



Evaluation and Management of an Infant with an Inguinal Hernia

Description of the Activity	<p>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.</p>
Functions	<ul style="list-style-type: none">❖ Nonoperative/Preoperative<ul style="list-style-type: none">➤ Synthesize information from a patient's referring providers, medical records, history, physical examination, and diagnostic evaluations to develop a differential diagnosis.➤ Determine whether surgery is indicated and the optimal timing for intervention.➤ Recognize complications of an inguinal hernia that require an emergency operation.➤ Select a safe anesthetic and surgical approach that is consistent with the patient's diagnosis, corrected gestational age, and comorbidities.➤ Obtain appropriate preoperative consultation with the anesthesia, cardiology, neonatology, or other teams as dictated by the infant's comorbidities.➤ Synthesize an operative plan that demonstrates understanding of the operative anatomy, physiology, indications, contraindications, risks, benefits, alternatives, and potential complications of:<ul style="list-style-type: none">▪ Communicating hydrocele▪ Femoral hernia▪ Inguinal hernia▪ Recurrent inguinal hernia• 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).➤ If necessary, identify the appropriate substitute decision-maker or caregiver, and ensure caregiver comprehension using applicable language services and audio/visual aids as required.➤ Ensure that the family/caregiver has an opportunity to ask questions, and address any expressed concerns.➤ Document the consent process.❖ Intraoperative<ul style="list-style-type: none">➤ Manage the perioperative environment, including room setup, equipment check, preprocedural time-out, counts, wound classification, and debriefing functions.➤ Perform the procedures required to manage an infant with an inguinal hernia:<ul style="list-style-type: none">▪ Position the patient, and ensure availability of relevant equipment, including laparoscopic equipment if applicable.▪ Ask for the correct instruments and sutures.



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	<ul style="list-style-type: none">▪ Visualize tissue planes, and identify and dissect relevant normal and abnormal anatomy.▪ Perform operative steps efficiently.➤ Integrate new information discovered intraoperatively to modify the surgical plan or technique in patients with:<ul style="list-style-type: none">▪ Concomitant cryptorchidism▪ Femoral hernia▪ Hernia containing nonviable bowel▪ Need for laparotomy or laparoscopy▪ No hernia sac identified▪ No vas deferens▪ Sliding inguinal hernia▪ Unexpected gonads➤ Recognize and manage intraoperative complications (eg, transection of vas deferens, intraoperative bleeding, tear or loss of control of sac).➤ 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.❖ Postoperative<ul style="list-style-type: none">➤ Initiate and oversee postoperative care, including postoperative disposition and the possible need for apnea monitoring.➤ Communicate with the family/caregiver(s) and members of the health care team to ensure an understanding of the postprocedure instructions.➤ Recognize and manage common complications following inguinal hernia repair in an infant:<ul style="list-style-type: none">▪ Damage to vas deferens▪ Hematoma▪ Hernia recurrence▪ Seroma/reactive hydrocele▪ Testicular ischemia
Scope	<ul style="list-style-type: none">❖ In scope<ul style="list-style-type: none">• Diagnoses<ul style="list-style-type: none">○ Direct inguinal hernia○ Indirect inguinal hernia○ Recurrent inguinal hernia○ Sliding hernia○ Femoral hernia○ Communicating hydrocele



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- 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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Level	Nonoperative/Preoperative	Intraoperative	Postoperative
<p style="text-align: center;">1</p> <p>Framework:</p> <p>The learner demonstrates understanding of information and has basic skills</p> <p>What a new pediatric surgery fellow should know</p> <p>Entrustment:</p> <p>The attending will show and tell or the learner acts as first assistant.</p>	<ul style="list-style-type: none"> 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 Recognizes an incarcerated inguinal hernia With active guidance, reduces an incarcerated hernia Demonstrates understanding of the basic anatomy of the inguinal canal and limited knowledge of the embryology of a patent processus vaginalis Needs assistance to identify the timing of premature infant inguinal hernia repair Discusses the diagnosis of inguinal hernia with the patient's family and answers basic questions but requires active assistance to obtain informed consent 	<ul style="list-style-type: none"> With active assistance, performs basic steps of infant indirect inguinal hernia repair, including identification of the sac, vessels, and vas deferens and high ligation With active guidance, performs infant inguinal hernia repair in the setting of prematurity or , recurrent, incarcerated, or sliding hernias With active assistance, recognizes unexpected intraop complications, including injury to the sac, vas deferens, testicle, or testicular vessels 	<ul style="list-style-type: none"> With active guidance, coordinates a plan to monitor for postop complications such as apnea, hydrocele, hematoma, and recurrence With active guidance, discusses surgery findings and answers a family's basic questions about short- and long-term postop care
<p style="text-align: center;">2</p> <p>Framework:</p> <p>The learner demonstrates understanding of the steps of the operation but requires direction through principles and does not</p>	<ul style="list-style-type: none"> 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 With direct supervision, distinguishes an inguinal hernia, hydrocele, and incarcerated inguinal hernia 	<ul style="list-style-type: none"> With direct supervision, performs basic steps of infant indirect inguinal hernia repair, including identification of the sac, vessels, and vas deferens and high ligation With direct supervision, performs infant inguinal hernia repair in the setting of prematurity or recurrent, incarcerated, or sliding hernias 	<ul style="list-style-type: none"> With direct supervision, identifies postop complications such as apnea, reactive hydrocele, hematoma, and recurrence (PC9 L2) 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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<p>know the nuances of a basic case</p> <p><u>Entrustment:</u></p> <p>The learner can use the tools but may not know exactly what, where, or how to do it.</p> <p>The attending gives active help throughout the case to maintain forward progression or may need to take over the case at a certain point</p>	<ul style="list-style-type: none"> • With direct supervision, reduces an incarcerated hernia and initiates surgical management • Describes the surgical anatomy of the inguinal canal and demonstrates knowledge of the embryology of a patent processus vaginalis leading to inguinal hernia/hydrocele • Identifies the timing of premature infant inguinal hernia repair to minimize anesthetic-related complications • Conducts all the elements of an informed consent process for a patient with an uncomplicated inguinal hernia and documents the process with direct supervision 	<ul style="list-style-type: none"> • With direct supervision, recognizes unexpected intraop complications, including injury to the sac, vas deferens, testicle, or testicular vessels 	
<p>3</p> <p><u>Framework:</u></p> <p>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</p> <p><u>Entrustment:</u></p> <p>The learner can perform the operation/task</p>	<ul style="list-style-type: none"> • With indirect supervision, performs a focused H&P, reviews diagnostic reports, and develops a differential that includes both medical and surgical problems • With indirect supervision distinguishes an inguinal hernia, hydrocele, and incarcerated inguinal hernia • With indirect supervision reduces an incarcerated hernia and initiates surgical management • Describes the anatomy of the inguinal canal including anatomic variations and demonstrates knowledge of the 	<ul style="list-style-type: none"> • Performs an indirect inguinal hernia repair in an infant, including identification of the sac, vessels, and vas deferens and high ligation • With indirect supervision, performs infant inguinal hernia repair in the setting of prematurity or recurrent, incarcerated, or sliding hernias. • With indirect supervision, recognizes and manages unexpected intraop complications, including injury to the sac, vas deferens, testicle, or testicular vessels 	<ul style="list-style-type: none"> • With indirect supervision, identifies postop complications such as apnea, reactive hydrocele, hematoma, and recurrence and initiates management (PC9 L3) • 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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<p>independently in the uncomplicated patient</p> <p>or</p> <p>The attending provides passive/indirect supervision/suggestions in the complicated patient but still allows the learner to perform the operation/task themselves</p>	<p>embryology of a patent processus vaginalis leading to inguinal hernia/hydrocele</p> <ul style="list-style-type: none"> Identifies the timing of infant inguinal hernia repair and considerations for management of concomitant cryptorchidism Conducts all the elements of an informed consent process for a patient with an uncomplicated inguinal hernia with indirect supervision and documents the process 		
<p>4</p> <p><u>Framework:</u></p> <p>The learner has a strong and in-depth understanding of surgical options and techniques</p> <p><u>Entrustment:</u></p> <p>Can perform the operation/task independently in complicated cases</p> <p>or</p> <p>The attending may need to provide indirect supervision or suggestions in the</p>	<ul style="list-style-type: none"> 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 Independently distinguishes an inguinal hernia, hydrocele, and incarcerated inguinal hernia Independently reduces an incarcerated inguinal hernia and initiates surgical management Independently predicts the anatomic variations associated with complex hernias, which may include incarcerated, sliding, and recurrent hernias or those associated with abdominal wall defects Independently plans the operative approach for an infant with a hernia and 	<ul style="list-style-type: none"> Independently identifies a missing vas deferens or aberrant gonadal anatomy during hernia repair and manages with appropriate consultation if indicated Independently performs infant inguinal hernia repair in the setting of prematurity or recurrent, incarcerated, or sliding hernias (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 	<ul style="list-style-type: none"> Independently assesses for and manages postop complications following repair of a neonatal hernia requiring bowel resection or orchidopexy 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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context of extremely rare or severely complicated cases	<p>coincidental cryptorchidism, taking into account corrected gestational age; uses current evidence to decide the timing of inguinal hernia repair in a premature infant</p> <ul style="list-style-type: none">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)		