Diarrhea, Acute and Chronic

Michelle Braunfeld

Risk
- Incidence in USA: 200–300 million new cases/y of acute, with >900,000 hospital admissions
- Chronic: 1–5% of population; increasing with age; female at greater risk than male
- Acute: Male and female equivalent

Perioperative Risks
- Hypovolemia with hemodynamic instability
- Electrolyte abnormalities, especially hypokalemia
- Acid-base abnormalities: May be non–anion gap acidosis or alkalosis, depending on underlying cause

Worry About
- Chronic
  - Underlying disease, especially iatrogenic (e.g., infection with antibiotic-induced diarrhea, end-stage liver disease with lactulose-induced diarrhea, or disaccharide [usually lactose] intolerance)
  - Hormone-producing tumors (e.g., carcinoid, VIPomas, gastrinomas)
  - Vitamin K malabsorption with coagulopathy
  - Extraintestinal manifestations of IBD (e.g., deforming arthritis, cholangitis)
  - Stress-steroid therapy in IBD
  - Psychologic symptoms in up to 50% of pts with IBS; often alternates with constipation
  - Postsurgical losses that may drain via ileostomy or fistula or may be due to inadequate bowel absorption secondary to resection (short bowel syndrome)
- Acute
- Viral, bacterial, or protozoan disease

Overview
- Acute: Abrupt onset of loose stools in healthy individual: Viral—Self-limited, 1–3 d, causing changes in small intestinal cells with a shortened transit time; bacterial—Tends to occur in groups of individuals (if within 12 h of a meal, usually due to preformed toxin); protozoan—Prolonged watery diarrhea from contaminated water supply in endemic area.
- Chronic: Too-frequent passage of stools that are too loose for too long; >200 g/day of stool for >4 wk.
- Multifactorial medical problem that requires supportive therapy and attention to the underlying etiology.
- Only one in a spectrum of medical problems associated with an underlying disease or with treatment of disease. Supportive therapy includes fluid and lyte repletion and attention to acid-base balance.
- Toxic megacolon: Extreme manifestation of inflammatory or infectious bowel disease is a surgical emergency. Pts often septic.

Etiology
- Chronic:
  - Osmotic: Laxatives, indigestible carbohydrates
  - Secretory: Hormone-producing tumors
  - Exudative: IBD, pseudomembranous colitis
  - Decreased mucosal contact/mixing: Short bowel syndrome, IBS, hypermotility secondary to vagotomy, diabetic neuropathy
  - Malabsorption: Pancreatic exocrine insufficiency, celiac disease, Whipple disease, small-bowel bacterial overgrowth
- Acute
  - Viral or bacterial (with or without toxin) or protozoan (see Overview)

Usual Treatment
- Volume and electrolyte replacement, including Na^+, K^+, $PO4^-$, Mg^{2+}.
- Although acid-base correction often follows above, may occasionally need replacement.
- Seek and treat underlying cause.

Assessment Points

System	Effect	Assessment by Hx	PE	Test
CV	Hypovolemia	Postural symptoms, quantitation of bowel movements	Orthostatic changes Narrow pulse pressure Tachycardia Dry mucous membranes	
	Dysrhythmia secondary to electrolyte abnormalities			ECG
RESP	Compensatory hyperventilation			ABG
METAB	Derangement dependent on underlying cause			Lab values include Ca^{2+}, Mg^{2+}, K^+, HCO_3^-; Na^+
RENAL	Prerenal azotemia			BUN/Cr
CNS	Profound electrolyte abnormality		Range from drowsiness to obtundation	
	Anemia—can be acute or chronic from acute GI losses or chronic disease state	Melena or hematochezia	Stool guaiac	Hct

Key References: Cataldo R, Potash M: Atropine as a treatment of diarrhea after celiac plexus block, *Anesth Analg* 83(5):1131–1132, 1996; DuPont HL: Persistent diarrhea. JAMA 315(24):2712-2723, 2016.

Perioperative Implications

Preoperative Preparation
- Assess volume status, lytes, and acid-base status.
- Repletion.

Monitoring
- Consider arterial and central venous cath (or some other fluid status monitor such as TEE) if significant hypovolemia and CV compromise present.

Airway
- May require full-stomach precautions

Induction
- Hemodynamic instability and decrease drug dosage if not repleted.
- Sympatholytic drugs and sympathectomy with regional anesthesia can shorten transit time and increase diarrhea.

Maintenance
- Tailor IV fluids to lyte and acid-base status (e.g., avoid normal saline if pt already has hyperchloremic acidosis).
- Continue lyte repletion if necessary.

Extubation
- Routine; dependent on underlying condition

Adjustments
- Acid-base status and lytes may affect muscle relaxant duration and ability of antagonists to reverse block.

Anticipated Problems/Concerns
- Most operations do not affect underlying condition; narcotics can make diarrhea less problematic, but use with caution in severe IBD because they may promote toxic megacolon.
- Regional anesthesia that causes sympathectomy leaves parasympathetic system unopposed, which can cause shortened transit time and increase diarrhea.

DiGeorge Syndrome

Andrea Johnson

Risk
- 1:4000 births with variable penetrance

Worry About
- Cardiac anomalies
- Immunodeficiency and poor wound healing
- Palatal anomalies
- Hypocalcemia
- Seizures
- Difficult mask/intubation

Overview
- Chromosome deletion 22q11.2.
- Classic triad: Conotruncal cardiac anomalies, hypoplastic thymus, and hypocalcemia.
- Clinical phenotype varies with mild-to-severe forms of immunodeficiency.
- Most cases are diagnosed in infancy, but Dx in adulthood is not uncommon.

Etiology
- Heterozygous versus homozygous deletion of 22q11.2
- Usually inherited from maternal genome

Usual Treatment

- Cardiac surgery
- Vitamin D (cholecalciferol and calcitriol), calcium supplementation
- Parathyroid hormone therapy
- BMT or thymic grafts (complete DiGeorge syndrome)
- Irradiated transfusion products
- IV Ig therapy
- Antibiotic prophylaxis

Assessment Points

System	Effect	Assessment by Hx	PE	Test
CNS	Language and motor developmental delay	Failure to meet milestones	Speech or language delay	Physical exam
HEENT	Palatal laryngotracheal anomalies Facial dysmorphism	Difficulty feeding Nasal regurgitation	Cleft palate Hypotonia Hypernasal speech, micrognathia	CT Barium swallow study
CV	Conotruncal cardiac defects(interrupted aortic arch, truncus arteriosus, TOF, ASD, VSD, vascular rings)	Failure to thrive Cyanosis Dyspnea	Cyanosis, heart murmur, dyspnea, dysphagia	ECHO, CT
RESP	Asthma (atopic)	Dyspnea	Wheezing	PFT
MS	Scoliosis Rheumatoid arthritis	Asymmetric spine, painful joints	Asymmetry of spine, joint inflammation	Radiographs
HEME	Hypoplastic/aplastic thymus Immunodeficiency Severe combined immunodeficiency Autoimmune disease	Recurrent URIs, otitis media, opportunistic infections Thyroiditis Rheumatoid arthritis Recurrent bleeding	Symptoms of PNA, otitis media, sinus infections or severe immunodeficiency Symptoms of hypothyroid/hyperthyroid Symmetric degenerative joint disease	CXR Ig levels: Increased IgE, decreased IgA, decreased CD^{3+} Decreased or increased TSH, T^3,T^4 X-ray of affected joints CBC: Decreased platelets
ENDO	Hypocalcemia	Stiffness or twitching	Tetany	Increased phosphorus, decreased Ca^{2+} Decreased PTH

Key References: Seroogy CM: DiGeorge (22q11.2 deletion) syndrome: clinical features and diagnosis. Stiehm ER, TePas E, editors. Waltham, MA, 2015, UpToDate; Hauk PJ, Johnston RB, Liu AH, et al.: Immunodeficiency. In Hay WW Jr, Levin MJ, Deterding RR, et al, editors: *Current diagnosis & treatment: pediatrics, ed 22,* New York, NY, 2013, McGraw-Hill.

Perioperative Management

Preoperative Considerations

- BMP, Ca^{2+}, Phos, CBC, CD^{3+} count
- Type and cross irradiated blood products prn
- Review imaging and cardiac studies
- Reverse isolation precautions prn

Monitoring

- Standard ASA monitors.
- Arterial, central line prn.
- Consider preop calcitriol and intraop Ca^{2+}, as well as phosphate; premedicating with calcitriol and calcium can prevent intraop hypocalcemia.

General Anesthesia

- All IV, arterial, and central access placed under sterile technique
- Anticipate difficult mask/intubation scenario.

Regional Anesthesia

- Difficult neuraxial anesthesia placement due to scoliosis.
- Caution in pts with thrombocytopenia.
- Consider increased risk for developing infection at site of injection.

Postoperative Period

- Poor wound healing.
- Increased infection risk.
- Continue to monitor lytes; stress can precipitate a hypocalcemic crisis.

Anticipated Problems/Concerns

- High infection risk
- Lyte imbalances
- Airway/facial anomalies necessitating FO or video laryngoscopy
- Cardiac defects with shunting lesions

Dilated Cardiomyopathy

Frank W. Dupont

Risk

- DCM is a largely irreversible form of heart muscle disease, with an estimated prevalence of 1:2500; it is the third most common cause of CHF and most frequent cause for heart transplantation.
- DCM leads to progressive CHF, ventricular and supraventricular arrhythmias, conduction system abnormalities, thromboembolism, and sudden or heart failure–related death.
- Marked limitation of exercise capacity is a reliable predictor of mortality.

Perioperative Risks

- Increased periop morbidity and mortality, particularly in high-risk surgery cases:
  - CHF exacerbation
  - Renal failure
  - Systemic or pulm embolization from dislodged intracardiac thrombi

Worry About

- Autonomic instability
- Malignant tachydysrhythmias
- Worsening LV systolic and/or diastolic function, RV dysfunction

Overview

- Syndrome characterized by dilatation and impaired systolic function of left, right, or both ventricles with normal ventricular wall thickness
- LV systolic (decreased EF) and diastolic dysfunction (noncompliant ventricle), RV dysfunction; possibly pulm Htn and AV valvular regurgitation
- High risk of sudden cardiac death

Etiology

- Cause of idiopathic DCM remains unclear, but several pathophysiologic mechanisms have been implicated: genetic and familial factors, inflammatory and infectious factors, cytotoxicity, cell loss, and abnormalities in endogenous repair.

Usual Treatment

- Medical interventions primarily based on CHF treatment with diuretics, ACEI, ARB, vasodilators, and β-adrenergic receptor–blocking agents; anticoagulants for thromboembolic prophylaxis; ICD implantation for management of tachyarrhythmias and CRT for dyssynchrony
- Surgical treatment for refractory end-stage CHF: LVAD placement, heart transplant