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Evaluation and Management of a Patient with a Congenital Lung Lesion

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 ○ During the prenatal consultation: ○ Obtain maternal history and fetal imaging. ○ Perform fetal risk stratification. ○ Use current scoring systems to assess severity of disease such as the congenital pulmonary airway malformation (CPAM) volume ratio (CVR). ○ Outline a prenatal surveillance strategy (eg, evaluate second-trimester growth, CVR) and delivery plan. ○ Discuss indications for fetal intervention based on the CVR (steroids, surgery). ○ Communicate predicted postnatal risk outcomes to the family and members of the multidisciplinary care team. ○ Assist in determining when referral to a specialized center is indicated. ○ 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. ○ Complete a cost-effective, evidence-based diagnostic evaluation. ○ Obtain appropriate imaging directed at operative planning. ○ Identify the appropriate operative timing, approach, and technique based on patient diagnosis and clinical stability. ○ Determine which patients require intervention in the neonatal period versus those who are stable enough to undergo elective operative intervention. ○ Determine when a patient would benefit from a minimally invasive versus an open approach. ○ 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 ○ Manage the perioperative environment, including room setup, equipment check, preprocedural time-out, specimen processing, counts, wound classification, updating the family, and debriefing. ○ 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. ○ Confirm the availability of necessary equipment (staplers, energy devices, clip appliers, ties, extra equipment for conversion to open approach).

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

Scope	❖ In scope
	
	• Diagnoses
	  ○ Bronchogenic cyst
	  ○ Bronchopulmonary sequestration
	  ○ Congenital lobar emphysema
	  ○ Congenital lung lesion
	  ○ CPAM
	
	• Procedures
	  ○ Open pulmonary lobectomy
	  ○ Thoracoscopic nonanatomic resection

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

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1 **Framework:** The learner demonstrates understanding of information and has basic skills What a new pediatric surgery fellow should know. **Entrustment:** 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 • 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 • 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) • With active guidance, describes the indications and contraindications for MIS • Demonstrates basic knowledge of relevant thoracic or respiratory anatomy, physiology, and development • 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) • 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 • With active guidance, identifies trocar placement and appropriate instrumentation for MIS • 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) • With active guidance, recognizes and manages a common intraop complications	• With direct supervision, manages routine chest tube care and infant-specific analgesia • Communicates a routine postop plan and the expected course to other members of the health care team • Identifies the rationale for long-term management, with specific diagnoses managed nonoperatively (e.g., CLE, certain CPAMs)

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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 **Framework** 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. **Entrustment:** 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 • 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 • 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) • With direct supervision, recognizes if a patient is an appropriate candidate for MIS • Demonstrates comprehensive knowledge of relevant thoracic or respiratory anatomy, physiology and development, and relevant clinical implications • 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 • With direct supervision, identifies trocar placement and appropriate instrumentation for MIS • 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) • With direct supervision, recognizes and manages common intraop complications	• With indirect supervision, manages routine chest tube care and infant-specific analgesia • 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 • Describes a general long-term management plan with specific diagnoses managed nonoperatively (CLE, certain CPAMs)

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	delivers medical information, identifying complex barriers to effective communication (e.g., health literacy, cultural differences) • 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 **Framework:** 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 **Entrustment:** The learner can perform the operation/task independently in the uncomplicated patient or 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 • 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 • 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) • 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 • With indirect supervision, manages trocar placement and appropriate instrumentation for MIS • With indirect supervision, manages critical portions of the procedure (e.g., division of incomplete fissure, ligation of key vascular structures, closure of bronchus) • 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 • 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 • 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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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 • 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 • 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 **Framework:** The learner has a strong and indepth understanding of surgical options and techniques **Entrustment:** Can perform the operation/task independently in complicated cases or	• Independently interprets prenatal diagnostic information and formulates an appropriate delivery and postnatal surgical plan with active participation in prenatal consultation • 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 • 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 • Independently manages trocar placement and appropriate instrumentation for MIS • Independently manages critical portions of the procedure (e.g., division of incomplete fissure, ligation of key vascular structures, closure of bronchus) • Independently recognizes and manages common intraop complications	• Independently manages a chest tube with and without air leak and infant-specific analgesia • 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 • Independently integrates patient- and family-specific factors in the construction of an evidence-based long-

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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 • Independently incorporates knowledge of relevant thoracic or respiratory anatomy, physiology and development to medical decision-making • 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 • 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