a leveling biopsies, and identifies the need for proximal diversion.<br>• With direct supervision, considers HD in a patient undergoing diversion after presenting with an acute abdomen (i.e., cecal or appendiceal perforation) and performs the appropriate workup (i.e., rectal biopsy). | |
| 3<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>Entrustment: | • With indirect supervision, performs a targeted H&P and identifies the diagnostic workup and surgical management for a complex patient with HD presenting with an acute abdomen, trisomy 21, ELBW, or a delayed presentation<br>• With indirect supervision, performs a suction rectal biopsy in a patient with suspected HD and interprets pathologic findings | • With indirect supervision, prepares and positions the patient depending on the HD surgical intervention to be performed<br>• With indirect supervision, performs the pull-through procedure (open or lap-assisted)<br>• With indirect supervision, recognizes HD transition zone pathophysiology and implications of a transition zone pull-through | • With indirect supervision, communicates a comprehensive postop plan to the family of a complex patient and other health care team members, including short- and long-term complications/goals of care<br>• With indirect supervision, recognizes the short- and long-term complications of a pull-through procedure such as HAEC, anastomotic stricture, cuff abscess, soiling/incontinence, and |

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# Evaluation & Management of a Patient with Hirschsprung Disease

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| The learner can perform the operation/task independently in the uncomplicated patient<br><br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | • With indirect supervision, identifies a patient in need of rectal irrigations, including one presenting with HAEC, promptly institutes management, and provides comprehensive parental education on their performance<br><br>• With indirect supervision, identifies uncommon fluoroscopic imaging findings that might suggest total colonic disease (e.g., microcolon, normal-appearing colon)<br><br>• With indirect supervision and in a respectful and culturally sensitive manner, discusses the proposed operative plan with the family and uses shared decision-making to ensure a personalized plan of care that aligns with the family's values, goals, and preferences | • With indirect supervision, articulates surgical options and general principles such as identification of the transition zone, preservation of the blood supply of the proximal intestine, and the importance of tension-free repair and avoiding injury to the dentate line<br><br>• With indirect supervision, performs an open rectal biopsy when a suction rectal biopsy is nondiagnostic or not possible and verbalizes complications of the procedure<br><br>• With indirect supervision, discusses intraop biopsy/specimen findings with the pathologist<br><br>• With indirect supervision, recognizes a patient with long-segment HD while performing a leveling biopsy and identifies the need for proximal diversion<br><br>• With indirect supervision, considers HD in a patient undergoing diversion after presenting with an acute abdomen (cecal or appendiceal perforation) and performs the appropriate workup (rectal biopsy) | obstructive symptoms and delineates a comprehensive treatment plan for short-term complications<br><br>• With indirect supervision, identifies the rationale for long-term multidisciplinary management and occasionally participates in this management (participation in clinic, discussion of follow-up care with the primary surgical attending) |
| 4<br><br>**Framework:** | • Independently performs a targeted H&P and promptly identifies the diagnostic workup and surgical management for a complex patient with HD presenting with | • Independently prepares and positions the patient depending on the HD surgical intervention to be performed | • Independently communicates a comprehensive postop plan to the family of a complex patient and other health care team members, including |

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# Evaluation & Management of a Patient with Hirschsprung Disease

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| The learner has a strong and indepth understanding of surgical options and techniques<br><br>Entrustment:<br><br>Can perform the operation/task independently in complicated cases<br><br>or<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | an acute abdomen, trisomy 21, ELBW, or a delayed presentation<br><br>• Independently performs a suction rectal biopsy in a patient with suspected HD and interprets and articulates pathologic findings<br><br>• Independently identifies a patient in need of rectal irrigations, including one presenting with HAEC, promptly institutes management, and provides comprehensive parental education on their performance<br><br>• Independently identifies uncommon fluoroscopic imaging findings that might suggest total colonic disease (e.g., microcolon, normal-appearing colon)<br><br>• Independently and in a respectful and culturally sensitive manner, discusses the proposed operative plan with the family and uses shared decision-making to ensure a personalized plan of care that aligns with the family's values, goals, and preferences | • Independently performs the pull-through procedure (open or lap-assisted)<br><br>• Independently recognizes HD transition zone pathophysiology and implications of a transition zone pull-through<br><br>• Independently articulates surgical options and general principles such as identification of the transition zone, preservation of the blood supply of the proximal intestine, and the importance of tension-free repair and avoiding injury to the dentate line<br><br>• Independently performs an open rectal biopsy when a suction rectal biopsy is nondiagnostic or not possible and verbalizes complications of the procedure<br><br>• Independently communicates with the pathologist before the procedure, intraoperatively, and postoperatively regarding specimen findings<br><br>• Independently, recognizes a patient with long- segment HD while performing a leveling biopsies, and identifies the need for proximal diversion.<br><br>• Independently considers HD in a patient undergoing diversion after presenting with an acute abdomen (i.e., cecal or | short- and long-term complications/goals of care<br><br>• Independently recognizes the short- and long-term complications of a pull-through procedure such as HAEC, anastomotic stricture, cuff abscess, soiling/incontinence, and obstructive symptoms as well as unique concerns in a patient with total colonic aganglionosis and delineates a comprehensive treatment plan for short- and long-term complications<br><br>• Independently identifies the rationale for long-term multidisciplinary management and frequently participates in this management (participation in clinic, discussion of follow-up care with the primary surgical attending) |

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# Evaluation & Management of a Patient with Hirschsprung Disease

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | | appendiceal perforation) and performs the appropriate workup (i.e., rectal biopsy). | |

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# Evaluation and Management of an Infant with an Inguinal Hernia

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| **Description of the Activity** | Pediatric surgeons are frequently called upon to evaluate an infant with a groin mass, scrotal swelling, or other symptoms of an inguinal hernia or hydrocele. The pediatric surgeon must be able to evaluate and manage these infants in the outpatient or elective settings as well as those who present in the emergency department or neonatal intensive care unit with urgent or emergent conditions. |
| **Functions** | ❖ Nonoperative/Preoperative<br>➢ Synthesize information from a patient's referring providers, medical records, history, physical examination, and diagnostic evaluations to develop a differential diagnosis.<br>➢ Determine whether surgery is indicated and the optimal timing for intervention.<br>➢ Recognize complications of an inguinal hernia that require an emergency operation.<br>➢ Select a safe anesthetic and surgical approach that is consistent with the patient's diagnosis, corrected gestational age, and comorbidities.<br>➢ Obtain appropriate preoperative consultation with the anesthesia, cardiology, neonatology, or other teams as dictated by the infant's comorbidities.<br>➢ Synthesize an operative plan that demonstrates understanding of the operative anatomy, physiology, indications, contraindications, risks, benefits, alternatives, and potential complications of:<br>▪ Communicating hydrocele<br>▪ Femoral hernia<br>▪ Inguinal hernia<br>▪ Recurrent inguinal hernia<br>• Obtain informed consent with cultural humility, describing the indications, risks, benefits, alternative therapies, and potential complications of the planned procedure to the family/caregiver(s).<br>➢ If necessary, identify the appropriate substitute decision-maker or caregiver, and ensure caregiver comprehension using applicable language services and audio/visual aids as required.<br>➢ Ensure that the family/caregiver has an opportunity to ask questions, and address any expressed concerns.<br>➢ Document the consent process.<br>❖ Intraoperative<br>➢ Manage the perioperative environment, including room setup, equipment check, preprocedural time-out, counts, wound classification, and debriefing functions.<br>➢ Perform the procedures required to manage an infant with an inguinal hernia:<br>▪ Position the patient, and ensure availability of relevant equipment, including laparoscopic equipment if applicable.<br>▪ Ask for the correct instruments and sutures. |

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# Evaluation and Management of an Infant with an Inguinal Hernia

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| | ▪ Visualize tissue planes, and identify and dissect relevant normal and abnormal anatomy.<br>▪ Perform operative steps efficiently.<br>➢ Integrate new information discovered intraoperatively to modify the surgical plan or technique in patients with:<br>▪ Concomitant cryptorchidism<br>▪ Femoral hernia<br>▪ Hernia containing nonviable bowel<br>▪ Need for laparotomy or laparoscopy<br>▪ No hernia sac identified<br>▪ No vas deferens<br>▪ Sliding inguinal hernia<br>▪ Unexpected gonads<br>➢ Recognize and manage intraoperative complications (eg, transection of vas deferens, intraoperative bleeding, tear or loss of control of sac).<br>➢ Work with the anesthesia and nursing teams and other perioperative health care professionals to create and maintain an intraoperative environment that promotes patient-centered care.<br><br>❖ Postoperative<br><br>➢ Initiate and oversee postoperative care, including postoperative disposition and the possible need for apnea monitoring.<br>➢ Communicate with the family/caregiver(s) and members of the health care team to ensure an understanding of the postprocedure instructions.<br>➢ Recognize and manage common complications following inguinal hernia repair in an infant:<br>▪ Damage to vas deferens<br>▪ Hematoma<br>▪ Hernia recurrence<br>▪ Seroma/reactive hydrocele<br>▪ Testicular ischemia |
| **Scope** | ❖ In scope<br><br>• Diagnoses<br>○ Direct inguinal hernia<br>○ Indirect inguinal hernia<br>○ Recurrent inguinal hernia<br>○ Sliding hernia<br>○ Femoral hernia<br>○ Communicating hydrocele |

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# Evaluation and Management of an Infant with an Inguinal Hernia

- Procedures
  - Femoral hernia repair
  - Laparoscopic inguinal hernia repair
  - Open high ligation
  - Tissue repair

- Special populations
  - Patients with preterm (< 36 weeks gestational age) incarcerated inguinal hernia

❖ Out of scope

- Diagnoses/procedures
  - Umbilical hernia
  - Ventral hernia
  - Spigelian hernia
  - Incisional hernia

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# Evaluation & Management of an Infant with an Inguinal Hernia

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| **1**<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br><br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br><br>The attending will show and tell or the learner acts as first assistant. | • With active guidance, performs a focused H&P, reviews diagnostic reports, and develops a differential that includes both medical and surgical problems for a patient presenting with a groin lump<br><br>• Recognizes an incarcerated inguinal hernia<br><br>• With active guidance, reduces an incarcerated hernia<br><br>• Demonstrates understanding of the basic anatomy of the inguinal canal and limited knowledge of the embryology of a patent processus vaginalis<br><br>• Needs assistance to identify the timing of premature infant inguinal hernia repair<br><br>• Discusses the diagnosis of inguinal hernia with the patient's family and answers basic questions but requires active assistance to obtain informed consent | • With active assistance, performs basic steps of infant indirect inguinal hernia repair, including identification of the sac, vessels, and vas deferens and high ligation<br><br>• With active guidance, performs infant inguinal hernia repair in the setting of prematurity or , recurrent, incarcerated, or sliding hernias<br><br>• With active assistance, recognizes unexpected intraop complications, including injury to the sac, vas deferens, testicle, or testicular vessels | • With active guidance, coordinates a plan to monitor for postop complications such as apnea, hydrocele, hematoma, and recurrence<br><br>• With active guidance, discusses surgery findings and answers a family's basic questions about short- and long-term postop care |
| **2**<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not | • With direct supervision, performs a focused H&P, reviews diagnostic reports, and develops a differential that includes both medical and surgical problems for a patient with a groin lump<br><br>• With direct supervision, distinguishes an inguinal hernia, hydrocele, and incarcerated inguinal hernia | • With direct supervision, performs basic steps of infant indirect inguinal hernia repair, including identification of the sac, vessels, and vas deferens and high ligation<br><br>• With direct supervision, performs infant inguinal hernia repair in the setting of prematurity or recurrent, incarcerated, or sliding hernias | • With direct supervision, identifies postop complications such as apnea, reactive hydrocele, hematoma, and recurrence (PC9 L2)<br><br>• With direct supervision, discusses surgery findings and answers a family's questions about short- and long-term postop care (ICS1 L2) |

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# Evaluation & Management of an Infant with an Inguinal Hernia

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| know the nuances of a basic case<br><br>Entrustment:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br><br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | • With direct supervision, reduces an incarcerated hernia and initiates surgical management<br><br>• Describes the surgical anatomy of the inguinal canal and demonstrates knowledge of the embryology of a patent processus vaginalis leading to inguinal hernia/hydrocele<br><br>• Identifies the timing of premature infant inguinal hernia repair to minimize anesthetic-related complications<br><br>• Conducts all the elements of an informed consent process for a patient with an uncomplicated inguinal hernia and documents the process with direct supervision | • With direct supervision, recognizes unexpected intraop complications, including injury to the sac, vas deferens, testicle, or testicular vessels | |
| **3**<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>Entrustment:<br><br>The learner can perform the operation/task | • With indirect supervision, performs a focused H&P, reviews diagnostic reports, and develops a differential that includes both medical and surgical problems<br><br>• With indirect supervision distinguishes an inguinal hernia, hydrocele, and incarcerated inguinal hernia<br><br>• With indirect supervision reduces an incarcerated hernia and initiates surgical management<br><br>• Describes the anatomy of the inguinal canal including anatomic variations and demonstrates knowledge of the | • Performs an indirect inguinal hernia repair in an infant, including identification of the sac, vessels, and vas deferens and high ligation<br><br>• With indirect supervision, performs infant inguinal hernia repair in the setting of prematurity or recurrent, incarcerated, or sliding hernias.<br><br>• With indirect supervision, recognizes and manages unexpected intraop complications, including injury to the sac, vas deferens, testicle, or testicular vessels | • With indirect supervision, identifies postop complications such as apnea, reactive hydrocele, hematoma, and recurrence and initiates management (PC9 L3)<br><br>• With indirect supervision, discusses surgery findings and answers a family's questions about short- and long-term postop care (ICS1 L3) |

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# Evaluation & Management of an Infant with an Inguinal Hernia

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| independently in the uncomplicated patient<br><br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | embryology of a patent processus vaginalis leading to inguinal hernia/hydrocele<br><br>• Identifies the timing of infant inguinal hernia repair and considerations for management of concomitant cryptorchidism<br><br>• Conducts all the elements of an informed consent process for a patient with an uncomplicated inguinal hernia with indirect supervision and documents the process | | |
| **4**<br><br>**<u>Framework</u>:**<br><br>The learner has a strong and indepth understanding of surgical options and techniques<br><br><u>Entrustment</u>:<br><br>Can perform the operation/task independently in complicated cases<br><br>or<br><br>The attending may need to provide indirect supervision or suggestions in the | • Independently performs a focused H&P, reviews diagnostic imaging, and determines the need for additional workup or optimization for a neonate presenting with an incarcerated inguinal hernia<br><br>• Independently distinguishes an inguinal hernia, hydrocele, and incarcerated inguinal hernia<br><br>• Independently reduces an incarcerated inguinal hernia and initiates surgical management<br><br>• Independently predicts the anatomic variations associated with complex hernias, which may include incarcerated, sliding, and recurrent hernias or those associated with abdominal wall defects<br><br>• Independently plans the operative approach for an infant with a hernia and | • Independently identifies a missing vas deferens or aberrant gonadal anatomy during hernia repair and manages with appropriate consultation if indicated<br><br>• Independently performs infant inguinal hernia repair in the setting of prematurity or recurrent, incarcerated, or sliding hernias (<br><br>• Independently performs an indirect inguinal hernia repair in a premature infant and recognizes and manages unexpected intraop complications, including injury to the sac, vas deferens, testicle, or testicular vessels | • Independently assesses for and manages postop complications following repair of a neonatal hernia requiring bowel resection or orchidopexy<br><br>• Independently discusses possible long-term outcomes of complex hernia repair with a patient's family, including gonadal atrophy, recurrence, or intestinal stricture |

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# Evaluation & Management of an Infant with an Inguinal Hernia

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| context of extremely rare or severely complicated cases | coincidental cryptorchidism, taking into account corrected gestational age; uses current evidence to decide the timing of inguinal hernia repair in a premature infant<br><br>• Independently discusses the diagnosis and obtains informed consent with the patient's family, using shared decision-making to address potential contralateral hernia identification (eg, laparoscopic evaluation, contralateral exploration) | | |

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# Evaluation and Management of a Patient with a Neonatal Intestinal Condition (Atresia, Meconium Ileus)

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| **Description of the Activity** | Neonatal intestinal conditions (eg, atresia, meconial disease) are a set of conditions occasionally encountered by pediatric surgeons in a semi-elective setting among the in-house, newborn patient population. Surgeons must be able to identify and treat the spectrum of neonatal conditions presenting as intestinal obstruction and determine the appropriate plan of care for pre- and postnatal presentations. |
| **Functions** | ❖ Nonoperative/Preoperative<br>➢ Synthesize essential information from the patient's records, history, physical examination, and initial diagnostic evaluations to develop a differential diagnosis.<br>➢ Complete a cost-effective, evidence-based diagnostic evaluation of the fetus.<br>➢ Communicate the diagnosis and potential care options to the family and consultants, including the nuances of the varied potential diagnoses, their possible/related comorbidities, and expected health outcomes. Ensure family understanding.<br>➢ Complete a cost-effective, evidence-based diagnostic evaluation. Identify causes for lack of diagnostic specificity in patient evaluation and prioritize further diagnostic evaluation or surgical intervention based on the conditions' risk of morbidity/mortality.<br>➢ Communicate the diagnosis (or differential diagnosis) and potential treatment options to the family and consultants.<br>➢ Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities (eg, genetic anomaly, cardiac anomaly), and ensure family understanding.<br>➢ Identify adjunct procedures that may be employed in the operative management of the condition, and ensure family understanding of the potential need for adjunct procedures and the need for unforeseen interventions, including:<br>▪ Identification of multiple intestinal conditions (eg, atresia, malrotation)<br>▪ Intestinal lengthening procedures<br>▪ Tapering enteroplasty<br>▪ Temporary decompressive ostomy (eg, Bishop-Koop, Santulli)<br>▪ Tunneled central line placement<br>❖ Intraoperative<br>➢ Perform the procedures required to manage a neonatal intestinal obstruction.<br>➢ Systematically identify the location of the intestinal obstruction among the varied segments of intestine.<br>➢ Assess the intestine for concurrent obstructive processes and possible treatment, such as operative irrigation.<br>➢ Assess the intestinal tract for anatomic anomalies in need of definitive surgical intervention, such as malrotation.<br>➢ Recognize indications for a concurrent need for intestinal lengthening procedures versus tapering enteroplasty to optimize intestinal function.<br>➢ Recognize indications for concurrent placement of tunneled central venous access or a gastrostomy device. |

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# Evaluation and Management of a Patient with a Neonatal Intestinal Condition (Atresia, Meconium Ileus)

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| | ➢ Recognize and develop a management plan to address unexpected intraoperative findings, such as an anterior portal vein, extreme intestinal loss, multiple atresia segments (type 4 atresia), and meconium cystic peritonitis.<br><br>❖ Postoperative<br>➢ Provide postoperative management for a patient with neonatal intestinal conditions, including:<br>▪ Routine postoperative, immediate, and follow-up care<br>▪ Management of supplemental parenteral nutrition<br>▪ Communication with the family to ensure understanding of care and instructions<br>▪ Recognition of early and late complications related to neonatal intestinal conditions, such as:<br>● Anastomotic stricture<br>● Bowel obstruction<br>● Intestinal dysmotility<br>● Malabsorption |
| **Scope** | ❖ In scope<br><br>• Diagnoses<br>▪ Colon atresia<br>▪ Duodenal atresia<br>▪ Meconium ileus<br>▪ Meconium plug<br>▪ Neonatal bowel obstruction<br>▪ Small bowel atresia<br>▪ Small left colon<br><br>• Procedures<br>▪ Duodenoduodenostomy<br>▪ Neonatal laparotomy<br>▪ Operative irrigation<br>▪ Tapering enteroplasty<br>▪ Various stoma configurations (eg, Bishop-Koop, Santulli)<br><br>• Special populations<br>▪ Cystic fibrosis<br>▪ Trisomy 21 |

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# Evaluation and Management of a Patient with a Neonatal Intestinal Condition (Atresia, Meconium Ileus)

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| | ❖ Out of scope<br><br>• Diagnoses/procedures<br>▪ Acute necrotizing enterocolitis (covered in a separate EPA)<br>▪ Anorectal malformation (covered in a separate EPA)<br>▪ Duplication cyst<br>▪ Hirschsprung disease (covered in a separate EPA)<br>▪ Malrotation and volvulus (covered in a separate EPA)<br>▪ Omphalomesenteric duct<br>▪ Appendicitis<br>▪ Premature intestinal dysfunction |

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# Evaluation & Management of a Patient with a Neonatal Intestinal Condition (Atresia, Meconium Ileus)

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| 1<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br><br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br><br>The attending will show and tell or the learner acts as first assistant. | • With active assistance, performs a focused H&P, reviews diagnostic reports, and comes up with a differential for an uncomplicated patient that includes both medical and surgical problems; creates a diagnostic treatment plan that includes nonoperative strategies<br><br>• Introduces self and the medical team, acknowledges all parties present, and engages them in a health care discussion; identifies communication issues or the need for a trained interpreter with non–English-speaking patients<br><br>• Receives consult requests and interacts with consultants in a polite manner; recognizes if there is need to improve communication style with the patient's family and the care team | • With active guidance, moves through critical portions of the procedure or serves as first assistant in critical portions of the procedure<br><br>• Requires active guidance in handling delicate neonatal tissue<br><br>• Describes the basic anatomic considerations for the atresia process and the impact on incision placement and planned operative exposure | • With active guidance, describes the strategy and macronutrient composition of parenteral nutrition needed for caloric support<br><br>• With direct assistance, manages the postop course, postop complications, and associated comorbid conditions (intestinal dysmotility, malabsorption) of a neonatal patient with an intestinal condition<br><br>• With active guidance, communicates intraoperative findings and interventions to the health care team and consulting services, while clearly defining important considerations of postoperative surgical care from a surgical standpoint. |
| 2<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not | • With passive assistance, integrates the H&P of an uncomplicated patient with personal interpretation of radiologic studies to determine a focused differential and a diagnostic treatment plan<br><br>• Communicates the differential diagnosis and operative plan to the family, confirming the patient's and family's understanding of clinical disease | • With direct supervision, performs all steps of an abdominal exploration, identifies all areas of obstruction/atresia for a common presentation of atresia<br><br>• Demonstrates adequate identification of tissue planes and dissects relevant common anatomy with direct supervision; adequately but | • With direct supervision, recognizes the need for parenteral nutrition in postop management and associated vascular access<br><br>• With indirect assistance, manages the postop course, postop complications, and associated comorbid conditions (intestinal dysmotility, malabsorption) |

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# Evaluation & Management of a Patient with a Neonatal Intestinal Condition (Atresia, Meconium Ileus)

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| know the nuances of a basic case<br><br>Entrustment:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br><br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | • Clearly communicates perioperative goals of care with the health care team and consulting services | inconsistently handles neonatal tissues delicately<br><br>• Demonstrates understanding of anatomic variations of intestinal atresia or types of presentations for meconium ileus, including additional atresias or downstream obstruction; with direct supervision, directs operative care to address common presentations of atresia/meconium ileus | of a neonatal patient with intestinal condition<br><br>• Clearly communicates intraop findings and interventions to the health care team and consulting services while clearly defining important considerations of postoperative surgical care |
| **3**<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>Entrustment: | • With passive assistance, integrates the H&P of a complicated patient with personal interpretation of radiologic studies to determine a focused differential and a diagnostic treatment plan that includes nonoperative strategies<br><br>• Engages the patient and family in shared decision-making in a circumstance of a common condition or comorbidity<br><br>• Promotes an open dialogue and a common understanding of perioperative goals in | • With indirect supervision, performs all steps of an abdominal exploration, identifies all areas of obstruction/atresia, and refines the operative approach based on intraop findings or associated conditions for a common presentation<br><br>• Visualizes tissue planes and dissects relevant abnormal anatomy with indirect supervision and consistently handles neonatal tissues delicately<br><br>• With indirect supervision, addresses a case of significant intestinal loss with | • With passive assistance, manages/supervises parenteral nutrition for medical support of a patient<br><br>• Independently manages the postop course and postop complications of an uncomplicated neonatal patient with an intestinal conditions including associated comorbid conditions (intestinal dysmotility, malabsorption) but requires passive assistance for a complicated patient with a neonatal intestinal condition |

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# Evaluation & Management of a Patient with a Neonatal Intestinal Condition (Atresia, Meconium Ileus)

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| The learner can perform the operation/task independently in the uncomplicated patient<br><br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | care among the health care team and consultative services | awareness of the need to preserve intestinal length, for central line placement, for an intestinal lengthening procedure, or for gastrostomy placement | • Promotes an open dialogue and a common understanding of goals in postoperative care among members of the health care team and consultative services |
| **4**<br><br>**Framework:**<br><br>The learner has a strong and indepth understanding of surgical options and techniques<br><br>Entrustment:<br><br>Can perform the operation/task independently in complicated cases<br><br>**or** | • Independently integrates the H&P of a complicated patient with personal interpretation of radiologic studies to determine a focused differential and a diagnostic treatment plan that includes non-operative strategies<br><br>• Engages in shared decision-making with the family of a complicated patient to determine options for a personalized plan of clinical care, such as a case with aspects of futile care or a complex issue such as short gut syndrome,<br><br>• Elicits and incorporates input from the health care team and consultants to optimize peri-operative patient care with appropriate interprofessional | • Independently performs all steps of an abdominal exploration, identifies all areas of blockage/atresia, and refines the operative approach based on intraop findings or associated conditions for a complex presentation<br><br>• Independently constructs intestinal anastomosis, considering relevant abnormal anatomy of the patient with complicated atresia, including appropriate tissue handling and use of tapering enteroplasty<br><br>• Independently addresses a case of significant intestinal loss with an understanding of the need to preserve intestinal length, for central line | • Independently manages/supervises parenteral nutrition for medical support of a patient<br><br>• Independently manages the postop course and postop complications of a complicated neonatal patient with an intestinal conditions including associated comorbid conditions (intestinal dysmotility, malabsorption)<br><br>• Elicits and incorporates input from the health care team and consultants to optimize postoperative patient care with appropriate interprofessional communication, addressing differences in opinion |

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# Evaluation & Management of a Patient with a Neonatal Intestinal Condition (Atresia, Meconium Ileus)

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | communication, addressing differences in opinions on care | placement, for an intestinal lengthening procedure, or for gastrostomy placement | |

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# Evaluating and Managing a Patient with Other Oncological Conditions

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| **Description of the Activity** | "Other oncological conditions" is a heterogeneous group of rare malignant tumors that pediatric surgeons may encounter, consisting of lymphoma; sacrococcygeal teratoma (SCT) and other teratomas; chest wall lesions such as Ewing sarcoma, osteosarcoma, and primitive neuroectodermal tumor (PNET); solid or cystic ovarian masses; testicular masses; and metastases to the lung and liver. Hepatoblastomas, mediastinal masses, and sarcomas are other rare diagnoses included in this group. Each of these tumors is treated differently regarding workup and surgical treatment. All pediatric patients with oncological masses need to be treated by a multidisciplinary team that may include clinicians in pediatric surgery, radiation oncology, pathology, interventional radiology, and pediatric oncology. The treatment details of every patient are discussed at a tumor board, with all specialties participating in the care of the patient, depending on the type and location of the tumor. For most pediatric malignant conditions, national protocols are available for treatment, surgery, and follow-up that follow the best available evidence. Optimal assessment, management, and intervention are needed to provide an ideal long-term outcome for the patient. |
| **Functions** | ❖ Nonoperative/Preoperative<br>➢ Obtain a history and physical exam, including prenatal history, family history, and comorbid conditions that portend an increased risk of malignancy.<br>➢ Order initial or advanced imaging.<br>➢ Perform a basic or advanced laboratory workup.<br>➢ Determine if an upfront biopsy should be obtained for diagnosis.<br>➢ Obtain appropriate consults on suspicion of malignancy (oncology).<br>➢ Communicate the clinical workup evaluation and expectations to other health care providers and parents.<br>➢ Discuss the operative plan with parents and consultants.<br>➢ Consider the safety of the surgical plan and alternatives (e.g., lymphoma with a large mediastinal mass and significant airway obstruction).<br>➢ Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.<br>➢ Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.<br><br>❖ Intraoperative<br>➢ Follow oncological principles when performing a tumor biopsy.<br>➢ Choose the biopsy site and approach: laparoscopic, open, or interventional radiology (fine-needle aspiration, core needle biopsy, image-guided biopsy).<br>➢ Obtain adequate tissue sampling in communication with a pathologist.<br>➢ Handle and process the tissue sample with care, obtaining special stains, molecular testing, and genetic analysis when indicated.<br>➢ Minimize complications. |

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# Evaluating and Managing a Patient with Other Oncological Conditions

- Perform ovarian tumor surgery.
- Decide on a laparoscopic versus an open approach.
- If the mass is cystic, avoid contamination and spillage.
- Decide on the feasibility of an ovarian-sparing procedure (e.g., teratoma).
- Decide on the necessity of additional initial ovarian tumor procedures, such as an additional ovarian biopsy, peritoneal sampling, omentectomy, or resection of a fallopian tube.
- Decide on whether the patient is indicated for a testicular biopsy or an orchiectomy.
- Perform inguinal or retroperitoneal lymph node dissection, recognizing the extent of nodal resection.
- Perform SCT excision.
- Choose a surgical approach depending on the type of SCT (laparoscopic vs open abdominoperineal vs perineal).
- For a type 1 SCT, perform surgery via a perineal approach, detecting and sparing the anus, rectum, and gluteal muscles, preserving the cosmesis of the buttocks, and recognizing the importance of the coccyx and middle sacral artery.
- Perform liver resection.
- Review cross-sectional imaging to plan a liver resection, determining whether the tumor is resectable or if the patient needs a transplant. Articulate the criteria for resectable and nonresectable lesions.
- Recognize the need to transfer the patient to a liver transplant center with high-end options for resection or transplant.
- Identify the special anatomy of the liver for standard resections.
- Identify the steps of standard liver resections (nonanatomic wedge, segmentectomy, left and right lobectomy, trisegmentectomy).
- Plan the technical steps of a liver resection and which instruments to use, including staplers, cautery, and electrosurgical devices (LigaSure, Aquamantys, Erbe).

❖ Postoperative

- Plan for ICU management if needed.
- Recognize the patient's risk for bleeding, and detect a bleed if it occurs.
- Monitor the patient's phosphorous and magnesium levels following an extensive resection.
- Observe for wound infections.
- Discuss next steps with the patient's family and consultants.
- Construct a timeline for pathology.
- Articulate commonly used adjuvant therapies and their risks (eg, cisplatin and ototoxicity).
- Identify long-term outcomes.
- Discuss possible next treatment steps as well as surgical steps.
- Present the case at a multispecialty tumor board to discuss treatment, possible additional operations (final resection), and implications and long-term prognosis.
- Discuss follow-up plans with the family and health care team members.

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# Evaluating and Managing a Patient with Other Oncological Conditions

## Sope

- In scope
  - Diagnoses
    - Chest wall lesion (PNET, osteosarcoma)
    - Germ cell tumor
    - Lung or liver tumor
    - Lymphoma
    - Metastasis
    - Ovarian mass (solid/cystic)
    - SCT
    - Teratoma
    - Testicular mass
  - Procedures
    - Biopsy (oncological principles)
    - Liver resection
    - Oophorectomy and ovarian-sparing surgery
    - SCT excision
    - Testicular biopsy/removal
  - Special populations
    - Anterior mediastinal mass
    - Fertility preservation
    - Hereditary oncologic conditions
  - Special skills
    - Communication (“the non-urgent difficult conversation”)
    - Multidisciplinary care (tumor board)
    - Palliative decision-making
- Out of scope
  - Diagnoses/procedures
    - Wilms tumor/neuroblastoma (covered in a separate EPA)
    - Breast lesion/melanoma sentinel lymph node biopsy

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# Evaluation & Management of a Patient with Other Oncological Conditions

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| **1**<br><br>Framework:<br>The learner demonstrates understanding of information and has basic skills<br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br>The attending will show and tell or the learner acts as first assistant. | • With active guidance, performs a detailed H&P for a patient with a suspected oncological condition or mass, including prenatal history, family history, comorbid conditions, and anatomic locations that portend increased risk of malignancy<br><br>• With active guidance, recognizes the need for an oncological condition to be evaluated and treated within a multidisciplinary team (tumor board)<br><br>• With active guidance, organizes an operative plan across the spectrum of rare malignancies, including proper selection of studies in the preop period, optimal surgical approach, and preparation of postop care if needed<br><br>• With active assistance, communicates basic facts about findings such as initial imaging to the family and the interprofessional care team<br><br>• With active assistance, describes treatment options, including surgical options, and recognizes potentially dangerous findings (e.g., compression of the airway in a case of mediastinal mass) | • With active guidance, performs surgical positioning and preparation of the patient, including the availability of blood products<br><br>• Demonstrates basic knowledge of oncological principles of straight-forward tumor biopsy or resection, including choice of biopsy site and approach (lap vs. open vs. IR), adequate tissue sampling, avoidance of tumor rupture, and surgical approach<br><br>• With active guidance, describes the essential steps of basic tumor operations<br><br>• With active guidance, performs critical portions of basic tumor resections<br><br>• With active guidance, identifies intraop complications for basic tumor operations<br><br>• Acts as first assistant for critical portions of rare or very complex oncologic operations | • With active guidance, recognizes and manages a general postop problem, demonstrating a basic understanding of oncological-specific complications (e.g., recurrence, metastasis)<br><br>• With active guidance, identifies the rationale for a long-term management plan, including follow-up and imaging depending on patient staging<br><br>• With direct supervision, manages a patient's postop course following tumor resection, including implementation of an effective pain-control strategy<br><br>• With direct supervision, communicates basic aspects of the operative procedure, expected outcomes, and subsequent postoperative surgical plan to the family and the interprofessional team<br><br>• Demonstrates basic knowledge of neoadjuvant or adjuvant therapies for more common tumors |
| **2**<br><br>**Framework:**<br>The learner demonstrates understanding of the steps of the operation but | • With direct supervision, performs a detailed H&P for a patient with a suspected oncological condition or mass, including prenatal history, family history, comorbid | • With indirect supervision, performs surgical positioning and preparation of a patient with a complex or rare tumor, including the availability of blood products | • With indirect supervision, recognizes and manages a general postoperative problem, demonstrating basic understanding of oncological-specific |

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# Evaluation & Management of a Patient with Other Oncological Conditions

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| requires direction through principles and does not know the nuances of a basic case<br><br>**Entrustment:**<br>The learner can use the tools but may not know exactly what, where, or how to do it.<br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | conditions, and anatomic locations that portend increased risk of malignancy<br><br>• With direct supervision, recognizes the need for an oncological condition to be evaluated and treated within a multidisciplinary team (tumor board)<br><br>• With direct supervision, organizes an operative plan across the spectrum of rare malignancies, including proper selection of studies in the preop period, optimal surgical approach, and preparation of postop care if needed<br><br>• With passive assistance, communicates basic facts about findings such as initial imaging to the family and interprofessional care team<br><br>• With passive assistance, describes treatment options, including surgical options, and recognizes potentially dangerous findings (eg, compression of airway in a case of mediastinal mass) | • Demonstrates thorough knowledge of and describes oncological principles of straight-forward tumor biopsy or resection, including choice of biopsy site and approach (lap vs open vs IR), adequate tissue sampling, avoidance of tumor rupture, and surgical approach<br><br>• Describes essential steps of complex oncologic operations, and, with direct supervision organizes an operative plan across the spectrum of rare malignancies, and recognizes the need for surgical assistance from other disciplines (e.g., cardiac surgery, neurosurgery, urology)<br><br>• With indirect supervision, performs critical portions of basic tumor resections<br><br>• With direct supervision, recognizes, manages, anticipates, and prevents unexpected intraop findings and complications and implements modifications to the operative plan in real time, which may include intravascular extension of a tumor, bilateral adnexal involvement, or intraop hemorrhage<br><br>• With direct supervision, performs critical portions of rare or very complex oncologic operations and implements modifications to the operative plan as appropriate | complications (eg, recurrence, metastasis)<br><br>• With direct supervision, identifies the rationale for a long-term management plan of a basic tumor, including follow-up and imaging depending on patient staging<br><br>• With indirect supervision, manages a patient's postop course following tumor resection, including implementation of an effective pain-control strategy<br><br>• With indirect supervision, communicates basic aspects of the operative procedure, expected outcomes, and subsequent postoperative surgical plan to the family and the interprofessional team<br><br>• Demonstrates understanding of and describes neoadjuvant or adjuvant therapies for common tumors |

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# Evaluation & Management of a Patient with Other Oncological Conditions

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| **3**<br><br>**Framework:**<br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>**Entrustment:**<br>The learner can perform the operation/task independently in the uncomplicated patient<br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | • With indirect supervision, assesses and performs a comprehensive H&P, interprets diagnostic images, reviews reports, and initiates an individualized initial surgical management plan across the spectrum of rare oncological conditions<br><br>• With indirect supervision, participates in multidisciplinary meetings (tumor board) and workup and communicates to appropriate consultants<br><br>• With indirect supervision, assesses and organizes an operative plan across the spectrum of rare and complex malignancies, including proper selection of studies in the preop period, optimal surgical approach, and preparation of postop care if needed<br><br>• With indirect supervision, conducts meetings with the family and the oncological care team to define expectations and goals of care for a pediatric surgical oncology patient, which may include informed consent for a surgical procedure<br><br>• With indirect supervision, recognizes limitations and discusses additional resources required for the care of rare and complex conditions (eg, liver transplant/HIPEC center) | • With indirect supervision, performs surgical positioning and preparation of a patient with a complex or rare tumor, including the availability of blood products<br><br>• Demonstrates knowledge of oncological principles of complex tumor biopsy or resection, including choice of biopsy site and approach (lap vs open vs IR), adequate tissue sampling, avoidance of tumor rupture, and surgical approach<br><br>• Thoroughly describes the steps of complex oncologic operations and, with indirect supervision organizes an operative plan across the spectrum of rare malignancies, and recognizes the need for surgical assistance from other disciplines (e.g., cardiac surgery, neurosurgery, urology)<br><br>• Independently performs critical portions of basic tumor resections; requires indirect supervision for complex resections<br><br>• With indirect supervision, recognizes, manages, anticipates, and prevents unexpected intraop findings and complications and implements modifications to the operative plan in real time, which may include intravascular extension of a tumor, bilateral adnexal involvement, or intraop hemorrhage | • With indirect supervision, recognizes and manages a general postop problem, demonstrating advanced understanding of oncological-specific complications (eg, recurrence, metastasis)<br><br>• With indirect supervision, identifies the rationale for a long-term management plan of more complex or rare tumor, including follow-up and imaging depending on patient staging<br><br>• With indirect supervision, manages a patient's postop course following complex tumor resection, including implementation of an effective pain-control strategy<br><br>• With indirect supervision, communicates complex aspects of the operative procedure, expected outcomes, and subsequent postoperative surgical plan to the family and interprofessional team<br><br>• With indirect supervision, demonstrates advanced understanding of neoadjuvant or adjuvant therapies for tumors |

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# Evaluation & Management of a Patient with Other Oncological Conditions

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| | | • With indirect supervision performs critical portions of rare or very complex oncologic operations and implements modifications to the operative plan as appropriate | |
| **4**<br><br>**<u>Framework:</u>**<br><br>The learner has a strong and indepth understanding of surgical options and techniques.<br><br>**<u>Entrustment</u>:**<br><br>Can perform the operation/task independently in complicated cases<br><br>or<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently assesses and performs a comprehensive H&P, interprets diagnostic images, reviews reports, and initiates an individualized initial surgical management plan across the spectrum of rare oncological conditions<br><br>• Independently participates in multidisciplinary meetings (tumor board) and workup and communicates to appropriate consultants<br><br>• Independently assesses and organizes an operative plan across the spectrum of rare malignancies, including proper selection of studies in the preop period, optimal surgical approach, and preparation of postop care if needed<br><br>• Independently conducts meetings with the family and the oncological care team to define expectations and goals of care for an oncological pediatric surgical patient, which may include informed consent for a surgical procedure<br><br>• Independently recognizes limitations and discusses additional resources required for the care of a rare or complex condition (eg, liver transplant/HIPEC center) | • Independently performs surgical positioning and preparation of a patient with a complex or rare tumor, including the availability of blood products<br><br>• Demonstrates thorough knowledge of oncological principles of complex tumor biopsy or resection, including choice of biopsy site and approach (lap vs open vs IR), adequate tissue sampling, avoidance of tumor rupture, and surgical approach<br><br>• Demonstrates in-depth understanding of the operative approach for complex oncologic operations and independently organizes an operative plan across the spectrum of rare malignancies, considering the need for surgical assistance from other disciplines (e.g., cardiac surgery, neurosurgery, urology)<br><br>• Independently performs all steps of the operation and moves fluidly through the course of a complicated oncological procedure<br><br>• Independently recognizes, manages, anticipates, and prevents unexpected intraop findings and complications and implements modifications to the | • Independently implements a succinct strategy for postop complications such as bleeding, bile leak, chylous ascites, and missed or delayed bowel injury<br><br>• Independently identifies the rationale for a long-term management plan of more complex and or rare tumors, including follow-up and imaging depending on patient staging<br><br>• Independently manages the postop course of a complex oncological patient and directs strategy for pain management<br><br>• Independently articulates expectations and postoperative surgical plan, incorporating factors that portend positive and negative long-term outcomes with families and other providers<br><br>• Independently articulates the neoadjuvant and adjuvant therapies for rare pediatric tumors (eg, hepatoblastoma, germ cell tumors) |

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# Evaluation & Management of a Patient with Other Oncological Conditions

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| | | operative plan in real time, which may include intravascular extension of a tumor, bilateral adnexal involvement, or intraop hemorrhage<br><br>● Independently performs critical portions of rare or very complex oncologic operations and implements modifications to the operative plan as appropriate | |

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# Evaluation and Management of a Patient with Neuroblastoma or Wilms Tumor

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| **Description of the Activity** | Neuroblastoma and Wilms tumor are the most common intra-abdominal solid tumors in children. The pediatric surgeon needs to identify the child at risk for a malignant abdominal mass, initiate a timely workup, and participate in the surgical care of the patient in the context of the larger oncologic care strategy. |
| **Functions** | ❖ Nonoperative/Preoperative<br>➢ Neuroblastoma<br>▪ Perform prenatal counseling for a congenital adrenal mass, recognizing that the differential diagnosis includes adrenal hemorrhage, congenital neuroblastoma, and intra-abdominal extralobar sequestration and that postnatal investigations will include an abdominal ultrasound (US) and urine vanillylmandelic acid (VMA) and homovanillic acid (HVA) levels. Emphasize that it is safe to deliver at term and vaginally.<br>▪ Perform postnatal management of congenital neuroblastoma. Check catecholamines and abdominal US immediately. Discuss an imaging strategy when proceeding with observation. Discuss the criteria for operative treatment if the patient "fails" observation.<br>▪ Perform a focused abdominal US and obtain urine VMA and HVA levels at diagnosis and every 3 months for 12 months, and then at 18, 30, 42, 66, and 90 months.<br>▪ Terminate observation, and refer the patient for surgical resection if the volume of the mass increased by 50% compared with the initial US, if the metabolites increased by more than 50% of the initial baseline value, or if the tumor is still present at the end of the 90-week observation period.<br><br>❖ Preoperative<br>➢ Neuroblastoma<br>▪ Initiate diagnostic and staging workup, including laboratory tests (complete blood count, comprehensive metabolic panel, coagulation studies, VMA, HVA, ferritin), US, and cross-sectional imaging (computed tomography or magnetic resonance imaging).<br>▪ Include a bone marrow biopsy, metaiodobenzylguanidine (MIBG) scan, and bone scan in the workup when available.<br>▪ Understand the International Neuroblastoma Risk Group (INRG) classification system (L1, L2, M, MS) and the importance of image-defined risk factors (IDRFs). Determine resectability based on a review of imaging and stage.<br>▪ Recognize atypical presentations of neuroblastoma, including retro-orbital metastasis (raccoon eyes) and paraneoplastic syndromes such as diarrhea (vasoactive intestinal peptide [VIP]-secreting tumors) and opsoclonus myoclonus syndrome (OMS).<br>▪ Discuss the pros and cons of the 2 main approaches to biopsy: open and minimally invasive (MIS).<br>▪ Discuss the timing of and approach to surgery, recognizing that surgery may not be indicated initially.<br>▪ Recognize the importance of multidisciplinary care and the possible need for transfer to a higher level of care.<br>▪ Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.<br>▪ Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning. |

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# Evaluation and Management of a Patient with Neuroblastoma or Wilms Tumor

- Wilms tumor
  - Discuss how to stage a Wilms tumor.
  - Recognize that there is a local stage and a disease stage.
  - Verbalize the importance of recognizing preoperative tumor rupture, the role of preoperative biopsy, the need for bowel preparation, and avoiding intraoperative rupture.
  - Assess for vascular invasion into the renal vein and the inferior vena cava (IVC) using US, Doppler, echocardiography, magnetic resonance angiography, or a combination of these.
  - Recognize the presence of and risk factors for syndromic Wilms tumor, and consider nephron-sparing surgery (NSS) if feasible. Identify conditions that predispose to syndromic Wilms tumor, including patients with *WT1* deletions or mutations; **W**ilms tumor/**A**niridia/**G**enitourinary anomalies/**R**ange of developmental delays [WAGR]; Denys-Drash and Frasier syndromes; overgrowth syndromes such as Beckwith-Wiedemann syndrome (BWS); diffuse hyperplastic perilobar nephroblastomatosis (DHPLN); and syndromes associated with other chromosomal anomalies.
  - Discuss the role of neoadjuvant chemotherapy, local radiation, and whole lung radiation in stage III/IV disease.
  - Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.
  - Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.

- Intraoperative
  - Neuroblastoma
    - Discuss surgical approach and exposure, recognizing that MIS is safe for most L1 tumors. Open is standard and offers superior exposure, particularly for L2 tumors.
    - Identify key principles, including:
      - Obtain wide exposure and proximal and distal control of the aorta or encased vessels when possible.
      - Bivalve the tumor, and remove it piecemeal if indicated to dissect out encased vasculature.
      - Do not perform en bloc resection of other organs.
      - Subtotal resection is the goal but is not mandatory.
      - Do not dissect into the neural foramina.
      - Consider intraoperative nerve monitoring for cervical and pelvic tumors.
    - Perform a thoracoabdominal incision for large L2 tumors traversing the thorax and abdomen.
  - Wilms tumor
    - Obtain safe initial exposure, and identify anatomic distortion in large Wilms tumors.
    - Maintain the integrity of the kidney capsule, recognizing the importance of avoiding intraoperative rupture.
    - Spare the adrenal gland when able; remove the adrenal gland en bloc with an upper pole Wilms tumor.
    - Palpate the renal vein to assess for tumor thrombus; perform venotomy and intimal dissection to remove the tumor.

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# Evaluation and Management of a Patient with Neuroblastoma or Wilms Tumor

- Recognize that lymph node (LN) sampling is mandatory, with a minimum of 5 nodes:
  - Left side: aortocaval window, periaortic, left hilar
  - Right side: right hilar, pericaval, aortocaval window
- Discuss the indications for partial nephrectomy, including patients with bilateral Wilms tumors and those at risk for developing additional tumors in the future.

❖ Postoperative

➢ Neuroblastoma

- Anticipate, recognize, and treat potential complications based on the primary tumor site, including:
  - Abdomen: hypertension, chyle leak, diarrhea, small bowel obstruction (SBO), bowel ischemia, renal ischemia/atrophy, diaphragm injury
  - Cervical: brachial plexus injury, chyle leak
  - Pelvic/paraspinal: paralysis, retrograde ejaculation
  - Thorax: Horner syndrome, chyle leak, paralysis
- Demonstrate understanding of the importance of INRG risk stratification, tumor biology, segmental chromosomal abnormalities, and multimodal treatment strategies and their effect on oncologic outcome.
- Demonstrate understanding that neuroblastoma is unique in that biology is critical to staging, treatment, and prognosis. List common genetic aberrations and the effect of each on outcomes and novel treatments.

➢ Wilms tumor

- Anticipate, recognize, and treat potential complications, such as urine leak, intussusception, SBO, chyle leak, and renal failure.
- Recognize that tumor anaplasia and genetic aberrations, such as loss of heterozygosity at chromosome 1p and 16p and gain of function at 1q, have implications in terms of prognosis and risk groups.
- Describe risk-adjusted multimodal therapy and the potential of treatment de-escalation
  - Avoiding flank radiation if the tumor is completely resected and not ruptured,
  - Avoiding whole lung irradiation if there is a complete response to lung nodules in tumors with metastasis,
  - Decreasing the doxorubicin dose for patients with low-risk features.

## Scope

❖ In scope

- Diagnoses
  - Renal tumor
    - Clear cell tumor kidney
    - Mesoblastic nephroma
    - Rhabdoid tumor kidney
    - Wilms tumor

➢ Neuroblastoma

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# Evaluation and Management of a Patient with Neuroblastoma or Wilms Tumor

- Anatomic location: head/neck, chest, intra-abdominal, pelvic
- Ganglioneuroma, ganglioneuroblastoma

❖ Procedures:

- ➢ Biopsy for neuroblastoma
- ➢ Neuroblastoma resection and LN sampling
- ➢ Partial nephrectomy with LN dissection
- ➢ Thoracic exposure for neuroblastoma resection
- ➢ Unilateral radical nephroureterectomy with LN dissection

- Special populations
  - Patients with:
    - Bilateral Wilms tumor
    - Syndromic Wilms tumor, Denys-Drash syndrome, WAGR
    - Syndromic neuroblastoma, OMS, invading foramina with paralysis
    - Initial nonoperative treatment:
      - Patients with L2 neuroblastoma encircling vasculature
      - Newborn with an adrenal mass
      - Patients with Wilms tumor invading into the IVC

❖ Out of scope

- Diagnoses/procedures
  - ➢ Neurofibromatosis
  - ➢ Other adrenal tumors: adrenal cortical carcinoma, pheochromocytoma, adrenal hyperplasia, and adrenal hemorrhage
  - ➢ Other renal tumors

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# Evaluation and Management of a Patient with Neuroblastoma or Wilms Tumor

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| **1**<br><br>**Framework:**<br><br>The attending will show and tell or the learner acts as first assistant.<br><br>**Entrustment:**<br><br>The learner demonstrates understanding of information and has basic skills.<br><br>What a new pediatric surgery fellow should know. | • With active guidance, initiates the workup and staging of a patient with suspected neuroblastoma or Wilms tumor, including US, cross-sectional imaging (CT/MRI), and biochemical markers, and demonstrates basic knowledge of typical/pathognomonic findings<br><br>• With active guidance, verbalizes indications/contraindications for biopsy when working up a patient with suspected neuroblastoma or Wilms tumor<br><br>• With active guidance, reviews prenatal diagnostic imaging during a prenatal consultation for a fetus with an adrenal mass<br><br>• With active guidance, integrates results of imaging studies, biochemical markers, and biopsies to accurately assign a stage and risk group in a patient with neuroblastoma or Wilms tumor<br><br>• Recognizes the importance of multidisciplinary communication for a patient with neuroblastoma or Wilms tumor<br><br>• Establishes a culturally sensitive rapport with the patient's family and demonstrates empathy during the initial consultation | • With active assistance, prepares the patient for surgery in collaboration with anesthesiology and the care team, including ensuring the availability of blood products and all special equipment<br><br>• Accesses the body cavity and identifies the tumor mass and distorted anatomy<br><br>• Understand the importance of assessing for preoperative rupture and avoiding intraoperative rupture in Wilms tumor<br><br>• Demonstrates basic knowledge of the role of lymph node assessment or resection during resection of neuroblastoma or Wilms tumor<br><br>• With active assistance, makes intraop decisions regarding the extent of resection/role of en bloc resection of critical surrounding structures in the surgical management of neuroblastoma or Wilms tumor<br><br>• With active guidance, identifies intraop complications | • With active assistance, guides the postop phase of care, including evaluation and management of pain and simple postop problems such as wound complications, ileus, and SBO<br><br>• Demonstrates understanding of how to access and use available evidence and incorporate patient/family preferences and values into the postop oncologic treatment plan<br><br>• With active guidance, articulates operative findings, postop expectations, and next steps with the patient and family immediately following the operation<br><br>• With active assistance, communicates operative findings and postop expectations with members of the multidisciplinary team |

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# Evaluation and Management of a Patient with Neuroblastoma or Wilms Tumor

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| **2**<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case.<br><br>**Entrustment:**<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point. | • Under direct supervision, interprets preoperative lab results and atypical/complex imaging findings for a patient with neuroblastoma or Wilms tumor<br><br>• Under direct supervision, verbalizes the indications/contraindications for biopsy during the workup of a patient with suspected neuroblastoma or Wilms tumor<br><br>• Under direct supervision, interprets prenatal imaging and discusses the differential during a prenatal consultation for a fetus with an adrenal mass<br><br>• With passive guidance, integrates results of imaging studies, biochemical markers, and biopsies to accurately assign a stage and risk group in a patient with neuroblastoma or Wilms tumor<br><br>• Identifies key consultants and seeks out multidisciplinary preoperative conferences for a patient with suspected neuroblastoma or Wilms tumor<br><br>• Establishes a therapeutic relationship with the family of a straightforward patient with neuroblastoma or Wilms tumor and obtains informed consent, incorporating the family's values | • With direct supervision, prepares the patient for surgery in collaboration with anesthesiology and the care team, including ensuring availability of blood products and all special equipment<br><br>• Mobilizes surrounding organs to safely expose and initiate dissection of the tumor mass, requiring assistance to determine the extent of resection<br><br>• Assesses patient with a Wilms tumor for preoperative rupture, actively avoids intraop rupture, and demonstrates delicate tissue handling<br><br>• Demonstrates detailed understanding of the role of lymph node assessment or resection during resection of a neuroblastoma or Wilms tumor<br><br>• With passive assistance, makes intraop decisions regarding the extent of resection/role of en bloc resection of critical surrounding structures in the surgical management of neuroblastoma or Wilms tumor<br><br>• With direct supervision, addresses intraop complications | • With passive assistance, guides the postop phase of care, including evaluation and management of pain and simple postop problems such as wound complications, ileus, or SBO<br><br>• Integrates available evidence and family preferences/values to guide the timing of postop oncologic interventions and elicits the patient's and family's preferences and values to guide evidence-based care<br><br>• With passive guidance, articulates operative findings, postop expectations, and next steps with the patient and family immediately following the operation<br><br>• With passive assistance, communicates operative findings and postop expectations with members of the multidisciplinary team |
| **3**<br><br>**Framework:** | • With indirect supervision, interprets distorted anatomy and atypical imaging | • With indirect supervision, positions the patient and collaborates with the | • With passive assistance, manages the postop care of a complex patient |

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# Evaluation and Management of a Patient with Neuroblastoma or Wilms Tumor

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case.<br><br>**Entrustment:**<br><br>The learner can perform the operation/task independently in the uncomplicated patient<br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves. | findings in a patient with neuroblastoma or Wilms tumor<br><br>• With indirect supervision, recognizes atypical presentations of neuroblastoma or Wilms tumor, including paraneoplastic syndromes and cancer predisposition syndromes, and modifies the diagnostic and surgical plan accordingly<br><br>• With indirect supervision, interprets diagnostic information and discusses postnatal expectations, workup, and the treatment plan, including observation vs operative treatment during a prenatal consultation for a fetus with an adrenal mass<br><br>• With passive guidance, integrates image-defined risk factors (IDRF) in neuroblastoma staging and displays understanding of how they affect the timing of surgical intervention<br><br>• In a multidisciplinary setting, articulates the diagnostic findings and surgical plan for a straightforward patient with a neuroblastoma or Wilms tumor<br><br>• With passive assistance, establishes a therapeutic relationship with the family of a complex patient with neuroblastoma or Wilms tumor and obtains informed consent, incorporating the family's values and using shared decision-making | anesthesia team regarding invasive monitoring and anesthetic strategy<br><br>• Resects an uncomplicated neuroblastoma or Wilms tumor<br><br>• With passive assistance, gains vascular control in a complex patient with neuroblastoma or abdominal Wilms tumor<br><br>• With passive assistance, performs resection of involved lymph nodes in a patient with neuroblastoma or formal lymphadenectomy in a patient with Wilms tumor<br><br>• With passive assistance, performs complex operative maneuvers in resection of a neuroblastoma or Wilms tumor, such as safe tumor bivalving over encased vascular structures in neuroblastoma or partial nephrectomy in bilateral Wilms tumor<br><br>• With indirect supervision, addresses intraop complications | undergoing tumor resection, including anticipating, diagnosing, and treating a rare or complex complication such as HTN, Horner syndrome, chyle leak, or urine/bowel leak<br><br>• Uses best available evidence to determine the optimal postop oncology treatment plan while integrating the patient's medical status, parental preferences, and family resources<br><br>• Customizes emotionally difficult news such as unanticipated surgical findings or changes to the postop plan to the family in an empathetic and culturally sensitive manner<br><br>• With passive assistance, implements recommendations from the multidisciplinary care team and uses shared decision-making to align the postop care plan with the patient's and family's values and preferences |

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# Evaluation and Management of a Patient with Neuroblastoma or Wilms Tumor

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| 4<br><br>**Framework**<br><br>The learner has a strong and indepth understanding of surgical options and techniques.<br><br>**Entrustment:**<br><br>Can perform the operation/task independently in complicated cases<br><br>or<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently modifies the surgical plan for a patient with neuroblastoma or Wilms tumor based on complex or atypical imaging findings such as bilateral tumors, IVC tumor thrombus, or image defined risk-factors (IDRFs), specifically addressing the timing of surgical intervention<br><br>• Independently recognizes atypical presentations of neuroblastoma or Wilms tumor, including paraneoplastic syndromes and cancer predisposition syndromes, and modifies the diagnostic and surgical plan based on initial biopsy results, disease staging, and unique imaging findings<br><br>• Independently interprets diagnostic information during a prenatal consultation for a fetus with an adrenal mass and discusses the criteria to change the postnatal management plan from observation to surgery<br><br>• Independently integrates IDRFs in neuroblastoma staging and displays understanding of how it affects the timing of surgical intervention<br><br>• In a multidisciplinary setting, independently articulates the diagnostic findings and surgical plan for a complex patient with neuroblastoma or Wilms tumor and critically appraises and applies evidence from up-to-date treatment protocols, including COG and other guidelines | • Independently positions the patient and collaborates with the anesthesia team regarding invasive monitoring and anesthetic strategy<br><br>• Performs radical nephroureterectomy and adjunct procedures such as IVC thrombectomy in a patient with complex Wilms tumor<br><br>• Independently obtains vascular control in a complex patient undergoing neuroblastoma or Wilms tumor resection<br><br>• Independently performs resection of involved lymph nodes in neuroblastoma or formal lymphadenectomy in Wilms tumor<br><br>• Independently performs complex operative maneuvers in resection of neuroblastoma or Wilms tumor, such as safe tumor bivalving over encased vascular structures in neuroblastoma or partial nephrectomy in bilateral Wilms tumor<br><br>• Independently addresses intraop complications | • Independently leads the team in managing postop care, including anticipating, diagnosing, and treating postop complications<br><br>• Critically appraises and applies evidence, including the effect of pathology and genetic results on risk stratification and subsequent oncologic treatment strategy, tailored to the patient and family<br><br>• Communicates complex surgical findings and plans to the family, including treatment-specific side effects and long-term complications of cancer therapy such as recurrence/relapse and secondary malignancies<br><br>• Independently implements recommendations from the multidisciplinary care team and uses shared decision-making to align the postop care plan with the patient's and family's values and preferences |

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# Evaluation and Management of a Patient with Neuroblastoma or Wilms Tumor

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | • Establishes a therapeutic relationship with the family of a complex patient with neuroblastoma or Wilms tumor and independently obtains informed consent, incorporating the family's values and using shared decision-making | | |

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# Evaluation and Management of a Patient with a Rotational Anomaly

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| **Description of the Activity** | Rotational anomalies are conditions commonly encountered by pediatric surgeons in elective and emergent care settings. These surgeons must be able to accurately identify and manage the spectrum of rotational anomalies in the elective and emergent settings. In addition, the surgeon must understand which comorbid conditions can occur with rotational anomalies and how these may influence the presentation and management of rotational anomalies. |
| **Functions** | ❖ Nonoperative/Preoperative<br>➢ Synthesize essential information from the patient's records, history, physical examination, and initial diagnostic evaluations to develop a differential diagnosis.<br>➢ Complete a cost-effective, evidence-based diagnostic evaluation.<br>➢ Communicate the diagnosis and potential treatment options to the patient, family/caregiver(s), and consultants.<br>➢ Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure patient and family understanding.<br>➢ Identify and differentiate patients with midgut volvulus in whom urgent or emergent operative intervention is necessary versus patients with rotational anomaly alone.<br>➢ Identify patients in whom observation alone may be sufficient, and recognize the criteria for operative intervention in these patients.<br>➢ Identify patients in whom evaluation for rotational anomalies may be necessary, including patients with:<br>▪ Abdominal wall defects<br>▪ Asymptomatic disease or atypical symptoms<br>▪ Congenital diaphragmatic hernia<br>▪ Heterotaxy syndromes<br>▪ Intestinal atresia<br>❖ Intraoperative<br>➢ Perform the procedures required to manage rotational anomalies, including the Ladd procedure and minimally invasive and open techniques.<br>▪ Untwist the intestine and mesentery if applicable.<br>▪ Mobilize and straighten the duodenum.<br>▪ Lyse all Ladd bands.<br>▪ Lyse all adhesions at the root of the mesentery to allow for broadening of the mesentery.<br>▪ Perform an appendectomy.<br>▪ Return the intestine to the abdomen (cecum in the left upper quadrant and small bowel in the right lower quadrant).<br>▪ Employ damage control principles to manage a patient with rotational anomaly and midgut volvulus.<br>➢ Perform bowel resection (as indicated). |

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# Evaluation and Management of a Patient with a Rotational Anomaly

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| | ➢ Perform temporary closure of the abdomen (as indicated)<br>➢ Perform second-look laparotomy (as indicated).<br><br>➢ Manage common intraoperative complications, such as bleeding from the mesentery or bowel injury.<br><br>➢ Recognize and develop a management plan for unexpected intraoperative findings such as intestinal atresia, significant intestinal loss, bleeding, and shock.<br><br>❖ Postoperative<br><br>➢ Provide postoperative management for patients with rotational anomalies, including:<br>▪ Routine postoperative, immediate, and follow-up care<br>▪ Management of patients with volvulus who require damage control surgery<br>▪ Communication with the patient/family to ensure that anatomy and surgical procedures are understood<br>➢ Discuss the normal postoperative course after a Ladd procedure with the family as well as long-term issues the patient may encounter.<br>➢ Explain to the patient and family how anatomy is changed postoperatively (the appendix is removed or the intestine may look abnormal on imaging studies).<br>➢ Identify early and late complications related to surgical rotational anomaly surgery, including volvulus after surgery and bowel obstruction. |
| **Scope** | ❖ In scope<br><br>• Diagnoses<br>▪ Malrotation<br>▪ Malrotation with midgut volvulus<br><br>• Procedures<br>▪ Ladd procedure – open or minimally invasive<br><br>• Special populations:<br>▪ Newborns and infants<br>▪ Older children<br>▪ Patients with:<br>● Congenital heart disease<br>● Heterotaxy |

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# Evaluation and Management of a Patient with a Rotational Anomaly

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| | ❖ Out of scope<br>● none |

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# Evaluation & Management of a Patient with a Rotational Anomaly

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| 1<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br><br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br><br>The attending will show and tell or the learner acts as first assistant. | • With active assistance, performs a focused H&P, requests appropriate diagnostic tests, and develops a differential and treatment plan for an otherwise uncomplicated patient with a rotational anomaly<br><br>• Demonstrates knowledge of typical anatomy of rotational anomaly<br><br>• Demonstrates basic knowledge of embryologic events leading to normal intestinal rotation<br><br>• With active guidance, recognizes the need for potential emergent evaluation of a patient with bilious emesis and initiates basic workup or resuscitation in a timely manner<br><br>• Establishes a professional rapport with the patient and family and communicates basic facts about rotational anomalies<br><br>• Receives a consult request for a rotational anomaly and asks clarifying questions politely | • Describes the steps of and performs an uncomplicated Ladd procedure with active guidance, including untwisting intestine, lysing Ladd bands, broadening mesentery, straightening the duodenum, and replacing intestine, +/– appendectomy<br><br>• With active guidance, identifies anatomic aspects of rotational abnormalities within the abdomen | • With active guidance manages the postop course of a medically uncomplicated patient following a Ladd procedure, demonstrating knowledge of when to initiate feedings and the normal postop course<br><br>• With active guidance, demonstrates basic knowledge of ethical principles for surgery in a scenario such as an asymptomatic/incidentally identified rotational anomaly (principles of “do no harm”)<br><br>• Provides basic information to the patient and family regarding the steps of the operation and the expected postop course for an uncomplicated case<br><br>• Communicates intraop findings and the surgical care plan with other members of the health care team in an uncomplicated postop case |
| 2<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through | • With direct supervision, performs a focused H&P, reviews diagnostic reports, and determines the need for additional imaging in a medically uncomplicated patient with a rotational anomaly | • With indirect supervision, identifies/orients the relevant anatomy and performs most steps of a Ladd procedure in an uncomplicated patient (no intestinal ischemia or comorbid conditions, hemodynamically stable), including untwisting intestine, lysing | • With direct supervision, manages the postop course of a medically uncomplicated patient following a Ladd procedure |

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# Evaluation & Management of a Patient with a Rotational Anomaly

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| principles and does not know the nuances of a basic case<br><br>Entrustment:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br><br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | • Demonstrates knowledge of surgically relevant anatomic variations of rotational anomalies<br><br>• Demonstrates knowledge of embryologic events leading to rotational anomalies and with direct supervision manages fluid resuscitation of a medically uncomplicated patient with a rotational anomaly<br><br>• With direct supervision, recognizes the need for potential emergent evaluation of a patient with bilious emesis and initiates basic workup and resuscitation in a timely manner<br><br>• Establishes a therapeutic relationship with a straightforward patient and their family and compassionately delivers medical information, using visual aids as necessary<br><br>• Communicates the care plan clearly and efficiently with members of the team | Ladd bands, broadening mesentery, straightening the duodenum, and replacing intestine, +/– appendectomy<br><br>• With direct supervision, identifies anatomic aspects of rotational abnormalities | • With passive assistance, identifies and applies ethical principles when treating an uncomplicated patient with a rotational anomaly<br><br>• Clearly explains to a patient and family the steps of the operation and the expected postop course for an uncomplicated case<br><br>• With indirect supervision, communicates intraop findings and the surgical care plan to other members of the health care team in an uncomplicated postop case |
| **3**<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case | • With indirect supervision, performs a focused H&P, reviews diagnostic reports, and develops a differential that includes both medical and surgical problems in a complicated patient with a rotational anomaly<br><br>• Recognizes anatomic variants that may require observation (eg, heterotaxy/cardiac conditions) vs operative intervention and with active assistance adapts the management plan accordingly | • Performs a Ladd procedure in a complex scenario (ischemic bowel, heterotaxy, comorbid condition) with indirect supervision, including untwisting intestine, lysing Ladd bands, broadening mesentery, straightening the duodenum, replacing intestine, and measuring residual intestinal length, with possible bowel resection or stoma and +/– appendectomy | • With indirect supervision, formulates a postop care plan, including subsequent operative care, for a complicated patient with a rotational anomaly (patient with volvulus, damage control surgery)<br><br>• Facilitates the resolution of professional differences of opinion between services (e.g., surgery and neonatology/anesthesiology) when |

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# Evaluation & Management of a Patient with a Rotational Anomaly

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| Entrustment:<br><br>The learner can perform the operation/task independently in the uncomplicated patient<br><br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | • Demonstrates knowledge of embryologic events leading to rotational anomalies and with indirect supervision manages fluid resuscitation of a medically complicated patient with a rotational anomaly<br><br>• With indirect supervision, recognizes the need for potential emergent evaluation of a patient with bilious emesis and initiates comprehensive workup and resuscitation in a timely manner<br><br>• Engages the patient and family to determine goals of care while confirming understanding of the disease process and care plan<br><br>• Independently triages and coordinates the care of an uncomplicated patient with a rotational anomaly with the referring physician and other members of the team to resuscitate, conduct necessary diagnostic tests, and prepare for the OR in an efficient manner | • With indirect supervision, identifies pertinent anatomic variations of rotational anomalies and adapts the operative plan accordingly | treating a complicated patient with a rotational anomaly<br><br>• Establishes a therapeutic relationship by engaging a medically complicated patient with a rotational anomaly and their family in a discussion of postop care and the expected postop course, acknowledging disparate care goals<br><br>• With indirect supervision coordinates care with other members of the health care team to continue resuscitation and supportive care in a complicated patient with a rotational anomaly |
| 4<br><br>**Framework:**<br><br>The learner has a strong and indepth understanding of surgical options and techniques<br><br>Entrustment: | • When a patient presents with malrotation with or without midgut volvulus, independently reads and interprets diagnostic images and formulates a plan for a timely operation<br><br>• Independently recognizes anatomic variants that may require observation (eg, heterotaxy/cardiac conditions) vs operative | • Independently performs all steps of a Ladd procedure in a complex scenario (intestinal ischemia, heterotaxy, concurrent comorbid conditions), performing damage control laparotomy, temporary abdominal closure, second-look laparotomy, intestinal resection or ostomy, and measurement of residual | • Independently formulates a plan for subsequent operative and postop care for a patient who has undergone damage control surgery; independently addresses complications of surgery for a rotational anomaly (malabsorption, intestinal failure, need for parenteral nutrition or bowel-lengthening procedure) |

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# Evaluation & Management of a Patient with a Rotational Anomaly

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| Can perform the operation/task independently in complicated cases<br><br>**or**<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | intervention and adapts the management plan accordingly<br><br>• Demonstrates comprehensive understanding of the considerations for observation, fluid resuscitation and operative intervention in the setting of comorbid conditions (CDH, gastroschisis, omphalocele)<br>.<br>• Leads the resuscitation of the infant with bilious emesis and independently determines the need for emergent operation without complete diagnostic imaging<br><br>• Independently counsels the patient and family regarding anatomic variants and options for observation or operative intervention; demonstrates understanding of patient and family goals and uses shared decision-making to develop a care plan<br><br>• Independently triages and coordinates the care of a complicated patient with a rotational anomaly (eg, volvulus) with the referring physician and other members of the team to resuscitate, conduct necessary diagnostic tests, and prepare for the OR in an efficient manner | intestinal length with consideration for a gastrostomy tube when necessary.<br><br>• Independently identifies pertinent anatomic variations of rotational anomalies and adapts the operative plan accordingly | • Independently leads a discussion about end-of-life care for a patient with significant bowel loss or irreversible shock as appropriate<br><br>• Independently advises a complicated patient with a rotational anomaly and their family on operative findings, the expected postop course, possible future complications, and overall prognosis<br><br>• Independently coordinates care with other members of the health care team to continue resuscitation and supportive care in a complicated patient with a rotational anomaly (e.g., volvulus) |

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# Evaluation and Management of a Patient Requiring Vascular Access

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| **Description of the Activity** | Central venous access remains a core component of the surgical care of infants and children. There are broad ranges of the clinical settings and medical conditions in which central access is required. A pediatric surgeon must be able to evaluate and manage a wide variety of healthy and critically ill patients needing venous access and demonstrate an understanding of the technical nuances of safe central line placement in patients of all sizes. A multidisciplinary, team-based approach is critical to the acute and long-term success of tunneled central catheters. |
| **Functions** | ❖ Nonoperative/Preoperative<br>➢ Use available clinical data to confirm the need for a line, determine the type of line, and assess the urgency of the procedure.<br>➢ Review clinical data to identify the increased risks related to line placement (coagulopathy, thrombocytopenia, multiple previous lines, history of venous thrombosis).<br>➢ Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.<br>➢ Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.<br>➢ Determine whether any preoperative workup is needed before line placement, such as ultrasound of vessels or an echocardiogram.<br>➢ Facilitate communication with the primary health care team regarding scheduling the procedure and the need for preoperative studies or transfusion.<br>➢ Identify additional peripheral cutdown targets (external jugular, facial, saphenous vein) for patients in whom it may be preferable to preserve larger central veins for future access or when percutaneous access may not be possible.<br>❖ Intraoperative<br>➢ Confirm that vascular ultrasound and fluoroscopy are available for the procedure when appropriate.<br>➢ Select the appropriate line type and size based on patient indications.<br>➢ Obtain percutaneous ultrasound-guided access to the internal jugular, subclavian, or femoral vein.<br>➢ Demonstrate knowledge of cutdown techniques for the most common cutdown sites (external jugular, facial, saphenous vein).<br>➢ Direct intraoperative fluoroscopy to confirm the location of the wire and identify the presence of pneumothorax.<br>➢ Create an appropriate subcutaneous tunnel to a location on the chest that is optimal for line access.<br>➢ Demonstrate a consistent technique to measure the appropriate length of the central line for the patient so that the tip is at the superior vena cava/right atrial junction.<br>➢ Develop a management strategy for a line that is not of appropriate length after initial placement (including lines that are either too long or too short).<br>➢ Identify the need to lock the line per institutional protocol.<br>➢ Manage intraoperative complications, including malposition of the wire, arterial stick, bleeding, and pneumothorax. |

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# Evaluation and Management of a Patient Requiring Vascular Access

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| | ➢ Develop a management plan for aberrant venous anatomy that is identified intraoperatively, including the use of a contrast venogram.<br>➢ Identify techniques to remove tunneled lines in the operating room and at the bedside.<br><br>❖ Postoperative<br><br>➢ Provide postoperative monitoring for the patient who has undergone a vascular access procedure.<br>➢ Develop a management plan for postoperative complications such as pneumothorax, bleeding, venous thrombosis, catheter occlusion, and pericardial tamponade.<br>➢ Exchange a line if needed in the setting of a broken catheter or when a different type of catheter is needed. |
| **Scope** | ❖ In scope<br><br>• Diagnoses<br>▪ All<br>▪ Infected line<br><br>• Procedures<br>▪ Hemodialysis catheter placement<br>▪ Tunneled central line placement with or without a subcutaneous port (with imaging guidance)<br><br>• Special Populations<br>▪ Patients needing long-term vascular access and management<br>▪ Patients with limited vascular access<br>▪ Preterm patients (younger than a gestational age of 36 weeks)<br><br>❖ Out of scope<br><br>• Diagnoses/procedures<br>▪ Cutdown access<br>▪ Peripherally inserted central catheter (PICC) placement |

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# Evaluation & Management of a Patient Requiring Vascular Access

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| 1<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br><br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br><br>The attending will show and tell or the learner acts as first assistant. | • With direct supervision, uses clinical data to determine indications for insertion, type of catheter, and urgency of the procedure in a straightforward patient<br><br>• With direct supervision, identifies risk factors for line placement in an uncomplicated patient and discusses additional preop lab testing or imaging with the primary team<br><br>• With direct supervision, communicates the risks and benefits of catheter placement in an uncomplicated patient to the family and obtains informed consent | • Requires direct supervision to identify targets for and perform peripheral cutdown line placement in an uncomplicated patient<br><br>• With direct supervision, prepares a routine patient for catheter placement, including catheter type/size, patient positioning, anesthesia strategy, availability of vascular ultrasound and fluoroscopy/x-ray, and bundled CLABSI prevention<br><br>• Demonstrates basic knowledge of how to minimize radiation risk for a patient and team members<br><br>• With direct supervision, obtains percutaneous US-guided access to the internal jugular, subclavian, or femoral vein in an uncomplicated patient<br><br>• Requires direct supervision during placement of a tunneled catheter including intraop fluoroscopy, identification/location of the wire, identifying pneumothorax, creating the subcutaneous tunnel, and measuring appropriate length of the tunneled catheter an uncomplicated patient<br><br>• With active guidance, identifies intraop complications and aberrant venous anatomy | • Requires direct supervision to promptly identify and treat acute postop line-related complications in an uncomplicated patient<br><br>• Requires direct supervision to plan and direct a postop monitoring and management plan for an uncomplicated patient who undergoes tunneled central line placement<br><br>• Requires direct supervision to recognize and manage long-term complications of central venous catheters in an uncomplicated patient |

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# Evaluation & Management of a Patient Requiring Vascular Access

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| **2**<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case<br><br>Entrustment:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br><br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | • With indirect supervision, uses clinical data to determine indications for insertion, type of catheter,and urgency of the procedure in an uncomplicated patient (PC1 L2, PBLI1 L2, ICS2 L2)<br><br>• With indirect supervision, identifies risk factors for catheter placement in an uncomplicated patient and discusses additional preop lab testing or imaging with the primary team (PC1 L2, ICS2 L2)<br><br>• With indirect supervision, communicates the risks and benefits of catheter placement in an uncomplicated patient to the family and obtains informed consent (ICS1 L2) | • With indirect supervision, identifies targets for and perform peripheral cutdown line placement in an uncomplicated patient<br><br>• With indirect supervision, prepares an uncomplicated patient for catheter placement, including catheter type/size, patient positioning, anesthesia strategy, availability of vascular ultrasound and fluoroscopy/x-ray, and bundled CLABSI prevention<br><br>• Demonstrates understanding of and describes measures to minimize radiation risk for a patient and team members<br><br>• With indirect supervision, obtains percutaneous US-guided access to the internal jugular, subclavian, or femoral vein in an uncomplicated patient<br><br>• Requires indirect supervision during placement of a tunneled catheter including intraop fluoroscopy, identification/location of the wire, identifying pneumothorax, creating the subcutaneous tunnel, and measuring appropriate length of the tunneled catheter an uncomplicated patient<br><br>• With direct supervision, identifies intraop complications and aberrant venous anatomy | • Requires indirect supervision to promptly identify and treat acute postop line-related complications in an uncomplicated patient<br><br>• Requires indirect supervision to plan and direct a postop monitoring and management plan for an uncomplicated patient who undergoes tunneled central line placement<br><br>• Requires indirect supervision to recognize and manage long-term complications of central venous catheters in an uncomplicated patient |

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# Evaluation & Management of a Patient Requiring Vascular Access

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| 3<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>Entrustment:<br><br>The learner can perform the operation/task independently in the uncomplicated patient<br><br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | • Independently uses clinical data to determine indications for insertion, type of catheter, and urgency of the procedure in an uncomplicated patient but requires passive assistance in the complicated patient<br><br>• Independently identifies risk factors for catheter placement and discusses additional preop lab testing or imaging with the primary team in an uncomplicated patient but requires passive assistance for the medically or surgically complex patient<br><br>• Independently communicates the risks and benefits of catheter placement to the family and obtains informed consent for an uncomplicated patient but requires passive assistance in a complex patient | • Independently identifies targets for peripheral cutdown catheter placement in an uncomplicated patient but requires passive assistance for the complex patient<br><br>• Independently, prepares an uncomplicated patient for catheter placement, including catheter type/size, patient positioning, anesthesia strategy, availability of vascular ultrasound and fluoroscopy/x-ray, and bundled CLABSI prevention but requires passive assistance for the medically or surgically complex patient.<br><br>• Coordinates efforts to minimize radiation risk for a patient and team members<br><br>• Independently obtains percutaneous US-guided access to the internal jugular, subclavian, or femoral vein in an uncomplicated patient but requires passive assistance in a medically or surgically complex patient.<br><br>• Independently inserts a tunneled catheter, including intraop fluoroscopy, identification/location of the wire, identifying pneumothorax, creating the subcutaneous tunnel, and measuring appropriate length of the tunneled catheter an uncomplicated patient but | • Independently identifies and promptly treats acute postop line-related complications in an uncomplicated patient but requires passive assistance in a complex patient<br><br>• Independently plans and directs a postop monitoring and management plan for an uncomplicated patient who undergoes tunneled central line placement but requires passive assistance in the medically complex patient<br><br>• Recognizes and manages long-term complications of central venous catheters in uncomplicated patients but requires passive assistance in the management of nuanced issues or a complex patient |

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# Evaluation & Management of a Patient Requiring Vascular Access

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | | requires passive assistance in a complex patient (e.g. multiple previous catheters).<br>• With indirect supervision, identifies intraop complications and aberrant venous anatomy and formulates an appropriate management plan | |
| 4<br><br>**Framework**:<br><br>The learner has a strong and indepth understanding of surgical options and techniques<br><br>Entrustment:<br><br>Can perform the operation/task independently in complicated cases<br><br>**or**<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently analyzes clinical data to determine indications for insertion, type of catheter, and urgency of the procedure in a challenging case, such as a neonate or child who has had multiple prior catheters or a patient with perioperative risk factors (PC1 L4, PBLI1 L4, ICS2 L4)<br>• Independently identifies risk factors for catheter placement in a complex patient and communicates a strategy/plan including additional preop or intraop imaging or IR consultation (PC1 L4, ICS2 L4)<br>• Independently tailors informed consent for a complex or extremely high-risk patient who requires catheter placement(ICS1 L4) | • Independently identifies targets and performs peripheral cutdown catheter placement in a complex patient<br>• Independently prepares the OR for line placement in a complex patient, including line type/size selection, patient positioning, availability of vascular ultrasound and fluoroscopy, and bundled CLABSI prevention<br>• Independently leads efforts to minimize radiation risk for a patient and team members<br>• Independently obtains percutaneous image-guided access to the internal jugular, subclavian, or femoral vein in a complicated patient (neonatal, narrowed vessels, multiple prior lines)<br>• In a patient with a difficult line placement/replacement or multiple prior lines, needs passive assistance to direct intraop fluoroscopy to identify the location of a wire and presence of pneumothorax, create the subcutaneous | • Independently diagnoses and treats acute postop line-related complications in a complex patient<br>• Independently plans and directs a postop monitoring and management plan for a medically complex patient who undergoes tunneled central line placement<br>• Independently recognizes and manages long-term complications of central venous catheters in all patients |

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# Evaluation & Management of a Patient Requiring Vascular Access

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | | tunnel, and measure the appropriate length of a tunneled line<br><br>• Independently identifies and manages intraop complications and aberrant venous anatomy and formulates an appropriate management plan | |

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# Evaluation & Management of a Patient Requiring Extracorporeal Life Support (ECLS)

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| **Description of the Activity** | Extracorporeal life support (ECLS) is necessary in reversible conditions when additional pulmonary or cardiac support is required. A pediatric surgeon is expected to have expertise in indications and contraindications for ECLS; techniques for cannulation; strategies for anticoagulation, especially during procedures; prevention and management of complications; and readiness for decannulation. |
| **Functions** | ❖ Nonoperative/Preoperative<br>➢ Define indications and contraindications for ECLS in neonates, children, and adolescents.<br>➢ Discuss the ethical dilemmas involved with the risks associated with ECLS versus ongoing medical management.<br>➢ Obtain informed consent for cannulation and decannulation of ECLS.<br>➢ Communicate to families the risks of ECLS, including neurologic injury, vascular injury, and inability to come off ECLS.<br>➢ Identify the equipment needed (eg, cannulas of different sizes, use of fluoroscopy or ultrasound).<br>➢ Determine the systems needed for safe cannulation (bedside vs operating room, personnel).<br>➢ Optimize the placement of cannulas by positioning the patient correctly and having medications and equipment readily available.<br>➢ Demonstrate understanding of the need for emergency cannulation without consent in special circumstances.<br>➢ Obtain informed consent for ECLS, including discussions regarding procedure, type of access, procedure risks, complications and outcomes<br><br>❖ Intraoperative<br>➢ Determine the ideal approach to cannulation for ECLS for a given condition.<br>➢ Implement management strategies for anticoagulation at cannulation, during an ECLS run, and decannulation.<br>➢ Avoid procedures when a patient is on ECLS, and manage anticoagulation when a procedure is needed.<br>➢ Address bleeding during an ECLS run (superficial vs organ space).<br>➢ Interpret a rotational thromboelastometry (ROTEM) or thromboelastography (TEG) to determine the appropriate response to anticoagulation.<br>➢ Identify when vessels are of an inappropriate size or when a strategy for cannulation needs to be modified.<br>➢ Troubleshoot elevated pressures when a patient is on ECLS, including dealing with "cutting out" and air or clots in cannula components.<br>➢ Manage the ventilator during ECLS (rest settings vs recruitment).<br>➢ Evaluate a patient for "awake" ECLS, including placement of a tracheostomy when needed and initiation of physical therapy.<br>➢ Interpret cannula placement using imaging guidance at placement and management during an ECLS run.<br><br>❖ Postoperative |

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# Evaluation & Management of a Patient Requiring Extracorporeal Life Support (ECLS)

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| | ➢ Communicate potential complications on ECLS.<br>➢ Discuss the readiness for decannulation.<br>➢ Implement a strategy when a patient is unable to be weaned off ECLS, and refer the patient to the transplant team when appropriate.<br>➢ Recognize the need for central cannulation when flows are inadequate.<br>➢ Assess the need for potential reconstruction of vessels and recannulation for repeat ECLS. |
| **Scope** | ❖ In scope<br><br>❖ Diagnoses<br>➢ All diagnoses that require ECLS support (sepsis, congenital diaphragmatic hernia, meconium aspiration, burns, acute respiratory distress syndrome/respiratory failure)<br><br>❖ Procedures<br>➢ Distal perfusion cannula<br>➢ Ultrasound/fluoroscopic guidance<br>➢ Veno-venous and veno-arterial (neck, femoral)<br><br>❖ Special populations<br>○ Neonates<br>○ Adolescents<br>○ Extracorporeal cardiopulmonary resuscitation (ECPR)<br><br>❖ Out of scope<br>• Diagnoses/procedures<br>○ Central cannulation<br>○ Congenital cardiac disease |

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# Evaluation & Management of a Patient Requiring Extracorporeal Life Support (ECLS)

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| 1<br><br>**Framework:**<br><br>The attending will show and tell or the learner acts as first assistant.<br><br>**Entrustment:**<br><br>The learner demonstrates understanding of information and has basic skills.<br><br>What a new pediatric surgery fellow should know. | • With active assistance, relates the indications and contraindications for ECLS in an uncomplicated patient<br><br>• With active assistance, identifies patient-specific factors that predict the need for ECLS (eg, oxygen index, blood gas values, imaging findings, need for vasopressors) and begins resuscitation<br><br>• With active assistance, recognizes aspects of care that may require ethical decisions concerning ECLS<br><br>• Recognizes the need to coordinate intensivist, OR, surgical, and, occasionally, cardiology or radiology teams for ECLS cannulation | • With active assistance, performs cannulation for ECLS in an uncomplicated presentation<br><br>• With active assistance, identifies evidence-based guidelines/recommendations for various aspects of ECLS care, including anticoagulation management, cannulation strategies, and the need for imaging to confirm cannula placement<br><br>• Demonstrates awareness about administration of anticoagulation and the need for sedation, additional resuscitation, and imaging when necessary and during connection to the circuit | • With active guidance, demonstrates awareness of patient-specific factors that show readiness for decannulation from ECLS<br><br>• With active assistance, demonstrates knowledge of ethical principles of ECLS complexities regarding tracheostomy, futility of care, and major complications<br><br>• With direct supervision, communicates with all team members about ECLS circuit performance, including clot burden, inlet and outlet pressures, potential for hemolysis, and readiness for pulmonary recruitment and decannulation |
| 2<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case. | • With passive assistance, relates the indications and contraindications for ECLS in an uncomplicated patient<br><br>• With passive assistance, identifies patient-specific factors that predict the need for ECLS (eg, oxygen index, blood gas values, imaging findings, need for vasopressors) and begins resuscitation and initial management | • With passive assistance, performs cannulation for ECLS in an uncomplicated patient<br><br>• With passive assistance, articulates evidence-based guidelines/recommendations for various aspects of ECLS care, including anticoagulation management, cannulation | • With passive guidance, articulates patient-specific factors of a straight-forward patient that show readiness for decannulation from ECLS<br><br>• With passive assistance, fosters discussion of ethical dilemmas on ECLS regarding tracheostomy, futility of care, and major complications |

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# Evaluation & Management of a Patient Requiring Extracorporeal Life Support (ECLS)

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| **Entrustment:**<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point. | • With passive assistance, analyzes straightforward situations using ethical principles for discussion of informed consent with a patient's family<br><br>• Communicates clearly with the care team for ECLS cannulation, recognizing the need to coordinate intensivist, OR, surgical, and, occasionally, cardiology or radiology teams | strategies, and the need for imaging to confirm cannula placement<br><br>• Solicits feedback and communicates clearly with care team members about administration of anticoagulation and the need for sedation, additional resuscitation, and imaging when necessary and during connection to the circuit | • With indirect supervision, communicates with all team members about ECLS circuit performance, including clot burden, inlet and outlet pressures, potential for hemolysis, and readiness for pulmonary recruitment and decannulation |
| **3**<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case.<br><br>**Entrustment:**<br><br>The learner can perform the operation/task independently in the uncomplicated patient.<br>or<br><br>The attending provides passive/indirect | • With passive assistance, relates the indications and contraindications for ECLS in a complicated patient<br><br>• With passive assistance, individualizes ongoing critical care of a patient requiring ECLS and assesses their response to therapy<br><br>• Analyzes a complex situation (previous ECLS, neurologic injury) using ethical principles and recognizes the need to seek help in managing or resolving a complex ethical situation for ECLS cannulation or withholding care<br><br>• Communicates concerns and provides feedback to ensure mutual understanding among team members, including the intensivist, OR, surgical, and, occasionally, cardiology or radiology teams | • With passive assistance, performs ECLS cannulation in a complicated patient (eg, additional venous drainage, reperfusion cannula, ECPR)<br><br>• Independently articulates evidence-based knowledge for various aspects of ECLS care, including anticoagulation management, cannulation strategies, and the need for imaging to confirm cannula placement, integrated with the patient's and family's preferences<br><br>• Communicates concerns and provides feedback to peers and learners about administration of anticoagulation and the need for sedation, additional resuscitation, and imaging when necessary and during connection to the circuit | • With passive guidance, identifies patient-specific factors of a complicated patient that show readiness for decannulation from ECLS<br><br>• Analyzes complex situations, seeking help as needed for ethical dilemmas on ECLS regarding tracheostomy, futility of care, and major complications<br><br>• Independently communicates with all team members about ECLS circuit performance, including clot burden, inlet and outlet pressures, potential for hemolysis, and readiness for pulmonary recruitment and decannulation |

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# Evaluation & Management of a Patient Requiring Extracorporeal Life Support (ECLS)

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves. | | | |
| **4**<br><br>**Framework:**<br>The learner has a strong and indepth understanding of surgical options and techniques<br>Entrustment:<br>Can perform the operation/task independently in complicated cases<br><br>**or**<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently relates the indications and contraindications for ECLS in a complicated patient<br><br>• Independently individualizes ongoing critical care management of a patient requiring ECLS and assesses their response to therapy<br><br>• Leads the team in formulating ethical decisions around the futility of ECLS, including discussions with the care team and family<br><br>• Leads the team for ECLS cannulation, independently coordinating intensivist, OR, surgical, and, occasionally, cardiology or radiology teams | • Independently performs ECLS cannulation in a complicated patient (eg, additional venous drainage, reperfusion cannula, ECPR)<br><br>• Critically appraises and applies evidence-based knowledge for various aspects of ECLS care, including anticoagulation management, cannulation strategies, and the need for imaging to confirm cannula placement, even in the face of uncertain or conflicting evidence to guide care, tailored to the patient and family<br><br>• Communicates recommendations to team members, including constructive criticism to peers/superiors, about administration of anticoagulation and the need for sedation, additional resuscitation, and imaging when necessary and during connection to the circuit | • Independently identifies patient-specific factors that show readiness for decannulation from ECLS in a complicated patient<br><br>• Leads complex discussions about ethical dilemmas on ECLS regarding tracheostomy, futility of care, and major complications<br><br>• Leads team members on ECLS circuit performance, including clot burden, inlet and outlet pressures, potential for hemolysis, and readiness for pulmonary recruitment and decannulation |

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# Evaluation & Management of a Patient with SIP/NEC

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| **Description of the Activity** | Pediatric surgeons are frequently called upon to evaluate a neonate with bloody stools, abdominal distension, abdominal tenderness, or laboratory or radiographic evidence of necrotizing enterocolitis (NEC) or perforated viscus. The pediatric surgeon must be able to expeditiously evaluate and manage these patients often in the neonatal intensive care unit (NICU) but also occasionally in the emergency department, pediatric or cardiac ward, or intensive care unit. The pediatric surgeon must decide when medical or surgical treatments are most appropriate and choose the appropriate intervention (eg, peritoneal drain, laparotomy), taking into account the infant's clinical status, stability, gestational age/weight, and presumed diagnosis. |
| **Functions** | ❖ Nonoperative/Preoperative<br>➢ Synthesize information from the patient's referring providers, medical records, history, physical examination, and diagnostic evaluations to develop a differential diagnosis.<br>➢ Determine whether immediate surgery is indicated or if medical management is the most appropriate initial strategy.<br>➢ For medically managed NEC, understand the need for ongoing reevaluation to include operative intervention for those patients failing medical management.<br>➢ Select the most appropriate location of intervention (bedside in the NICU versus the operating room) depending on patient stability, urgency of procedure, and local resources.<br>➢ Select a safe anesthetic and surgical approach that is consistent with the patient's diagnosis, corrected gestational age, and comorbidities.<br>➢ Obtain appropriate preoperative consultation with the anesthesia, cardiology, neonatology, or other teams as dictated by the infant's comorbidities.<br>➢ Synthesize an operative plan that demonstrates understanding of the operative anatomy, physiology, indications, contraindications, risks, benefits, alternatives, and potential complications of:<br>▪ Nonperforated necrotizing enterocolitis/NEC totalis<br>▪ Perforated necrotizing enterocolitis<br>▪ Spontaneous or focal intestinal perforation (SIP/FIP)<br>➢ Obtain informed consent with recognition of urgency, parental distress, and unclear intraoperative findings.<br>➢ Describe the indications, risks, benefits, alternative therapies, and potential complications of the planned procedure in the context of the neonate presenting with NEC.<br>➢ If necessary, identify the appropriate substitute decision-maker ("caregiver"), and ensure caregiver comprehension using applicable language services and audio/visual aids as required.<br>➢ Ensure that the family/caregiver has the opportunity to ask questions, and address any expressed concerns.<br>➢ Document the consent process.<br><br>❖ Intraoperative<br>➢ Manage the perioperative environment, including room setup, equipment check, preprocedural time-out, counts, wound classification, and debriefing functions.<br>➢ Perform the procedures required to manage an infant with NEC: |

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# Evaluation & Management of a Patient with SIP/NEC

- Position the patient, and ensure availability of relevant equipment, including heating the patient.
- Ask for the correct instruments.
- Visualize tissue planes, and identify and dissect relevant normal and abnormal anatomy.
- Perform operative steps efficiently, including:
  - Peritoneal drain placement
  - Laparotomy
  - Bowel resection with stoma or anastomosis
  - Temporary abdominal closure

➢ Integrate new information discovered intraoperatively to modify the surgical plan or technique in patients with:
- Focal NEC
- Multifocal NEC
- SIP/FIP
- Very proximal disease

➢ Give special consideration for NEC totalis and non-salvageable disease and the potential for short bowel syndrome and intestinal transplantation. (special skills: communication of the urgent, difficult conversation)

➢ Work with the anesthesia and nursing teams as well as other perioperative health care professionals to create and maintain an intraoperative environment that promotes patient-centered care.

❖ Postoperative

➢ Initiate and oversee postoperative care, including postoperative disposition.

➢ Communicate with the caregiver and members of the health care team to ensure an understanding of the procedure findings and their potential implications regarding short- and long-term recovery.

➢ Recognize and manage the common complications following surgery for NEC in an infant, such as:
- Anastomotic leak
- High-output stoma
- Indications for formal laparotomy following failed peritoneal drainage
- Recurrent NEC
- Short-bowel syndrome
- Stoma-related complications (prolapse, retraction)
- Stricture (anastomotic or related to prior medically managed NEC)

## Scope

❖ In scope

❖ Diagnoses
- NEC
- SIP/FIP
- NEC stricture

❖ Procedures

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# Evaluation & Management of a Patient with SIP/NEC

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| | ▪ Bowel anastomosis<br>▪ Neonatal laparotomy<br>▪ Peritoneal drainage<br>▪ Stoma<br>▪ Temporary closure<br><br>• Special populations<br>○ NEC totalis<br><br>❖ Out of scope<br><br>• Diagnoses/procedures<br>○ Gastric perforation or other causes of neonatal pneumoperitoneum<br>○ Intestinal failure |

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# Evaluation & Management of a Patient with SIP/NEC

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| 1<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br><br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br><br>The attending will show and tell or the learner acts as first assistant. | • When a neonate presents with bloody stools, abdominal distension, or abdominal tenderness, performs a focused H&P, reviews diagnostic reports, and develops a differential with active assistance<br><br>• With active assistance, distinguishes between surgical and nonsurgical NEC and between SIP and NEC, formulates an appropriate treatment plan including appropriate resuscitation<br><br>• With active assistance, recognizes abnormal vital signs and lab values in a neonate<br><br>• With active assistance, recognizes potentially inappropriate intervention in NEC (eg, unnecessary laparotomy)<br><br>• With active guidance, works within a multidisciplinary team to manage a neonate with NEC in a timely manner<br><br>• With active assistance, discusses the diagnosis of NEC with a patient's family and treatment team, answers basic questions; demonstrates understanding of the components of informed consent | • With active guidance, proceeds through the operative steps of abdominal exploration, bowel resection/anastomosis, and ostomy creation<br><br>• Places a peritoneal drain with active assistance<br><br>• With active guidance handles delicate bowel with appropriate care to minimize further bowel loss<br><br>• With active assistance, identifies when further discussion with a patient's family and the health care team is needed to facilitate ethical shared decision-making | • With direct supervision, provides surgical management for the postop care of an uncomplicated neonate with NEC<br><br>• With active assistance, recognizes the physiology of a neonate that can influence postop recovery<br><br>• With active assistance, discusses the ethical considerations for a neonate with significant bowel loss<br><br>• With assistance, discusses intraop findings and a plan for postop care with the multidisciplinary team<br><br>• With active assistance, discusses surgery findings with a patient's family and answers basic questions about postop care |

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# Evaluation & Management of a Patient with SIP/NEC

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| **2**<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case<br><br>Entrustment:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br><br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | • When a neonate presents with bloody stools, abdominal distension, or abdominal tenderness, performs a focused H&P, reviews diagnostic reports, and develops a differential with direct supervision<br><br>• With direct supervision, distinguishes between surgical and nonsurgical NEC and between SIP and NEC, formulates an appropriate treatment plan including appropriate resuscitation<br><br>• With direct supervision, recognizes abnormal vital signs and lab values in a neonate<br><br>• With passive assistance, recognizes and discusses potentially inappropriate intervention in NEC (eg, unnecessary laparotomy)<br><br>• Under direct supervision, can work within a multidisciplinary team to manage a neonate with NEC in a timely manner<br><br>• Under direct supervision, initiates and engages a family and the treatment team in empathetic and appropriate discussion of potential operative findings and subsequent interventions for a stable neonate with a low predicted risk of periop mortality or massive bowel loss | • With direct supervision, proceeds through the operative steps of abdominal exploration, bowel resection/anastomosis, and ostomy creation<br><br>• Places a peritoneal drain with direct supervision<br><br>• With direct supervision, handles delicate bowel with appropriate care to minimize further bowel loss<br><br>• With direct supervision, identifies when further discussion with a patient's family and the health care team is needed to facilitate ethical shared decision-making | • With indirect supervision, provides surgical management for the postop care of an uncomplicated neonate with NEC<br><br>• With direct supervision, recognizes and responds to the physiology of a neonate that can influence postop recovery<br><br>• With passive assistance, discusses the ethical considerations for a neonate with significant bowel loss<br><br>• With direct supervision, discusses intraop findings and a plan for postop care with the multidisciplinary team<br><br>• With indirect supervision, discusses surgery findings with a patient's family and healthcare team and answers questions about postop care in the uncomplicated patient |

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# Evaluation & Management of a Patient with SIP/NEC

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| 3<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>Entrustment:<br><br>The learner can perform the operation/task independently in the uncomplicated patient<br><br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | • When a neonate presents with bloody stools, abdominal distension, or abdominal tenderness, performs a focused H&P, reviews diagnostic reports, and develops a differential with indirect supervision<br><br>• With indirect supervision, distinguishes between surgical and nonsurgical NEC and between SIP and NEC, formulates an appropriate treatment plan including appropriate resuscitation<br><br>• With indirect supervision, recognizes abnormal vital signs and lab values in a neonate<br><br>• Analyzes complex situations, seeking help as needed to recognize and discuss potentially inappropriate intervention in NEC (eg, unnecessary laparotomy)<br><br>• With indirect supervision, works within a multidisciplinary team to manage a neonate with NEC in a timely manner<br><br>• Independently initiates and engages a family and the treatment team in empathetic and appropriate discussion of potential operative findings and subsequent interventions for a stable neonate with a low risk of mortality and significant bowel loss but requires passive assistance in the high risk neonate | • With indirect supervision, proceeds through the operative steps of abdominal exploration, bowel resection/anastomosis, and ostomy creation<br><br>• Places a peritoneal drain with indirect supervision<br><br>• Consistently handles bowel delicately and with indirect supervision, adapts an operative plan to manage an infant with bowel loss<br><br>• With indirect supervision, analyzes a complex situation and identifies when further discussion with a patient's family and the health care team is needed to facilitate ethical shared decision-making | • With indirect supervision, provides surgical management for the postop care of a medically complex neonate with NEC<br><br>• With indirect supervision, recognizes and responds to the physiology of a neonate that can influence postop recovery<br><br>• Analyzes a complex situation to facilitate discussion of the ethical considerations for a neonate with significant bowel loss<br><br>• With indirect supervision, discusses intraop findings and a plan for postop care with the multidisciplinary team<br><br>• Independently discusses surgery findings with a patient's family and healthcare team and answers questions about postop care in the uncomplicated patient but requires passive assistance in the complex neonate with NEC (bowel loss, short gut or prematurity) |

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# Evaluation & Management of a Patient with SIP/NEC

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| **4**<br><br>**Framework:**<br><br>The learner has a strong and indepth understanding of surgical options and techniques<br><br>Entrustment:<br><br>Can perform the operation/task independently in complicated cases<br><br>or<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently performs a focused H&P, requests and interprets appropriate investigations, and efficiently formulates a treatment plan for a critically ill neonate with suspected NEC or SIP; formulates a preop plan that incorporates patient-related factors and local resources<br><br>• Independently distinguishes between surgical and nonsurgical NEC and between SIP and NEC, formulates an appropriate treatment plan including appropriate resuscitation<br><br>• Recognizes subtle deviations in neonatal physiology that may indicate severity of disease, response to medical treatment, or failure of medical treatment to guide ongoing decision-making<br><br>• Displays understanding of the differing concepts of patient/family autonomy and potential inappropriate intervention (eg, futile treatment) in NEC totalis and independently counsels a family appropriately<br><br>• Works independently within a multidisciplinary team to manage a neonate with NEC in a timely manner<br><br>• Independently initiates and engages a family and the treatment team in empathetic and appropriate discussion of potential operative findings and subsequent interventions for an unstable | • Independently performs operative steps, including evaluation of the bowel, assessment of viability, primary anastomosis vs stomas, abdominal closure vs second look, and consideration of the need for vascular access<br><br>• Independently places a peritoneal drain<br><br>• Consistently handles bowel delicately and Independently adapts an operative plan to manage an infant with bowel loss<br><br>• Independently initiates a discussion with the family and health care team to disclose catastrophic intraop findings and reinitiates the goals of care, building on the preop consent discussion | • Independently provides ongoing surgical management and follow-up for the postop care of a neonate with complicated NEC, including management of a neonate with a peritoneal drain, stoma, or open abdomen and nutritional care<br><br>• Recognizes the postop physiology of a critically ill neonate and independently interprets when there is a role for reoperation for progressive disease or surgical complication<br><br>• Independently recognizes and leads discussions for the ethical considerations for a neonate with significant bowel loss and directs the plan for long-term follow-up and surveillance for any sequelae of NEC management<br><br>• Leads a discussion of surgery findings and a plan for postop care with the multidisciplinary team<br><br>• Independently engages the family and treatment team in a goals-of-care or quality-of-life discussion regarding a complex neonate with NEC with bowel loss/short gut syndrome in the context of other issues related to prematurity |

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# Evaluation & Management of a Patient with SIP/NEC

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| | neonate with a high predicted risk of periop mortality or massive bowel loss | | |

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# Evaluation & Management of A Pediatric Patient with Obesity

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| **Description of the Activity** | Obesity is a common condition affecting at least 14.5 million children in the United States. It is encountered by pediatric surgeons in elective and emergent care settings when treating a myriad of pediatric surgical conditions. It is now so common that pediatric bariatric surgery has become a mainstay of severe obesity treatment in childhood. The essential function of this activity is the definitive treatment of severe obesity in childhood and the recognition of how obesity affects the care of children with other pediatric surgical conditions. |
| **Functions** | ❖ Nonoperative/Preoperative<br>• Recognize the information needed to diagnose the multiple genotypes that lead to the obesity phenotype and its classification.<br>• Perform a workup as it pertains to bariatric surgery and other pediatric surgery procedures.<br>• Communicate the diagnosis and treatment options to the patient and family/caregiver(s) using patient-first language.<br>• Obtain informed consent, describing the indications, risks, benefits, alternatives, and potential complications of the planned operation, including nuances relevant to the patient's individual condition and comorbidities, and ensure familial understanding. Document the informed consent discussion in the medical record.<br>• Devise an operative plan, and communicate it to the operative team (anesthesia, nursing, techs, assistants), including patient position, anesthesia needs, special instrumentation, and postoperative planning.<br><br>❖ Intraoperative<br>• Perform bariatric surgery procedures.<br>• Recognize intraoperative complications of surgical treatment of obesity.<br>• Perform technical modifications for patients with obesity who are undergoing other pediatric surgical procedures.<br><br>❖ Postoperative<br>• Implement unique postoperative care requirements for patients with obesity.<br>• Identify short- and long-term complications of bariatric surgery and how to manage them.<br>• Recognize when to refer a patient for postoperative antiobesity medication or other subspecialty management.<br>• Recognize the need and indications for revisional surgery. |
| **Scope** | ❖ In scope<br><br>❖ Diagnoses<br>▪ Hypothalamic obesity<br>▪ Monogenic obesity<br>▪ Polygenic obesity<br>▪ Syndromic obesity |

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# Evaluation & Management of A Pediatric Patient with Obesity

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| | ❖ Procedures<br>• Laparoscopic Roux-en-Y gastric bypass<br>• Laparoscopic sleeve gastrectomy<br>• Special considerations in general surgery procedures commonly performed in patients with obesity (eg, appendectomy, cholecystectomy)<br><br>❖ Special populations<br>▪ Autism spectrum disorders associated with obesity<br><br>❖ Out of scope<br><br>❖ Diagnoses/procedures<br>▪ Adult patients<br>▪ Endoscopic therapies or other devices not approved in patients under 18<br>▪ Revisional surgery<br>▪ Single anastomosis duodenal-ileal bypass (with or without sleeve gastrectomy), biliopancreatic diversion/duodenal switch, and other malabsorptive procedures not currently used in the pediatric population |

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# Evaluation & Management of A Pediatric Patient with Obesity

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| **1**<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br><br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br><br>The attending will show and tell or the learner acts as first assistant. | • With active guidance, obtains and synthesizes essential information from a patient's medical record, H&P, and initial diagnostic evaluation to develop a treatment plan for a primary diagnosis, with consideration for how childhood obesity may impact the operative plan (e.g., VTE prophylaxis, anesthesia in patients with OSA, anti-obesity medication cessation)<br><br>• With active guidance, discusses with the patient and family how obesity impacts the primary diagnosis (e.g., biliary colic) and the surgical plan, including the option of obesity treatment before or concomitant with treatment of the primary diagnosis<br><br>• Demonstrates understanding that the pathophysiology and treatment of obesity-related conditions in children differ from those in adults<br><br>• With active guidance, uses patient-first language to communicate the diagnosis and risks and benefits of different treatment options to the family and medical team/consultants and how obesity impacts these treatment options | • With active guidance, identifies the need for changes in trocar choice (e.g., length) and placement and other appropriate MIS or open procedure instrumentation (e.g., retractor options) when impacted by obesity<br><br>• With active guidance, aids with OR setup to include additional equipment required for a patient with severe obesity (e.g., lift assist devices)<br><br>• With active guidance, discusses how the course of general abdominal or bariatric surgery procedures may differ in children with obesity<br><br>• With active guidance, identifies pitfalls for intraop complications associated with general abdominal or bariatric procedures in children with obesity, including but not exclusive to increased risk of bleeding and difficulties with exposure (e.g., insufflation pressure) | • With active guidance, implements a postop management plan for a child with severe obesity after a general abdominal procedure or bariatric surgery that includes a VTE prophylaxis plan and any additional changes to the usual postop plan based on the patient's obesity-related comorbidities<br><br>• With active guidance, demonstrates understanding of how to identify acute complications associated with children with severe obesity such as intra-abdominal bleeding, SSI, VTE, and pulmonary insufficiency, and for bariatric procedures, staple line leak, oral intolerance, biliary colic, weight regain, and bowel obstruction<br><br>• Demonstrates basic understanding of the long-term outcomes for children with obesity with or without bariatric surgery, including in special populations<br><br>• With active guidance, communicates with family/guardians/care teams to ensure postop instructions, goals, and expectations are understood<br><br>• With active guidance, uses patient-first language to discuss the health impact of childhood obesity and options for obesity treatment if available at the local institution |

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# Evaluation & Management of A Pediatric Patient with Obesity

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| 2<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case<br><br>Entrustment:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br><br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point<br><br>. | • With direct supervision, obtains and synthesizes essential information from a patient's medical record, H&P, and initial diagnostic evaluation to develop a treatment plan for a primary diagnosis, with consideration for how obesity may impact the operative plan (e.g., VTE prophylaxis, anesthesia in patients with OSA, anti-obesity medication cessation)<br><br>• With direct supervision, discusses with the patient and family how obesity impacts the primary diagnosis (e.g., biliary colic) and the surgical plan, including the option of obesity treatment<br><br>• Demonstrates basic knowledge of pathophysiology and treatment of obesity-related conditions in children and how they differ from those in adults<br><br>• With direct supervision, identifies the appropriate operative timing, approach, and technique based on the severity of the patient's obesity and current obesity-related comorbidities | • With direct supervision, changes trocar choice (length) and placement and implements other appropriate MIS or open procedure instrumentation when impacted by obesity<br><br>• With direct supervision, sets up the OR to include additional equipment required for a patient with severe obesity (e.g., lift assist devices)<br><br>• With direct supervision, progresses through the course of a general abdominal or bariatric procedure in a patient with obesity<br><br>• With direct supervision, identifies pitfalls for intraop complications associated with general abdominal or bariatric procedures, including but not exclusive to increased risk of bleeding and difficulties with exposure (e.g., insufflation pressure) | • With passive guidance, implements a postop management plan for a child with severe obesity after a general abdominal procedure or bariatric surgery that includes a VTE prophylaxis plan and any additional changes to the usual postop plan based on the patient's obesity-related comorbidities<br><br>• With passive guidance, identifies and treats acute complications associated with children with severe obesity or bariatric surgery such as intra-abdominal bleeding, SSI, VTE, and pulmonary insufficiency, and for bariatric procedures, staple line leak, oral intolerance, biliary colic, weight regain, and bowel obstruction<br><br>• Demonstrates thorough understanding of the long-term outcomes for children with obesity with or without bariatric surgery, including in special populations<br><br>• With direct supervision, uses patient-first language to communicate with family/guardians/care teams to ensure postop instructions, goals, and expectations are understood<br><br>• With direct supervision, uses patient-first language to discuss the health impact of childhood obesity and options for obesity treatment if available at the local institution |

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# Evaluation & Management of A Pediatric Patient with Obesity

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| **3**<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>Entrustment:<br><br>The learner can perform the operation/task independently in the uncomplicated patient<br><br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | • With indirect supervision, synthesizes essential information from a patient's medical record, H&P, and initial diagnostic evaluation to develop a treatment plan for a primary diagnosis, with consideration for how obesity may impact the operative plan (e.g., VTE prophylaxis, anesthesia in patients with OSA, anti-obesity medication cessation)<br><br>• With indirect supervision, discusses with the patient and family how obesity impacts the primary diagnosis (eg, biliary colic) and the surgical plan, including the option of obesity treatment before or concomitant with treatment of the primary diagnosis<br><br>• Demonstrates advanced knowledge of pathophysiology and treatment of obesity-related conditions in children and how they differ from those in adults<br><br>• With indirect supervision, identifies the appropriate operative timing, approach, and technique based on the severity of the patient's obesity and current obesity-related comorbidities | • With indirect supervision, changes trocar choice (length) and placement and implements other appropriate MIS or open procedure instrumentation when impacted by obesity<br><br>• With indirect supervision, sets up the OR to include additional equipment required for a patient with severe obesity (eg, lift assist devices)<br><br>• With indirect supervision, progresses through the course of a general abdominal or bariatric operation in a patient with obesity<br><br>• With indirect supervision, identifies pitfalls for intraop complications associated with general abdominal or bariatric procedures in children with obesity, including but not exclusive to increased risk of bleeding and difficulties with exposure (eg, insufflation pressure) | • With indirect supervision, implements a postop management plan for a child with severe obesity after a general abdominal procedure or bariatric surgery that includes a VTE prophylaxis plan and any additional changes to the usual postop plan based on the patient's obesity-related comorbidities<br><br>• With indirect supervision, identifies and treats acute complications associated with children with severe obesity or bariatric surgery such as intra-abdominal bleeding, SSI, VTE, pulmonary insufficiency, and for bariatric procedures, staple line leak, oral intolerance, biliary colic, weight regain, and bowel obstruction<br><br>• Demonstrates advanced understanding of the long-term outcomes for children with obesity with or without bariatric surgery, including in special populations<br><br>• With indirect supervision, uses patient-first language to communicate with family/guardians/care teams to ensure postop instructions, goals, and expectations are understood<br><br>• With indirect supervision, uses patient-first language to discuss the health impact of childhood obesity and options for obesity treatment if available at the local institution |

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# Evaluation & Management of A Pediatric Patient with Obesity

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| 4<br><br>**Framework:**<br><br>The learner has a strong and indepth understanding of surgical options and techniques<br><br>Entrustment:<br><br>Can perform the operation/task independently in complicated cases<br><br>**or**<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently obtains and synthesizes essential information from a patient's medical record, H&P, and initial diagnostic evaluation to develop a treatment plan for a primary diagnosis, with consideration for how obesity may impact the operative plan (eg, VTE prophylaxis, anesthesia in patients with OSA, anti-obesity medication cessation)<br><br>• Independently discusses with the patient and family how obesity impacts the primary diagnosis (eg, biliary colic) and the surgical plan, including the option of obesity treatment before or concomitant with treatment of the primary diagnosis<br><br>• Independently demonstrates comprehensive knowledge of pathophysiology and treatment of obesity-related conditions in children and how they differ from those in adults.<br><br>• Independently identifies the appropriate operative timing, approach, and technique based on the severity of the patient's obesity and current obesity-related comorbidities | • Independently implements changes in trocar choice (length) and placement and other appropriate MIS or open procedure instrumentation (retractor options) when impacted by obesity<br><br>• Independently sets up the OR to include additional equipment required for a patient with severe obesity (eg, lift assist devices)<br><br>• Independently moves through the course of a general abdominal or bariatric operation in a patient with obesity<br><br>• Independently identifies pitfalls for intraop complications associated with general abdominal or bariatric procedures in children with obesity, including but not exclusive to increased risk of bleeding and difficulties with exposure (eg, insufflation pressure) | • Independently implements a postop management plan for a child with severe obesity after a general abdominal procedure or bariatric surgery that includes a VTE prophylaxis plan and any additional changes to the usual postoperative plan based on the patient's obesity-related comorbidities<br><br>• Independently identifies and treats acute surgical complications associated with severe obesity or bariatric surgery such as staple line leak or bleeding, oral intolerance, biliary colic, weight regain, and bowel obstruction<br><br>• Demonstrates comprehensive understanding of the long-term outcomes for children with obesity with or without bariatric surgery, including in special populations<br><br>• Independently uses patient-first language to communicate with family/guardians/care teams to ensure postop instructions, goals, and expectations are understood<br><br>• Independently uses patient-first language to discuss the health impact of childhood obesity and options for obesity treatment if available at the local institution |

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# Evaluation & Management of a Trauma Patient

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| **Description of the Activity** | Trauma is a common clinical problem encountered by pediatric surgeons. The pediatric surgeon should be able to triage, diagnose, and treat injured patients and understand when local resources require consultation of additional health care providers or transfer to a higher level of care. The pediatric surgeon is expected to assess, stabilize, and treat patients in the emergency department as their condition warrants. |
| **Functions** | ❖ Trauma bay:<br>➢ Activate the trauma response based on the projected acuity of the patient as described by prehospital personnel.<br>➢ Manage the trauma bay receiving area, including room setup, equipment check (Breslow tape, guided resuscitation equipment, fluid warmers and rapid infusers, thoracotomy instrumentation and chest tube insertion sets, chest tubes, central line kits, Foley catheters, nasogastric tubes).<br>➢ Ensure the room is at a temperature regulated to receive a trauma patient and recognize the potential cold sensitivity in infants.<br>➢ Manage personnel and ensure adequate staffing, including nursing, pharmacy, and transport, for the safe management of trauma patients.<br>➢ Delegate responsibilities as necessary.<br>➢ Receive the trauma patient from emergency medical services or other transport teams with adequate debriefing of the injury mechanism and resuscitation status.<br>➢ Transfer the patient to the trauma bay, taking precautionary measures to prevent iatrogenic injury, ensure adequate pain control, and alleviate anxiety in the trauma patient using Child Life or other resources.<br><br>❖ Primary survey:<br><br>➢ Confirm patency of the patient's airway. Remove debris from the oral cavity, including loose teeth, blood, and secretions, using a chin lift or jaw thrust maneuver.<br>➢ Perform advanced airway methods such as intubation, cricothyroidotomy, or tracheostomy as necessary.<br>➢ Assess breathing by inspecting and auscultating the chest. Manage sucking chest wounds using occlusive dressing taped on 3 sides.<br>➢ Diagnose a pneumothorax by clinical findings, and confirm on chest x-ray if necessary. Decompress with a tube thoracostomy.<br>➢ Evaluate circulation by assessing capillary refill and age-appropriate heart rate and blood pressure. Establish venous access by cannulation, cut down, central venous, or intraosseous access. Activate the massive transfusion protocol if necessary.<br>➢ Perform disability assessment and prevention of secondary injury by assessing the pediatric Glasgow Coma Scale score, ensuring satisfactory oxygenation and perfusion, maintaining C-spine precaution, and using a log roll until the thoracolumbar spine can be cleared. Clear a cervical spine to allow for collar removal in an awake pediatric patient.<br>➢ Assess exposure, recognizing higher ambient temperature needs in infants and toddlers.<br>➢ Provide pain control and alleviate anxiety, using Child Life expertise if available.<br>➢ Recognize the importance of decreasing exposure to radiation in the form of unnecessary computed tomography scans and use alternate imaging modalities. |

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# Evaluation & Management of a Trauma Patient

- Use Breslow tape to determine the size of equipment to be used in resuscitation.
- Order and interpret laboratory tests and imaging (following ALARA [“as low as reasonably achievable”] protocols) based on a patient's clinical presentation.
- Perform a secondary survey. When able, obtain a history and physical, and elicit pertinent positive and negative signs and symptoms. Determine if additional diagnostic evaluation should be obtained.
- Consider history and comorbidities that can modify patient care, including:
  - Bleeding and clotting disorders
  - Chronic health conditions (cardiac history, asthma, previous surgery, cancer)
  - Differently abled children with special needs
  - Recognition of nonaccidental trauma (NAT)
- HEENT (head, eyes, ears, nose, and throat):
  - Assess for signs of severe head injury and raised intracranial pressure, bleeding from the ear, and cerebrospinal fluid otorrhea/rhinorrhea.
  - Prevent the development of secondary brain injury due to elevated intracranial pressure, hypoxia, or hypovolemia.
  - Assess ocular movement and integrity of vision, recognizing entrapment.
  - Identify fractures of nasal and facial bones, recognizing their impact on the patient’s airway. Identify Le Fort fractures.
  - Assess for fractures of the maxilla and the mandible and loose teeth.
  - Maintain C-spine precautions. Evaluate for penetrating neck injury and the integrity of the aerodigestive track as well as vascular structures in the neck.
- Chest:
  - Assess chest wall integrity and the presence of pneumothorax and sucking chest wounds.
  - Assess for flail chest and paradoxical respiration.
  - Evaluate for diaphragmatic integrity. Consider placing a nasogastric or orogastric tube after excluding base of skull injury to decompress the stomach.
  - Recognize the signs of respiratory failure due to trauma and the need for intubation.
  - Assess for signs of cardiac contusion and pericardial effusion, and obtain an electrocardiogram if there is a concern. Look for evidence of penetrating cardiac trauma.
  - Recognize the signs of major vessel injury in the chest on chest x-ray imaging.
  - Manage a hemothorax, and be aware of the need to activate the operating room if initial drainage is significant or there is ongoing drainage (e.g. based on weight parameters).

- Abdomen/pelvis:
  - Use E-FAST (Extended Focused Assessment with Sonography in Trauma) to evaluate for blood in the peritoneal cavity.
  - Examine the pelvis and perineum, and be aware of signs of urethral transection such as blood at the meatus or a floating prostate.
  - Diagnose blunt splenic trauma, with awareness of the ATOMAC (Arizona-Texas-Oklahoma-Memphis-Arkansas Consortium) protocol to decrease blood draws, start early mobilization, and discharge all patients but those with the most severe splenic trauma grades. Recognize physiological instability as a guide to intervention.

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# Evaluation & Management of a Trauma Patient

- Recognize the importance of splenic conservation in children.
- Diagnose blunt liver injury with awareness of ATOMAC guidelines in managing liver injury, including minimizing laboratory draws and performing early mobilization and discharge in all patients but those with the most severe liver trauma grades. Recognize physiological instability as a guide to intervention.
- Use interventional radiology procedures when available, such as coil and gel foam embolization in severe liver and spleen injuries that are hemodynamically stable.
- Perform nonoperative management of blunt renal injury. Document the grade and assessment of pelvicalyceal injury. Evaluate for urine leak by further imaging if necessary.
- Diagnose blunt and penetrating hollow viscus injury, and determine the need for surgical intervention.
- Diagnose open and high-grade pelvic fractures. Use a pelvic binder to reduce bleeding. Consider referral for early fixation in patients with unstable ring fractures or open fractures. Consider embolization in pelvic fractures/bleeding. Consider injury to the bladder, urethra, and pelvic vessels.
- Determine the level of care based on patient acuity (pediatric intensive care unit vs floor).
- Musculoskeletal and soft tissue injury:
  - Provide washout and antibiotics promptly for patients with open fractures.
  - Stabilize fractures to minimize pain, and perform early intervention using splints and other adjuncts as necessary and by internal or external fixation after orthopedic consultation.
  - Determine if there are associated vascular or neurological injuries, and set expectations with the family and other members of the health care team.
  - Diagnose a mangled extremity and provide wound care in the immediate setting. Employ a multidisciplinary team for limb salvage if possible.
- NAT:
  - Recognize injury patterns that are indicative of NAT, including:
    - Evidence of frequent previous injuries or healed fractures of different ages in the absence of osteogenesis imperfecta
    - Injury to the genital or perianal area
    - Multicolored bruising
    - Perioral injuries
    - Retinal hemorrhage
    - Ruptured internal viscera without antecedent trauma
    - Skull or rib fractures in children younger than 24 months
  - Ensure the safety of the child from ongoing abuse and exposure to the perpetrator.
  - Involve social work and activate child protection services or law enforcement to investigate as necessary.
  - Develop care coordination with other specialists as necessary, including a pediatric abuse specialist, ophthalmologist, child psychologist, other state agencies, and Child Life.
- Burn injury:
  - Recognize inhalation injury, and plan to secure the airway early.

# Evaluation & Management of a Trauma Patient

- Start resuscitation in patients with more than 10% body surface area (BSA) after diagnosing the percentage of BSA that is burned using the Lund and Browder chart and identifying the greater percentage allocated to facial burn.
- Start prophylactic antibiotic treatment (single dose) and tetanus toxoid if necessary.
- Recognize burn criteria that warrant transfer to a burn center, including:
  - Burn greater than 5% BSA
  - Burn involving the face, hands, feet, or perineum or over a joint
  - Circumferential burn
  - Inhalation injury or part of polytrauma
  - Nonaccidental burn
  - Electrical and chemical burns
- Use either the Brooke or Parkland formula to begin resuscitation in all children with greater than 10% BSA burns using clinical endpoints for volume resuscitation.
- Address pain control and anxiety associated with burn dressing changes.
- Optimize temperature in treatment areas, recognizing that patients with burns are predisposed to hypothermia with loss of skin integrity.
- Be aware of indications for early burn wound excision and grafting and options for skin coverage, including meshed autograft, meshed allograft, and other artificial skin substitutes.
- Recognize burn wound sepsis early, and develop a plan to manage it.

- Burn injury procedures:
  - Identify the need for and safely perform or delegate indicated bedside procedures, including but not limited to:
    - Advanced airway management
    - Application of a pelvic binder or tourniquet
    - Arterial line placement
    - Arterial puncture for arterial blood gases
    - Central line placement
    - Chest tube placement
    - Debridement and closure of skin and scalp lacerations
    - E-FAST
    - Foley catheter placement
    - Splinting/traction
    - Resuscitative thoracotomy

❖ Abdominal trauma:

- Determine the operative approach (laparoscopy versus open).
- Safely access the abdominal cavity. Control hemoperitoneum using 4-quadrant packing. Control enteral contamination by stapling or suturing.
- Communicate with the anesthesia team and operating room support staff, and allow time for resuscitation to catch up.

# Evaluation & Management of a Trauma Patient

- Perform methodical inspection of all quadrants of the peritoneal cavity, including evaluation of the retroperitoneal duodenum, and enter the lesser sac to evaluate the posterior wall of the stomach, body and neck of the pancreas, and the hilum of the spleen.
- Diagnose hollow viscus injury in patients with blunt and penetrating trauma, and manage small and large bowel injuries. Identify when to perform damage control versus anastomosis. Identify the indications for colon resection anastomosis versus colostomy.
- Manage splenic injury, and use spleen preservation techniques, including splenorraphy and partial splenectomy.
- Manage major liver injury, including concepts of hepatorrhaphy, selective debridement, selective hepatic artery ligation, perihepatic packing, and other techniques.
- Manage pancreatic and duodenal penetrating and blunt trauma using distal pancreatectomy, pyloric exclusion, triple-tube technique, and other rare procedures.
- Manage intraperitoneal and extraperitoneal bladder rupture.
- Manage retroperitoneal hematomas in blunt and penetrating injuries, recognizing the importance of classifying hematomas as midline, lateral, and pelvic retroperitoneal hematomas.
- Select sutures and close the fascia, or apply temporary abdominal closure techniques.
- Recognize injury to the kidney and pelvis, and consider additional imaging to determine interventions for urine leak such as placement of a ureteral stent.

❖ Thoracic trauma:

- Determine the operative approach (thoracoscopy vs thoracotomy).
- Position the patient for access, providing adequate padding for bony prominences. Access the thoracic cavity.
- Manage traumatic diaphragmatic injury in the setting of blunt trauma and penetrating trauma. Use suture material in repairs of the diaphragm.
- Perform resuscitative thoracotomy in exsanguinating intrathoracic hemorrhage, open cardiac massage, evacuation of tamponade, and cross-clamping of the descending aorta to allow for ongoing resuscitation in major abdominal trauma.
- Manage cardiac tamponade by ultrasound/echocardiography-guided subxiphoid drainage and placement of a pigtail catheter in the pericardial space.
- Manage tracheobronchial injuries and disruption. Demonstrate understanding of the concept of selective intubation and delayed management.

❖ Neck trauma:

- Recognize the zones of neck injury:
  - Zone 1: between the clavicles and the cricoid
  - Zone 2: between the cricoid and the angle of the mandible
  - Zone 3: superior to the angle of the mandible
- Manage zone 2 injuries that penetrate the platysma by surgical exploration, recognizing the anatomy of the neck. Expose and control vascular structures that are injured, and repair or ligate vessels as indicated. Expose the cervical esophagus, and repair esophageal injury. Repair tracheal injury. Involve other specialists as indicated.

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# Evaluation & Management of a Trauma Patient

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| | ❖ Extremity trauma:<br>➢ Develop a collaborative approach with the orthopedic and plastic surgery teams. If necessary, collaborate with the vascular surgery team.<br>➢ Manage wounds, and perform debridement with careful evaluation of viable and nonviable structures and preservation of function.<br>➢ Evaluate elevated compartment pressures, and recognize the need for fasciotomy.<br><br>❖ Transition of care:<br>➢ Recognize and triage patients with hemodynamic instability who need to be taken to the operating room immediately.<br>➢ Determine the disposition of the patient.<br>➢ Communicate a postoperative treatment plan to other health care team members, considering location, postoperative needs, outcome expectations, and follow-up. Discuss the plan with the patient's family/caregiver(s).<br>➢ Manage postoperative patient resuscitation, and determine the timing of return to the operating room for patients who have undergone damage control laparotomy.<br>➢ Anticipate and try to prevent complications that can delay recovery in a trauma patient, including secondary brain injury, pressure ulcers, and deep vein thrombosis.<br>➢ Complete a tertiary survey, and remain vigilant for potentially missed injuries. Consult with additional services based on identified associated injuries.<br>➢ Maintain awareness of the social determinants of trauma. |
| **Scope** | ❖ In scope<br><br>• Diagnoses<br>▪ Blunt trauma<br>▪ NAT<br>▪ Penetrating trauma<br><br>• Procedures<br>▪ Damage control laparotomy<br>▪ Laparoscopy<br>▪ Pericardial window<br>▪ Pericardiocentesis<br>▪ Thoracoscopy<br>▪ Trauma exploratory laparotomy |

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# Evaluation & Management of a Trauma Patient

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| | ❖ Out of scope<br><br>• Diagnoses/procedures<br>▪ Nontraumatic injury<br>▪ Patients >18 years of age |

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# Evaluation & Management of a Trauma Patient

| Level | Trauma Bay | Procedures | Transition of Care |
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| **1**<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br><br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br><br>The attending will show and tell or the learner acts as first assistant. | • With active guidance, gathers prehospital information for a stable prehospital pediatric trauma patient<br><br>• With active guidance, prepares the trauma bay with equipment and personnel for a straightforward trauma resuscitation<br><br>• With direct supervision, gathers relevant information from the patient, family and prehospital personnel, and performs an ATLS/PALS survey for a non-critically ill patient<br><br>• With direct supervision, develops a differential for a non-critically ill pediatric trauma patient<br><br>• With active guidance, orders and interprets routine diagnostic studies for a pediatric trauma patient, including radiologic and lab evaluations, exhibiting awareness of the need to limit radiation exposure in children<br><br>• With active guidance, initiates fluid resuscitation in a pediatric patient with trauma or burns; demonstrates limited awareness of risks for inhalational injury and criteria for burn center transfer<br><br>• With active guidance, recognizes when a patient may need procedural or operative intervention based on significant changes in vital signs and considers hemorrhagic shock in a hypotensive trauma patient | • With direct supervision, intervenes on a nonoperative pediatric trauma patient with straightforward problems (eg, sutures lacerations, debrides contaminated wounds, applies bandages)<br><br>• With direct supervision, performs a FAST exam when appropriate and interprets the findings<br><br>• With direct supervision, performs resuscitative trauma bay procedures (airway management, IV access, thoracostomy) in a pediatric trauma patient<br><br>• With active guidance, implements nonoperative management in pediatric solid organ trauma and recognizes when intervention in the form of IR embolization or surgery is necessary<br><br>• With active guidance, performs exploration of simple neck trauma without major vascular or aerodigestive tract penetration<br><br>• Functions as a first assistant for maximally invasive procedure such as resuscitative thoracotomy, rapid access to an abdominal cavity, cross- clamping the aorta, 4- quadrant packing, and damage control principles | • Communicates to a patient/family and healthcare team with cultural humility and provides timely updates<br><br>• Places indicated consults for a pediatric trauma patient who is not critically ill<br><br>• With active guidance, accurately documents trauma resuscitation<br><br>• Participates in trauma debriefs with active guidance<br><br>• Performs effective handoff to the healthcare team of a trauma patient who is not critically ill<br><br>• With direct supervision, initiates the process of floor/ICU admission or transition to the OR for nonemergent care of a stable patient<br><br>• With active guidance, applies national best practice guidelines for the management of a pediatric trauma patient<br><br>• With active guidance, elicits patient and family preferences and incorporates their needs into a plan for transition of care after pediatric trauma in an uncomplicated patient<br><br>• With active guidance, performs an effective handoff to a rehab unit or |

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# Evaluation & Management of a Trauma Patient

| Level | Trauma Bay | Procedures | Transition of Care |
|---|---|---|---|
| | • With active guidance, identifies social disparities in health, including the identification of children at risk for NAT | • Requires active guidance to communicate with the OR and subspecialty teams regarding the need for transition to the OR and the priorities of operative management by multiple services<br><br>• With direct supervision, performs a burn dressing change, recognizing the need for excision and grafting | home care delivery system for a patient recovering from a complex injury<br><br>• With active guidance, implements a care plan that considers the priorities of multiple injuries<br><br>• With active guidance, communicates with all health care team members and coordinates complex care plan discussions for a pediatric trauma patient<br><br>• With active guidance, identifies system factors that can impact pediatric trauma patient safety and lead to deviation from best practice guidelines |
| **2**<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case<br><br>Entrustment:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it. | • With indirect supervision, gathers prehospital information for a stable prehospital pediatric trauma patient<br><br>• With indirect supervision, prepares the trauma bay with equipment and personnel for a straightforward trauma resuscitation<br><br>• With indirect supervision, gathers relevant information from the patient, family and prehospital personnel, performs an ATLS/PALS survey for a non-critically ill patient<br><br>• With indirect supervision, develops a comprehensive differential for a non-critically ill pediatric trauma patient | • With indirect supervision, intervenes on a nonoperative pediatric trauma patient with straightforward problems (eg, sutures lacerations, debrides contaminated wounds, applies bandages)<br><br>• With indirect supervision, performs a FAST exam and interprets normal and obviously abnormal findings<br><br>• With indirect supervision, performs a trauma bay resuscitative procedure in a pediatric trauma patient such as airway management, central line, or thoracostomy<br><br>• With indirect supervision, implements nonoperative management in pediatric solid organ trauma and recognizes when | • Customizes communication to a patient/family and healthcare team about management plans, considering personal/systemic biases; addresses some elements when discussing expected outcomes and the anticipated treatment course<br><br>• Independently implements consultant recommendations and leads interdisciplinary communication in the care of a non–critically ill pediatric trauma patient<br><br>• With direct supervision, provides timely and complete communication in the medical record for members of the health care team |

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# Evaluation & Management of a Trauma Patient

| Level | Trauma Bay | Procedures | Transition of Care |
|---|---|---|---|
| The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | • With indirect supervision, orders and interprets routine diagnostic studies for a pediatric trauma patient, including radiologic and lab evaluations, exhibiting awareness of the need to limit radiation exposure in children<br>• With indirect supervision, initiates fluid resuscitation in a pediatric patient with trauma or burns, recognizes inhalational burn injury, and demonstrates knowledge of the criteria for burn center transfer<br>• With passive guidance, recognizes when a patient may need procedural or operative intervention based on significant changes in vital signs and considers hemorrhagic shock in a hypotensive trauma patient<br>• With indirect supervision, identifies social disparities in health, including the identification of children at risk for NAT | intervention in the form of IR embolization or surgery is necessary<br>• With indirect supervision, performs exploration of simple neck trauma without major vascular or aerodigestive tract penetration<br>• With direct supervision performs maximally invasive procedure such as resuscitative thoracotomy, rapid access to an abdominal cavity, cross- clamping the aorta, 4- quadrant packing, and damage control principles<br>• With direct supervision, manages communication with the OR and subspecialty teams regarding the need for transition to the OR and the priorities of operative management by multiple services<br>• With indirect supervision, performs a burn dressing change, recognizing the need for excision and grafting | • With direct supervision, leads the trauma debrief process<br>• With direct supervision, communicates with all pediatric trauma team members regarding next steps in trauma management<br>• With direct supervision, initiates the process of floor/ICU admission or transition to the OR for nonemergent care of a stable patient<br>• With passive guidance, applies national best practice guidelines for the management of a pediatric trauma patient and considers priorities of multiple injuries<br>• With indirect supervision, elicits patient and family preferences and incorporates their needs into a plan for transition of care after pediatric trauma in an uncomplicated patient<br>• With direct supervision, performs an effective handoff to a rehab unit or home care delivery system for a patient recovering from a complex injury<br>• With direct supervision, implements a care plan that considers the priorities of multiple injuries<br>• With direct supervision, communicates with all health care team members and coordinates complex care plan |

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# Evaluation & Management of a Trauma Patient

| Level | Trauma Bay | Procedures | Transition of Care |
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| | | | discussions for a pediatric trauma patient<br>• With direct supervision, identifies system factors that can impact pediatric trauma patient safety and lead to deviation from best practice guidelines |
| **3**<br><br>**Framework:**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not understand the nuances of a complicated case<br><br>Entrustment:<br><br>The learner can perform the operation/task independently in the uncomplicated patient<br><br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | • With indirect supervision, gathers information from a prehospital provider or OSH information for a critically ill pediatric trauma patient<br>• With indirect supervision, prepares the trauma bay with equipment and personnel for resuscitation of a critically ill pediatric trauma patient<br>• With indirect supervision, gathers all relevant clinical information and performs ATLS/PALS on a critically injured pediatric trauma patient using an evidenced-based protocolized approach<br>• With indirect supervision, develops a comprehensive differential for a critically ill pediatric trauma patient<br>• With indirect supervision, orders and interprets all diagnostic studies, including radiologic and lab evaluations, for a pediatric trauma or NAT patient, exhibiting awareness of the need to limit radiation exposure and blood draws<br>• With indirect supervision, initiates fluid resuscitation in a pediatric patient with | • With indirect supervision, intervenes on a nonoperative trauma patient with more complex problems (eg, venous access by cutdown or IO access, splinting, pelvic binder application)<br>• With indirect supervision, performs a FAST exam and identifies subtle anomalies, adjusting technique and considering patient-specific factors and mechanism of injury<br>• With indirect supervision, performs a complex pediatric resuscitative bedside procedure using resources like pediatric sedation protocols and child life (eg, airway management, central line placement and tube thoracostomy)<br>• With indirect supervision, implements nonoperative management in pediatric solid organ trauma and initiates intervention in the form of IR embolization or surgery as necessary<br>• With indirect supervision, repairs major aerodigestive tract injury and adjacent | • Communicates patient care information with cultural humility to the family and healthcare team of a complex pediatric trauma patient<br>• Independently implements consultant recommendations and leads interdisciplinary communication in the care of a critically ill pediatric trauma patient<br>• With indirect supervision, provides timely and complete communication in the medical record for members of the health care team<br>• Provides feedback to team members about performance and independently leads the debrief process (ICS2 L3, P3 L3, SBP2 L3)<br>• With indirect supervision, communicates with all team members regarding the next steps in trauma and NAT; involves social services and other state resources in addressing the safety of the injured patient |

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# Evaluation & Management of a Trauma Patient

| Level | Trauma Bay | Procedures | Transition of Care |
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| | trauma or burns, secures the airway in inhalational injury, and articulates the criteria for burn center transfer<br><br>● With indirect supervision, recognizes when a pediatric trauma patient needs an operative or procedural intervention by responding to subtle changes in vital signs and initiates a massive transfusion protocol when indicated<br><br>● With indirect supervision, recognizes and individualizes care for at-risk pediatric trauma patients, including patients experiencing burns, NAT, and social disparities in health | vascular injury in major head and neck trauma<br><br>● Requires indirect supervision for a maximally invasive procedure such as resuscitative thoracotomy, rapid access to an abdominal cavity, cross-clamping the aorta, 4-quadrant packing, and damage control principles<br><br>● With indirect supervision, manages communication with the OR and subspecialty teams regarding the need for transition to the OR and the priorities of operative management by multiple services<br><br>● With indirect supervision, performs burn wound excision and grafting | ● With indirect supervision, initiates floor/ICU admission or transition to the OR for a complex pediatric trauma patient<br><br>● With indirect supervision, applies national best practice guidelines to address a pediatric trauma patient's comprehensive needs and analyzes outcomes<br><br>● With indirect supervision, elicits patient and family preferences and incorporates their needs into a plan for transition of care after pediatric trauma in a complicated patient<br><br>● With indirect supervision, performs an effective handoff to a rehab unit or home care delivery system for a patient recovering from a complex injury<br><br>● With indirect supervision, implements a care plan that considers the priorities of multiple injuries<br><br>● With indirect superivsion, clearly communicates with all health care team members and coordinates complex care plan discussions for a pediatric trauma patient<br><br>● With indirect supervision, identifies system factors that can impact pediatric trauma patient safety and attempts to |

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# Evaluation & Management of a Trauma Patient

| Level | Trauma Bay | Procedures | Transition of Care |
|---|---|---|---|
| | | | mitigate deviation from best practice guidelines |
| **4**<br><br>**Framework:**<br><br>The learner has a strong and indepth understanding of surgical options and techniques<br><br>Entrustment:<br><br>Can perform the operation/task independently in complicated cases<br><br>or<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently synthesizes prehospital data and leads a trauma team for a pediatric trauma patient<br><br>• Independently prepares the trauma bay with equipment and personnel for a pediatric trauma patient<br><br>• Independently gathers all relevant clinical information and performs ATLS/PALS for a pediatric trauma patient using an evidence-based protocolized approach that individualizes care and recognizes when deviation from protocol is necessary; identifies missed injuries<br><br>• Independently develops a comprehensive differential for a critically ill pediatric trauma patient<br><br>• Independently orders and interprets diagnostic studies for a pediatric trauma patient or NAT patient, limiting cross-sectional imaging, using alternative imaging technology to decrease radiation exposure, and limiting blood draws<br><br>• Independently initiates fluid resuscitation in a pediatric patient with trauma or burns, secures the airway in inhalational injury, and initiates burn center transfer as indicated | • Leads and independently intervenes on a nonoperative trauma patient with complex problems<br><br>• Independently adjusts technique to perform and interpret a FAST exam, considering patient-specific factors and mechanism of Injury<br><br>• Independently performs a bedside resuscitative procedure, requiring passive assistance for maximally invasive procedures such as resuscitative/clamshell thoracotomy or cross-clamping the aorta)<br><br>• Independently implements nonoperative management in pediatric solid organ trauma, including intervention in the form of IR embolization or surgery as necessary<br><br>• Independently performs neck exploration/endoscopy, requiring assistance with corrective procedures in major neck trauma<br><br>• Independently performs maximally invasive procedures, such as resuscitative thoracotomy, rapid access to an abdominal cavity, cross-clamping the aorta, 4-quadrant packing, and damage control principles | • Empathetically delivers emotionally difficult news (eg, changes to the operative plan, adverse outcome, end-of-life discussion) to a patient and family with cultural humility, negotiating conflicts with the patient/family or health care team and facilitating goals-of-care discussions<br><br>• Coordinates and leads the identification and placement of indicated consults and integrates recommendations for a pediatric trauma patient<br><br>• Independently reviews and provides feedback about documentation in the medical record<br><br>• Leads trauma debriefs and provides counseling when necessary<br><br>• Independently coordinates the transfer of a patient to a long-term or home care setting and effectively navigates barriers for a NAT victim or a patient with limited social and economic resources<br><br>• Leads and coordinates admission to the floor/ICU or transition to the OR for all trauma patient |

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# Evaluation & Management of a Trauma Patient

| Level | Trauma Bay | Procedures | Transition of Care |
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| | • Independently manages all aspects of a critically ill pediatric trauma patient, including initiation of a massive transfusion protocol<br><br>• Independently recognizes and individualizes care for at-risk pediatric trauma victims, including patients experiencing burns, NAT, and social disparities in health | • Manages communication with the OR and subspecialty teams regarding the need for transition to the OR and the priorities of operative management by multiple services<br><br>• Independently manages burns and burn wound sepsis by burn wound excision and grafting, with awareness of skin replacement options | • Critically appraises evidence and integrates national best practice guidelines in local management protocols, tailoring recommendations to a pediatric trauma patient<br><br>• Independently elicits patient and family preferences and incorporates their needs into a plan for transition of care after pediatric trauma in a complicated patient<br><br>• Independently performs an effective handoff to a rehab unit or home care delivery system for a patient recovering from a complex injury<br><br>• Independently implements a care plan that considers the priorities of multiple injuries in a critically ill patient<br><br>• Independently maintains clear communication in high-stress situations with health team members and provides constructive feedback to supervisors<br><br>• Independently Identifies system factors that can impact pediatric trauma patient safety and mitigates deviation from best practice guidelines |

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# Assessment & Resuscitation of an Unstable Patient

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| **Description of the Activity** | The pediatric surgeon needs to develop the ability to manage unstable pediatric surgical patients, covering critical areas such as diagnosis; initial resuscitation; sepsis management; and preoperative, perioperative, and postoperative care. |
| **Functions** | ❖ Initial assessment<br>➢ Perform a focused history and physical examination, including pertinent positives and negatives.<br>➢ Identify the important points in the patient's history, physical examination, medical records, and existing diagnosis to assess the primary surgical problem and illness severity.<br>➢ Identify if the patient is in shock, and determine the type of shock.<br>➢ Interpret vital signs, and monitor devices accurately.<br>➢ Recognize that an unstable patient could have secondary postoperative complications, such as infection, bleeding, and organ dysfunction.<br>➢ Determine the goals of care with the family/caregiver(s) and the health care team.<br><br>❖ Resuscitation<br>➢ Stabilize and resuscitate the patient using antibiotics, blood products, and cardiopulmonary support.<br>➢ Assess and manage the airway, breathing, and circulation of a pediatric surgical patient in critical condition.<br>➢ Execute pediatric-specific resuscitation protocols, including pediatric advanced life support (PALS) and advanced trauma life support (ATLS).<br>➢ Remain skilled in administering vasopressor support, antibiotics, blood products, and fluids.<br>➢ Prevent secondary organ injury using protective lung ventilation and avoiding nephrotoxic medications and early enteral feeding.<br>➢ Provide sedation and analgesia.<br>➢ Monitor and manage hyperglycemia.<br>➢ Make quick, informed decisions under pressure to stabilize the patient.<br>➢ Determine if a subspecialty or more experienced consultation is indicated.<br><br>❖ Adjunctive procedures<br>➢ Ensure informed consent as indicated, including appropriate audiovisual support for comprehension and allotted time for questions and concerns.<br>➢ Identify the indications for pediatric airway management, including intubation.<br>➢ Recognize the indications for placement of arterial lines, central venous lines for resuscitation and continuous renal replacement therapy, and pigtail or chest tubes.<br>➢ Perform high-quality cardiopulmonary resuscitation, and use defibrillation.<br>➢ Perform thoracentesis, paracentesis, bronchoscopy, and endoscopy. |

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| | ➢ Identify the need for source control, and consider surgical interventions early as appropriate (eg, abscess drainage, laparotomy).<br>➢ Consider adjunct therapies such as extracorporeal life support (ECLS) for refractory septic shock, diuresis, continuous renal replacement therapy, and, potentially, intravenous immunoglobulin in a neonate.<br>❖ Post resuscitation<br>➢ Monitor endpoints of resuscitation, and reassess the patient to modify the treatment plan and optimize stabilization.<br>➢ Recognize and manage common perioperative problems or complications, including:<br>▪ Fluid, electrolyte, or renal system abnormalities<br>▪ Hematologic system abnormalities<br>▪ Hemodynamic instability and its underlying causes<br>▪ Infection or immune system dysfunction<br>▪ Issues with the gastrointestinal/hepatobiliary systems<br>▪ Metabolic, nutritional, or endocrine system abnormalities<br>▪ Neurologic system abnormalities<br>▪ Respiratory failure<br>➢ Organize the handover of care to the most appropriate health care provider or health care setting.<br>➢ Communicate patient-specific needs to the health care team.<br><br>❖ Sepsis management<br>➢ Recognize, diagnose, and manage sepsis in pediatric surgical patients.<br>➢ Implement pediatric sepsis guidelines effectively, including timely antibiotic administration and fluid resuscitation.<br>➢ Identify the need for escalation of care, including appropriate ionotropic support. |
| **Scope** | ❖ In scope<br><br>• Diagnoses<br>▪ Cardiogenic shock<br>▪ Hemorrhagic shock<br>▪ Neurogenic shock<br>▪ Septic shock<br>▪ Respiratory distress/insufficiency<br>• Procedures<br>▪ Intubation, bronchoscopy, endoscopy, laparotomy, arterial catheter<br><br>❖ Out of scope<br><br>• Diagnoses/procedures<br>▪ Trauma patients |

# Assessment & Resuscitation of an Unstable Patient

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| | ▪ ECLS cannulation (see specific ECLS EPA)<br>▪ Vascular access (e.g. central venous catheter, hemodialysis catheter) – see specific EPA<br>• Special populations<br>▪ Preterm patients (younger than a gestational age of 36 weeks) |

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# Assessment & Resuscitation of an Unstable Patient

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| 1<br><br>**Framework:**<br><br>The learner demonstrates understanding of information and has basic skills<br><br>What a new pediatric surgery fellow should know<br><br>Entrustment:<br><br>The attending will show and tell or the learner acts as first assistant. | • With active guidance, obtains a detailed H&P, reviews diagnostic reports, and formulates a differential that includes both medical and surgical problems<br><br>• With active guidance, makes patient-specific decisions regarding approach, admission, and disposition in a time-sensitive manner in a routine situation<br><br>• With direct supervision, identifies the need for resuscitation of a critically ill neonate (eg, NEC), considers ventilatory management (e.g. CDH), and recognizes the signs and symptoms of sepsis<br><br>• Demonstrates basic knowledge of the common pediatric and neonatal pathophysiology of critical illness<br><br>• With active assistance, applies evidence-based guidelines in pediatric critical care<br><br>• Establishes a professional rapport with a patient, family, and the health care team in a clear and understanding manner; with active assistance, discusses goals for shared decision-making | • With direct supervision, ensures informed consent for a common pediatric procedure in the ICU, including appropriate audiovisual support for comprehension and allotted time for questions and concerns<br><br>• Demonstrates knowledge of the indications for pediatric airway management, including intubation<br><br>• Demonstrates knowledge of the indications for placement of arterial lines, central venous lines (for resuscitation and CRRT), and pigtail or chest tubes in a critically ill pediatric patient<br><br>• With direct supervision, identifies the need for and the appropriate timing of source control or surgical intervention | • With direct supervision, monitors endpoints of resuscitation and reassesses the patient to modify the treatment plan and optimize stabilization<br><br>• Demonstrates basic knowledge of reporting patient safety events in the pediatric critical care setting<br><br>• Demonstrates basic knowledge of the health needs and disparities of critically ill pediatric surgical patients<br><br>• With direct supervision, makes a plan with a patient and their family, considering personal biases and patient and family values, goals, and preferences in treatment options in an uncomplicated clinical scenario<br><br>• With active assistance, delivers the handover of care of a straightforward patient to the most appropriate physician or health care setting, communicating patient-specific needs to the health care team |
| 2<br><br>**Framework:**<br><br>The learner demonstrates understanding of the steps | • With direct supervision, obtains a detailed H&P, reviews diagnostic reports, and formulates a differential that includes both medical and surgical problems | • With indirect supervision, ensures informed consent for a common pediatric procedure in the ICU, including appropriate audiovisual support for | • With indirect supervision, monitors endpoints of resuscitation and reassesses the patient to modify the |

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# Assessment & Resuscitation of an Unstable Patient

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| of the operation but requires direction through principles and does not know the nuances of a basic case<br><br><u>Entrustment</u>:<br><br>The learner can use the tools but may not know exactly what, where, or how to do it.<br><br>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point | • With direct supervision, makes patient-specific decisions regarding approach, admission, and disposition in a time-sensitive manner in a routine situation<br><br>• With indirect supervision, identifies the need for resuscitation of a critically ill neonate (eg, NEC), considers appropriate initial management and ventilatory management (CDH), and identifies the need for further modification of the management plan based on the patient's response to treatment<br><br>• Demonstrates understanding of and describes the common pediatric and neonatal pathophysiology of critical illness<br><br>• With passive assistance, applies evidence-based guidelines in pediatric critical care<br><br>• With passive assistance, participates in a multidisciplinary approach to shared decision-making, including family meetings, to align values, goals, and preferences with treatment options to make a personalized care plan | comprehension and allotted time for questions and concerns<br><br>• Under direct supervision, performs common pediatric airway management procedures, including intubation<br><br>• Under direct supervision, places arterial lines, central venous lines (for resuscitation and CRRT), and pigtail or chest tubes in a critically ill pediatric patient<br><br>• With indirect supervision, identifies the need for and the appropriate timing of source control or surgical intervention | treatment plan and optimize stabilization<br><br>• Demonstrates understanding of and describes important aspects of reporting patient safety events in the pediatric critical care setting<br><br>• Demonstrates understanding of and describes the health needs and disparities of critically ill pediatric surgical patients<br><br>• With indirect supervision, makes a plan with a patient and their family, considering personal biases and patient and family values, goals, and preferences in treatment options in an uncomplicated clinical scenario<br><br>• With passive assistance, delivers the handover of care of a straightforward patient to the most appropriate physician or health care setting, communicating patient-specific needs to the health care team |
| **3**<br><br>**<u>Framework:</u>**<br><br>The learner has a good understanding of surgical options and techniques but does not recognize abnormalities and does not | • With indirect supervision, obtains a detailed H&P, reviews diagnostic reports, and integrates information to design a management plan for medical and surgical diagnosis<br><br>• With indirect supervision, makes patient-specific decisions regarding approach, | • With indirect supervision, ensures informed consent for a complex pediatric procedure in the ICU, including appropriate audiovisual support for comprehension and allotted time for questions and concerns | • With indirect supervision, monitors endpoints of resuscitation and reassesses the patient to modify the treatment plan and optimize stabilization, adapting the plan of care when the patient does not respond |

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# Assessment & Resuscitation of an Unstable Patient

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
|---|---|---|---|
| understand the nuances of a complicated case<br><br>Entrustment:<br><br>The learner can perform the operation/task independently in the uncomplicated patient<br><br>or<br><br>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves | admission, and disposition in a time-sensitive manner in a complex or stressful situation<br><br>• With indirect supervision, identifies and initiates medical management and resuscitation of a critically ill neonate (eg, NEC); initiates ventilatory management (CDH); recognizes the signs and symptoms of sepsis and establishes appropriate initial management, modifying the management plan based on the patient's response to treatment<br><br>• Demonstrates basic knowledge of the complex pediatric and neonatal pathophysiology of critical illness<br><br>• With passive assistance, applies evidence-based guidelines in pediatric critical care and recognizes the current limitations of uncertain or conflicting evidence<br><br>• Establishes a culturally sensitive and therapeutic relationship with a medically complex patient or a socially complex family and compassionately communicates the disease-specific risks and benefits of a planned procedure and prognosis | • With indirect supervision, performs common pediatric airway management procedures, including intubation<br><br>• With indirect supervision, places arterial lines, central venous lines (for resuscitation and CRRT), and pigtail or chest tubes in a critically ill pediatric patient<br><br>• With indirect supervision, develops a plan for source control and considers the appropriate timing for surgical intervention | • With indirect supervision in the ICU setting, helps create, implement, and assess quality improvement initiatives at the institutional level<br><br>• With indirect supervision, coordinates changes and adaptations to critically ill patient care to provide for the needs of specific pediatric surgical populations<br><br>• With indirect supervision, makes a plan with a patient and their family, considering personal biases and patient and family values, goals, and preferences in treatment options in a complex clinical scenario<br><br>• With passive assistance, organizes the handover of care of a critically ill patient in a crisis situation to the most appropriate physician or health care setting, clearly communicating patient-specific needs to the health care team |
| 4<br><br>**Framework:**<br><br>The learner has a strong and indepth understanding of | • Independently integrates information with patient-specific factors to design a succinct diagnostic workup and management plan for a critically ill neonatal or pediatric surgical patient | • Independently ensures informed consent for a complex pediatric procedure, including appropriate audiovisual support for comprehension and allotted time for questions and concerns | • Independently monitors endpoints of resuscitation and reassesses the patient to modify the treatment plan and optimize stabilization, adapting the plan of care when the patient does not respond |

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# Assessment & Resuscitation of an Unstable Patient

| Level | Nonoperative/Preoperative | Intraoperative | Postoperative |
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| surgical options and techniques<br><br>Entrustment:<br><br>Can perform the operation/task independently in complicated cases<br><br>or<br><br>The attending may need to provide indirect supervision or suggestions in the context of extremely rare or severely complicated cases | • Independently makes patient-specific decisions regarding approach, admission, and disposition in a time-sensitive manner, recognizing the limitations of the health care system<br><br>• Independently individualizes ongoing critical care management and assesses the response to therapy, including the need for advanced ventilatory management, monitoring the endpoints of resuscitation and adapting management as indicated<br><br>• Demonstrates comprehensive understanding of the components of pediatric and neonatal pathophysiology of critical illness<br><br>• Critically appraises and applies evidence to guide care, even in the face of uncertain or conflicting evidence, tailoring it to the patient and family<br><br>• Leads a multidisciplinary approach and uses shared decision-making, including family meetings, to align values, goals, and preferences with treatment options to make a personalized care plan | • Independently manages pediatric airways, including intubation, ventilatory settings, and modes<br><br>• Independently identifies the need for and performs necessary adjunct procedures in a critically ill pediatric patient (eg, arterial lines, central lines, cutdowns, chest tubes, drains)<br><br>• Independently performs source control and plans the appropriate timing for surgical intervention | • In an ICU setting, leads quality improvement initiatives at the institutional level<br><br>• Independently anticipates, formulates, and coordinates changes and adaptations of critically ill patient care to provide for the needs of specific pediatric surgical populations<br><br>• Independently makes a plan with a patient and their family, considering personal biases and patient and family values, goals, and preferences in treatment options in a complex clinical scenario<br><br>• Independently organizes the handover of care of a critically ill patient in a crisis situation to the most appropriate physician or health care setting, clearly communicating patient-specific needs to the health care team |