



PEDIATRIC SURGERY *Update**

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Anorectal Myectomy

In 1964 Lynn devised a surgical procedure for short segment Hirschsprung's disease (HD). This procedure was later utilized for chronic idiopathic constipation not associated with Hirschsprung's disease and for children who suffered from anal sphincteric achalasia after a pull-through procedure. A rectal biopsy is warranted in cases of chronic constipation to determine the presence or absence of ganglion cells. The biopsy can be performed using a suction biopsy tool in children less than three months of age, while a full-thickness biopsy might be needed for children above six months of age. Thus, will determine if the child has aganglionosis or not. The anorectal myectomy consists of an outpatient procedure. Dissection of the internal sphincter from the mucosa and external sphincter is performed in the intersphincteric plane. The dissection is extended proximally for five to 7 centimeters. Excision of one-centimeter-wide strip of the internal sphincter muscle is performed for the length of the dissection. Barium enema suggests the presence of ultra-short segment HD but may not precisely indicate the extent of the disease and in some children a constricting segment may not be demonstrable. Confirmation will only take place after a rectal biopsy is performed. If after anorectal posterior myectomy for HD there is no relief of symptoms, then the child will need a major procedure for cure. Anal stricture and incontinence have been reported as complications of myectomy. The advantage of this operation is its relatively simplicity and in addition serves as both diagnostic and therapeutic. Internal anal sphincter achalasia is a clinical condition with a presentation similar to HD. The diagnostic criteria for anorectal sphincter achalasia are based on anorectal manometry showing absence of the recto-inhibitory reflex associated with a normal rectal biopsy. Anorectal sphincter achalasia reflects the failure of relaxation of the internal sphincter. The exact pathogenesis and pathophysiology of internal sphincter achalasia is not fully understood. Patients present with constipation and soiling with or without abdominal distension. Nutritional support, laxatives and enemas are the first line of treatment of chronic constipation associated with achalasia of the sphincter and approximately 85% of cases could improve or cure by conservative medical management. Due to an inadequate response to medical treatment of constipation other children are selected for surgery. Anorectal myectomy relieves more than 60% of patients with chronic refractory constipation associated with internal sphincter achalasia. In children with internal anal sphincter achalasia, posterior anorectal myectomy of the internal sphincter is a more effective treatment option when compared with intrasphincteric Botox injection. Anorectal myectomy is an effective and safe procedure in patients suffering from persistent chronic constipation despite medical treatment. Is also the definitive treatment for children and adults with ultrashort-segment Hirschsprung's disease.

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Vaping Lung Injury

Electronic cigarettes are alternative tobacco products that deliver nicotine without the tobacco smoke. They are devices that produce an aerosol by heating a liquid that contains a solvent (vegetable glycerin, propylene glycol) on one of several flavoring with or without nicotine. Each device structurally comprises four components: a battery, a reservoir for the liquid, a vaporizing chamber with a heating element and a mouthpiece for inhalation. Evaporation of the liquid during heating followed by rapid cooling forms the aerosol which after inhaled is term "vaped". This method of smoking is less harmful as compared with cigarette use since it's not associated with inhalation of combustible products of tobacco which is more carcinogenic. While most e-cigarettes deliver nicotine and a flavoring agent, many contain cannabis-based compounds used as a substitute for traditional marijuana. Vaping use has increased significantly between high school and middle school students. Vaping has been associated with increase odds of myocardial infarction, thermal injury due to explosions, seizures, and psychosocial effects due to addiction. Lately electronic cigarettes have been associated with significant lung injury (EVALI = electronic vaping associated lung injury), with most cases in teenage and young adult males. Vaping generates harmful carbonyl compounds such as formaldehyde, acrolein and acetaldehyde implicated in the development of oxidative stress and release of inflammatory mediators causing airway epithelial injury. Most associated vaping lung injury involves THC, the active ingredient in marijuana and vitamin E acetate which is used a diluent. Vitamin E acetate when heated and aerosolized produce ketene, an extreme irritant of airways further propagating inflammation. Common respiratory symptoms found in these patients include shortness of breath, cough, pleuritic chest pain and hemoptysis. Gastrointestinal symptoms of nausea and abdominal pain, associated with fever and chills are reported in most cases. This inflammation can progress to hypoxemic respiratory failure decreasing oxygen saturation. Mechanical ventilation will be required in 15-30% of these patients. Chest films and CT-Scans show bilateral hazy or consolidate opacity with lower lobe or centrilobular ground glass nodule appearance. Pleural effusions are rarely seen. Vaping associated lung injury (EVALI) is a diagnosis of exclusion with the case definition being a history of vaping within 90 days of symptom onset, abnormal imaging, and absence of an alternative diagnosis such as infection. An infectious workup should be performed in all cases.

Bronchoscopy with bronchoalveolar lavage with transbronchial biopsy should be performed to exclude other causes of injury. Pathology of specimen shows organizing pneumonia, diffuse alveolar damage, lipoid pneumonia, acute fibrinous pneumonitis, or a combination of these patterns. Cytology of alveolar lavage reveals foamy macrophages and pneumocyte vacuolization. Lab's evaluation reveals leukocytosis, elevated inflammatory markers, and elevated lactate dehydrogenase levels. Management consists of antibiotics, steroids, high-flow oxygen therapy, mechanical ventilation, and extracorporeal membrane oxygenation. Prognosis is excellent in young patients with most improving after a week of therapy. Due to the alarming number of EVALI cases a public crisis has been declared.

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Clavien-Dindo Classification

The Clavien-Dindo classification (CDC) is a standardized system for the registration of surgical complications. It was initially based in three definitions of different outcomes after surgery: failure to cure, sequelae and complications, completed by a system ranking complications according to severity. Clavien focused on grading the severity of complications based on the therapeutic consequence required to manage the complication. The classification can be seen in the Table below. There are five grades of evaluation of a surgical complication. Grade 1 includes any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic, or radiological intervention. Acceptable therapeutic regimens include drugs as antiemetics, antipyretics, analgesics, diuretics, and electrolytes. This grade includes wound infections opened bedside. Grade II includes requiring pharmacologic treatment with drugs other than those allowed for Grade 1 complications. Grade II complications are those that result in deviations from the normal postoperative course including unplanned or additional clinic or office visits that can be managed as outpatients without additional invasive, radiographic, or surgical procedures. This includes wound infections, transient nerve injury, deep-vein thrombosis necessitating anticoagulation. Grade III requires surgical, endoscopic, or radiological intervention. Grade III is subdivided further into III-A if intervention does not require general anesthesia, and Grade III-B if the intervention requires general anesthesia. Grade IV is a life-threatening complication, including CNS complication or requiring intensive care management. Grade IV is subdivided into Grade IV-A if it involves single organ dysfunction (including dialysis) and Grade IV-B if it includes multiorgan dysfunction. Grade V is death of a patient. A suffix "d" is added to each grade if the patient suffers a complication at the time

of discharge. The label indicates the need for follow-up to fully evaluate the complication. Clavien-Dindo Grade II is the most represented complication overall accounting for almost 20% of all patients. The CDC can be applied to patients who have undergone elective and emergency surgery during the first 30 postoperative days. Complication rates during emergency cases are higher than in elective procedures. Complications are higher in neonates than in another pediatric group. The advantage of this system is that all possible adverse events are included. The Clavien-Dindo grading system while widely used in general, transplantation and orthopedic surgery, it has been sporadically used in pediatric surgery to identify complications related to jejunal feeding, after repair of congenital duodenal obstruction, after Nuss procedure, after ileostomy and colostomy procedures, and after transanal endorectal pull-through for Hirschsprung's disease. The most recurring complication in pediatrics using the CDC is wound infection and post-appendectomy fluid collection/abscess. A high complication rate after enterostomy formation in children with motility disorders was identified using the CDC. Virtually all current general surgical publications with morbidity as an outcome measure use the Clavien-Dindo classification.

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APPENDIX A. Classification of Surgical Complications	
Grades	Definition
Grade I:	Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic and radiological interventions. Acceptable therapeutic regimens are: drugs as antiemetics, antipyretics, analgetics, diuretics and electrolytes and physiotherapy. This grade also includes wound infections opened at the bedside.
Grade II:	Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included.
Grade III:	Requiring surgical, endoscopic or radiological intervention
Grade III-a:	intervention not under general anesthesia
Grade III-b:	intervention under general anesthesia
Grade IV:	Life-threatening complication (including CNS complications) [‡] requiring IC/ICU-management
Grade IV-a:	single organ dysfunction (including dialysis)
Grade IV-b:	multi organ dysfunction
Grade V:	Death of a patient
Suffix 'd':	If the patient suffers from a complication at the time of discharge (see examples in Appendix B, http://Links.Lww-.com/SLA/A3), the suffix "d" (for 'disability') is added to the respective grade of complication. This label indicates the need for a follow-up to fully evaluate the complication.

[‡] brain hemorrhage, ischemic stroke, subarachnoidal bleeding, but excluding transient ischemic attacks (TIA); IC: Intermediate care; ICU: Intensive care unit
www.surgicalcomplication.info

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