

Pediatric Endoscopy and High-risk Patients

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LEADING THE QUEST

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No relevant disclosures



Complication rates

- EGD complication rate: 2.3%
 - Respiratory (1.5%)
 - Bleeding (0.3%)
- Colonoscopy: 1.1%

Types of complications

- Cardiopulmonary compromise
- Bleeding
- Perforation
- Infection

Cardiopulmonary and sedation-related risks

Patients with compromised cardiopulmonary function

- Infants < 1-year of age
- Congenital heart disease
 - Eg: Tetralogy of fallot, hypoplastic left heart
- Pulmonary hypertension
- Cystic fibrosis
- Muscular dystrophy
- Obesity
- Acute respiratory illness

Airway compromise

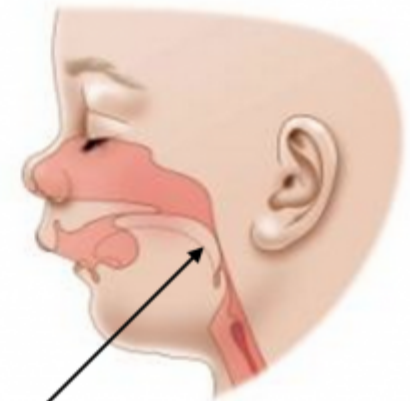
- Congenital craniofacial abnormalities
 - Large tongue
 - High or narrow palate
 - Short neck
 - Thick neck

• Examples

- Trisomy 21 (Down syndrome)
- Treacher Collins syndrome
- Pierre-Robin sequence



Micrognathia - a small jaw with a receding chin



Tongue that is large compared to the jaw, resulting in airway obstruction

Bleeding-related risks

- PEDS-CORI data, 2008
 - EGD risk: 0.3% (>10,000 EGDs)
 - Colonoscopy risk: 0.43% (>8,000 colonoscopies)
 - Does not report post-procedure bleeding, therefore bleeding risk may be underestimated
- Kramer et al, 2016
 - All procedures: 0.11%

Patients at higher-risk of bleeding

- Cystic fibrosis (Stenbit, 2008. Wiehe 2010)
- Children with leukemia post-BMT*
 - High risk of duodenal hematoma
 - Lead to anemia and duodenal obstruction
- End-stage liver disease
- Diseases of coagulation
- Children taking antithrombotic medications

*Ramakrishna, 1997; Lipson, 1996; Grasshof, 2012

Thresholds for endoscopy

- Similar to adults (Krishna, 2014 ASGE Standards of Practice Committee).
 - Platelet counts
 - >20,000 for performing endoscopy without biopsies
 - >50,000 for performing endoscopy with biopsies

Perforation-related risks

- Technical aspects:

- Endoscope-to-patient size mismatch - using a large(r) endoscope for a small child.

- Patient factors:

- Inflammatory bowel disease

- Stricture disease
- Patients on corticosteroids

- Genetic conditions

- Ehlers-Danlos syndrome type IV (connective tissue disease)*
- Epidermolysis bullosa[^] (easy blistering of skin and mucous membranes)

*Stillman 1991; Allaparthi 2013; Burcharth 2012; Yoneda 2014

[^]Van Den Heuvel 2013; Vowinkel 2015

Infection-related risks

- Endoscope-related transmission of infections: 1 in 1.8 million (Kimmery et al, 1993).
 - 1988 – 1992: 28 cases of endoscopy-related infections over 40 million endoscopies. Prior reports of 251 cases of infections.
 - Factors associated with underreporting:
 - Under recognition of endoscopy-related infections
 - Asymptomatic transmissions/infections
 - Infections with long incubation period
 - Under-reporting of infections. Infections not always publicly reported.
 - Scientific, peer-review articles
 - Manufacturer and User-Facility Device Experience (MAUDE) database
 - Media reports

Patients with increased infection risks

- Congenital and acquired heart disease
 - Antibiotic coverage for enterococci (amoxicillin or ampicillin)

TABLE 2. Cardiac conditions in which periprocedural antibiotic prophylaxis may be considered because of high risk for poor outcome from infective endocarditis (90)

Previous history of infectious endocarditis

Cardiac valve repair utilizing prosthetic materials

Cardiac transplantation recipients who develop cardiac valvulopathy

Congenital heart disease (CHD) with any of the following:

Unrepaired cyanotic CHD, including palliative shunts and conduits

Completely repaired CHD when prosthetic material or device during the first 6 months following placement.

Repaired CHD when residual defects at the site or adjacent to the site of a prosthetic patch or device

Patients with increased infection risks

- Immunocompromised children
 - Chemotherapy
 - Neutropenic patients
 - Immunosuppression medications (e.g. transplant patients)
 - Cirrhotic children undergoing band ligation (lack of data)
- Not all patient's on immunosuppression medications need antibiotics (e.g. IBD patients, asplenic patients)
- Data: No increase infection rates in children with cancer and post-BMT who underwent upper or lower endoscopy (Buderus 2012; Bianco 1990).

Procedures with increased risk of infections

- Percutaneous endoscopic gastrostomy (PEG) tube placement
 - Peristomal rate 4 – 7% (Fortunato 2010; McSweeney 2013; Rox 1997).
 - Higher infection rates in children with malignancy and neutropenia
 - Prophylactic antibiotic (cefazolin) recommended.
- ERCP and EUS – no pediatric specific guidelines.
 - Avoid fluoroquinolones in children (arthropathy and damage to developing cartilage).

Pre-procedure checklist

TABLE 4. Sample preprocedure checklist for patients undergoing endoscopy

Consideration	Y/N	Potential impact on procedural planning
Premature infant <60 wk gestation or term infant <45 days old	<input type="checkbox"/> Yes <input type="checkbox"/> No	May affect location of procedure (eg, hospital, not ambulatory surgical center); postprocedural admission for monitoring
Difficult airway	<input type="checkbox"/> Yes <input type="checkbox"/> No	May affect sedation planning
BMI >35	<input type="checkbox"/> Yes <input type="checkbox"/> No	May affect location of procedure and sedation planning
Cardiac disease	<input type="checkbox"/> Yes <input type="checkbox"/> No	May affect location of procedure, sedation planning, need for prophylactic antibiotics.
Guardianship/social services involved	<input type="checkbox"/> Yes <input type="checkbox"/> No	May impact planning for informed consent
Diabetes/endocrinopathy	<input type="checkbox"/> Yes <input type="checkbox"/> No	May affect procedure timing (ie, schedule as first procedure) and/or glucose monitoring
Hematologic/oncologic	<input type="checkbox"/> Yes <input type="checkbox"/> No	May affect need for prophylactic antibiotics; need for blood products to be available prn
Hypo/hypertonia	<input type="checkbox"/> Yes <input type="checkbox"/> No	May affect sedation planning
Neurologic/seizure disorder/ventilatory status	<input type="checkbox"/> Yes <input type="checkbox"/> No	May affect sedation planning
Psych issues/anxiety	<input type="checkbox"/> Yes <input type="checkbox"/> No	May affect sedation planning; pre-procedural approach; recovery
Renal/metabolic	<input type="checkbox"/> Yes <input type="checkbox"/> No	May affect procedure timing (ie, schedule as first procedure) and/or glucose monitoring
Respiratory/pulmonary/asthma	<input type="checkbox"/> Yes <input type="checkbox"/> No	May affect sedation planning
Short bowel syndrome	<input type="checkbox"/> Yes <input type="checkbox"/> No	May affect procedure planning
Other medical issues	<input type="checkbox"/> Yes No	If yes, specify issue and impact on procedural planning:

Pediatric Endoscopy and High-risk Patients: A Clinical Report From the NASPGHAN Endoscopy Committee

Jenifer R. Lightdale, Quin Y. Liu, Benjamin Sahn, David M. Troendle, Mike Thomson, and Douglas S. Fishman, on behalf of the NASPGHAN Endoscopy and Procedures Committee

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